

# **Physical activity and mental health in adolescence**

**–a longitudinal study in a multiethnic cohort**

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## Summary

Public health discussions of physical activity's positive health effects have tended to focus on physical health benefits rather than mental health benefits. Mental health problems are a worldwide public health burden. Among adults some evidence suggests that physical activity is a protective factor in relation to mental health problems. The same body of literature is not present among adolescents.

With regard to prevention of mental health problems it is important to identify vulnerable groups that need special attention. If physical activity can be a preventive strategy, knowledge of physical activity in subgroups of adolescents is important. With an increasing influx of immigrants to the Western parts of the world, cultural/ethnic background has become an important factor when studying health and health behaviour in a public health perspective. Inequality in health has also been a subject of increased attention during the last years, thus it is of great importance to study the significance of sociodemographic factors.

### Objectives:

The main objective of this thesis was to study physical activity and mental health in a multiethnic cohort of adolescents.

The specific aims were:

- To study how physical activity in boys and girls at age 15–16 were associated with mental health three years later (Paper I).
- To compare mental health and physical activity between adolescents with ethnic Norwegian and ethnic minority background aged 15-16 years followed for three years, while taking gender and sociodemographic factors into account (Paper II and III).
- To identify subgroups lost at three-years of follow-up and investigate the magnitude and direction of possible selection bias (Paper IV).

**Materials and Methods:**

The youth part of The Oslo Health Study constitutes the baseline of the self-reported longitudinal sample used in paper I, II and III. The information was collected in schools in 2001 ( $n = 3811$ ). In 2004, the follow-up study (Youth 2004) was conducted partly in school and partly by mail. A total of 2489 (1112 boys and 1377 girls) (65% of participants at baseline) participated in the follow-up, and 20% of the participants in Oslo had an ethnic minority background. In paper IV, participants from the youth part of The Hedmark Health Study (2001) were also included, of these 1939 adolescents 827 (43%) participated in Youth 2004.

Mental health was measured by the Strengths and Difficulties Questionnaire (SDQ) and The Hopkins Symptom Checklist (HSCL-10). Physical activity level was measured by a question about weekly hours of physical activity outside of school. Ethnic background and sociodemographic variables were both measured by self-report and by data received from Statistics Norway.

**Results:**

We found a weak inverse association between weekly hours of physical activity at age 15 and emotional- and peer problems three years later in boys. In girls, the associations did not persist after adjustments (paper I).

Overall, girls reported more symptoms of mental health problems than boys. At both age 15 and 18 years, ethnic minorities reported more mental health problems than ethnic Norwegians of the same sex. No ethnic disparities were found for mean change in mental health during these three years, and the current sociodemographic factors were not differently associated with changes in mental health between the ethnic groups (paper II). Boys were more physically active than girls. Ethnic Norwegian girls were more physically active than their ethnic minority counterparts, thus ethnic minority girls were least physically active. Among boys, no difference in physical activity was found between ethnic Norwegians and ethnic minorities. There was a consistent reduction in physical activity from 15 to 18 years in all groups, and sociodemographic factors were only marginally associated with this reduction (paper III).

Non-western ethnicity, male gender and characteristics related to low social class and general- and mental health problems measured at baseline, were associated with lost to

follow-up. Lost to follow-up had marginal impact on the association measures (prevalence ratios) in the present study (IV).

**Conclusions:**

Physical activity was associated with some aspect of mental health problems in boys. Ethnic minorities reported more mental health problems than ethnic Norwegians. Ethnic minority girls were least physically active. These findings encourage search for further knowledge about physical activity as a possible protective factor in relation to mental health problems in adolescents. Further research should acknowledge the distinctive characteristics of subgroups of gender and ethnicity and investigate both mental health and physical activity, and the association between these aspects in subgroups.

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Oslo, December 2009

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## List of papers

### Paper I

Sagatun Aa, Sogaard A-J, Selmer R, Bjertness E, Heyerdahl S, **The association between weekly hours of physical activity and mental health. -A three-year follow up study of 15/16-years old pupils in the city of Oslo, Norway.** *BMC Public Health* 2007;12(7):155.

### Paper II

Sagatun Å, Lien L, Sogaard A-J, Bjertness E, Heyerdahl S. **Ethnic Norwegian and ethnic minority adolescents in Oslo, Norway. A longitudinal study comparing change in mental health.** *Social Psychiatry and Psychiatric Epidemiology* 2008;43(2):87-95.

### Paper III

Sagatun Å, Kolle E, Anderssen SA, Thoresen M, Sogaard AJ. **Three year follow-up of physical activity in two ethnic groups of Norwegian youth: associations with socio-demographic factors.** *BMC Public Health* 2008;22(8):419.

### Paper IV

Bjertness E, Sagatun Å, Green K, Lien L, Sogaard AJ, Selmer R. **Response rates and selection problems, with emphasis on mental health variables and DNA-sampling, in large population based cross-sectional and longitudinal studies of adolescents in Norway.** [submitted] *BMC Public Health*



## Contents

<b>SUMMARY</b> .....	<b>I</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>IV</b>
<b>LIST OF PAPERS</b> .....	<b>VI</b>
<b>1.0 BACKGROUND</b> .....	<b>1</b>
<b>2.0 INTRODUCTION</b> .....	<b>2</b>
2.1 PHYSICAL ACTIVITY AND MENTAL HEALTH AMONG ADOLESCENTS.....	3
2.1.1 Possible mechanisms of the associations between physical activity and mental health.....	5
2.2 MENTAL HEALTH AMONG ADOLESCENTS.....	7
2.3 PHYSICAL ACTIVITY AMONG ADOLESCENTS.....	8
<b>3.0 OBJECTIVE</b> .....	<b>10</b>
<b>4.0 MATERIAL AND METHODS</b> .....	<b>11</b>
4.1 DATA COLLECTION.....	11
4.1.1 The youth part of The Oslo Health Study.....	11
4.1.2 The youth part of The Hedmark Health Study.....	11
4.1.3 Youth 2004.....	12
4.2 STUDY SAMPLES.....	13
4.3 VARIABLES.....	15
4.3.1 Mental Health.....	16
4.3.2 Physical activity.....	20
4.3.3 Other lifestyle factors.....	20
4.3.4 General health.....	21
4.3.5 Ethnicity.....	21
4.3.6 Sociodemographic variables.....	22
4.3.7 Other variables.....	22
4.4 ETHICS.....	23
4.5 STATISTICS.....	23
<b>5.0 SYNOPSIS OF PAPER I-IV</b> .....	<b>25</b>
5.1 PAPER I.....	25
5.2 PAPER II.....	26
5.3 PAPER III.....	27
5.4 PAPER IV.....	28
<b>6.0 DISCUSSION</b> .....	<b>29</b>
6.1 METHODOLOGICAL ISSUES.....	29
6.1.1 Design.....	29
6.1.2 Random errors.....	30
6.1.3 Systematic errors.....	32
6.2 DISCUSSION OF MAIN RESULTS.....	39
6.2.1 The association between mental health and physical activity according to gender.....	39
6.2.2 Mental health and physical activity according to ethnicity.....	42
6.2.3 Mental health and physical activity according to sociodemographic variables.....	45
<b>7.0 CONCLUSIONS</b> .....	<b>49</b>
<b>8.0 PUBLIC HEALTH AND RESEARCH IMPLICATIONS</b> .....	<b>50</b>
<b>REFERENCES</b> .....	<b>51</b>
<b>ERRATA</b> .....	<b>66</b>
<b>PAPERS I-IV</b> .....	
<b>APPENDIX I-IV</b> .....	



## **1.0 Background**

After my master degree performed on the youth part of The Oslo Health Study, we started planning the data collection in Youth 2004. This thesis is based on both studies, and is a product of four papers. After paper I, investigating the association between physical activity at age 15 and mental health three years later, we realised the need for more knowledge on both mental health and physical activity in host and immigrants during late teens/adolescence (paper II and III). We do not have a complete follow-up of all participants in the baseline study. Thus in paper IV, we identify predictors of lost to follow-up, and investigate the magnitude and direction of possible selection bias. In the latter paper we use a somewhat larger study population than in the first three papers. In this summary, I only elaborate on findings from paper IV that are of direct relevance for the findings in the papers I-III.

## 2.0 Introduction

The World Health Report 2002 (1) paid considerable attention to the potential of physical activity to reduce the burden of various diseases (e.g. cardiovascular disease, some cancers and type 2 diabetes). During recent years, both internationally and nationally, focus has been put on developing guidelines for physical activity to provide risk reduction for morbidities, along with strategies to increase participation (2-9).

The attention has been focused on the physical health benefits of physical activity (10). In recent years, the knowledge of positive effects of physical activity in the treatment of depression among adults has become well established (11-17). In adults, prospective population based studies have also revealed that those who become or remain physically active are less likely to develop depression (11;13-15;18-20).

Mental health problems are worldwide a large public health burden (21-23). A considerable number of children and adolescents are impaired by mental health problems (22-24). Both professionals and health authorities emphasise the need for preventive strategies (5;25). A Norwegian public health report (The report no 16 (2002-2003) to the Storting) (5) points out insufficient knowledge about factors that strengthen mental health, reasons for mental health problems, and effective interventions, as important barriers to developing a preventive framework.

Physical activity may be such a factor, hence promoting physical activity could be a preventive strategy in adolescents. However, more research is needed to determine this. Epidemiological research can contribute to this evidence-base by studying associations between physical activity and mental health in longitudinal population based studies during adolescence.

With regard to prevention of mental health problems it is important to identify vulnerable groups that need special attention, and if physical activity can be a preventive strategy knowledge of physical activity in subgroups of adolescents is also important. With an increasing influx of immigrants to the Western parts of the world, cultural/ethnic background has become an important factor when studying health and health behaviour in a public health perspective.

In the following section a short review of the associations between physical activity and mental health problems among adolescents is presented, with a special focus on population based studies. Then mental health and physical activity in adolescents are considered.

The following introduction mainly reviews the literature prior to the present papers. In the discussion, some relevant literature is introduced that has been published after the publications in this thesis.

## **2.1 Physical activity and mental health among adolescents**

A Cochrane review evaluating the literature of *randomised trials*, concludes that the effect of physical activity in the *treatment of anxiety and depression* in children and young people is unknown as the evidence base is scarce (26). There appears to be a small effect in favour of physical activity in reducing depression and anxiety scores in *non-clinical populations* of children and adolescents and the intensity of the physical activity appears to be of little importance (26). However, the small number of studies included and the diversity of participants, interventions and methods of measurement, limit the ability to draw conclusions (26).

There are *cross-sectional population based studies* among adolescents focusing on the association between physical activity and mental health. Depressive symptoms/emotional problems/psychological distress have been most studied, and the majority of the papers report an inverse association with physical activity (27-36). The association between physical activity and social and/or behaviour problems is less studied and the evidence is less clear (32-40).

The cross-sectional design of most population based studies limits the possibility to draw conclusions on the temporal nature of the association between physical activity and mental health among adolescents, and there is little *longitudinal evidence* published to determine this. However, two studies report a consistent positive relationship between physical activity in adolescence and psychological well-being (41) and mental health (42) in adulthood. However, others have failed to show any association between physical

activity in adolescence and depression in mid-life (43). To our knowledge, the first longitudinal study investigating the association between physical activity and depression during pre-teen years in a general population, found that change in the frequency of physical activity outside of school was inversely associated with changes in depressive symptoms (44). A population based cohort study during late teens, focusing on delinquent behaviour, found that adolescents with high sporting activity at 15 years of age were more likely to be delinquent three years later than those with low sporting activity (45). However, this was not true for team sport participation (45). We do not know of any longitudinal population based studies looking at physical activity and *various dimensions* of mental health during adolescence.

An increasing amount of research, especially among adults, has found that physical activity is associated with good mental health, however, the underlying mechanisms for this relationship are not clear (11;13;15).

Before mentioning different hypotheses postulated to explain the positive association, it is important to mention that physical activity during adolescence also can cause harm (46). Forced physical activity in childhood and adolescence has been associated with inactivity in adulthood (47). However, most of the detrimental consequences of physical activity have been observed in athletes undergoing intensive training (48-52).

Overtraining and exercise addiction/dependency, accompanied by fatigue, stress, depression, sleep disturbances and anger, may be negative effects of hard physical activity for some (50;53). The negative outcomes are largely associated with the exercise dosage, but the individual differences in the capacity to adapt to overtraining and addiction play a role (53). In a public health perspective this may not be of great concern (11). However, with the growing focus on body appearance in our culture, the risk for overtraining and exercise dependency, perhaps in combination with eating problems/disorders (secondary dependency (50)), may be increasing problems in the general population of adolescents.

### **2.1.1 Possible mechanisms of the associations between physical activity and mental health**

Part of the difficulty in identifying a single causal mechanism to explain improvements in mental health associated with physical activity, may be due to the varied, complex and individual causes of mental illness. This section presents a brief overview of some of the *biological, psychological and social factors* that have been suggested as explanations for the possible psychological benefits of physical activity. Given the complexity of both physical activity and mental health, no particular mental health effects are likely to be adequately explained by a single process (54). Multiple mechanisms may well interact to affect both short-term and long-term psychological functioning. The current thesis does not elaborate further on the possible mechanisms, other than highlighting some of them when discussing the present findings. The following postulated mechanisms operate on different levels, directly and indirectly. Some of the mechanisms are not unique to physical activity, however this does not make them less important.

#### *2.1.1.1 Biological factors*

Neurotransmitters: Experimental studies in animals have demonstrated an influence of physical activity on transmitters in the brain. Some of the most discussed transmitters are: *Monoamines* such as serotonin and noradrenalin, involved in regulation of stress, mood and emotions; *Dopamine* which plays a role in reward and motivation; *Endorphins* which act as natural opiates and are involved in perceptions of pain, and have also been implicated in reward mechanisms and positive emotions; *Gamma-Aminobutyric Acid* (GABA) which probably is important in anxiety (13;17;55-57).

Thermogenics: Another hypothesis proposes that the changes in body temperature that occur during exercise, are associated with increased central and peripheral neuron activity in the brain, as well as decreased muscle tension (58). This mechanism is also linked to improved sleep (59).

Current evidence is inadequate to conclusively determine the biological plausible explanation for physical activity's possible effect on mental health (13).

2.1.1.2 *Psychological and social factors*

Self-esteem: Self-esteem is the value people place on their conception or view of themselves, and is a cornerstone in mental health. It reflects a person's feelings about, and evaluations of specific personal features, including physical attributes, such as appearance and physical ability, as well as social, academic and emotional attributes (60). Improvement in body image or physical skills as a result of physical activity can contribute to general self-esteem in children and adolescents (61). Expectations of increased fitness can also improve self-esteem even when the fitness has actually not improved. Believing that you are doing something positive for yourself may be enough to improve self-esteem (13).

Mastery and self-efficacy: Feeling of achievement, like improved fitness or successfully following an exercise regime, can give an increased sense of mastery and enhance ones faith in e.g. staying physically active. Some evidence suggests that this confidence can extend beyond physical activity settings to enhance an overall belief in mastering – also called self-efficacy, and improve mental health. Successfully reaching a goal can increase ones self-efficacy (62).

Distraction: Mental health benefits may also be related to the fact that participation typically occurs in settings distant from what can be experienced as stressful environments. Hence, a person is shielded from potential stressors and provided with a pleasant distraction (63).

Social factors: Several of the most popular physical activities among young people take place in a social setting (e.g. football and handball), that provide social interaction and may promote social competence and support (64;65). In depression, social isolation can be a contributing and sustaining factor. Participating in physical activity may provide personal contact that can decrease a sense of isolation. Being physically active with others may also demonstrate that he or she is important to others, as well as being a part of a community (64;65).



It is often concluded that biological mechanisms are independent of sex and age. However, concerning the psychological and social mechanisms it is relevant to assume that they may vary dependent on sex, age, ethnicity and socioeconomic status.

## **2.2 Mental health among adolescents**

Mental health has been defined in various ways by scholars from different cultures (21). It is difficult to define mental health comprehensively, however, it is agreed that good mental health is more than simply a lack of mental disorder (21). The World Health Organisation defines mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with normal stressors in life, can work productively and fruitfully, and is able to make a contribution to his or her community” (p. 1) (66). In the research literature use of the term mental health is often related to the chosen measures of mental health. In the following review, the terms from the actual referred literature are used. The use of the term mental health in this thesis, is presented in the methods (Chapter 4.3.1)

Mental health problems, including emotional, behavioural and peer problems are prevalent among adolescents and may severely interfere with everyday functioning (23;67;68). A comprehensive international review concluded that the median prevalence estimate of functionally impairing psychiatric disorders in children and adolescents was 12%, although the range of the estimate was wide (23). In a Norwegian epidemiological study of children (7-9 years of age), using a diagnostic tool to identify cases, 7 % of the children were reported to have some kind of psychiatric disorder (69).

A common feature in most studies is the great gender variation in mental health problems in adolescence, with girls reporting more emotional symptoms and distress and boys more behavioural problems (24;68;70-73). Prospective studies show that mental distress and emotional problems are increasing from puberty up to early adulthood in girls, with a more stable trend in boys (73;74), whereas behavioural problems in both boys and girls are peaking in mid- and late adolescence somewhat depending on type of behaviour (71;75).

In the literature on immigrants, mental health findings among adolescents are less clear. In some cross-sectional studies, using self-report measures, a higher prevalence of mental health problems has been reported among immigrants compared to the host population (76-78), whereas others have found no difference (79-82) or a lower frequency of problems among immigrant compared to host adolescents (82-84). Even when including studies examining both parental and teachers' report, no general conclusion of the psychological development and health of migration can be drawn (79;85;86). Population based longitudinal studies, focusing on mental health in different ethnic groups of adolescents, are scarce (87;88).

Migrant populations often have a weak social position in their host countries (86). This may create an economic disadvantage, consequently the socioeconomic position in the host country may be of importance when comparing migrants' and hosts' mental health (86). We do not know of any population based longitudinal studies comparing changes in mental health during late teens between immigrants and the host population also adjusting for sociodemographic factors.

### **2.3 Physical activity among adolescents**

Physical activity is defined as any bodily movement produced by skeletal muscles that result in an expenditure of energy (89). It is a complex behaviour that occurs in a variety of forms and contexts including free play, exercise, physical education and organized sport. Physical activity has several dimensions including *duration* (units of time); *frequency* (number of sessions per time unit); *intensity* and *type* of activity (90). In the research literature use of the term physical activity varies and is often a result of how it is measured. For use of the term physical activity in this thesis, see methods (Chapter 4.3.2).

Regular physical activity is an important factor for healthy growth and development in children and adolescents (91). Despite the importance of physical activity in youth, studies consistently show that physical activity declines during adolescence. Such declines are reported in both cross-sectional (92-94) and longitudinal studies (95-104),

and in studies using self-reported measures (92;95-100) as well as objective measures of physical activity (93;94;104).

The gender difference in physical activity, with boys being more physically active than girls, is well documented (4;93;94;105;106).

There is a lack of studies investigating physical activity in adolescents of different ethnicities. The majority of the existing research is from the United States (US), and generally reveals that black adolescents (especially girls), and to some degree also Hispanics, are less physically active than their white counterparts (100;107-110). In Europe one study from the United Kingdom (UK) reports that Asian students are more sedentary than white students, and that was also true for black girls but not black boys (111).

Different socioeconomic variables show various associations with physical activity in adolescence, but most studies agree that there is a positive association between physical activity and socioeconomic status (112-114). Whether the relation between socioeconomic status and physical activity varies by ethnicity is less studied in adolescents (112). More knowledge on physical activity level and changes over time in immigrant and host adolescents, and the association with sociodemographic variables, is needed

### 3.0 Objective

The main objective of this thesis was to study physical activity and mental health in a multiethnic cohort of adolescents.

**The specific aims were:**

- To study how physical activity in boys and girls at age 15–16 were associated with mental health three years later (Paper I).
- To compare mental health and physical activity between adolescents with ethnic Norwegian and ethnic minority background aged 15-16 years followed for three years, while taking gender and sociodemographic factors into account (Paper II and III).
- To identify subgroups lost at three years of follow-up at age 18-19 years and investigate the magnitude and direction of possible selection bias (Paper IV).

## **4.0 Material and Methods**

The papers in this thesis were based on data collected at two time points three years apart. Baseline data consisted of the youth parts of The Oslo Health Study and The Hedmark Health Study conducted in 2001, and the follow-up data consisted of Youth 2004 which was carried out both in Oslo and Hedmark in 2004.

### **4.1 Data collection**

#### **4.1.1 The youth part of The Oslo Health Study**

All 10<sup>th</sup> grade students (aged 15–16 years, later referred to as 15 years) in Oslo during the school years 1999–2000 and 2000–2001 were invited to enter the youth part of The Oslo Health Study. A total of 7343 students (88%) from the total population of 10<sup>th</sup> graders participated (both 1999–2000 and 2000–2001). In 2000–2001, 3811 students participated (89%), and this group comprised the baseline of the longitudinal study in Oslo (blue box on top in the flow chart, page 14). This was a questionnaire study conducted in all the 60 schools in the city. All parents received written information (Appendix I) and the students signed a consent form before participation (Appendix II). The students completed two four-page questionnaires during two school classes (Appendix III). A project assistant was present in the classroom to inform the students about the survey and to administer the questionnaires. For those not present on the day of the survey, questionnaires, informed consent forms and a pre-stamped envelope were left for them at school. A separate instruction was prepared for teachers responsible for this follow-up task. Students who did not return the completed questionnaire during the course of the school year were invited by a letter sent to their home. A more detailed description of the procedure has been published elsewhere (115).

#### **4.1.2 The youth part of The Hedmark Health Study**

In 2000–2001, all 10<sup>th</sup> graders attending the 41 schools in Hedmark county were invited to participate in the youth part of The Hedmark Health Study. The study was conducted following the same protocol as the youth part of The Oslo Health Study (described

above). A total of 1939 students participated (88%) and comprised the baseline of the longitudinal study in Hedmark (green box on top in the flow chart, p 14).

#### **4.1.3 Youth 2004**

Youth 2004 was carried out in Oslo and Hedmark. We wanted to invite all individuals participating in the baseline cohorts in Oslo and Hedmark, thus, the follow-up study had a different design than the baseline studies. In Oslo, the study was carried out partly at school and partly by mail. In Hedmark, the data collection was carried out by mail. A more detailed description of the procedure has been published elsewhere (116).

##### *4.1.3.1 In school*

The procedure for the school part of Youth 2004 in Oslo, was similar to the baseline health studies in Oslo and Hedmark. To get hold of as many as possible of the 10<sup>th</sup> graders participating in the baseline study in Oslo, all senior year students (13<sup>th</sup> grade) in all 32 secondary high-schools in Oslo 2003-2004 were invited. This study also constituted a new cross-sectional study of 13<sup>th</sup> graders in Oslo (yellow/orange box in the flow chart, p 14). In this school-based study 3308 students participated (90%). The senior year students (aged 18–19 years, later referred to as 18 years) completed a four-page questionnaire during one school class (Appendix IV). They also provided a cell sample from the cheek mucosa. The students received instructions and then everyone performed a joint rubbing of the mucosa using cyto-brushes (Medscand Medical AB, Malmö, Sweden). Because not all students were present when the study was conducted, materials were left at school with the school-contact, or schools were visited several times. The decision on which procedure to follow was made by the project coordinator, based on the number of missing students and the collaboration with the school-contact. Those that could not be reached by this procedure were invited to participate by mail.

##### *4.1.3.2 By mail*

The participants in the baseline study in Oslo who were not enrolled in the senior year of secondary high-schools in Oslo, and all the baseline-participants in Hedmark, who had consented to participate in a follow-up, were invited to participate in Youth 2004 by mail. The invitation included an invitation letter, an information brochure (Appendix I), a consent form (Appendix II), the questionnaire (Appendix IV), two cyto-brushes including

a container for buccal cell sampling and a pre-stamped return envelope. Two reminders were sent to those who did not respond. Of those invited by mail in Oslo, 384 participated and signed a written consent (35 %). The corresponding number in Hedmark was 827 (49%).

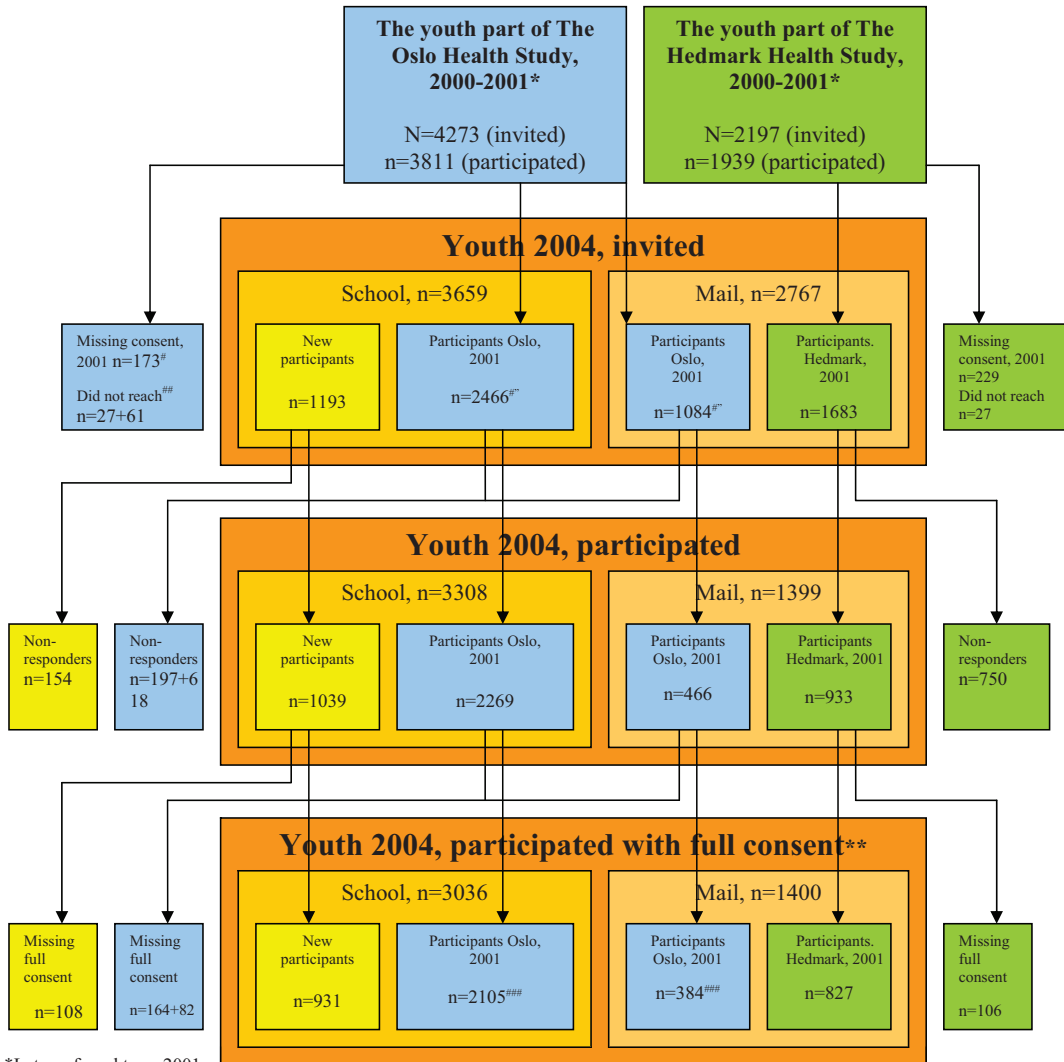
## 4.2 Study samples

### **Paper I, II and III:**

Of the 3811 participants in the baseline study in Oslo, 2489 individuals (65%) (1112 boys and 1377 girls) participated in Youth 2004 (follow-up) and gave consent to link their information from the two surveys (blue boxes in the flow chart, p14). These adolescents were included in the main analyses in papers I-III. In paper I, 56 of the 2489 individuals were excluded because they reported motor disabilities at baseline.

### **Paper IV:**

Paper IV uses two longitudinal and three cross-sectional samples extracted from the three studies previously described. In addition to the longitudinal sample from Oslo (used in paper I, II and III), the longitudinal sample from Hedmark was also included (green boxes in the flow chart, p 14). The longitudinal sample from Hedmark consisted of adolescents who participated in both the baseline study and Youth 2004. A total of 5750 participated in the baseline studies in Oslo and Hedmark, and 3316 of these individuals (58%) participated in the follow-up study (Youth 2004). The school-based part of the follow-up (4.1.3.1), as well as the two baseline studies in Oslo and Hedmark, constitutes the three cross-sectional samples in paper IV.



\*Later referred to as 2001

\*\*Full consent: acceptance of linking the questionnaire with other surveys and different registers (Appendix II).

<sup>#</sup>In the flow chart in paper III an error occurred, the correct number is 173

<sup>##</sup>27+2466 (school) and 61+1084 (mail) constitute the invited in the flow charts in paper I, II and III

<sup>###</sup> Study sample in paper II and III, in paper I 56 was excluded because of motor disabilities at age 15

Figure 1: Study-population flow chart



### **4.3 Variables**

Variables included are mainly collected by self-reported questionnaires. After paper I and II were published/accepted for publication, information from Statistics Norway (SSB), a public institution collecting many types of national statistics, was added to the data file. Thus, country of birth as registered by SSB is used in paper III, and several sociodemographic variables from SSB were included in paper III and IV.

**Table 1:** Summary of the variables used in the different papers

Question	Paper			
	I	II	III	IV
Gender	E	E	E	E/C
<i>Mental Health:</i>				
SDQ, baseline	D/C	D		D*/C
SDQ, follow-up	D	D		
SDQ Impact, follow-up	D			
HSCCL-10, baseline		D		D/C
HSCCL-10, follow-up		D		
<i>Physical activity (PA)</i>				
Weekly hours of PA, baseline	E		D	E/C
Weekly hours of PA, follow-up			D	
<i>Other lifestyle factors:</i>				
Alcohol consumption, baseline	C			
Smoking habits, baseline	C			E/C
<i>General health:</i>				
Self perceived health, baseline				D/C
<i>Ethnicity</i>				
Parents country of birth, self report, baseline	C	E		E/C
Parents country of birth, SSB, 2002			E	
<i>Sociodemographic variables:</i>				
Perceived family economy, baseline	C	C	C	C
Mother's education, SSB 2002			C	
Father's education, SSB 2002			C	C
Mother's income, SSB 2002			C	
Father's income, SSB 2002			C	C
Parents marital status, baseline		C	C	C
Socioeconomic region of residence, baseline		C	C	
Education plans, baseline				C
<i>Other variables</i>				
Participation with cyto-brush, follow-up				D/C
Invitation group, follow-up	C	C	C	C
Lost to follow-up				D

D: Dependent variables

E: Exposure/predictor/group differences studied

C: Covariates

\*The SDQ sub-scores hyperactivity and inattention problems, and behaviour problems are used

### 4.3.1 Mental Health

In this thesis the term mental health includes both internalizing and externalizing problems as well as a positive aspect of mental health - prosocial behaviour. Mental

health is measured by Strengths and Difficulties Questionnaire (SDQ) and Hopkins Symptoms Checklist (HSCL). When referring to HSCL, the term mental distress is used and when referring to the SDQ the names of the different subscales are used.

*The Strengths and Difficulties Questionnaire (SDQ):* The SDQ is a multi-informant wide-angle screening questionnaire, developed by Robert Goodman in the UK and first published in 1997 (117;118). The SDQ has been used in a large number of population based studies in several countries during the last decade (118). In the current study the self-report version of the questionnaire was used. The SDQ is a 25-item questionnaire with five subscales, each consisting of five items, generating scores for emotional symptoms, conduct problems, hyperactivity–inattention, peer problems, and prosocial behaviour. Each item can be answered with “not true” (0), “somewhat true” (1) or “certainly true” (2), with reference to the past 6 months. For each subscale these values were summed to generate scale scores ranging from 0 to 10. The first four problem scales are summed to generate a total difficulties score ranging from 0 to 40. According to the scoring instructions for the SDQ, missing values for each individual were replaced with the individual mean for the other items in the subscale. However, records with three or more missing items in the current subscales were excluded. The prosocial scale measures the adolescent’s ability to act prosocially. This subscale assesses positive behaviours, like caring and helpful behaviour (with a range of scores from 0 to 10). SDQ self-report is designed and validated for youngsters (11-16 years), but SDQ has also been used for older youths (119;120). In the follow-up questionnaire some linguistic changes were made in accordance with the approved Norwegian translation at that time. In Tromsø, the “old” and “new” versions of the SDQ were used among 15-16 year-olds three years apart (2002 and 2005). Based on comparisons of answers in the two versions, we concluded that the linguistic changes most likely had little impact on the subscale scores (121). Among adolescents from Oslo that had been followed longitudinally, the internal consistency (Cronbach’s alpha) of the various SDQ scales were at baseline and follow-up: 0.73 and 0.77 for the total difficulties score; 0.70 and 0.73 for emotional symptoms; 0.47 and 0.38 for conduct problems; 0.54 and 0.65 for hyperactivity–inattention; 0.53 and 0.57 for peer problems; and 0.64 and 0.61 for prosocial behaviour. The internal consistency was about the same for ethnic Norwegians and ethnic minorities at both time

points. The low alpha coefficients may be associated with a low number of response categories and skewed distributions of scores. Because of this, Oppedal et al (122) argued that it may be more appropriate to calculate alpha based on polychoric correlation to provide an estimate of a potential underlying continuous factor in stead of the consistency of the actual sum score. They performed both analyses and reported more satisfactory results with polychoric correlation - even if the values were still low (i.e. peer problems improved from 0.44 to 0.61 and conduct problems from 0.46 to 0.59) (122). Other studies have also reported low Cronbach's alpha values for some of the subscales (123), particularly for conduct problems (124). The conduct problem items cover selected essential criteria for oppositional defiant disorder and conduct disorder (123;125), which implies some heterogeneity. Nevertheless, the low reliability in some of the SDQ subscales poses a problem regarding the unity of the underlying structure of the construct. Two other large Norwegian studies (120;124), have explored the construct validity of the self-reported SDQ (by confirmatory factor analysis) and concluded that the fit statistics were satisfactory. However, some of the factor loadings and, correspondingly, some of the subscale reliabilities (internal consistency) were low, which suggests poor specificity of items (120). In spite of this, Rønning et al (124) argued that the SDQ self-report is an efficient screening instrument for preventive research on large community samples. A large SDQ validation study found that a high score on the self-reported conduct problem scale was associated with an odds ratio of 7.1 for having conduct or oppositional-defiant disorder (based on interviews), supporting the validity of the subscale (123). The self-reported version of SDQ has also shown satisfactory discrimination between community and clinical samples (126).

In paper I and II, the SDQ subscales and "total score" are used as continuous measures of (self-perceived) mental health problems and strengths. In paper IV, two of the SDQ subscales; conduct problems and hyperactivity-inattention problems were summed to give an index of externalizing problems (127). The index is divided into two groups by the 90 percentile (score $\geq$ 10) when comparing associations at baseline between all participants and lost to follow-up, and when exploring predictors for lost to follow-up.

*The Strengths and Difficulties Impact Supplement:* In epidemiological studies, many young people with high psychiatric symptom load are not significantly socially impaired by

their symptoms (128). To get a better indication of the significance of the symptoms an impact supplement has been made (129). This supplement was included in Youth 2004 and starts with a question on whether the respondent thinks he or she has a problem. If so, further enquiries are made about chronicity, overall distress, social impairment and burden to the environment. The impact questions have four response categories: “no” (0), “little” (0), “quite a lot” (1), “a great deal” (2). The items concerning overall distress and social impairment related to family, friends, learning situation and leisure activities generate a total impact score, ranging between 0 and 10. Goodman defines a score of two or more as “abnormal” or “caseness” and a score of one as borderline (129). In paper I, the variable was dichotomized into high ( $\geq 1$ ) and low ( $< 1$ ) scores when conducting logistic regression.

*The Hopkins Symptom Checklist (HSCL-10):* The HSCL-10 comprises questions regarding psychological symptoms of depression and anxiety (mental distress) experienced the previous week (130). For each question there are four possible answers; ranging from “not troubled” (1) to “heavily troubled” (4). According to the scoring instructions for the HSCL, missing values on individual items were replaced with the sample mean value for each item. However, records with three or more missing items were excluded. The average item score is used as a measure of mental distress (130). The HSCL-25 version is shown to have satisfactory validity and reliability as a measure of mental distress in adults (131;132). The version with ten questions performs almost as well as the longer versions, also among subjects aged 16-24 years (130). In the longitudinal data from Oslo, the consistency (Cronbach’s alpha) of the HSCL-10 scale was 0.86 at baseline and 0.88 at follow-up. The internal consistency was approximately the same for ethnic Norwegians and ethnic minorities at both time points. Among subjects aged 16-24 years of age, an average score for all 10 items equal to or above 1.85 has been shown to be a valid predictor for mental distress, corresponding to the 1.75 cut-off of HSCL-25 (130). In paper II, the HSCL-10 was used as a continuous variable. In paper IV, the HSCL-10 was dichotomized at 1.85 (High score  $\geq 1.85$ ), when comparing associations at baseline between all participants and lost to follow-up, and when exploring predictors for lost to follow-up.

### 4.3.2 Physical activity

Our use of the term physical activity may include various types of activities in leisure time, and both organized and unorganized activities. The measure takes into account the amount of both moderate and vigorous physical activity.

*Weekly hours of physical activity in leisure time:* Participants were asked how many hours per week they spent on physical activity “to an extent that makes you sweat and/or out of breath” outside of school. The possible answers were: 0 (0), 1–2 (1.5), 3–4 (3.5), 5–7 (6), 8–10 (9), or 11(11) hours or more per week. The numbers in the parentheses represent the coding in paper III, when using the ranked ordinal variable as a continuous variable. Hours of physical activity was also recoded into different groups [0, 1-4, 5-7 and 8 hours or more (paper I) and 0-2 versus 3 hours or more (paper III and IV)]. The latter grouping was done because of the skewed distribution of physical activity among the ethnic minority girls.

In an unpublished validation study, physical activity was measured both subjectively using the questions on physical activity included in the present questionnaire - and objectively using Actigraph accelerometers (Manufacturing Technology Inc., Fort Walton Beach, FL) that measures body acceleration (105). The selected physical activity question “hours per week” was the one that best predicted physical activity measured by accelerometry (Hein Stigum, Norwegian Institute of Public Health, personal communication). Several studies have used simple self-reported questionnaires on overall physical activity, and such measures have been shown to correlate fairly well with other activity measures (133;134), and with maximum oxygen uptake (135) and aerobic fitness (136). Nevertheless, how accurate the adolescents reported their weekly hours of physical activity is uncertain.

### 4.3.3 Other lifestyle factors

*Alcohol consumption* was estimated by asking how often in the course of the past year the person had been drinking alcohol. Answers were coded into six categories: “Not at all”, “a few times”, “once per month”, “2-3 times per month”, “once per week”, and “2-3 times per week or more”.

*Smoking habits* were studied by asking “Do you smoke, or have you smoked earlier?” Possible answers were: “No, never”, “Yes, but I have stopped”, “Yes, once in a while”, and “Yes, daily”. The answers were categorized into “never/quit”, “once in a while”, and ‘daily’.

#### 4.3.4 General health

Self-evaluated *general health status* was measured by the question: “How would you describe your present state of health? Possible answers were: “Poor”, “not very good”, “good”, and “very good”. The categories were grouped into “poor/not very good” versus “good/very good”.

#### 4.3.5 Ethnicity

In paper I, II and III, SSB’s definition of ethnic minorities, as those having both parents born in a country other than Norway was applied (137). In paper IV, ethnic groups were defined as minorities with a non-Western background versus ethnic Norwegians/Western minorities. Information about parents’ country of birth was collected both by *adolescents’ report* and by register-data from SSB. In paper I, II and IV, the ethnic background was defined by self-report, whereas in paper III, information from SSB was used. When classifying participants as ethnic minorities or ethnic Norwegians, a very good agreement was found between self-reported data and information registered by SSB (Cohen’s’ Kappa = 0.96). A total of 20% of the participants in the follow-up study in Oslo had an ethnic minority background (paper III). The majority of the ethnic minority youth (96%) came from non-Western countries. The largest ethnic minority groups came from the Indian subcontinent (42%), the Middle East (16%) and Eastern Europe (11%). Fifty-four percent of the individuals in the minority group were born in another country than Norway (1<sup>st</sup> generation immigrants). In the papers the terms ethnic Norwegians and ethnic minorities are mainly used, whereas in the current summary immigrants and ethnic minorities are used synonymously. When referring to the research of others, the concepts/terms from the papers are used.

#### 4.3.6 Sociodemographic variables

*Perceived family economy* was studied by asking how students perceived their family economy compared with other families in Norway. The question had the options: “very bad”, ”bad”, “good”, and “very good”.

*Mother’s and father’s education* from SSB’s register on education (2002) was used. In the analysis, education was categorized by the highest level of accomplished education and categorized in “tertiary education”, “intermediate education”, and “compulsory education” (138).

*Mother’s and father’s income* from SSB’s register on income (2002) was used. The mother’s and father’s income (139) was categorized as “high” (above the 75<sup>th</sup> percentile), “medium” (25<sup>th</sup> to 75<sup>th</sup> percentile), or “low” (below the 25<sup>th</sup> percentile).

*Parents’ marital status* was registered by a question asking if their parents were “married/cohabitant”, “unmarried”, “divorced/separated”, “one or both dead”, and “other options”. The variable was categorized into those having parents who were “married/cohabitant” versus the “others”.

*Socioeconomic region of residence in Oslo* indicates the socioeconomic level of the neighbourhood. This is a social index that takes into account the distribution of unemployment, education, non-Western immigration, and single parenting (140). The major dividing line concerning health status and health related behaviour is found between “East” and “West” (140), consequently these two regions were used.

*Education plans* of the adolescents were assessed by asking about their plan for highest future education, which was operationalised into: “University/ higher” (i.e. university or regional college higher degree), “other” (university or regional college intermediate level; upper secondary school; vocational education at upper secondary school; one year at upper secondary school; other plans), and “not decided”.

#### 4.3.7 Other variables

*Participation with cyto-brushes*: In Youth 2004, two DNA samples from the cheek mucosa were collected using cyto-brushes (Medscand Medical AB, Malmö, Sweden). In paper IV, we studied whether the additional collection of DNA could have influenced the participation rate. The cyto-brushes are not further discussed in the current summary.



*Invitation group:* Youth 2004 was conducted partly in school and partly by mail. In paper I, II and III, a variable called “*Invitation group*” was created to dichotomize school and mail participation. In paper IV, this variable contained three groups; postal-based Hedmark, postal-based Oslo and school-based Oslo.

*Lost to follow-up:* A variable was made indicating whether adolescents participated or were lost to follow-up in Youth 2004.

#### **4.4 Ethics**

In the baseline studies in Oslo and Hedmark, all parents received written information concerning why and how the study would be conducted, describing the topics addressed in the questionnaire, the voluntary nature of the study, how the results would be used and that they could reserve their child from participating. All students/adolescents were also thoroughly informed and were free to withdraw at any stage without giving any reason. All information from the health surveys were treated confidentially, and the data used for research was made anonymous.

The protocols of all three studies were evaluated by the Regional Committee for Medical Research Ethics and were approved by the Norwegian Data Inspectorate. The linkage of the survey-data to information from Statistics Norway was also approved by the Norwegian Data Inspectorate. The studies that were carried out in school received approval from the school authorities.

#### **4.5 Statistics**

The Norwegian Institute of Public Health coded the questionnaires and prepared data files containing information from all the studies. In all papers, SPSS (version 13 and 14) was used for statistical data analyses, whereas STATA (version 10) was also used in Paper IV.

Analyses were mainly done separately by gender. This stratification was mainly done due to large gender differences in both physical activity and mental health, and pooled estimates would not be representative for either boys or girls.

The description of the sample in the papers was done by Chi-square tests (for categorical data), dependent and independent samples T-tests, GLM-repeated measures and analyses of variance when comparing a continuous variable between two or more groups.

When exploring the main objectives, analyses of covariance were used to compare means between different groups (paper I and II). To compare relationships between variables, multiple regression was used when the dependent variables were continuous/ranked ordinal (paper I and III), whereas logistic regression (paper I) and Poisson regression (paper IV) was performed when the dependent variables were dichotomous. To study stability in the physical activity groups we used Cohen's kappa (paper III).

The exact p values are presented if higher than 0.001. A 95% confidence interval and a significance level of 0.05 and 0.01 were used (see discussion; 6.1.2). See the papers for more detailed descriptions

## 5.0 Synopsis of paper I-IV

### 5.1 Paper I

**The association between weekly hours of physical activity and mental health. -A three-year follow up study of 15/16-years old pupils in the city of Oslo, Norway.**

**Background:** Mental health problems are a worldwide public health burden. The literature concerning the mental health benefits from physical activity among adults has grown. Adolescents are less studied, and especially longitudinal studies are lacking. This paper investigates the associations between weekly hours of physical activity at age 15–16 and mental health three years later.

**Methods:** Longitudinal self-reported health survey. The baseline study consisted of participants from the youth section of the Oslo Health Study, carried out in schools in 2000–2001 ( $n = 3811$ ). The follow-up in 2003–2004 was conducted partly at school and partly through mail. A total of 2489 (1112 boys and 1377 girls) participated in the follow-up. Mental health was measured by the Strengths and Difficulties Questionnaire with an impact supplement. Physical activity was measured by a question on weekly hours of physical activity outside of school, defined as exertion ‘to an extent that made you sweat and/or out of breath’. Adjustments were made for well-documented confounders and mental health at baseline.

**Results:** In boys, the number of hours spent on physical activity per week at age 15–16 was negatively associated with emotional symptoms [B (95%CI)=-0.09 (-0.15, -0.03)] and peer problems [B (95%CI)=-0.08 (-0.14, -0.03)] at age 18-19 after adjustments. In girls, there were no significant differences in SDQ subscales at age 18-19 according to weekly hours of physical activity at age 15-16 after adjustments. Boys and girls with five to seven hours of physical activity per week at age 15-16 had the lowest mean scores for total difficulties and the lowest percentage with high impact score at age 18-19, but the differences were not statistically significant after adjustments.

**Conclusions:** Weekly hours of physical activity at age 15-16 years was weakly associated with mental health at three-year follow-up in boys. Results encourage a search for further knowledge about physical activity as a possible protective factor in relation to mental health problems in adolescence.

## 5.2 Paper II

**Ethnic Norwegian and ethnic minority adolescents in Oslo, Norway. A longitudinal study comparing change in mental health.**

**Background:** Little is known about ethnic disparities in mental health during late teens. The aim of this study was to compare changes in self-reported mental health between adolescents with ethnic Norwegian and ethnic minority background aged 15-16 years followed for three years.

**Methods:** The youth part of The Oslo Health Study constituted the baseline of this self-reported longitudinal study, carried out in schools in 2001 ( $n = 3811$ ). The follow-up in 2004 was conducted partly in school and partly through mail. A total of 2489 (1112 boys and 1377 girls) participated in the follow-up. Twenty percent of the participants had an ethnic minority background. Mental health was measured by the Strengths and Difficulties Questionnaire (SDQ) and The Hopkins Symptom Checklist (HSCL-10).

**Results:** Ethnic minority boys and girls reported poorer mental health than ethnic Norwegians of the same sex, both at baseline and follow-up. Exceptions were hyperactivity-inattention problems and prosocial behaviours where no differences were found. Consistent changes from baseline to follow-up were; an increase in mental distress and prosocial behaviour. No ethnic disparities were found for *changes* in mental health from ages 15 to 18 between the two groups. There was no different effect of perceived family economy, parents' marital status and socioeconomic region of residence in Oslo on *change* in mental health between ethnic Norwegian and ethnic minority boys and girls from age 15 to 18 years.

**Conclusions:** Ethnic disparities in mental health remained the same from age 15-16 and throughout teenage years. Demographic factors adjusted for had no different impact on changes in mental health between host and immigrant adolescents.

### 5.3 Paper III

#### **Three year follow-up of physical activity in two ethnic groups of Norwegian youth: associations with socio-demographic factors.**

**Background:** More research on factors associated with physical activity and the decline in participation during adolescence is needed. In this paper, we investigate the levels, change, and stability of physical activity during the late teens among ethnic Norwegians and ethnic minorities, and we examine the associations between physical activity and socio-demographic factors.

**Methods:** The baseline (T1) of this longitudinal study included 10<sup>th</sup> graders who participated in the youth part of The Oslo Health Study, which was carried out in schools in 2000–2001. The follow-up (T2) in 2003–2004 was conducted partly at school and partly by mail. A total of 2489 (1112 boys and 1377 girls) participated both at baseline and at follow-up. Physical activity level was measured by a question on weekly hours of physical activity outside of school. Socio-demographic variables were collected by questionnaire and from data obtained from Statistics Norway. Analysis of variance was used to study the level of and changes (T1 to T2) in physical activity, and the associations between physical activity and socio-demographic factors. Stability in physical activity was defined as the percentage of students reporting the same physical activity both times.

**Results:** Boys were more active than girls at age 15 and 18 years, independent of ethnic background. Among girls, ethnic Norwegians were more active than ethnic minorities. Hours per week spent on physical activity declined in all groups during the follow-up period. Few associations were found between physical activity and socio-demographic factors in both cross-sectional and longitudinal data. Among the ethnic minority girls, 65% reported being physically active 0–2 hours per week at baseline, and 82% of these girls reported the same level at follow-up.

**Conclusions:** The association between physical activity and ethnicity at age 15 years remained the same during the follow-up. Few associations were found between physical activity and socio-demographic variables. A large proportion of ethnic minority girls reported a persistently low physical activity level, and this low participation rate may need special attention.

## 5.4 Paper IV

### **Response rates and selection problems, with emphasis on mental health variables and DNA-sampling, in large population based cross-sectional and longitudinal studies of adolescents in Norway.**

**Background:** Selection bias is a threat to the internal validity of epidemiological studies. In light of a growing number of studies aiming at providing DNA and a considerable number of invitees declining to participate, we discuss response rates, predictors of lost to follow-up and failure to provide DNA, and presence of possible selection bias, based on five samples of adolescents.

**Methods:** We included nearly 7000 adolescents from two longitudinal studies of 18/19 year-olds with two corresponding cross-sectional baseline studies at age 15/16 (10<sup>th</sup> graders), and one cross-sectional study of 13<sup>th</sup> graders (18/19 years). DNA was sampled from the cheek mucosa in the 18/19 year-olds. Predictors of loss to follow-up and failure to provide DNA were studied by Poisson regression. Selection bias in the follow-up at age 18/19 years was estimated through investigation of prevalence ratios (PRs) between selected exposures (physical activity; smoking) and outcome variables (general health; mental distress; externalizing problems) measured at baseline.

**Results:** Out of 5750 who participated at age 15/16, we lost 42% at follow-up at age 18/19. The percentage of participants who gave consent to DNA provision was as high as the percentage that consented to linkage of data with other health registers and surveys, around 90%. Significant predictors of loss to follow-up and failure to provide DNA samples were: male gender; non-western ethnicity; postal survey compared with school-based; low educational plans; low education and income of father; low perceived family economy; unmarried parents; poor self-reported health; externalizing symptoms; and smoking, with some differences in subgroups of ethnicity and gender. The association measures (PRs), however, were quite similar among participants and all invitees, with minor discrepancies in subgroups of non-western boys and girls.

**Conclusions:** Loss to follow-up has marginal impact on the estimated prevalence ratios in the present study. It is not likely that the invitation to provide DNA have influenced the response rates of 18/19 year-olds. Non-western ethnicity, male gender and characteristics related to low social class and general- and mental health problems measured at baseline, are associated with lost to follow-up and failure to provide DNA.

## **6.0 Discussion**

### **6.1 Methodological issues**

Many epidemiological studies make use of questionnaires to obtain information from the participants. There are however, several potential biases associated with this method of data collection. Awareness of the sources of measurement errors and how they can impact study results is important for drawing appropriate conclusions. In epidemiological studies we have both random and systematic errors (141). Random errors are, in many situations, attributable to precision and related to the size and the design of the study. Systematic errors include selection bias, information bias and confounding. Both random and systematic sources of error can affect the validity of the study (141). A valid study is equivalent to an “unbiased” study – a study that, based on the design, methods, and procedures will produce overall results that are close to the “truth” (142).

Before random and systematic errors are discussed, some comments about the design are given.

#### **6.1.1 Design**

In epidemiology, a cohort is defined most broadly (143) as “any designed group of individuals who are followed or traced over a period of time” (p57). A study is considered to have a longitudinal design if the information obtained pertains to more than one point in time (143). All cohort studies rely on data in which exposure information refers to an earlier time than that of disease occurrence/outcome, making the study longitudinal (143).

One problem in longitudinal studies is that some participants are lost to follow-up. Who are they and what is the impact on the results? We have devoted one paper to this issue (paper IV). Possible problems with incomplete follow-ups are discussed in section 6.1.3.4 (selection bias).

In paper I, II, III and parts of paper IV, information is collected twice from the same cohort and the study is considered to have a longitudinal observational design. In paper I, we study mental health at age 18 years according to the physical activity level at age 15 years adjusted for mental health at baseline (15 years). Despite the longitudinal design,

with physical activity as exposure coming before the symptoms of mental health problems, we can not infer the direction of causality from our analyses. In the analyses we adjust for baseline mental health, however, we can not rule out the possibility that the development of mental health problems has started before the exposure (physical activity) and thus influenced the physical activity at baseline. There could also be a common underlying unknown factor influencing both physical activity and mental health at both time points (see also confounding, 5.1.3.3).

In contrast to cross-sectional studies, considered to be snapshots in time, studies measuring the same individuals more than once make it possible to study change between the measurement points. Hence, the present design is suitable for studying change in mental health and physical activity from age 15 to 18 years (papers II and III). In descriptive epidemiology, distributions of determinants and disease occurrences in subgroups are essential (144). In paper IV, the longitudinal design also allows us to identify predictors of lost to follow-up and investigate the magnitude and direction of possible selection bias by comparing cross-sectional associations at baseline between all participants and those lost to follow-up.

Even though our design has limitations for making causal inferences, such a design can be one of the first steps in an investigation into causality. The design allows a large number of participants, which makes it possible to compare subgroups and to adjust for several variables. Additionally, such a study is relatively easy and fairly inexpensive to conduct.

### **6.1.2 Random errors**

Random errors represent the variability in the data that we can not really explain (143). Sampling variation and random measurement variation are two main types of random errors, that both can compromise precision (141).

*Sampling variation* arises as no sample will be exactly identical to the target population and because individual variation always occurs. Consequently, the estimates will vary from sample to sample, although the confidence limits will inform how close the estimate is likely to be to the underlying population value. A method to reduce sampling variation



is to enlarge the sample size (141). In paper I, II and III, the study population consisted of 3811 participants, whereas 2489 participated in the follow-up. While this sample size gave a fairly high precision in the overall results, small sample sizes in subgroups of gender and ethnic minorities reduced the precision and increased the probability of type II errors. For economical and practical reasons, there was no opportunity to enlarge the sample size.

*Random measurement variation* may lead to a reduction in the reliability of the measurements. The way to minimize random measurement variation is by securing precision in measurement (141). Both physical activity and mental health is measured by self-report, and random measurement variation might have reduced the precision of the measure. When comparing mean and mean differences (paper II and III), random measurement variation will hardly influence the estimation of the sample mean (145). With regards to associations, random error of measurement may dilute the estimated effect (145). For instance, the associations between physical activity and mental health, and physical activity and sociodemographic factors may be impaired due to random measurement variation.

With regards to measurement error, systematic inaccuracy is of greater concern than random variation (see information bias, 6.1.3.2).

A different, but related problem is multi-significance and the probability of making a type I error. When studying several outcome variables (SDQ subscales), associations may turn out statistically significant by chance. With a significance level of 5% ( $p < 0,05$ ), 1 in 20 significant tests will theoretically be positive by chance alone (141).

In this study, a 95% confidence interval and a significance level of 0.05 and 0.01 was used to emphasise findings. In paper I, we studied the associations between physical activity and all SDQ subscales. The results revealed only a few statistically significant associations with a stable trend after adjustments. These could be due to chance. Thus, only associations that showed a relatively consistent trend were emphasised (linear or u-shaped). Further, that other researchers report similar associations supports the validity of the findings (see discussion of findings, 6.2.1). In paper II, comparing various dimensions of mental health between ethnic minorities and ethnic Norwegians, and the association

with sociodemographic factors, we only highlighted findings with a p value less than 0.01. When studying the associations between physical activity and sociodemographic factors (paper III), we emphasised the pattern of findings and interpreted single significant associations with caution

It should be noted that when focusing primarily on the pattern of findings, we might have ignored some interesting single findings.

### **6.1.3 Systematic errors**

Bias is another term for systematic error. This can refer to an investigator's attitude, but it is mainly used to describe any systematic error in a study. The study can be biased because of the way subjects have been selected (selection bias), the way the variables have been measured (information bias), or some confounding factor not completely controlled for (confounding) (143).

#### *6.1.3.1 Selection bias*

Selection bias occurs when the subjects studied are not representative of the target population on which conclusions are to be drawn (143).

In the baseline studies, 88% of all 10<sup>th</sup> graders participated. We can not rule out the possibility that the adolescents who did not attend are systematically different from the participants. However, we consider the sample to be fairly representative for the 10<sup>th</sup> graders in Oslo and Hedmark during the school year 2000-2001.

In Oslo, 65% (2489) of the responders in the baseline study participated in the follow-up study (Youth 2004) (paper I, II and III). When pooling the longitudinal studies in Oslo and Hedmark, 63% of the participants in the baseline studies participated in the follow-up (paper IV). In paper I-III, we checked for baseline differences between responders and non-responders at follow-up for relevant variables and attrition analyses were performed. In paper IV, the main objectives were to study response rates and selection problems in epidemiological studies among adolescents. In the latter paper, the overall findings of significant predictors of lost to follow-up which are of relevance to paper I-III were; post invitation, male gender, non-western ethnicity, externalizing symptoms and mental

distress. Some of these predictors showed differences for subgroups of ethnicity and gender.

In the following section, possible selection bias in the papers is discussed.

In paper IV, we have investigated if there were differences in association measures (PRs) between baseline physical activity (exposure) and baseline mental health outcomes (mental distress and externalizing symptoms) among participants at follow-up and all invited, as a proxy evaluation of selection bias in associations between baseline exposures and outcomes at *follow-up*. In paper I, we studied, by linear regression, the association between physical activity and mental health at baseline between those lost to follow-up and participants.

In these papers there were some differences in the populations studied and the way mental health and physical activity were measured/operationalised. Associations were studied by gender in paper I, and in paper IV we additionally stratified the sample on ethnicity. In paper I, there was no different association between physical activity and mental health at baseline in responders and those lost to follow-up. In paper IV, the PRs in the groups compared were also similar. Thus, we may conclude that there is probably no major selection bias in the associations studied in paper I. In another longitudinal study by Wiles et al (146), investigating the association between physical activity and mental health, attrition was studied by imputing missing data using multiple imputations by chained equation (MICE). Sensitivity analyses including imputed data were consistent with the result in the complete-case analyses, suggesting that missing data had not biased the results (146).

Other studies support this conclusion by reporting association measures to be less sensitive to selection bias than prevalence measures (147-149).

In paper II and paper IV, there were some differences in the populations studied and the measures of mental health (SDQ total/SDQ externalizing). In spite of this, both papers reported no difference in mental health between (all) responders and those lost to follow-up among ethnic minorities/non-western ethnic minorities. However, among ethnic Norwegians/participants with western ethnicity there was a difference in both studies; poor mental health status was a predictor of lost to follow-up.

Others have shown that subjects who participate after reminders are fairly similar to the non-responders (148;150). In the attrition analysis in paper II, we found that ethnic Norwegians participating after reminders had a slightly poorer mental health than those participating after the primary invitation, indicating that the selection might hide a poorer development among ethnic Norwegians. Thus, a “differential” selection bias can not be ruled out in paper II. The fact that the response rate was lower in ethnic minorities (54%) than in ethnic Norwegians (70%), and that those with increasing mental health problems independent of baseline characteristics seem to drop out of longitudinal studies (151), complicate a prediction of the direction of the possible selection bias.

In paper III, we found a difference in physical activity between responders and those lost to follow-up among the ethnic minorities, but not among the ethnic Norwegians. In paper IV, there was no difference in physical activity between responders and those lost to follow-up, in neither subgroups of ethnicity nor gender. This could be due to a somewhat different study population and different operationalisation of physical activity in the two papers.

In paper III, attrition analysis revealed no difference when comparing changes in those participating after the primary invitation and those participating after reminders. Thus, the overall findings indicate that the attrition did not influence the comparison of mean change in physical activity in paper III substantially.

A high proportion of missing values in a data set could also introduce selection bias. However, the amount of missing values in the data set used in paper I, II and III was generally low, and the effect of this attrition is hardly substantial. When studying health and health behaviour as predictors for lost to follow-up in paper IV, we adjusted for different sociodemographic factors (table 4). A significant number had missing records in at least one of the variables adjusted for, hence the adjusted analyses included fewer individuals than the crude analyses. To get an impression if the crude estimates were representative for the individuals included in the adjusted analyses, we also did the crude analyses with only the participants included in the adjusted analyses. Some of the associations were slightly stronger, but the overall results did not change.

In conclusion:

It is not possible to conclude that the association between baseline physical activity and mental health at follow-up, or that change in mental health problems and weekly hours of physical activity, is free from selection bias. However, considering the analyses of the present data and previous studies, we may say that attrition has not influenced the conclusions substantially, even though some findings indicated a possible selection bias in the comparison of mental health between ethnic Norwegians and ethnic minorities.

#### *6.1.3.2 Information bias*

Information bias can arise because information collected about or from study subjects is erroneous. Because the present study is mainly based on self-reported data, information bias may come from imperfect measures of exposure, outcome and covariate variables.

Imperfect measures obtained from questionnaires may e.g. be biased due to a permanent tendency to exaggerate or underestimate problems/behaviour (permanent response style) and/or because of a subject's state of mind at the time when the responses are given (situational response style) (152;153). Social desirability and recall bias are other factors that contribute to information bias and impair the validity of the measures in self-report studies (142;143).

Information bias may lead to misclassification; which can be non-differential or differential (142;143;145;154). Differential measurement error occurs when the degree of error in the exposure variable depends on the response variable or vice versa. For instance, if the degree of misclassification of physical activity varies with mental health problems, i.e. due to social desirability bias and/or permanent response style, we would have a differential misclassification in paper I. We can not exclude such a misclassification, but due to the time difference between exposure and outcome the possible misclassification is more likely to be non-differential. A non-differential error occurs when the error in the exposure variable is independent of the response variable - or the other way around (145;154). Non-differential errors have been considered less serious, as the general understanding has been that the effect (in simple models) is most often biased in the direction of the null (142;154).

A related problem is that of dependent, or correlated, errors, occurring when there are measurement errors in both the exposure and the response variable, and these errors are correlated (153;154). In the current thesis, this may e.g. be of relevance in the cross-sectional analyses in paper IV. Correlation of the tendencies to over-/under report smoking and mental health problems, and/or physical activity and mental health problems, may give biased estimates. However, the purpose of the analyses in paper IV was not to estimate the strength of the associations but to compare the association between all participants and those lost to follow-up in subgroups of adolescents. The feasible dependency in exposure and outcome is probably the same in the groups compared.

A greater problem in both the cross-sectional and longitudinal analyses in paper II and III is if the permanent response style, situational response style, social desirability and/or recall bias differ between the ethnic groups compared. We will then have differential misclassification, and the comparison of the groups will be biased.

In paper II, changes in mental health are compared between ethnic minorities and ethnic Norwegians. When studying changes over time the permanent response bias problem is avoided to some degree because the same person reports at both time points. Social desirability bias may also influence the report of mental health, and the magnitude of this bias may differ between the ethnic groups. In a study from the Netherlands, Moroccan immigrant youths reported fewer externalising problems than the Dutch natives, whereas their parents reported as many problems as Dutch native parents (85). The teachers, on the other hand, reported far *more* externalising problems for Moroccan immigrants than Dutch native youths. The authors pointed out social desirability bias as a possible explanation for these findings (85). Another factor affecting the validity of the findings is that the cultural equivalence of the scales is unknown. The internal consistency (reliability coefficients; Cronbach alpha values) was similar for ethnic Norwegians and ethnic minorities, however, we can not rule out that questions are differently understood due to differences in linguistic abilities in the ethnic groups and/or according to the norm of their specific cultural reference groups. Thus, we may compare a somewhat different underlying construct in the two ethnic groups. This should be kept in mind, especially in the cross-sectional comparisons between the ethnic groups.

Recalling physical activity is a complex cognitive task and there are concerns about children's ability to accurately recall physical activity (155). However, this particularly relates to younger children who are frequently active in short bursts and are less active in structured activities. Our participants are 15 years at baseline and it is reasonable to assume that they are capable of filling in the general question of physical activity. A general problem of remembering affects all people and to some extent tends to be non-differential (143).

Social desirability bias may have led to an over-report of physical activity (155). One study evaluating question wording in surveys of culturally diverse adult populations in the US, reports variation by race/ethnicity in the way the respondents defined physical activity (156). The findings from this study also suggested an over-report of the frequency of physical activity due to social desirability in some ethnic minority groups (156). Several methodological differences complicate the comparison with our study (adults/adolescents, interview/survey and different ethnic groups). However, ethnic minorities and ethnic Norwegians might have a different understanding of the physical activity question. This might especially affect the cross-sectional comparisons in paper III. Another limitation, already mentioned in the methods (4.3.1.2), is the accuracy of the self-reported physical activity measure (weekly hours spent on physical activity). Thus, we have interpreted the exact answers with caution and focused on associations and differences between groups, and believe that the measure is reasonably reliable and valid for these purposes.

In conclusion:

We have no information indicating that a major information bias makes our conclusions erroneous. However, the cultural equivalence of the measures used is not well enough explored, and a differential misclassification between ethnic Norwegians and ethnic minorities can not be ruled out. To ensure validity in multicultural research, more knowledge on the cultural equivalence of measures is needed.

### 6.1.3.3 *Confounding*

Confounding can be thought of as a mixing of effects (143). To be a confounder the factor must be associated with the outcome, either as a cause or a proxy for a cause, but not an effect of the outcome, and associated with exposure, but not an effect of exposure (143).

Several potential confounding factors were included in the multivariate analyses in the papers. However, we can not rule out residual confounding due to wide classification, imprecise measures and/or factors not adjusted for (e.g., like parents' physical activity and mental health).

In paper I, we have adjusted for well known confounders when studying the association between physical activity and mental health. A factor not taken into consideration is that the participants are attending different schools, and also different classes. However, a study by Wiles et al (146) found no evidence for an effect of school on the association between physical activity and mental health problems (measured by SDQ). In our study, this is complicated by the fact that the participants change classes and schools during the follow-up period.

In addition to the confounding variables we adjusted for baseline mental health symptoms, and it attenuated the association between physical activity (baseline) and mental health (follow-up). It is possible that SDQ scores at baseline lie on the causal pathway between physical activity at an earlier age and later mental health problems, and as such, adjustments for baseline symptoms may represent an over-adjustment.

In paper II, we compared mean changes in mental health scores between ethnic Norwegians and ethnic minorities, adjusted for different sociodemographic variables. The minimal difference between the crude and adjusted estimates indicates that the sociodemographic factors measured did not explain the difference between the ethnic groups.

In paper III, we compared physical activity between ethnic Norwegians and ethnic minorities. In the final version of the paper, the comparisons of change in physical activity with adjustment for sociodemographic variables were not included. However, the



analyses were done in a previous draft and crude and adjusted analysis gave the same results (no ethnic difference in change in physical activity in neither boys nor girls).

In Paper IV, we adjusted for various sociodemographic confounders when studying health and health behaviour as possible predictors for lost to follow-up (Table 4), and the estimates did not change substantially.

In conclusion:

We have performed multivariate analyses and controlled for most confounders used in other similar studies. Nevertheless, confounding by variables not measured can never be ruled out.

## **6.2 Discussion of main results**

In this section I will discuss the association found between physical activity and mental health according to gender (paper I). I will then discuss physical activity and mental health in ethnic Norwegians and ethnic minority adolescents (paper II, III and IV), before sociodemographic differences in mental health and physical activity are highlighted (paper II and III).

### **6.2.1 The association between mental health and physical activity according to gender**

Boys were more physically active than girls in our study (Paper I and III), a finding that is well established (4;93;94;105;106). The gender difference in symptoms of mental health problems – with more symptoms in girls and a somewhat different pattern of change during late teens (Paper I and II), is also widely described in the literature (24;68;70;73).

In boys, we found a weak inverse association between weekly hours of physical activity at age 15 and emotional- and peer problems three years later. In girls, the associations did not persist after adjustments (Paper I).

Negative associations between physical activity and depression/sadness/emotional problems are reported in several cross-sectional studies (28-31;157;158). Positive associations have also been observed between physical activity and psychological well-being and good social function (32-34;37;159). Gender differences in the associations are rarely reported in these studies, but have been seen in some recently published cross-sectional studies (160;161). In a study of 15-16 year-olds in Finland (160), physical activity was inversely associated with symptoms of anxiety/depression in boys, and social problems in both boys and girls. No association between accumulated amount of physical activity and depressive symptoms was found among 13-18 year-old Americans, but boys joining a sports club reported less depressive symptoms than those who did not (161). Boys were involved in a larger number of structured sporting activities than girls (161). It was suggested that the association found may reflect the Western gendered cultural expectations that males develop physical prowess and competitive skills through sporting activities (160;161). These norms may expose uninvolved males to pressure or criticism. In contrast, non-participation may be more socially acceptable for females than males, and females may have avenues for social contact through non-sporting alternatives. These hypotheses may also be valid for our longitudinal findings. However, whether physical activity represents something else in boys than girls, or if the gender difference in the associations found is due to gender differences in types of activity, needs more research.

As emphasised in paper I, being active in organised physical activity gives opportunities for adult supervision, exposure to role models, and social networking and all these may provide social skills and improve self-esteem (34;65). However, not all organised physical activity does automatically give the foundation for such positive growth. Donaldson et al (34) emphasise that focus on competition must be lessened and the educators should encourage a cooperative learning environment while promoting autonomy to achieve positive growth. Additionally, the authors of this paper points out that success defined in terms of mastering personal goals rather than winning, may have long term mental health benefits (34).

After we submitted paper I, a few longitudinal studies have been published looking at the association between mental health and physical activity in youth (146;162;163). Two of

these studies followed somewhat younger participants (146;163), but they both measured mental health with the same instrument (SDQ) as we did. Clark et al (163) studied psychological symptoms and physical health and health behaviour in 11-12 year-olds followed for two years in London. They found no association between inactivity (<2 h per week) and later psychological health. The second longitudinal study by Wiles et al (146) followed English 11-14 year-olds for 1 year and reported that children who undertook physical activity at recommended levels (1 h per day) had fewer emotional problems 1 year later, although this effect attenuated markedly after adjustment for gender and baseline symptoms (146). The third study is to our knowledge the first large scale study to explore prospectively the relationship between physical activity and mental disorder assessed by interview, using Composite International Diagnostic Interview (CIDI). The researchers followed 2548 14-24 year-olds in Germany for 4 years (162), and found that regular physical activity at baseline was associated with a lower incidence of anxiety, somatoform and dysthymic (depression) disorders. By contrast, the incidence of bipolar disorder was increased among those with regular physical activity at baseline. Some interactions were found for gender and age i.e. regular physical activity appeared to be particularly protective for mood disorders in older males (162). In terms of the population attributable fraction, the potential for preventive effects of physical activity on mental disorders was considerably higher for men than women. Wiles et al (146) also considered the possible protective importance of physical activity on mental health problems in a public health perspective, after acknowledging the small effect size in their study. They calculated the reduction in emotional problems according to meeting physical activity recommendations or not. This was done by dividing the adjusted mean difference between the two groups at follow-up with the baseline symptoms for the whole group, and it equated to a 9% reduction in emotional problems. The authors argue that this may be important in a population perspective.

Some of the postulated mechanisms behind the effects of physical activity on mental health, especially the biological hypothesis, are assumed to have a short-term effect and continuation of physical activity is needed for a lasting effect. Some of the social and psychological hypotheses, involving social competence, forming of friendship, self-esteem and self-efficacy, may have more long-term effects. The longitudinal studies

referred to above (146;162;163), and our paper I, all studied “the long-term effect” of physical activity, by revealing the association between physical activity at baseline and mental health problems at follow-up. In paper III, we found that physical activity declined in the follow-up period from 15 to 18 years of age. A reduction in physical activity during follow-up among adolescents that were physically active at baseline could be accompanied by an increase in mental health problems. If so, this might have weakened the association between physical activity at baseline and mental health at follow-up. The only study we have found looking at *changes* in physical activity and mental health, found that a reduction in physical activity was associated with an increase in depressive symptoms (44).

At present, the evidence to support a longitudinal association between physical activity (at baseline) and mental health problems (follow-up) among adolescents is weak. This may reflect the lack of longitudinal studies of good quality in the area. The study using CIDI to assess mental health disorder (162) found stronger associations than our study (paper I) and the other studies using self-report measures (146;163). Nevertheless, the existing evidence points towards a longitudinal link between physical activity and depression and anxiety. However, more research is needed and further longitudinal research should study how the longitudinal pattern of physical activity is associated with mental health.

## **6.2.2 Mental health and physical activity according to ethnicity**

### *6.2.2.1 Mental health in ethnic minorities and ethnic Norwegians*

At both 15 and 18 years, we found that ethnic minorities reported more mental health problems than ethnic Norwegians of the same gender. However, no differences were found for mean change in symptoms of mental health problems from 15 to 18 years between ethnic Norwegians and ethnic minorities (Paper II).

As pointed out in the introduction, others have also reported a higher prevalence of symptoms of mental health problems among ethnic minorities/immigrants (76-78) than the native/host adolescents. However, results are inconclusive as no difference (79-82) or fewer symptoms have also been reported (82-84).

In paper II, the processes of migration are discussed as possible explanations for the current findings. However, cultural diversity in the ethnic minority group studied and the length of stay in Norway are also pointed out as factors that may give a more heterogeneous picture of the ethnic minority group. A later published cross-sectional paper by Oppedal et al (164), has analysed the whole youth part of the Oslo Health Study, and found that symptoms of mental distress varied depending on the country of origin and gender. The authors conclude that young Muslim immigrants in Norway are not in general at risk of increased mental distress (164). The size of our longitudinal sample limits analyses on specific ethnic groups. Even if our study does not have the strength or relevant information to give a detailed picture of changes in symptoms of mental health problems in various ethnic minorities, it points out ethnic minorities as a vulnerable group and gives the foundation for further research.

#### *6.2.2.2 Physical activity in ethnic minority and ethnic Norwegians*

We found no differences in physical activity between ethnic Norwegian and ethnic minority boys. Among girls, ethnic Norwegians were more physically active than ethnic minorities, making ethnic minority girls the least active group. In all groups, there was a consistent reduction in mean hours of physical activity from 15 to 18 years.

When paper III was submitted, other epidemiological studies had also reported that ethnic minority girls were less physically active than their host counterparts (100;107;111;165;166), but only one of these papers was from Europe. During the last couple of years, a few papers have been published on a somewhat older population of Turkish and Moroccans in the Netherlands (167-169). Hosper et al (168) reported that Turkish and Moroccan young women were less physically active than Dutch young women (mean age 19.3-25 years). Non-western immigrant women in parts of the western world are also reported to be less physically active compared with the host population, in Norway (170) and in other European countries (166;171-173).

To our knowledge, the only European longitudinal study reporting physical activity in different ethnic groups of adolescents, compared mean hours of physical activity per week and concluded that the ethnic differences did not evolve over the teenage years (111). In addition to comparing mean changes in physical activity, we studied stability by

categorizing physical activity in two groups (0-2 h vs. 3 h or more) and measured the tendency of the subjects to report the same activity at the two time points. Ethnic minority girls was the largest group being physically active 0-2 hours at baseline (65%), and also the group with the largest relative amount of participants remaining in this fairly inactive group (82% of the 65%). Additionally, 54% of the ethnic minority girls who were physically active 3 hours or more at baseline reduced their activity level at follow-up (Paper III - figure 2).

The existing epidemiological literature seems to agree that young ethnic minority/immigrant females are less physically active than their counterparts.

The possible role of religion and culture on the ethnic disparities in physical activity found in our data is discussed in paper III. Later publications have showed that cultural heritage impacts physical activity norms, attitudes, and patterns (174-176). Shuval et al (175) conclude that the disparity between Arab and Jewish students in Israel, with Arab Israeli being least physically active, might primarily stem from the Arab Israeli living in an extended family setting that deemphasises the importance of physical activity. Among Muslims, boys and girls have different opportunities for being physically active. Girls have more responsibility at home and less “freedom” than boys (174), and the importance of family-oriented interventions to increase physical activity in people from cultures high on “familism” is acknowledged (174;175). The importance of social support from family for being physically active was also highlighted in a paper studying Iranian female adolescents in Iran (176). The restrictions regarding exercising in public was pointed out, and the need for ethnic and gender specific interventions to increase physical activity among Iranian girls, and similar cultural groups, was emphasised.

The majority of ethnic minority adolescents in our study population had a non-Western background. However, the above discussed importance of cultural heritage emphasises that a more cultural/ethnic specific subclassification may be of importance in further studies.

### 6.2.2.3 *The association between mental health and physical activity according to ethnicity*

In paper I, we did not have a specific focus on ethnicity, and only adjusted for ethnic background. In paper II and III, ethnicity was given a broader focus, and when studying possible selection bias in paper IV separate analyses were done for ethnic Norwegian/Western and non-Western minorities. The cross-sectional association between physical activity and mental health at baseline among “all invited” and those participating in the follow-up study (“participants at follow-up”) was similar in girls irrespective of ethnic background. This was overall true also for boys, even though the association estimate was less concurrent (table 5, paper IV).

We are aware of only one paper comparing ethnic groups when studying the association between physical activity and mental health among adolescents (30). This cross-sectional study compared Hispanic and non-Hispanic white girls in the US, and found no difference in the association between physical activity and feeling of sadness, or physical activity and considering and planning suicide (30).

We are not aware of any longitudinal studies focusing on the association between physical activity and mental health among host and immigrant adolescents.

Given the findings in paper II and III, and the possible cultural explanations for the ethnic differences in both mental health and physical activity, the possible cultural impact on the association between changes in physical activity and mental health is yet to be explored.

### **6.2.3 Mental health and physical activity according to sociodemographic variables**

Overall, few associations were found between physical activity and sociodemographic variables in both the cross-sectional and the longitudinal dataset (paper III). However, the few associations were more pronounced in girls than boys. There was no different effect of sociodemographic variables on changes in weekly hours of physical activity between ethnic Norwegians and ethnic minorities.

Mental health was also weakly associated with sociodemographic factors in the cross-sectional analyses at baseline (paper II). Perceived family economy was the only factor associated with mental health in both ethnic Norwegians and ethnic minorities. The association between the sociodemographic factors and changes in mental health did not

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differ between the ethnic Norwegians and ethnic minorities, and the sociodemographic measures hardly affected the change-estimates.

Associations between sociodemographic factors and health may not be equally apparent across the lifespan (177;178). West (177) reviewed the literature on social class patterning from childhood, through youth and into adulthood, concerning various dimensions of health (mortality, chronic illness, specific conditions, self rated health, acute illness, accidents/injuries and mental health). He hypothesised that the social class gradient seen in child- and adulthood equalises in youth, and concludes that the overall picture was consistent with his hypothesis, except for severe chronic illness. West (177) summarises that the majority of the literature on emotional problems showed no or only a weak association with social class parameters in adolescents. Some studies which used perceived “economic hardship” found a weak association, but the possibility of reversed causality was suggested. This may also be the case for the associations found in our study. A possible reason for the equalisation pattern discussed in the literature is that during secondary high-school years the peer group and youth culture cut across those of family, home background, and neighbourhood in such a way as to reduce or remove class differences in health (177;178). This may also be relevant for our findings, but we (only studied a few factors and) can not exclude that other measures of sociodemographic status would have revealed associations. The equalisation theory has also been challenged (179) and more differentiated according to various health outcomes and gender (180;181).

The above referred literature focused on health outcomes, and not health behaviour like physical activity. It may be that the increasing peer influence during adolescence also contributes to deflate the association between sociodemographic variables and physical activity. The lack of associations between the current sociodemographic variables and physical activity in paper III were more striking than the few associations found when considering all the factors studied. In paper III, we referred to reviews evaluating the association between various indexes of socioeconomic status and physical activity, which found that associations were dependent of the subgroup studied and the measures used (112-114). However, the reviews seemed to agree that there was an association between physical activity and socioeconomic factors in adolescence, but the associations were



perhaps not as robust as those in adulthood. One of the reviews also pointed out that associations may be stronger in girls than boys (112). A possible explanation for the gender difference discussed by Hanson et al (112) is that girls may be more likely to exercise if they are enrolled in a formal activity, such as dance classes and soccer practice (182). As a result, girls of low socioeconomic status may be hindered in their access to such activities, and thus engage in lower levels of physical activity than girls of high socioeconomic status. In contrast, males may engage in daily activity as a more natural part of their interaction with peers, hence differences in physical activity by socioeconomic status is less likely to appear (112). This might also explain why the few associations found in paper III were mainly among girls.

The results from our paper (III) give *some* support that West's equalisation theory (177) may also apply to health behaviour like weekly hours of physical activity. However, use of different measures like types of activities and/or membership in sports clubs could possibly have uncovered stronger associations (183;184).

When paper III was submitted, we were not aware of other studies reporting associations between sociodemographic variables and change in physical activity during late teens. We are now aware of a few studies reporting such associations; two in the U.S. (100;185) and one from Slovakia (186). The first study from the U.S. followed girls and found that parents' education, but not income, was inversely associated with decline in activity through late adolescence (100). The second study found no different change between socioeconomic groups in hours of physical activity for either gender (185). However, when taking organised sport into consideration, a steeper decline in hours of physical activity was found among boys with low socioeconomic status joining organised sport, than among boys from the same socioeconomic group not doing any organised sport. Socioeconomic status was measured by an index based on parents' education, employment status and family's reception of public assistance (185). The Slovak study explored the amount not getting sufficient physical activity during late teens according to several socioeconomic factors, and found no associations in boys (186). Among girls, an increase in insufficient physical activity was seen among those with low education themselves, and low parental education and -occupational level (186).

These findings illustrate that results depend on the measures of both physical activity and socioeconomic status. Another important factor when comparing studies is that physical activity may be differently associated with socioeconomic status in different countries. However, the current literature indicates that socioeconomic factors are perhaps more strongly associated with some aspects of physical activity than the analyses and the discussions in paper III revealed.

## 7.0 Conclusions

The findings in paper I, II, III and IV support the following conclusions to the aims addressed in the present thesis:

- We found a weak inverse association between weekly hours of physical activity at age 15 and emotional- and peer problems three years later in boys. In girls, the associations did not persist after adjustments.
- Ethnic minorities reported overall more mental health problems than ethnic Norwegians of the same sex at both 15 and 18 years. No ethnic disparities were found for mean change in mental health from 15 to 18 years, and the current sociodemographic factors were not differently associated with changes in mental health between the ethnic groups.
- Among girls, ethnic Norwegians were more physically active than ethnic minorities. Ethnic minority girls were the least physically active group. No difference was found in physical activity between ethnic Norwegian and ethnic minority boys. There was a consistent reduction in physical activity from 15 to 18 years in all groups, and sociodemographic factors were only marginally associated with this reduction.
- Non-western ethnicity, male gender and characteristics related to low social class and general- and mental health problems measured at baseline, were associated with lost to follow-up. Lost to follow-up had marginal impact on the estimated prevalence ratios in the present study.

## **8.0 Public health and research implications**

Our findings concerning the longitudinal associations between physical activity and mental health indicate that physical activity may have a potential in prevention of mental health problems in subgroups of adolescents. Whether increased physical activity translates into reduction or lower increase of mental health problems in the general population of adolescents is still unknown. To demonstrate causal effects of physical activity on mental health outcomes, experimental intervention studies are needed. Large scale community trials are one way to study if physical activity may have an effect on mental health at a population-level. The fact that the health authorities in Norway have an action plan for promotion of physical activity, where a specific aim is to increase physical activity in schools, provides an opportunity for research on this topic. Inclusion of mental health measures in the evaluation of these programs may be one step towards providing a stronger evidence-base for the potential mental health effects of physical activity in a public health perspective.

The interventions aimed at increasing and sustaining physical activity among children and adolescents are crucial. Given the ethnic and gender difference in physical activity, interventions should be tailored to meet these subgroups' distinctive needs. Girls, especially those of ethnic minorities, need special attention.

Although observational longitudinal studies can not determine causal effects, such studies can provide some needed understanding of possible causal mechanisms and identify possible targets for intervention in different subgroups of the population. More specifically, population based cohort studies can contribute to increase knowledge on associations between mental health and different aspects of physical activity in subgroups of e.g. ethnicity. Special attention to the cultural equivalence of methods of measurement is also needed.

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## **Errata**

### **Paper I:**

Table 1: Alcohol last year. The most frequent category; “2-3 times per week” is missing “or more” in the label.

Statistical methods: It is written that analyses were done separately by gender. In the description of SDQ, gender differences are tested. Gender differences in the associations between physical activity and covariates are also tested.

### **Paper II:**

Statistical methods: It is written that analyses were done separately by gender. In table 2 gender differences are tested.

### **Paper III:**

In the flow chart, the correct number from the baseline study in Oslo who had reservations against being contacted again should be 173 (not 166).

### **Paper IV:**

Mother’s and father’s education from SSB’s register on education (2002) was used, in the submitted script (paper IV) 2000 is written – (it will be changed in the final version).









## The association between weekly hours of physical activity and mental health: A three-year follow-up study of 15–16-year-old students in the city of Oslo, Norway

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### Abstract

**Background:** Mental health problems are a worldwide public health burden. The literature concerning the mental health benefits from physical activity among adults has grown. Adolescents are less studied, and especially longitudinal studies are lacking. This paper investigates the associations between weekly hours of physical activity at age 15–16 and mental health three years later.

**Methods:** Longitudinal self-reported health survey. The baseline study consisted of participants from the youth section of the Oslo Health Study, carried out in schools in 2000–2001 ( $n = 3811$ ). The follow-up in 2003–2004 was conducted partly at school and partly through mail. A total of 2489 (1112 boys and 1377 girls) participated in the follow-up. Mental health was measured by the Strengths and Difficulties Questionnaire with an impact supplement. Physical activity was measured by a question on weekly hours of physical activity outside of school, defined as exertion 'to an extent that made you sweat and/or out of breath'. Adjustments were made for well-documented confounders and mental health at baseline.

**Results:** In boys, the number of hours spent on physical activity per week at age 15–16 was negatively associated with emotional symptoms [B (95%CI) = -0.09 (-0.15, -0.03)] and peer problems [B (95%CI) = -0.08 (-0.14, -0.03)] at age 18–19 after adjustments. In girls, there were no significant differences in SDQ subscales at age 18–19 according to weekly hours of physical activity at age 15–16 after adjustments. Boys and girls with five to seven hours of physical activity per week at age 15–16 had the lowest mean scores for total difficulties and the lowest percentage with high impact score at age 18–19, but the differences were not statistically significant after adjustments.

**Conclusion:** Weekly hours of physical activity at age 15–16 years was weakly associated with mental health at three-year follow-up in boys. Results encourage a search for further knowledge about physical activity as a possible protective factor in relation to mental health problems in adolescence.

## Background

Mental health problems are a worldwide public health burden. They decrease the quality of life and substantially increase health care costs. At any given time, one in eight children have an impairing psychiatric disorder [1], and considerably more adolescents report psychiatric symptoms [2]. The fact that symptoms of mental distress are frequent and cause significant impairment underlines the importance of knowledge about risk and protective factors in relation to mental health problems.

The documented benefits from regular physical activity for psychological well being in adults include improved mood states, enhanced self-perception and self-esteem [3]. Further, exercise has been recommended as a tool in therapy for mild to moderate depression and anxiety [3,4]. Several mechanisms have been hypothesized. Biochemical mechanisms which include release of endorphins, and increased serotonin and norepinephrine synthesis have been suggested, but methodological problems have prevented the link to mental health effects in humans [3,5,6]. Another hypothesis is that exercise reduces emotional strain and serves as a buffer against stressful events. In addition, participation in regular physical exercise programs may convey a sense of mastery and increased self-esteem [7-9]. Participation in sport and exercise groups may also provide social interaction and promote social support. Most studies reporting mental health effects of physical activity deal with relationships between physical activity and mental health within short time frames [3,4]. Little is known about the long-term effects of physical activity on the risk of developing mental health problems [4]. The small known number of prospective studies of adults concludes that inactivity is an independent predictor of depressive disorder and that physical activity protects against depression [10-15]. One study of women reports a negative association between athletic activity in college and depression 15 years later [15]. Others could not find evidence that exercise reduces the risk of depression [16] or anxiety [10,13]. Some population-based studies focus on the relation between physical activity and mental health in adolescents, but most of them are cross sectional [17-21]. The only, to our knowledge, population-based longitudinal study in young teens (7th to 8th grade) reported an association between reduced physical activity and increased depressive symptoms [22]. Thus, knowledge of the association between physical activity and various dimensions of mental health in a longitudinal perspective are lacking. In a review of the dose-response effects of physical activity on depression and anxiety, the authors noted the lack of studies focusing on frequency or duration of physical activity and symptoms of mental health problems [23]. Although both physical activity and mental health problems in adolescence differ by gender, results are rarely reported sep-

arately for boys and girls. Thus, little is known of the relationships between different amounts of physical activity in mid-teens and various mental health outcomes over time, and whether the associations differ by gender.

The aim of the present study was to investigate how numbers of weekly hours of physical activity in boys and girls at age 15-16 are associated with mental health three years later.

## Methods

### Baseline study

All 10th graders in Oslo during the school years 1999-2000 and 2000-2001 were invited to enter the youth component of the Oslo Health Study, a questionnaire study conducted in schools. All parents received written information and the students completed a consent form before participation. The students completed the two questionnaires during two school classes. A project assistant was present in the classroom to inform the students about the survey and to administer the questionnaires. Questionnaires were left at school to be completed by students not present on the day of the survey. Those who did not respond were sent a copy by mail to their home address, together with a prestamped, return envelope. A more detailed description has been published elsewhere [24]. From the total population of 15-16-year-olds, 7343 (88%) participated. Those participating in 2000-2001 ( $n = 3811$ ) constituted the baseline of our longitudinal study and were invited again in 2004.

### Follow-up study

The follow-up study was carried out partly as a school-based survey and partly through mail. The study is described more thoroughly elsewhere [25]. The procedure of the school-based part of the study was similar to the baseline. All the 32 secondary high schools in Oslo took part and the final year students filled out one questionnaire during one school class.

The participants in the baseline study (2000-2001) who were not enrolled in the final year of secondary high school in Oslo and who had consented to participate in a follow-up were invited by mail to participate. The invitation included an invitation letter, an information brochure, a consent form, the questionnaire and a prestamped return envelope. Two reminders were sent to those who did not respond.

### Study population

From the participants in the baseline study (3811), 2489 (1112 boys and 1377 girls) participated in the follow-up with consent to link data from the two surveys. Students reporting motor disabilities at baseline were excluded ( $n = 56$ ). Only adolescents who had participated in both sur-

veys were included in the analysis ( $n = 2433$ ) [see Additional file 1]. Those who did not respond in the follow-up were characterized at baseline by higher mean (SD) SDQ total (10.8 (4.9) vs. 9.6 (4.8),  $p < 0.001$ ) and lower physical activity levels ( $p < 0.001$ ). The association between SDQ total score and physical activity at baseline among the responders and non-responders was similar ( $p^{\text{(interaction)}} = 0.725$ ).

## Measures

### Mental health

We used the self-report version of the Strengths and Difficulties Questionnaire (SDQ) [26]. The SDQ has been used in large number of studies during the last ten years, including the British Child and Adolescent Mental Health Survey [27], The US National Health Interview Survey [28], and several large Norwegian epidemiological studies [29]. The SDQ is a 25-item screening questionnaire with five scales, each consisting of five items, generating scores for emotional symptoms, conduct problems, hyperactivity-inattention, peer problems, and prosocial behaviour. Each item can be answered with 'not true' (0), 'somewhat true' (1) or 'certainly true' (2). The first four problem scales are summed to generate a total difficulties score. SDQ is designed and validated for youngsters (11–16 years), but SDQ has also been used for older youths [29]. In the follow-up questionnaire minor linguistic changes were made in accordance with the approved Norwegian translation. The internal consistency (Cronbach's alpha) of the various SDQ scales at baseline and follow-up were: 0.73, 0.77 for the total difficulties score; 0.70, 0.73 for emotional symptoms; 0.47, 0.38 for conduct problems; 0.54, 0.65 for hyperactivity-inattention; 0.53, 0.57 for peer problems; and 0.64, 0.61 for prosocial behaviour. In accordance with other studies, the Cronbach's alpha values were low for some of the subscales [30], particularly for conduct problems [31]. The problem scales are based on current nosological concepts [30]. Conduct problem items cover selected essential criteria for oppositional defiant disorder and conduct disorder [32]. A large validation study found that a high score on the self-report conduct problems was associated with an odds ratio of 7.1 for having conduct or oppositional-defiant disorder [30]. The self-report version of SDQ has also shown satisfactory discrimination between community and clinical samples [33].

Many young people with high psychiatric symptoms score in epidemiological studies, are not significantly socially impaired by their symptoms [34]. To get a better indication of influence of the symptoms an impact supplement has been made [35]. This supplement was included in our follow-up survey and starts with a question on whether the respondent thinks he or she has a problem. If so, further enquiries are made about chronicity, overall distress,

social impairment and burden to the environment. The impact questions have four response categories: no (0), little (1), quite a lot (2), a great deal (3). The items concerning overall distress and social impairment related to family, friends, learning situation and leisure activities generate a total impact score, ranging between 0 and 10. A validation study finds that the impact scores discriminate between a clinical and a community sample, and that impact scores were better than symptoms scores at discriminating between the two samples [35]. Goodman defines a score of two or more as 'abnormal' or 'caseness' and a score of one as borderline [35]. The variable is dichotomized into high ( $\geq 1$ ) and low ( $< 1$ ) scores when conducting logistic regression.

### Weekly hours of physical activity in leisure time

Participants were asked how many hours per week they spend on physical activity 'to an extent that make you sweat and/or out of breath'; 0, 1–2, 3–4, 5–7, 8–10, or 11 hours or more per week. When studying the relationship between physical activity and mental health by variance analysis and logistic regression, physical activity was recoded into four groups (0, 1–4, 5–7 and  $\geq 8$  hours per week). The six original categories were included as an ordinal variable coded 1,2,..6 in multiple linear regression.

### Confounding factors

Adjustments were done for well-documented confounding factors: ethnic background, family economy, smoking, and use of alcohol [36–39]. Of the study population, 20% reported an ethnic minority background, defined as those having both parents born in a country other than Norway [40]. The family economic status was characterized as 'very bad/bad', 'good' or 'very good' based on a question comparing the family economy with other families in Norway. Alcohol consumption was measured by asking how often in course of the past year the person had drunk alcohol, and coded into six categories (Table 1). Smoking habits were categorized into 'never/quit', 'once in a while' and 'daily'.

Because the study was conducted partly in school and partly by mail, we created a variable, 'invitation group', categorizing mail or school participation.

### Ethics

Both protocols were evaluated by the Regional Committee for Medical Research Ethics and were approved by the Norwegian Data Inspectorate. The baseline study, and the part of the follow-up study carried out in the schools, received approval from the school authorities in Oslo.

**Table 1: Baseline characteristics of participants in the youth part of the Oslo Health Study (2000–2001) who participated in the follow-up in 2004.**

Characteristics at age 15–16	Boys		Girls		<i>p</i> , gender
	<i>n</i> = 1085*	%	<i>n</i> = 1348*	%	
<b>Invitation group</b>					0.489
In school	913	84.1	1148	85.2	
By mail	172	15.9	200	14.8	
<b>Ethnic background</b>					0.099
Ethnic Norwegian	879	81.5	1057	78.8	
Ethnic minority	200	18.5	285	21.2	
<b>Family economic status</b>					0.047
Very bad/Bad	285	26.6	399	30.2	
Good	634	59.2	771	58.3	
Very good	152	14.2	152	11.5	
<b>Alcohol use last year</b>					0.094
2–3 times per week	42	3.9	51	3.8	
Once per week	137	12.9	204	15.4	
2–3 times per month	233	21.9	245	18.5	
Once per month	94	8.8	128	9.6	
A few times	247	23.2	342	25.8	
Not at all	313	29.4	357	26.9	
<b>Smoking</b>					<0.001
No	844	78.2	939	70.0	
Once in a while	152	14.1	232	17.3	
Yes, daily	83	7.7	171	12.7	
<b>Physical activity</b>					<0.001
0 hours per week	82	7.6	143	10.6	
1–2 hours per week	202	18.8	418	31.0	
3–4 hours per week	223	20.7	361	26.8	
5–7 hours per week	263	24.4	234	17.4	
8–10 hours per week	187	17.4	96	7.1	
11 hours or more per week	120	11.1	60	4.5	

\*The numbers who answered the different questions differ somewhat.

### Statistical methods

In addition to descriptive statistics, paired and un-paired *t*-testes, we used the GLM Repeated Measure to test if change in SDQ in the follow-up period differed between boys and girls. One-way ANCOVA between-groups analysis of covariance was used to test if the SDQ subscales in the follow-up varied by weekly hours of physical activity (0, 1–4, 5–7 or ≥8) at baseline. Invitation group, ethnic background, family economy, smoking and alcohol use, and the respective SDQ subscale at baseline were collectively entered as covariates. Results are given as adjusted means with 95% confidence intervals (95% CI). To test the linearity of the associations described in the ANOVA/ANCOVA we performed multiple linear regression. To test a nonlinear association between physical activity and mental health, physical activity squared [(physical activity)<sup>2</sup>] was included in the model. Logistic regression was conducted to study how those with high total impact score at follow-up varied between the four groups of phys-

ical activity at baseline. All analyses were done separately for boys and girls. Calculations were performed in SPSS 13.

### Results

Baseline characteristics are presented in Table 1. There was no gender difference in ethnic background, invitation group and alcohol consumption. Girls perceived their family economic status to be slightly worse than did boys. Girls were more often daily or 'once in a while' smokers than boys, and boys spent more hours per week on physical activity compared with girls (Table 1).

At baseline, girls reported more overall mental health difficulties (SDQ total difficulties), emotional symptoms and hyperactivity-inattention problems than boys. Girls also reported more prosocial behaviour than boys, whereas boys reported more conduct problems and peer problems than girls (Table 2). During the follow-up

period, the difference in overall mental health difficulties between the genders increased, with a reduction in SDQ total difficulties for boys and an increase for girls. Peer problems were reduced in boys and increased in girls. Emotional symptoms also increased in girls, while there was no change in boys. Both genders had an increase in hyperactivity-inattention problems and prosocial behaviour, while conduct problems decreased (Table 2).

**Mental health at age 18–19 years according to physical activity at age 15–16 years**

Emotional symptoms and peer problems at age 18–19 were inversely associated with physical activity at age 15–16 in both genders, whereas prosocial behaviour was positively associated only in boys ( $p < 0.05$  for all these associations in linear regression analyses) (Table 3, crude analysis). Boys and girls who were physically active 5–7 hours per week at age 15–16 had the lowest total problem score at follow up [see Additional file 2]. The U-shaped association was statistically significant in regression models, with (physical activity)<sup>2</sup> included, for both boys ( $p = 0.003$ ) and girls ( $p = 0.014$ ). When adjusting for invitation group, ethnic background, family economic status, smoking, use of alcohol and the respective SDQ score at baseline, the U-shaped trend between SDQ total and physical activity was no longer statistically significant for neither boys ( $p = 0.14$ ) nor girls ( $p = 0.31$ ). Also the differences in the SDQ subscales according to physical activity decreased after adjustments (Table 3, adjusted model). In girls, there

were no significant differences between categories of physical activity at baseline for any SDQ subscale at follow up after adjustments (Table 3, adjusted model), whereas emotional problems [B (95%CI) = -0.09 (-0.15, -0.03)] and peer problems [B (95%CI) = -0.08 (-0.14, -0.03)] decreased with increasing amount of physical activity in boys. In boys, prosocial behaviour varied significantly between the groups of physical activity (Table 3, adjusted model) but there was no significant linear trend [B (95%CI) = 0.05 (-0.02, 0.12)].

Boys and girls who were physically active 5–7 hours per week at age 15–16 years had the lowest risk of reporting distress and social impairment (total impact score  $\geq 1$ ) three years later (Table 4, crude model). However after adjusting for possible confounders and mental health at baseline the associations were no longer statistically significant (Table 4, adjusted model).

**Discussion**

In boys, weekly hours of physical activity at age 15–16 years were inversely associated with emotional symptoms and peer problems at age 18–19 years after adjustment for confounders and mental health at baseline. In boys also prosocial behaviour varied with physical activity after adjustments, but there was no linear trend. In girls there was no independent effect of physical activity at age 15–16 on mental health at age 18–19 after adjustments. Participants reporting five to seven hours of physical activity

**Table 2: Strengths and Difficulties Questionnaire (SDQ) mean score at age 15–16 years (baseline) and at age 18–19 years (follow-up) in boys and girls in Oslo (2001–2004).**

Measure and Time Point	Boys				Girls				p, gender***
	n	mean	SD	p time**	n	mean	SD	p time**	
SDQ -Emotional Symptoms				0.183				0.021	
baseline	1074	1.64	1.69		1340	3.38	2.27		<0.001
follow up	1082	1.73	1.69		1343	3.52	2.41		<0.001
SDQ – Conduct Problems*				<0.001				<0.001	
baseline	1076	2.07	1.67		1344	1.88	1.37		0.002
follow up	1083	1.67	1.39		1343	1.69	1.22		0.684
SDQ – Hyperactivity-Inattention				0.038				<0.001	
baseline	1074	3.22	1.93		1339	3.62	1.90		<0.001
follow up	1083	3.35	2.07		1344	3.88	2.11		<0.001
SDQ – Peer Problems*				0.009				0.008	
baseline	1074	1.61	1.56		1340	1.39	1.39		<0.001
follow up	1083	1.50	1.54		1344	1.51	1.53		0.874
SDQ -Prosocial Behavior*				<0.001				<0.001	
baseline	1077	6.95	1.87		1344	7.98	1.55		<0.001
follow up	1083	7.69	1.71		1342	8.38	1.40		<0.001
SDQ -Total Difficulties*				0.019				0.011	
baseline	1072	8.53	4.63		1339	10.27	4.64		<0.001
follow up	1082	8.25	4.51		1342	10.60	5.12		<0.001

\*General Linear Model Repeated Measure showed a statistical interaction between time and gender ( $p < 0.001$ )

\*\*Paired t-test

\*\*\*Un-paired t-test

**Table 3: Strengths and Difficulties Questionnaire (SDQ) according to weekly hours of physical activity. SDQ (mean scores) at age 18–19 years according to hours of physical activity per week at age 15–16 years, in boys and girls – unadjusted (crude) and adjusted for confounders and mental health at baseline.**

Physical activity per week (age 15–16)	Strengths and Difficulties Questionnaire (age 18–19)														
	Boys					Girls									
	Crude		Adjusted*			Crude		Adjusted*							
	n	mean	95%CI	F	p	n	mean	95%CI	F	p	n	mean	95%CI	F	p
<b>SDQ – Emotional Symptoms</b>				3.28	0.020				6.14	<0.001				0.08	0.971
0 hours	80	2.00	(1.60–2.40)			73	1.80	(1.46–2.14)			141	4.05	(3.64–4.46)		
1–4 hours	424	1.96	(1.78–2.13)			410	1.86	(1.72–2.01)			777	3.59	(3.42–3.76)		
5–7 hours	263	1.51	(1.32–1.69)			254	1.56	(1.38–1.75)			233	3.09	(2.80–3.37)		
8 hours or more	307	1.55	(1.38–1.73)			299	1.56	(1.40–1.73)			156	3.18	(2.80–3.56)		
<b>SDQ – Conduct Problems</b>				2.90	0.087				1.28	0.280				1.69	0.168
0 hours	81	1.62	(1.35–1.89)			74	1.57	(1.30–1.85)			141	1.89	(1.69–2.08)		
1–4 hours	424	1.71	(1.57–1.84)			412	1.71	(1.60–1.83)			777	1.64	(1.56–1.73)		
5–7 hours	263	1.51	(1.34–1.67)			253	1.58	(1.43–1.73)			233	1.65	(1.51–1.79)		
8 hours or more	307	1.79	(1.64–1.95)			300	1.75	(1.62–1.89)			156	1.72	(1.53–1.92)		
<b>SDQ – Hyperactivity- Inattention</b>				1.14	0.331				0.92	0.431				1.14	0.331
0 hours	81	3.48	(3.00–3.96)			74	3.31	(2.89–3.73)			141	4.08	(3.75–4.41)		
1–4 hours	424	3.23	(3.04–3.42)			410	3.27	(3.09–3.45)			778	3.78	(3.63–3.92)		
5–7 hours	263	3.32	(3.08–3.56)			254	3.34	(3.11–3.57)			233	3.89	(3.61–4.17)		
8 hours or more	307	3.50	(3.25–3.74)			299	3.50	(3.29–3.71)			156	3.99	(3.65–4.33)		
<b>SDQ – Peer Problems</b>				13.3	<0.001				2.57	0.053				4.41	0.004
0 hours	81	2.20	(1.83–2.56)			74	1.79	(1.48–2.10)			141	1.90	(1.62–2.18)		
1–4 hours	424	1.69	(1.54–1.84)			409	1.52	(1.39–1.65)			777	1.49	(1.38–1.60)		
5–7 hours	263	1.21	(1.04–1.38)			254	1.40	(1.23–1.56)			234	1.32	(1.13–1.50)		
8 hours or more	307	1.28	(1.11–1.45)			300	1.35	(1.20–1.50)			156	1.49	(1.24–1.73)		
<b>SDQ – Prosocial Behavior**</b>				5.00	0.002				4.44	0.004				0.96	0.411
0 hours	81	7.14	(6.72–7.55)			74	7.40	(7.04–7.75)			141	8.43	(8.22–8.65)		
1–4 hours	424	7.77	(7.61–7.94)			412	7.75	(7.60–7.90)			778	8.33	(8.23–8.44)		
5–7 hours	263	7.53	(7.32–7.73)			254	7.44	(7.25–7.63)			233	8.39	(8.21–8.57)		
8 hours or more	307	7.86	(7.67–8.04)			300	7.86	(7.68–8.04)			156	8.53	(8.32–8.74)		
<b>SDQ – Total Difficulties</b>				4.31	0.005				0.67	0.579				4.63	0.003
0 hours	80	9.24	(8.22–10.25)			73	8.32	(7.43–9.21)			141	11.91	(11.07–12.76)		
1–4 hours	424	8.58	(8.14–9.02)			409	8.35	(7.98–8.73)			776	10.51	(10.15–10.87)		
5–7 hours	263	7.54	(7.01–8.07)			253	7.93	(7.45–8.40)			233	9.94	(9.31–10.56)		
8 hours or more	307	8.13	(7.62–8.63)			299	8.15	(7.72–8.59)			156	10.38	(9.57–11.20)		

\*Adjusted for: invitation group, ethnicity, family economy, smoke, use of alcohol, and the respective SDQ subscore at baseline.

\*\*High values are positive

**Table 4: Total Impact score according to weekly hours of physical activity. Percentage (p%) with high score\* and odds ratio (OR) for high score\* at age 18–19 years according to hours of physical activity per week at age 15–16 years, in boys and girls—unadjusted (crude) and adjusted for confounders and mental health at baseline.**

Physical activity per week (age 15–16)	Boys						Girls					
			Crude		Adjusted**				Crude		Adjusted**	
	n	p%***	OR	95%CI	OR	95%CI	n	p%***	OR	95%CI	OR	95%CI
0 hours	79	22.8	ref.		ref.		139	36.7	ref.		ref.	
1–4 hours	423	17.3	0.71	0.39 – 1.27	0.79	0.42 – 1.49	775	28.8	0.67	0.46 – 0.98	0.82	0.53 – 1.24
5–7 hours	262	10.3	0.39	0.20 – 0.75	0.51	0.25 – 1.04	232	24.6	0.56	0.36 – 0.89	0.76	0.45 – 1.27
8 or more hours	304	17.1	0.70	0.38 – 1.28	0.84	0.44 – 1.64	155	29.7	0.73	0.45 – 1.19	1.05	0.61 – 1.81

\*High total impact score  $\geq 1$

\*\*Invitation group, Ethnicity, Family economy, smoking and alcohol habit, SDQ total at baseline

\*\*\*Percent of n with high total impact score

per week at age 15–16 had the lowest mean score for SDQ total difficulties and the lowest percentage with high impact score at follow up, but the differences were not statistically significant after adjustments.

#### Methodological strengths and limitations

Our longitudinal study extends beyond previous reports of population-based cross-sectional associations between physical activity and depression [19], emotional well-being [20] and social problems [17,18] when studying physical activity at age 15–16 years and different aspects of mental health three years later. We are still not able to infer the direction of causality from our analysis. There could be common underlying factors influencing both physical activity and mental health at both time points, or these two factors could be in a continuous circular relationship.

In the baseline study, all 10th graders in Oslo were invited to participate in the school year 2000–2001. The high participation rate implies that the baseline cohort is representative for 10<sup>th</sup> graders in Oslo. In the follow-up, those not participating were less physically active and reported more symptoms of mental health problems at baseline than those who participated. However, the association at baseline between SDQ total problem score and physical activity was similar for the non-responders and those participating in the follow-up. Thus, we believe it is unlikely that those lost to follow-up would appreciably influence the associations at follow-up.

When measuring mental health among children and adolescents it is preferable to use several informants (also parents and teachers). Self-reports are generally less strongly associated with psychiatric disorder than parent reports [30]. In our follow-up study the participants were 18 years, and parent reports could not be included. The fact that this is a self-report study, with low internal consist-

ency for some of the subscales, should be kept in mind when interpreting the results. However, low internal consistency may have led to an underestimation of associations.

Measuring physical activity by questionnaire is also associated with difficulties [41]. We have used a single item measure for this variable, something that has to be taken into consideration. A measure of weekly hours of physical activity however, has shown the ability to discriminate between levels of aerobic fitness in youth [42]. It seems reasonable to assume that the question captures different levels of physical activity, but how accurate the adolescents report hours per week is unknown.

Within the limitation of the study design the results reveal an interesting association between physical activity and mental health. Although the associations were weak, physical activity was a positive factor for some dimensions of mental health problems in boys. In the population strategy of prevention: 'even a small shift in the distributions may have a large effect on the number of individuals falling into the high vulnerable tail of the distribution' [43].

#### Mental health at age 18–19 years according to physical activity at age 15–16 years

We found a more consistent association between weekly physical activity and mental health in boys than in girls, and the associations were connected to emotional symptoms, peer problems and prosocial behaviour. Similar overall findings have been reported from cross-sectional studies of adolescents [17–19], but not by gender. One such study of adolescents in grades 7–13 found a positive association between vigorous physical activity and social functioning, but no association for depression/anxiety when adjusted for age, gender, and SES [17]. Kirkcaldy et al reported that adolescents who engaged regularly in



physical activity display much less inhibition in social behaviour than their less active counterparts [18]. A third cross-sectional study reported that adolescents who did not exercise, or exercised infrequently, scored higher on psychological discomfort measured by loneliness, shyness and hopelessness than did adolescents who were more frequent exercisers [19]. One explanation for all these findings may be that physical activity and the sports arena represent an increased opportunity for social interaction and development of social skills. Adolescents who join a sports club show lower anxiety and depression scores than those pursuing individual sports [44]. Boys are more often than girls doing sport in a club [45]. If physical activity promotes social development, it is likely that this is a more permanent influence – and may be possible to detect as a long-term effect. Cardon et al found in a study among 1124 children aged 10 and 11 that boys felt more social support from family and friends to be active than girls [46]. Boys also perceived more benefits from physical activity than girls in regard to being together with friends/meet people, have fun and being admired by others. The difference in peer problems and prosocial behavior according to physical activity may also be due to individuals with low social competence ceasing physical activity or participating in sports at a young age. Adolescents who possess good sport or physical activity skills may also be more socially attractive than less talented peers. Different patterns in type of physical activity, and changes in weekly hours over the period under study may also contribute to the gender difference.

Participants reporting 5–7 hours of physical activity per week at age 15–16 had *both* the lowest SDQ total problem score and the lowest percentage with SDQ total impact score at follow-up, but the differences became insignificant after adjustments. Cross sectional studies have however reported similar U-shaped associations [19,21,47]. One suggested reason for the non-linear association involves the detrimental effect of overtraining in athletes [47]. Unger (1997), who studied participation in sport team and suicidal behaviour, revealed that girls who exercised 6–7 days per week and did not participate in team sports, were at the greatest risk of suicidal behaviour [21]. The author of this study suggests that these results may be due to a widespread perception of overweight and negative body image among adolescent girls who then exercise to lose weight. More research in general populations is needed on effects of high volume physical activity/exercise and mental health among adolescents.

## Conclusion

Our findings indicate that physical activity at age 15–16 years may influence some aspects of mental health three years later in boys, but not in girls. Our study underlines the need to perform longitudinal studies with different

aspect of mental health as outcome, conducting separate analyses by gender, and also consider the amount of physical activity when studying the relation between physical activity and mental health in adolescence. The results encourage subsequent cohort studies to focus on different types of physical activity (competitive vs. recreational, team vs. individual) and mental health follow up.

## Competing interests

The author(s) declare that they have no competing interests.

## Authors' contributions

AaS was active in the planning of the follow-up and coordinated the practical part of the study, did the conception and design, analysed and interpreted the data and drafted the manuscript. AJS was project manager of the baseline study, participated in planning of the follow-up study, was involved in the conception and design of the project, discussed the analysis and interpretation of the data, and reviewed the article critically. EB was project manager of the follow-up study, involved in the conception and design of the project, discussed the analysis and interpretation of the data, and reviewed the article critically. RS took part in collecting of the baseline data, contributed particularly in the statistical analyses and interpretation of the data, and reviewed the article critically. SH was involved in the conception and design of the project, discussed the analysis and interpretation of the data and reviewed the article critically.

## Additional material

### Additional file 1

*Flowchart of the study and the participants at follow-up.*

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[<http://www.biomedcentral.com/content/supplementary/1471-2458-7-155-S1.pdf>]

### Additional file 2

*Strengths and Difficulties Questionnaire Total difficulties score (follow up) according to weekly hours of physical activity (baseline) in boys and girls.*

Click here for file

[<http://www.biomedcentral.com/content/supplementary/1471-2458-7-155-S2.pdf>]

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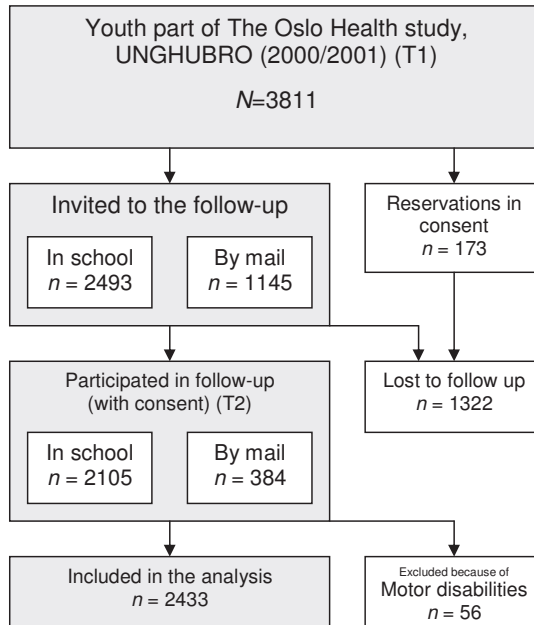
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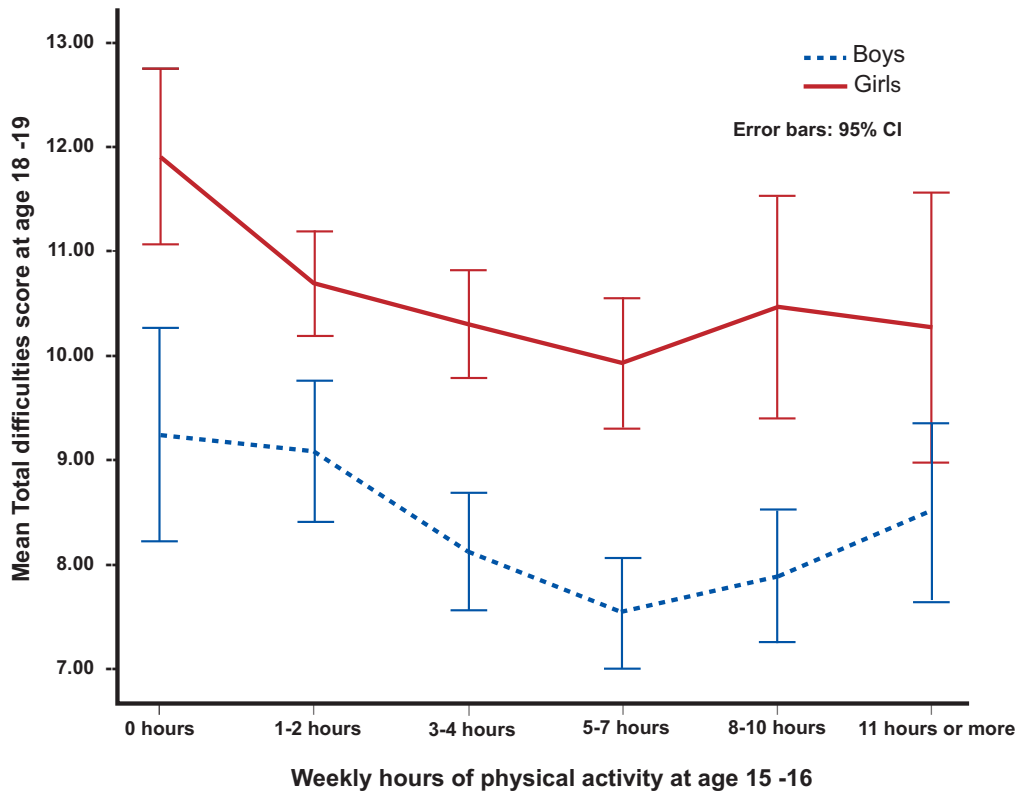
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## Three-year follow-up of physical activity in Norwegian youth from two ethnic groups: associations with socio-demographic factors

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### Abstract

**Background:** More research on factors associated with physical activity and the decline in participation during adolescence is needed. In this paper, we investigate the levels, change, and stability of physical activity during the late teens among ethnic Norwegians and ethnic minorities, and we examine the associations between physical activity and socio-demographic factors.

**Methods:** The baseline (T1) of this longitudinal study included 10<sup>th</sup> graders who participated in the youth part of the Oslo Health Study, which was carried out in schools in 2000–2001. The follow-up (T2) in 2003–2004 was conducted partly at school and partly by mail. A total of 2489 (1112 boys and 1377 girls) participated both at baseline and at follow-up. Physical activity level was measured by a question on weekly hours of physical activity outside of school. Socio-demographic variables were collected by questionnaire and from data obtained from Statistics Norway. Analysis of variance was used to study the level of and changes (T1 to T2) in physical activity, and the associations between physical activity and socio-demographic factors. Stability in physical activity was defined as the percentage of students reporting the same physical activity both times.

**Results:** Boys were more active than girls at age 15 and 18 years, independent of ethnic background. Among girls, ethnic Norwegians were more active than ethnic minorities. Hours per week spent on physical activity declined in all groups during the follow-up period. Few associations were found between physical activity and socio-demographic factors in both cross-sectional and longitudinal data. Among the ethnic minority girls, 65% reported being physically active 0–2 hours per week at baseline, and 82% of these girls reported the same level at follow up.

**Conclusion:** The association between physical activity and ethnicity at age 15 years remained the same during the follow-up. Few associations were found between physical activity and socio-demographic variables. A large proportion of ethnic minority girls reported a persistently low physical activity level, and this low participation rate may need special attention.

## Background

Regular physical activity is important for healthy growth and development of children and adolescents. It helps build and maintain healthy bones, muscles, and joints, and enhances psychological well-being [1]. Regular physical activity contributes to the control of body weight, which is important because the prevalence of obesity is increasing [2]. Mid-adolescence is an important period in young people's life as adult patterns of health behaviours start to emerge. Habits of, and attitudes towards, physical activity developed during childhood are assumed to continue through adolescence and into adulthood [3,4]. Despite the importance of physical activity in youth, studies show consistently that participation in physical activity declines during adolescence. This decline has been reported in both cross-sectional [5-7] and longitudinal studies [8-17], and in studies using both self-reported measures [5,8-13] and objective measures of physical activity [6,7,17]. Knowledge about the factors related to this decline in physical activity is scarce.

With an increasing influx of immigrants to the Western parts of the world, cultural and ethnic background has become an important variable when studying health and health behaviour from the public health perspective. Few studies have investigated the relationship between physical activity and ethnicity in adolescence. Most studies have reported that ethnic minorities are less active than their majority counterparts [13,18-20], whereas others have not found any association [21] or have found that ethnic minorities are more physically active [16].

In addition to ethnicity, socio-economic status (SES) is an important factor regarding physical activity [22]. In children and adolescents, the association between SES and physical activity is inconsistent [23-26]. The controversy relates to whether SES and physical activity level are positively associated [20,21,24-27] or not related at all [24-26,28]. The differences between studies may reflect differences in the methods used to measure SES and physical activity and the subgroup studied [24-26].

Few longitudinal population-based studies in adolescents have focused on the relationship between physical activity and ethnicity while also considering socio-demographic factors [20]. In a longitudinal population-based study of about 2500 adolescents for 3 years, of which 20% had an ethnic minority background, we collected data about physical activity, ethnicity, and socio-demographic factors. The aims of this study were: (1) to estimate and compare levels of physical activity in ethnic Norwegian and ethnic minority youth at ages 15 and 18 years; (2) to examine the association between socio-demographic factors and physical activity in the two groups at 15 and 18 years; (3) to describe changes in, and stability of, physical

activity in ethnic Norwegian and ethnic minority youth after three years of follow-up; and (4) to examine the relationships between socio-demographic factors and change in physical activity over the three years in the two ethnic groups.

## Methods

### Baseline study (T1)

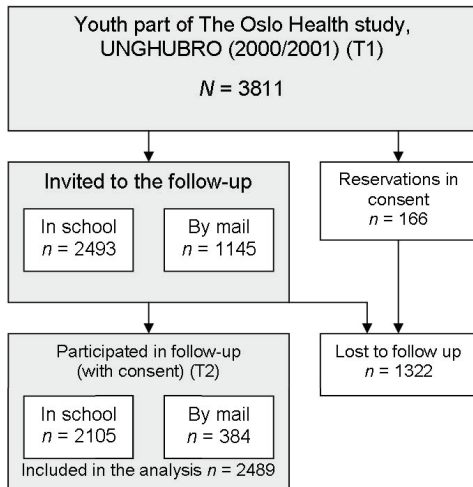
All students in grade 10 (aged 15-16 years, later referred to as 15 years) in Oslo during the school years 1999-2000 and 2000-2001 were invited to enter the youth part of the Oslo Health Study. This was a questionnaire study conducted in schools. All parents received written information, and the students completed a consent form before participation. The students completed questionnaires during two school classes. For those not present on the day of the survey, questionnaires were left for them at school. A copy was mailed to the home address of those who did not respond, together with a stamped return envelope. A more detailed description has been published elsewhere [29,30]. From the total population of 10<sup>th</sup> graders (both 1999-2000 and 2000-2001), 7343 (88%) participated. The 3811 subjects participating in the year 2000-2001 comprised the baseline of our longitudinal study. During the school year 2003-2004, a second study was conducted with the same adolescents.

### Follow-up study (T2)

The follow-up study was carried out partly as a school-based survey and partly through mail, as described elsewhere [30,31]. The procedure for the school-based part of the study was similar to the baseline procedure. All 32 secondary high schools in Oslo took part, and the senior year students (aged 18-19 years, later referred to as 18 years) completed the questionnaire during one school class. The participants in the baseline study (year 2000-2001) who were not enrolled in the senior year of secondary high school in Oslo and who had consented to participate in the follow-up were invited to participate by mail.

### Study population

Of the 3811 participants in the baseline study, 2489 (65.3%) participated in the follow-up and gave their consent to link their data between the two surveys. Only the adolescents who participated in both surveys were included in our analyses (1,112 boys and 1,377 girls) (Figure 1). Of the participants in the follow-up, 20% had an ethnic minority background. Ethnic minorities were defined as those having both parents born in a country other than Norway [32]. The parents' countries of birth were provided by Statistics Norway and were linked to the data file. Most of the ethnic minority youth (96%) came from non-Western countries. The largest ethnic minority groups were from the Indian subcontinent (42%), the Middle East (16%), and Eastern Europe (11%). Fifty-four



**Figure 1**  
**Flow sheet of the study population.**

percent of the minority group were born in a country other than Norway (first-generation immigrants).

### Measures

#### Weekly hours of physical activity in leisure time

Participants were asked how many hours per week they spent in physical activity "to an extent that makes you sweat and/or out of breath": 0 (0), 1–2 (1.5), 3–4 (3.5), 5–7 (6), 8–10 (9), or 11 (11) hours or more per week. The numbers in the parentheses represent the coding when using the ranked ordinal variable as a continuous variable. In an unpublished validation study, physical activity was measured both objectively, using Actigraph accelerometers, and subjectively using the questionnaire. The question about "hours per week" was the one that best predicted physical activity measured by an accelerometer and was therefore chosen as our physical activity measure (Hein Stigum, Norwegian Institute of Public Health, personal communication). Change in physical activity was defined as the difference in hours of physical activity per week between baseline and follow-up. To study *stability* in physical activity from baseline to follow-up, we dichotomized hours per week spent doing physical activity as 0–2 hours versus 3 hours or more, and we measured the tendency of subjects to report the same activity level at the two times.

#### Socio-demographic factors

To obtain information on the education and income levels of fathers and mothers, the questionnaire was linked to information collected by Statistics Norway. Statistics

Norway's register on income and education (2002) was used. In the analysis, education was categorized by the highest level of education: tertiary education, intermediate education, and compulsory education [33]. The father's and mother's income [34] was categorized as high (above the 75<sup>th</sup> percentile), medium (25<sup>th</sup> to 75<sup>th</sup> percentile), or low (below the 25<sup>th</sup> percentile).

The "perceived family economy" question had four options – "poor", "moderate", "good", or "very good" – based on a question asking the participant to compare his or her family economy with other families in Norway. "Parents' marital status" was categorized as having parents who were married/cohabitant or "other" (i.e. divorced/separated, one or both deceased). "Socio-economic region of residence" in Oslo (neighbourhood socio-economic level) was a social index that took into account the distribution of unemployment, education, non-Western immigrants and single parents [35]. In our analyses, East and West regions were used.

#### Invitation group

Because the follow-up part of the study was conducted partly in school and partly by mail, a variable called "Invitation group", was created to dichotomize mail and school participation.

#### Ethics

Both protocols were evaluated by the Regional Committee for Medical Research Ethics and were approved by the Norwegian Data Inspectorate. The baseline study and the part of the follow-up study carried out in the schools received approval from the school authorities in Oslo.

#### Lost to follow-up

Seventy percent of the ethnic Norwegian students and 54% of the ethnic minority students participated in the follow-up study. In ethnic Norwegian participants, baseline physical activity did not differ between those who participated in the follow-up and those who were lost to follow-up. In the ethnic minority participants, physical activity level at baseline was higher in those who completed the follow-up than in those lost to follow-up. To test whether the physical activity level among the immigrants could be biased by the length of stay in Norway, we compared the physical activity level of those lost to follow-up and in those participating at both times in first- and second-generation immigrants. Weekly hours of physical activity by both boys and girls did not differ between first- and second-generation immigrants. To predict how attrition might bias the results, others have shown that subjects who participate after reminders are fairly similar to the non-responders [36]. In our analysis, the change in physical activity did not differ significantly between adolescents from ethnic minorities who participated after the first invitation

and those who participated after reminders [mean difference in change in weekly hours of physical activity (SE), -0.28 (0.59), p = 0.59].

**Statistical analysis**

The data were stratified by sex and partly by ethnicity (ethnic Norwegians and ethnic minorities). To compare physical activity levels at baseline (T1) and follow-up (T2), the change in physical activity from baseline to follow-up (T2-T1), and the associations between physical activity and socio-demographic factors at the two times, we classified hours per week as a continuous variable and analysed the data using analysis of variance (ANOVA). The patterns of association were compared between ethnic Norwegians and ethnic minorities by testing the interaction terms.

Cohen's kappa and percentage of agreement were used to study the stability in physical activity (0–2 hours versus 3 hours or more) from baseline to follow-up in the four subgroups.

Finally, we studied the association between socio-demographic factors and change in physical activity level (T2-T1) using a linear regression model. The estimated regression coefficients ( $\beta$ ) and 95% confidence interval (95% CI) are presented in the text. The socio-demographic factors that showed associations with physical activity at T1 or T2 were entered collectively in the adjusted model. Only participants who provided information on all variables in the adjusted analysis were included in the crude comparisons. Weekly physical activity level did not differ significantly between participants excluded and those included in this analysis. The level of significance was set at p < 0.05. The data were analysed using SPSS version 14.

**Results**

**Physical activity at 15 and 18 years**

Boys were more physically active than girls at both 15 and 18 years, and this was independent of ethnic background

(Table 1). We found ethnic differences in physical activity levels in girls but not boys. At both ages 15 and 18 years, ethnic Norwegian girls were more physically active than ethnic minority girls (Table 1).

**Physical activity and socio-demographic factors at 15 and 18 years**

Ethnic minority adolescents had parents with lower income and lower education level than ethnic Norwegians (p < 0.001). Compared with their Norwegian counterparts, more ethnic minority boys and girls lived in eastern regions of Oslo and had parents that were married/cohabiting (both sexes p < 0.001). Ethnic minority girls perceived poorer family economy than did ethnic Norwegian girls (p = 0.01). No difference was observed in boys (p = 0.38).

**Boys**

At age 15 years, ethnic Norwegian boys who perceived a poor family economy reported low physical activity level (Table 2a). At age 18 years, ethnic minority boys living in the eastern part of Oslo were more physically active than those living in the western part. The association between physical activity level and socio-demographic factors did not differ between ethnic Norwegian and ethnic minority boys at ages 15 or 18 years (i.e. no interaction).

**Girls**

In ethnic Norwegian girls, higher levels of physical activity at both ages 15 and 18 years were positively associated with father's income and perceived family economy. Physical activity at age 18 years was positively associated with mother's education and parents' marital status (Table 2b). Ethnic minority girls living in the western regions of Oslo were more physically active at age 18 years than were ethnic minority girls living in the eastern part (Table 2b). The associations between physical activity level and socio-demographic factors in the two ethnic groups were significantly different for only one factor:

**Table 1: Physical activity level at age 15 and 18 years in ethnic Norwegian and ethnic minority adolescents.**

	Physical activity								p ethnicity
	Ethnic Norwegian				Ethnic minority				
	n	Mean	95%CI*	n	Mean	95%CI*			
<b>Boys</b>									
15 years (baseline)	892	5.35	5.13	5.58	211	5.00	4.55	5.46	0.18
18 years (follow-up)	897	4.61	4.38	4.84	209	4.37	3.92	4.83	0.38
Δ** (follow-up-baseline)	889	-0.73	-0.96	-0.58	209	-0.61	-1.17	-0.06	0.67
<b>Girls</b>									
15 years (baseline)	1058	4.00	3.82	4.18	283	2.43	2.16	2.70	< 0.001
18 years (follow-up)	1066	3.58	3.41	3.77	287	2.01	1.74	2.27	< 0.001
Δ** (follow-up-baseline)	1044	-0.38	-0.56	-0.20	274	-0.47	-0.77	-0.16	0.66

\*95% confidence interval (CI).

\*\* Δ Change from baseline to follow-up.

Table 2:

2a: Physical activity level and socio-demographic factors in ethnic Norwegian and ethnic minority boys.

Boys (1112*)	Physical activity at age 15 years						Physical activity at age 18 years					
	Ethnic Norwegian (900)			Ethnic minority (211)			Ethnic Norwegian (900)			Ethnic minority (211)		
	M°	SD°	p	M°	SD°	p	M°	SD°	p	M°	SD°	p
Income father #			0.12			0.69			0.91			0.17
Low	3.98	3.30		4.80	3.54		4.03	3.34		5.37	3.34	
Medium	4.50	3.31		5.14	3.23		4.75	3.57		5.43	3.52	
High	6.04	3.88		4.46	3.33		4.65	3.38		5.32	3.36	
Education mother #			0.13			0.29			0.31			0.16
Compulsory	4.43	3.64		5.34	3.51		3.92	3.69		4.50	3.31	
Intermediate	5.36	3.63		4.43	3.37		4.59	3.62		4.04	3.50	
Tertiary	5.44	3.25		5.28	3.21		4.69	3.37		5.47	3.26	
Perceived family economy			0.01			0.54			0.22			0.74
Poor	3.56	3.34		6.86	3.34		3.83	3.61		3.71	4.37	
Moderate	5.03	3.61		4.91	3.75		4.38	3.50		4.11	3.20	
Good	5.41	3.30		4.94	3.18		4.62	3.38		4.62	3.42	
Very good	5.96	3.54		5.05	3.42		5.10	3.83		4.21	3.44	
Parents marital status			0.08			0.70			0.20			0.29
Married or cohabiting	5.49	3.39		5.06	3.35		4.71	3.52		4.25	3.35	
Other §	5.05	3.48		4.80	3.46		4.38	3.42		4.95	3.40	
Residence in Oslo			0.15			0.79			0.01			0.93
East	5.54	3.65		4.94	3.43		4.99	3.78		4.27	3.31	
West	5.20	3.24		5.13	2.77		4.38	3.24		4.34	3.73	

° Values are expressed as Mean (M) and Standard Deviation (SD).  
 \* Some participants have missing information on some of the background characteristics.  
 # Information collected by Statistics Norway (2002).  
 § Parents divorced or separated, or one or both parents dead.

2b: Physical activity level and socio-demographic factors in ethnic Norwegian and ethnic minority girls

Girls (1377*)	Physical activity at age 15 years						Physical activity at age 18 years					
	Ethnic Norwegian (1081)			Ethnic minority (296)			Ethnic Norwegian (1081)			Ethnic minority (296)		
	M°	SD°	p	M°	SD°	p	M°	SD°	p	M°	SD°	p
Income father #			0.02			0.45			0.05			0.05
Low	3.36	2.92		2.25	2.08		3.10	3.09		1.71	2.19	
Medium	4.00	3.04		2.40	2.52		3.55	3.02		2.00	2.24	
High	4.18	2.90		3.00	2.20		3.83	2.92		3.08	2.11	
Education mother #			0.74			0.32			0.04			0.12
Compulsory	3.80	3.04		2.48	2.46		2.74	2.62		1.69	1.86	
Intermediate	4.07	2.96		2.29	2.20		3.55	3.05		2.35	2.66	
Tertiary	3.97	3.01		2.93	2.48		3.73	2.99		2.16	2.09	
Perceived family economy			0.01			0.10			0.001			0.54
Poor	3.30	2.80		2.21	3.25		2.25	2.58		1.07	0.73	
Moderate	3.56	2.99		2.07	1.91		3.13	2.90		1.94	2.33	
Good	4.11	2.92		2.48	2.34		3.73	2.99		2.17	2.23	
Very good	4.53	3.20		3.16	2.70		4.19	3.21		1.82	2.35	
Parents marital status			0.11			0.12			0.01**			0.14**
Married/cohabiting	4.10	2.97		2.33	2.24		3.77	3.00		1.88	2.31	
Other §	3.79	3.00		2.85	2.51		3.24	2.98		2.36	1.93	
Residence in Oslo			0.12			0.87			0.53			0.03
East	4.15	3.09		2.42	2.36		3.65	3.13		1.89	2.17	
West	3.86	2.89		2.49	1.92		3.54	2.91		2.76	2.63	

° Values are expressed as Mean (M) and Standard Deviation (SD).  
 \* Some participants have missing information on some of the background characteristics.  
 \*\* Interaction term = 0.02 (marital status, ethnicity, and physical activity).  
 # Information collected by Statistics Norway (2002).  
 § Parents divorced or separated, or one or both parents dead.

having married/cohabitating parents was positively associated with physical activity in Norwegian girls at age 18 years, but the opposite was the case in ethnic minority girls (Table 2b) (interaction term,  $p = 0.02$ ).

The mother's income and father's education level was not significantly related to physical activity level in boys or girls.

**Change in and stability of physical activity from age 15 to 18 years**

Physical activity level measured as weekly hours declined in all groups ( $\Delta$ , change) from age 15 to 18 years (Table 1). The change in physical activity level from age 15 to 18 years did not differ between ethnic Norwegian and ethnic minority boys or girls (Table 1).

More ethnic Norwegian girls and boys were physically active for three hours or more at both times (stability) than were ethnic minority girls and boys (Figure 2). Eighty-two percent of the ethnic minority girls had a persistently low physical activity level (0–2 hours per week) at both times. Fifty-four percent of ethnic minority girls who were physically active for more than three hours per week at age 15 years reduced their activity level at age 18 years (Figure 2). The kappa ( $\kappa$ ) values for stability of physical activity level are presented in Figure 2 according to sex and ethnicity. The  $\kappa$  values varied between 0.15 and 0.31 for both sexes and ethnic groups. The lowest  $\kappa$  value was seen in ethnic minority boys.

**Socio-demographic factors and change in physical activity level over three years**

We found similar associations in the crude and adjusted analyses for the association between socio-demographic variables and change in physical activity analysed by sex. The only significant associations found in the adjusted analyses were that physical activity level declined more in girls with mothers with compulsory education than in girls with mothers with tertiary education [ $\beta$ , -0.75; 95%CI, -1.38, -0.12]], and declined more in boys with fathers with low income than in boys with fathers with high income [ $\beta$ , -0.90; 95% CI, -1.66, -0.14).

The association between socio-demographic factors and change in physical activity level did not differ between ethnic Norwegians and ethnic minorities (i.e. no interaction).

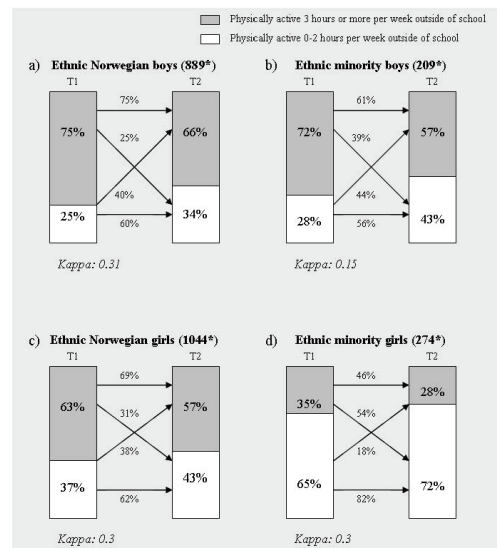
**Discussion**

**Physical activity and ethnicity**

In our study, boys were more physically active than girls, as has been reported earlier [6,7,37]. We found ethnic differences in activity level, an observation that is consistent with previous findings from the UK [20] and USA [13,18], although other studies in the USA reported no differences

[21] or higher physical activity level in some ethnic minority groups [16]. The difference between the USA and Europe may reflect differences in the immigrants' ethnicity, history, and time since immigration. Discrimination and racism are other factors that might cause differences in sport participation between ethnic minority and host adolescents [38,39]. Fear of being exposed to racism could be keeping ethnic minorities away from organized sport [40]. However, our results do not allow us to conclude whether racism influences the choice of physical activity type.

As observed in other studies [13,18], we found that ethnic differences in physical activity were more apparent in girls than in boys. Differences in physical activity may reflect the influence of factors such as the religion and culture in the country of origin. In our study, 96% of the ethnic minorities came from non-Western countries, the largest group being from the Indian subcontinent. The difference between boys and girls could relate to gender segregation in some religions (Islam), girls having more household responsibility, or stricter rules set by parents [41-43]. The



**Figure 2**  
**Change in physical activity level from T1 to T2.** Percentage of participants who were physically active 0–2 hours per week or 3 or more hours per week at baseline (T1) and follow-up (T2), and percentage who maintained or changed activity level from T1 to T2 in ethnic Norwegian (a and c) and ethnic minority (b and d) boys and girls.

\* indicates the number of participants who answered the question about physical activity at both times.



ethnic minority girls' low activity level might also relate to the structure of organized sports in Norway, which includes fewer differences according to gender than in many of the ethnic minorities' countries of origin [44]. Another contributing factor could be the low physical activity level among ethnic minority women in Oslo [45]. Parents' physical activity patterns probably influence their children's physical activity through modelling, social influence, and social support [1].

#### **Physical activity and socio-demographic factors at age 15 and 18 years**

Consistent with other studies, [24-26] we found few significant associations between socio-demographic factors and physical activity level. Such associations seem to be dependent on the SES measure used and the characteristic of the subgroup being studied.

One relatively consistent finding in our study was the lower physical activity level among ethnic Norwegians who perceived family economy as poorer than other Norwegian families. Those who perceived themselves as having low family income might be restricted in their physical activity choices and opportunities because of the cost involved.

The lack of association between physical activity and SES in ethnic minorities may indicate a different relationship between SES and health and disease, and a different influence on health behaviour in ethnic minorities than in ethnic Norwegians. A Norwegian study focusing on determinates of diabetes in different ethnic adult groups reported a negative association between the prevalence of diabetes and SES among ethnic Norwegians and Westerners but almost no association in ethnic minorities [45].

#### **Change in and stability of physical activity from age 15 to 18 years**

We found a decline in mean hours per week of physical activity from age 15 to 18 years, which was similar in ethnic Norwegians and ethnic minorities. In the UK, Asian adolescents and black girls are less active than white girls at age 11-12 years, and this difference does not change over the next five years [20]. McMurray et al. [16] observed a similar decline in physical activity from age 8 to 16 years in African-American and Caucasian girls but a greater decline in Caucasian boys than in African-American boys. Another longitudinal study from the USA [13] found a substantial decline in physical activity level that was higher in black girls than in white girls.

The relatively low  $\kappa$  scores in our study suggest low stability of physical activity levels within groups. Anderssen et al. [12] used a similar physical activity questionnaire with youths in the western part of Norway and reported  $\kappa$  val-

ues, based on tertiles, of 0.26 for boys and 0.21 for girls over a three-year period (age 16-19 years). The only study that assessed physical activity stability in different ethnic groups (Caucasians and African-Americans) reported low  $\kappa$  values (0.03-0.22) [16]. The discrepancy in results might be because  $\kappa$  appears to be higher for shorter time periods, whereas our study and the study by Anderssen et al. [12] studied stability over a three-year period, and McMurray et al. [16] studied stability over seven years. We also dichotomized physical activity level at two times, whereas the other studies divided the physical activity variable into three groups.

McMurray et al. [16] also reported that more Caucasian than African-American youth remained in the low physical activity group during the follow-up. In our study, the highest percentage of persistently low physical activity was found among the ethnic minority girls. As suggested previously, the different findings might be explained by the different immigrant histories and cultures of origin of the ethnic minorities in the USA and in Norway. The discrepancy in results may also be caused by different sample sizes, age, and the definition of "low physical activity".

#### **Socio-demographic factors and change in physical activity**

The only socio-demographic factors that were associated with change in physical activity level were mother's education in girls, and father's income in boys. The few associations observed might reflect the influence of more important circumstances experienced by this group of youth. These adolescents had experienced changes in schools, increasing homework level, and the biological, social, and psychological changes that accompany puberty. These factors, alone or in combination, may affect physical activity significantly and might "overrule" the importance of socio-demographic factors.

#### **Methodological issues**

Measuring physical activity level by questionnaire is associated with difficulties [46]. The measure used to capture physical activity level in this study is general: "activities outside of school that make you feel sweaty and out of breath". Such a crude overall measure does not capture all the physical activities that promote health. However, simple, self-reported questions on overall physical activity have been used in several studies and correlated significantly with other activity measures [47,48], and with other indicators of physical activity such as maximal oxygen uptake [49] and physical fitness [50]. It seems reasonable to assume that the question captures the level of physical activity, although we do not know how accurate the adolescents were in reporting hours per week. However, we compared associations, change in, and stability of physical activity between groups and believe that the measure is reasonably reli-

ble and valid for this purpose. Generally, the more unreliable the measure, the greater the chance of not finding differences or associations that exist. Therefore, we probably underestimated rather than overestimated any associations and difference between the groups.

Performing a large number of tests, as we did when studying the relationship between physical activity level and socio-demographic factors (aims 2 and 4), increases the risk of type 1 error. Hence, we emphasize the pattern of our findings and interpret the single significant associations with caution.

We also note the variety of ethnic minorities represented by our sample. Even though about 96% of the ethnic minorities in our study population were from non-Western countries, they were not a homogenous group. Studying all ethnic minorities together might conceal differences in physical activity levels between different ethnic groups.

The attrition is also a concern. Of those participating in the baseline study, 70% of the ethnic Norwegians and 54% of the ethnic minorities participated in the follow-up. Ethnic minorities participating at follow-up reported more physical activity at baseline than did the ethnic minorities lost to follow-up; there was no corresponding difference at baseline in the ethnic Norwegians. However, in the ethnic minorities, the physical activity level did not differ between those who completed the questionnaire after reminders compared with those who participated after the primary invitation, indicating that the selection probably did not influence the results substantially [36].

## Conclusion

This study confirms that boys are more physically active than girls, and the ethnic differences in physical activity are more pronounced in girls than boys. Further, the physical activity level declines during the late teenage years in all groups. Socio-demographic factors are only weakly related to physical activity level at age 15 and 18 years, and the change in physical activity between these ages. Ethnic minority girls were the least physically active group, and a considerable proportion reported a stable low activity level. Religious, cultural, social, and environmental factors may contribute to the differences and the decline in physical activity level. Society-wide approaches promoting physical activity that focus on families and local society, and that consider the special needs of subgroups such as immigrant girls, are required to reverse these patterns.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

ÅS was active in the planning of the follow-up and coordinated the practical part of the study, conceptualized and designed the study, analysed and interpreted the data, and drafted the manuscript. EK conceptualized and designed the study, discussed the analysis and interpretation of the data, and drafted the manuscript. SAA was involved in the conceptualization and design of the article, discussed the analysis and interpretation of the data, and reviewed the manuscript critically. MT was involved in the conceptualization and design of the article, contributed to the statistical analyses and interpretation of the data, and reviewed the article critically. AJS was project manager of the baseline study, participated in planning of the follow-up study, was involved in the conceptualization and design of the article, discussed the analysis and interpretation of the data, and reviewed the manuscript critically.

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# Appendix I

## Information brochures:

- The youth part of The Oslo (and Hedmark) Health Study
  - Parents (1)
  - Youth (2)
- Youth 2004
  - Mail Oslo (and Hedmark) (3)



Helseundersøkelsen i Oslo er et samarbeid mellom:

**Oslo kommune**

Byrådsavdeling for eldre og bydelene  
Rådhuset, 0037 OSLO.  
Tlf. 22 86 16 00



**Universitetet i Oslo**

Institutt for allmenntilleggsmedisin og samfunnsmedisin  
Postboks 1130 Blindern, 0317 OSLO.  
Tlf. 22 85 05 50.



**Statens helseundersøkelser**

Postboks 8155 Dep., 0033 OSLO  
Tlf. 22 24 21 00 (9-15)  
e-post: [post@shus.no](mailto:post@shus.no)

Du finner også informasjon om helseundersøkelsen på  
hjemmesidene våre  
[www.shus.no](http://www.shus.no)

Kontaktperson for ungdomsundersøkelsen:

Tove Eie  
Tlf. 22 24 21 22  
[tove.eie@shus.no](mailto:tove.eie@shus.no)

# Helse-undersøkelsen i Oslo

## UNGDOM

Informasjon til  
foreldre/foresatte til ungdom  
som fyller 15/16 år i 2000

## Til foreldre/foresatte til ungdom som fyller 15/16 år i 2000

Nå skal Oslohelsa under lupen.

Hvordan står det egentlig til i hovedstaden?

Hvordan har ungdommen i Oslo det i dag?

Hvordan vurderer ungdommen sine egne problemer, vaner og situasjon?

Det er noe av det vi håper å få svar på gjennom denne helseundersøkelsen. Data som samles inn skal bl.a. brukes til å finne ut hva som er viktig for ungdommens helse og trivsel, både i den enkelte bydel og i hele Oslo. Resultatene skal brukes til å planlegge en bedre helsejefeneste, og til å finne ut mer om årsaker til sykdom.

I tillegg til ungdomsprosjektet inviterer vi utvalgte voksne aldersgrupper til Helseundersøkelsen i Oslo, til sammen ca. 50.000 personer.

*Det er første gang vi inviterer ungdom til en slik undersøkelse!*

*Hvorfor bør ungdommene være med i denne helseundersøkelsen?  
Hva vil vi med ungdomsundersøkelsen?*

- *finne ut hvordan helsa til ungdommene er*
- *finne ut hvordan de trives*
- *finne ut hva som bidrar til god helse og trivsel*
- *bedre helsejefenesten og det forebyggende helsearbeidet for ungdom*
- *arbeide for å finne ut mer om forskjeller mellom bydelene*
- *finne ut hva som kjennetegner et godt oppvekstmiljø*

### **Hvordan foregår undersøkelsen?**

Helseundersøkelsen (utfylling av to spørreskjemaer, ingen helsesjekk) foregår på skolen i skoletiden, og finner sted i løpet av våren og høsten 2000.

### **Hva spør vi om?**

Vi spør bl.a. om sykdom og helse, kosthold, idrett, nærmiljøet og hvordan ungdommen selv synes de har det.

### **Må alle være med?**

Undersøkelsen er frivillig. Vi håper at alle deltar. De som ikke deltar i undersøkelsen, bruker tiden til vanlig skolearbeid .

### **Hvordan skal resultatene brukes?**

Elever som er 15 år og eldre skriver selv under på samtykke om bruk av data til planlegging og forskning. Vi ber også om muligheten til å ta ny kontakt for å gi tilbud om eventuelle nye undersøkelser senere.

Spørreskjemaene inneholder ikke navn eller personnummer, men skal merkes med en kode som bare kan leses av en datamaskin. De utfylte skjemaene blir samlet inn av en person fra Statens helseundersøkelser. Dataene blir behandlet strengt fortrolig.

Etter godkjenning fra Datatilsynet kan svarene kobles mot andre helse-trygde- og sykdomsregistre og mot registre fra for eksempel folketelling. Dataene kan lagres uten noen spesiell tidsbegrensning. Det er likevel fullt mulig når som helst å trekke seg fra undersøkelsen, og be om å bli slettet fra registeret. Dette må i så fall gjøres skriftlig.

### **Hvem godkjenner undersøkelsen?**

Undersøkelsen er forelagt Den regionale komite for medisinsk forskningsetikk, og den er godkjent av Datatilsynet.

### **De som står bak undersøkelsen.**

Statens helseundersøkelse har i over 50 år drevet store befolkningsundersøkelser i hele landet. Denne undersøkelsen gjennomføres i samarbeid med Oslo kommune og Universitetet i Oslo. Skolesjefen i Oslo har anbefalt undersøkelsen.

Undersøkelsen er tilknyttet Oslos 1000-års jubileum.

Helseundersøkelsen i Oslo er et samarbeid mellom:

#### **Oslo kommune**

Byrådsavdeling for eldre og bydelene  
Rådhuset, 0037 OSLO.  
Tlf. 22 86 16 00



#### **Universitetet i Oslo**

Institutt for allmenntilleggsmedisin og samfunnsmedisin  
Postboks 1130 Blindern, 0317 OSLO.  
Tlf. 22 85 05 50.



#### **Statens helseundersøkelser**

Postboks 8155 Dep., 0033 OSLO  
Tlf. 22 24 21 00. (9-15)  
e-post: [post@shus.no](mailto:post@shus.no)

Du finner også informasjon om helseundersøkelsen på  
hjemmesidene våre [www.shus.no](http://www.shus.no)

Kontaktperson for ungdomsundersøkelsen:

tove Eie Tlf. 22 24 21 22

E-mail: [tove.eie@shus.no](mailto:tove.eie@shus.no)

Ønsker du å snakke med noen etter at du har svart  
på spørsmålene, kan du kontakte **skolehelsestjenesten**  
på skolen din, eller du kan ringe til:

**Barn og unges Kontakttelefon: Tlf. 80 03 33 21**

Kontakttelefonen er åpen mellom kl. 14.00 og 20.00  
alle ukedager, fra mandag til fredag.

# Helse-undersøkelsen i Oslo

**UNGDOM**  
Informasjon til dere som  
fyller 15/16 år i 2000

## **Hei!**

Hvordan har **du** det?

Hvordan er **helse di** for tida?

Hvordan synes **du** det er å være ungdom i Oslo?

Dette er noe av det vi håper å få svar på gjennom denne helseundersøkelsen. Opplysningene som samles inn skal bl.a. brukes til å finne ut hva som er viktig for ungdommens helse og trivsel - både i din bydel og i hele Oslo. Resultatene skal brukes til å planlegge en bedre helsetjeneste, og til å finne ut mer om årsaker til sykdom.

Nå har du sjansen til å være med å planlegge framtida!

Dere som er 15 og 16 år er de eneste ungdommene som blir spurt om å være med.

## **Det er første gang vi inviterer ungdom i Oslo til en helseundersøkelse!**

Flere voksne aldersgrupper vil også bli invitert til Helseundersøkelsen i Oslo, til sammen ca. 50.000 personer.

## **Hvordan foregår undersøkelsen?**

Undersøkelsen blir gjort i skoletiden, og vi ber deg svare på to spørreskjemaer. Vi spør om sykdom og helse, kosthold, idrett, nærmiljø, og hvordan du har det. Du skal ikke gjennom en helsesjekk.

## **Hvordan skal resultatene brukes?**

Før du fyller ut skjemaene, ber vi deg skrive under en godkjenning (samtykkeerklæring). Der sier du deg enig i at vi kan bruke svarene fra spørreskjemaene til planlegging og forskning. Vi ber også om muligheten

til å kontakte deg senere for å gi deg tilbud om å være med i eventuelle nye undersøkelser.

Dataene blir behandlet strengt fortlølig. Det er ikke noen spesiell tidsbegrensning for hvor lenge opplysningene kan lagres. Du kan når som helst trekke deg fra undersøkelsen. Dette må i såfall gjøres skriftlig. Opplysningene kan kobles opp mot andre registre hvis Datatilsynet gir tillatelse til det. Dette kan for eksempel være andre helse-, trygde- og sykdomsregistre, eller data fra for eksempel folketellinger. Det er ikke navn og personnummer på spørreskjemaene, men en kode som bare kan leses av en datamaskin.

## **Undersøkelsen er frivillig.**

Undersøkelsen er frivillig. Vi håper at du vil delta. Det er veldig viktig at flest mulig er med. De som ikke ønsker å delta, vil få vanlig skolearbeid mens undersøkelsen pågår.

## **Hvem står bak undersøkelsen?**

Vi i Statens helseundersøkelser (SHUS) samarbeider med Oslo kommune og Universitetet i Oslo. Datatilsynet har godkjent undersøkelsen. Skolesjefen i Oslo har anbefalt undersøkelsen

## **Du skal vite at:**

- alle som jobber med helseundersøkelsen har taushetsplikt**
- resultatene skal brukes i planlegging og forskning og blir behandlet helt fortlølig**
- dine foreldre/foresatte er informert om undersøkelsen**
- det er viktig at nettopp du deltar**

## KOPI AV SAMTYKKEERKLÆRING for å delta i Helseundersøkelsen av ungdom i Oslo "UNGDOM 2004"

- Jeg har mottatt informasjon om Helseundersøkelsen "UNGDOM 2004", som er en del av Landsomfattende helseundersøkelse i Norge. Jeg er informert om formålet med undersøkelsen og at:
- opplysninger om meg blir behandlet strengt fortrolig
  - undersøkelsen er godkjent av Datatilsynet og forelagt Den regionale komité for medisinsk forskningsetikk
  - ingen forskere vil få tilgang til opplysninger som direkte kan tilbakeføres til meg
  - spørreprøver og spørreskjema lagres nedlåst ved Nasjonalt folkehelseinstitutt
  - det ikke er satt noen spesiell tidsbegrensning for hvor lenge opplysningene om meg kan lagres
  - jeg på et senere tidspunkt kan be om å bli slettet fra registeret og/eller at spørreprøven destrueres uten å oppgi noen grunn, ved å sende skriftlig henvendelse til: Nasjonalt folkehelseinstitutt, Postboks 4404, Nydalen, 0403 Oslo.

Erklæringen nedenfor er avgitt innenfor rammene av informasjon jeg har mottatt om helseundersøkelsen.

### ERKLÆRING

1. Jeg vil delta i spørreskjemaundersøkelsen og samtykker til at data kan benyttes til planlegging og forskning nå og i fremtiden.
2. Jeg vil avgi spørreprøve og samtykker til at data kan benyttes til forskning, herunder analyser av arvemateriale og sammenheng med sykdom og helseplager nå og i fremtiden.
3. Jeg samtykker til at jeg på et senere tidspunkt kan bli kontaktet og få tilbud om å være med i nye undersøkelser.
4. Jeg samtykker til at dataene etter godkjenning fra Datatilsynet, kan kobles med opplysninger om meg i andre helseundersøkelser og registre. Dette kan for eksempel være tidligere helseundersøkelser, helse-, trygde- eller sykdomsregistre, eller data fra folketellinger.

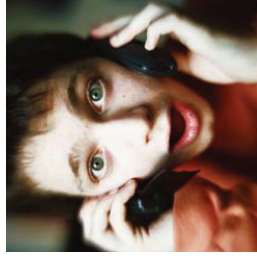
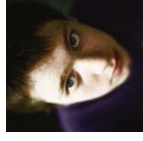
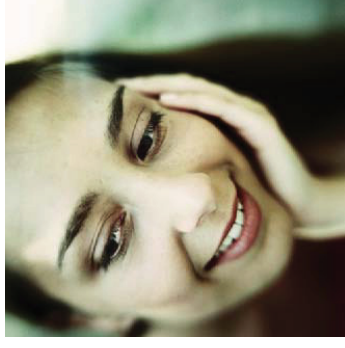
Jeg samtykker i punktene ovenfor.

Jeg samtykker **ikke** til følgende punkter:.....

*Dette eksemplaret beholder du selv. Samtykkeerklæringen på baksiden av invitasjonsbrevet underskrives og returneres sammen med spørreskjema/børsteprøve. Den returnerte samtykkeerklæringen vil bli oppbevart på et nedlåst sted atskilt fra spørreskjema/børsteprøve slik at forskere ikke vil ha adgang til opplysninger som kan identifisere deg som person.*

Invitasjon til å delta i Helseundersøkelsen

# UNGDOM 2004



Universitet i Oslo  
Institutt for allmenn- og samfunnsmedisin  
Postboks 1130 Blindern, 0317 OSLO.  
Prosjektleder professor  
Espen Bjertness



Nasjonalt folkehelseinstitutt  
Postboks 4404 Nydalen  
0403 Oslo  
Avd. direktør Wenche Nystad

Kontaktperson for undersøkelsen:  
Ase Sagatun tlf 22 85 06 77  
E-post: ase.sagatun@samfunnsmed.uio.no

## Hva er viktig for ungdoms helse og velvære? Hvordan kan vi unngå at ungdom blir syke?

Dette er noe av det vi håper å få svar på gjennom helseundersøkelsen UNGDOM 2004.

DU er invitert til å delta sammen med alle de andre som deltok i Helseundersøkelsen i Oslo i 10. klasse i 2001. Målet er å få en bedre helsejenneste for ungdom, og å finne ut mer om årsaker til sykdom. Derfor er nettopp DINE svar viktige.

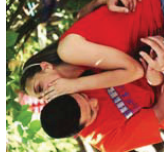
Undersøkelsen er unik i Norge, bl.a. fordi vi vil få helsedata fra de samme ungdommene på to ulike tidspunkter. Ved å sammenligne resultatene med forrige undersøkelse, kan vi lære mye om hvordan ungdoms helse endrer seg over tid. Nå kan DU være med å bidra til arbeidet med å forhindre sykdom hos nye generasjoner av ungdom i fremtiden.

Undersøkelsen dreier seg om hvordan du har det, om sykdom og helse, om sosial støtte og mestring, om nærmiljøet, om idrett, lese-/skrivevansker og kosthold. Vi vil også undersøke om forhold knyttet til arvematerialet kan forklare hvorfor noen har helseproblemer mens andre ikke har det.

**Som takk for at du deltar med spørreskjema og børsteprøve, blir du med i trekningen av tre pengepremier à kr. 15.000**

**Hvordan foregår undersøkelsen?** Da du gikk i 10. klasse takket du JA til å kunne bli kontaktet igjen, noe vi er veldig glade for. Vi ber deg nå om å svare på vedlagte spørreskjema, og ta en børsteprøve av munnslimhinnen. Bruksanvisningen finner du i vedlagte "boblepose". Børsteprøven fungerer omtrent som å gni en tannbørste over tannkjøttet. Disse prøvene skal brukes til å studere arvestoffet for å se om spesielle typer arvestoff kan beskytte mot eller gi økt risiko for lese-/skrivevansker eller helseproblemer som f. eks. angst, depresjon, astma, allergi og kreft.

**Hvordan skal resultatene brukes?** Før du tar børsteprøven og fyller ut spørreskjemaet, ber vi deg skrive under en godkjenning (samtykkeerklæring) – som du finner på baksiden av invitasjonsbrevet.



Der sier du deg enig i at vi kan bruke opplysningene til planlegging og forskning. Vi ber også om muligheten til å kontakte deg senere for å gi deg tilbud om å være med i en eventuell ny undersøkelse. Det kan dreie seg om en undersøkelse i løpet av de neste 5-10 årene, og du kan når den tid kommer selvfølgelig velge om du vil være med eller ikke.

Opplysningene dine blir behandlet strengt fortrolig, og de blir oppbevart og sikret i henhold til regelverk vedtatt av Stortinget. Det er ikke noen spesiell tidsbegrensning for hvor lenge børsteprøve og spørreskjema kan lagres. Du kan når som helst senere be om å bli slettet fra registeret uten å oppgi noen grunn. Dette må i så fall skje skriftlig til Nasjonalt folkehelseinstitutt (se baksiden av arket).

Opplysningene kan kobles opp mot andre helseundersøkelser (f.eks. fra 10. klasse) og fra andre registre f.eks. Medisinsk fødselsregister (for å se hvordan forhold ved fødsel kan påvirke helsen senere), Kreftregisteret og Utdanningsregisteret dersom Datatilsynet gir tillatelse til det. Det er ikke navn eller fødselsnummer på spørreskjemaet og børsteprøvene, men en kode som bare kan leses av en datamaskin, slik at forskere ikke kan gjenkjenne deltakerne.

**Undersøkelsen er frivillig.** Vi håper imidlertid du vil delta, slik at vi kan få et mest mulig riktig og nyansert bilde av ungdoms helse. Det er veldig viktig at flest mulig er med for å gi undersøkelsen høy kvalitet.

**Hvem står bak undersøkelsen?** Undersøkelsen er et samarbeid mellom Nasjonalt folkehelseinstitutt og Universitetet i Oslo. Undersøkelsen er godkjent av Datatilsynet og forelagt Regional etisk komité for medisinsk forskning.

**Du skal vite at:**

- **alle som jobber med helseundersøkelsen har taushetsplikt**
- **resultatene skal bare brukes i planlegging og forskning og blir behandlet helt fortrolig**
- **det er viktig at nettopp du deltar**



## **Appendix II**

### **Informed Consent:**

- The youth part of the Oslo and Hedmark Health Study (1)
- Youth 2004 (2)



*Lim inn etikett med  
navn og personnummer*

## **SAMTYKKEERKLÆRING for deltakelse i Helseundersøkelsen i Oslo**

### **UNGDOM**

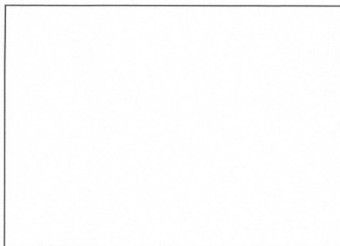
Jeg har mottatt informasjon om ungdomsdelen av Helseundersøkelsen i Oslo. Jeg er informert om formålet med undersøkelsen. Jeg er også kjent med at opplysninger om meg blir behandlet strengt fortrolig og at undersøkelsen er godkjent av Datatilsynet. Undersøkelsen er forelagt Den regionale komité for medisinsk forskningsetikk. Jeg er videre kjent med at det ikke er satt noen spesiell tidsbegrensning for hvor lenge opplysningene om meg kan lagres. Jeg kan på et senere tidspunkt be om å bli slettet fra registeret uten å oppgi noen grunn. Dette må i så fall sendes skriftlig til Statens helseundersøkelser.

- 1. Jeg samtykker i at svarene mine kan brukes til planlegging og forskning.**
- 2. Jeg samtykker i at jeg på et senere tidspunkt kan bli kontaktet og få tilbud om å være med i nye undersøkelser.**
- 3. Jeg samtykker i at dataene, etter godkjenning fra Datatilsynet, kan kobles med opplysninger om meg i andre registre. Dette kan for eksempel være andre helse-, trygde- eller sykdomsregistre, eller data fra for eksempel folketellinger.**

*Du kan stryke det eller de punkter som du vil reservere deg mot.*

-----  
**Elevens underskrift**

-----  
**Dato**



← Lim inn etikett nr. 2 (med navn og løpenr.) her!

↓

## SAMTYKKEERKLÆRING

for å delta i Helseundersøkelsen av ungdom i Oslo UNGDOM 2004

↓

Jeg har mottatt informasjon om Helseundersøkelsen av ungdom - UNGDOM 2004, som er en del av Landsomfattende helseundersøkelse i Norge.

Jeg er informert om **formålet** med undersøkelsen og at:

- opplysninger om meg blir behandlet strengt fortrolig
- undersøkelsen er godkjent av Datatilsynet og forelagt Den regionale komité for medisinsk forskningsetikk
- ingen forskere vil få tilgang til opplysninger som direkte kan tilbakeføres til meg
- børsteprøver og spørreskjema lagres nedlåst ved Nasjonalt folkehelseinstitutt
- det ikke er satt noen spesiell tidsbegrensning for hvor lenge opplysningene om meg kan lagres
- jeg på et senere tidspunkt kan be om å bli slettet fra registeret og/eller at børsteprøven destrueres uten å oppgi noen grunn, ved å sende skriftlig henvendelse til: Nasjonalt folkehelseinstitutt, Postboks 4404, Nydalen, 0403 Oslo.

Erklæringen nedenfor er avgitt innenfor rammene av informasjon jeg har mottatt om helseundersøkelsen.

↓

### ERKLÆRING

1. Jeg vil delta i spørreskjemaundersøkelsen og samtykker til at data kan benyttes til planlegging og forskning nå og i fremtiden.
2. Jeg vil avgi børsteprøve og samtykker til at data kan benyttes til forskning, herunder analyser av arvemateriale og sammenheng med sykdom og helseplager nå og i fremtiden.
3. Jeg samtykker til at jeg på et senere tidspunkt kan bli kontaktet og få tilbud om å være med i nye undersøkelser.
4. Jeg samtykker til at dataene etter godkjenning fra Datatilsynet, kan kobles med opplysninger om meg i andre helseundersøkelser og registre. Dette kan for eksempel være tidligere helseundersøkelser, helse-, trygde- eller sykdomsregistre, eller data fra folketellinger.

Jeg samtykker i punktene ovenfor.

Jeg samtykker ikke til følgende punkter:.....

*Dette eksemplaret underskrives og returneres sammen med spørreskjema/ børsteprøver. Kopi av samtykkeerklæringen har du fått i informasjonsbrosjyren. Du kan også få en ekstra kopi etter undersøkelsen. Den returnerte samtykkeerklæringen vil bli oppbevart på et nedlåst sted atskilt fra spørreskjema/børsteprøver slik at forskere ikke vil ha adgang til opplysninger som kan identifisere deg som person.*

↓

\_\_\_\_\_

Dato

\_\_\_\_\_

Underskrift

## **Appendix III**

### **Questionnaires:**

- The youth part of the Oslo Health Study (1 and 2)
- The youth part of the Hedmark Health Study (1 and 3)



Etikett

# U Helseundersøkelsen

Dato for utfylling: T

Dag Måned År

## U1. EGEN HELSE

1.1 Hvordan er helsen din nå? (Sett bare ett kryss)

Dårlig Ikke helt god God Svært god

1  2  3  4

1.2 Har du, eller har du hatt? (Sett ett kryss for hver linje) JA NEI

Astma .....

Høysnue (pollenallergi, allergisk reaksjon, rennende nese, svie i øynene) .....

Eksem .....

Diabetes (sukkersyke) .....

1.3 Har du de siste 12 mnd hatt? (Sett ett kryss for hver linje)

Ørebetennelse .....

Halsbetennelse (minst 3 ganger) .....

Bronkitt eller lungebetennelse .....

Psykisk plage som det er søkt hjelp for .....

Alvorlig skade eller sykdom .....

Hvis du svarte «JA»; hva slags alvorlig skade eller sykdom var dette:

1.4 Har du følgende funksjonshemming? (Sett ett kryss for hver linje)

Bevegelseshemming ..... Nei  Ja, litt  Ja, mye

Nedsatt syn .....

Nedsatt hørsel .....

1.5 Har du i løpet av de siste 12 mnd flere ganger vært plaget med smerter i? (Sett ett kryss for hver linje)

Hode (hodepine, migrene e.l.) ..... JA  NEI

Nakke/skuldre .....

Armer/ben/knær .....

Mage .....

Rygg .....

Hvis du svarte «NEI» på alle spørsmålene under 1.5: Hopp til U2

1.6 Har disse smertene ført til at du har vært hjemme fra skolen?

Oppgi også ca. antall skoledager de siste 12 mnd: (Sett bare ett kryss)

Nei Ja, 1-2 dager Ja, 3-5 dager Ja, 6-10 dager Ja, mer enn 10 dager

1  2  3  4  5

JA NEI

1.7 Har smertene ført til redusert aktivitet i fritida? .....

## U2. TANNHELSE

2.1 Mener du at du har bedre eller dårligere tenner enn andre ungdommer på din alder? (Sett bare ett kryss)

Bedre Som de fleste Dårligere Vet ikke

1  2  3  4

2.2 Bryr du deg om at du har fine tenner? (Sett bare ett kryss)

Ja, mye  1 Ja, litt  2 Nei  3

2.3 Hvor ofte pusser du tennene dine? (Sett bare ett kryss)

Flere ganger om dagen En gang om dagen Annenhver dag Sjeldnere enn annenhver dag

1  2  3  4

2.4 Har du hatt tannverk på grunn av hull? (Sett eventuelt flere kryss)

Ja, men før jeg begynte på skolen Ja, etter at jeg begynte på skolen Nei, aldri Vet ikke

## U3. MOSJON OG FYSISK AKTIVITET

3.1 Utenom skoletid: Hvor mange ganger i uka driver du idrett/mosjon slik at du blir andpusten eller svett?  ganger pr. uke

3.2 Omtrent hvor mange timer pr. uke bruker du på dette?

0 timer 1-2 timer 3-4 timer 5-7 timer 8-10 timer 11 timer eller mer

1  2  3  4  5  6

JA NEI

3.3 Driver du med konkurranseidrett? .....

(Individuelt eller på lag)

3.4 Bruker du naturen (skog og mark) til tur? Aldri Ja, mindre enn 1 gang i måneden Ja, 1 gang i måneden eller mer

Sommer:  1  2  3

Vinter:  1  2  3

3.5 Utenom skoletid: Hvor mange timer pr. skoledag (mandag til fredag) sitter du i gjennomsnitt foran TV, video og/eller PC (spill og internett)?

Inntil 1 time 1-2 timer 3-5 timer Mer enn 5 timer

1  2  3  4

3.6 Hvordan kommer du deg normalt til skolen i sommerhalvåret? (Sett bare ett kryss)

Med buss/tog e.l. (offentlig transport) .....  1

Med bil/moped .....  2

På sykkel .....  3

Til fots .....  4

3.7 Hvor lang skolevei har du? T

Mindre enn 2 km 2-4 km Over 4 km

1  2  3

Ikke skriv her: 1.3 (skade) 8.1 (utdanning - annet) 9.5 (far født) (mor født)

9.7 (far - yrke) 9.7 (mor - yrke) 12.5 (prevensjon) 12.6 (p-pille merke)



## U4. RØYKING, RUSMIDLER OG DOP

### 4.1 Røyker du, eller har du røykt? (Sett bare ett kryss)

Nei, aldri  1 Ja, men jeg har sluttet  2 Ja, av og til  3 Ja, hver dag  4

Hvis du har svart «NEI, ALDRI»; hopp til pkt. 4.3

### 4.2 Hvor gammel var du da du begynte å røyke? år

### 4.3 Bruker du eller har du brukt snus, skrå eller lignende? (Sett bare ett kryss)

Nei, aldri  1 Ja, men jeg har sluttet  2 Ja, av og til  3 Ja, hver dag  4

### 4.4 Røyker noen av de du bor sammen med? (Sett ett eller flere kryss)

Ja, mor  Ja, far  Ja, søsken  Ja, andre  Nei

JA NEI

### 4.5 Har du noen gang drukket alkohol?..... JA NEI (f.eks. alkoholholdig ol, rusbrus, vin, brennevin eller hjemmebrent)

Hvis du svarte «NEI»; hopp til pkt. 4.8

### 4.6 Har du noen gang drukket så mye alkohol at du har vært beruset (full)? (Sett bare ett kryss)

Nei, aldri  Ja, en gang  Ja, 2-3 ganger  Ja, 4-10 ganger  Ja, mer enn 10 ganger

### 4.7 Omtrent hvor ofte har du i løpet av det siste året drukket alkohol? (Sett bare ett kryss) (Lettol og alkoholfritt ol regnes ikke med)

4-7 ganger i uka  1 2-3 ganger i uka  2 ca. 1 gang i uka  3 2-3 ganger pr. måned  4

Omtrent 1 gang i måneden  5 Noen få ganger siste år  6 Har ikke drukket alkohol siste år  7 Har aldri drukket alkohol  8

### 4.8 Har du noen gang prøvd dopingmidler? (Sett bare ett kryss)

Nei, aldri  1 Ja, en gang  2 Ja, flere ganger  3 Ja, jeg bruker det regelmessig  4

## U5. MAT, DRIKKE OG SPISEVANER

### 5.1 Hvor ofte spiser du vanligvis disse matvarene? (Sett ett kryss for hver linje)

	Sjelden /aldri	1-3 g. pr.mnd	1-3 g. pr.uke	4-6 g. pr.uke	1-2 g. pr.dag	3 g. el. mer pr.dag
Frukt, bær.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ost (alle typer).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poteter.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kokte grønnsaker.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rå grønnsaker/salat....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feit fisk (f.eks. laks, ørret, makrell, sild).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sjokolade/smågodt.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chips, potetgull.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5	6

## U5. Mat, drikke og spisevaner (fortsettelse)

### 5.2 Hvor mye drikker du vanligvis av følgende? (Sett ett kryss pr. linje) (1/2 liter = 3 glass)

	Sjelden /aldri	1-6 glass pr.uke	1 glass pr.dag	2-3 glass pr.dag	4 glass el. mer pr.dag
Helmelk, kefir, yoghurt.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lettmelk, cultura, lettyoghurt..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skummet melk (sur/søt).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cola/brus med sukker.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cola/brus «light».....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruktjuice.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saft.....	<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"/>
	1	2	3	4	5

### 5.3 Hva slags fett bruker du oftest på brødet? (Sett bare ett kryss)

Smør/hard margarin  1 Myk/lett margarin  2 Oljer  3 Bruker ikke  4

### 5.4 Hvor ofte spiser du disse måltidene en vanlig uke? (Sett ett kryss for hver linje)

	Sjelden /aldri	1-2 ganger pr.uke	3-4 ganger pr.uke	5-6 ganger pr.uke	Hver dag
Frokost.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formiddagsmat/matpakke....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5

### 5.5 Hvor mye penger bruker du i uka på snop, snacks, cola/brus og gatekjøkkenmat? (Sett bare ett kryss)

0-25 kr  1 26-50 kr  2 51-100 kr  3 101-150 kr  4 151-200 kr  5 over 200 kr  6

### 5.6 Bruker du følgende kosttilskudd: Ja, daglig Ibland Nei

Tran, trankapsler, fiskeoljekapsler?.....

Vitamin- og/eller mineraltilskudd?.....

### 5.7 Har du noen gang prøvd å slanke deg? (Sett bare ett kryss)

Nei, aldri  1 Ja, tidligere  2 Ja, nå  3 Ja, hele tiden  4

Hvis du svarte «NEI, ALDRI»; hopp til pkt. 5.9:

### 5.8 Hva har du gjort for å slanke deg? (Sett ett kryss for hver linje)

	Aldri	Sjelden	Ofte	Alltid
Jeg spiser mindre.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg faster.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg trener mer.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kaster opp.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg bruker avføringspiller eller vandrivende midler.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg tar mettende eller sult-dempende piller.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 5.9 Hva veide du sist du veide deg? hele kg

### 5.10 Hvor høy var du sist du målte deg? hele cm

### 5.11 Hva synes du om vekta di? (Sett bare ett kryss)

Vekta er OK  1 Veier litt for mye  2 Veier alt for mye  3 Veier litt for lite  4 Veier alt for lite  5

### 5.12 Jeg bryr meg mye om vekta mi. (Sett bare ett kryss)

Enig  Litt enig  Ikke enig

### 5.13 Hvilken vekt ville du vært tilfreds med nå (din «trivselsvekt»)? hele kg

### 5.14 Har du noen gang vært til behandling for spiseforstyrrelser?

Nei  1 Nei, men jeg burde vært  2 Ja  3



## U6. PÅKJENNINGER OG MESTRING

### 6.1 Under finner du en liste over ulike plager. Har du opplevd noe av dette den siste uken (til og med i dag)?

(Sett ett kryss for hver linje)

	Ikke plaget	Litt plaget	Ganske mye	Veldig mye
Plutselig frykt uten grunn.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Føler deg redd eller engstelig.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Matthet eller svimmelhet.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Føler deg anspent eller oppjaget.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lett for å klandre deg selv.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Søvnproblemer.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nedtrykt, tungsindig (trist).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av å være unyttig, lite verd.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av at alt er et slit.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av håpløshet mht. framtida.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

### 6.2 Under finner du noen påstander.

(Sett ett kryss for hver linje)

	Helt galt	Nokså galt	Nokså riktig	Helt riktig
Jeg klarer alltid å løse vanskelige problemer hvis jeg prøver hardt nok.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hvis noen motarbeider meg, så kan jeg finne måter og veier for å få det som jeg vil.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hvis jeg har et problem og står helt fast, så finner jeg vanligvis en vei ut.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg føler meg trygg på at jeg ville kunne takle uventede hendelser på en effektiv måte.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg beholder roen når jeg møter vanskeligheter, fordi jeg stoler på mine evner til å mestre/få til ting.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

### 6.3 Har du i løpet av de siste 12 mnd selv opplevd noe av følgende?

(Sett ett kryss for hver linje)

	JA	NEI
Foreldre (foresatte) har blitt arbeidsløse eller uføretrygdet.....	<input type="checkbox"/>	<input type="checkbox"/>
Alvorlig sykdom eller skade hos deg selv.....	<input type="checkbox"/>	<input type="checkbox"/>
Alvorlig sykdom eller skade hos noen som står deg nær.....	<input type="checkbox"/>	<input type="checkbox"/>
Dødsfall hos noen som sto deg nær.....	<input type="checkbox"/>	<input type="checkbox"/>
Seksuelle overgrep (f.eks. blotting, befoling, utfrivillig samleie m.m.).....	<input type="checkbox"/>	<input type="checkbox"/>

### 6.4 Har du opplevd noe av følgende?

(Sett ett kryss for hver linje)

	Nei	Ja, av og til	Ja, ofte
Stort arbeidspress på skolen.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stort press fra andre for å lykkes/gjøre det bra på skolen.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Store vansker med å konsentrere deg i timen....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Store vansker med å forstå læreren når hun/han underviser.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 6.5 Har fagpersonell sagt at du har eller har hatt lese- og skrivevansker. (Sett bare ett kryss)

(Sett bare ett kryss)

Ja, store	Ja, middels	Ja, lette	Nei
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

### 6.6 Har du i løpet av de siste 12 mnd, opplevd problemer med mobbing på skolen/skoleveien?

(Sett bare ett kryss)

Aldri	Av og til	Omtrent en gang i uka	Flere ganger i uka
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

## U7. BRUK AV HELSETJENESTER

### 7.1 Har du de siste 12 mnd. selv brukt?:

(Sett ett kryss for hver linje)

	Ingen ganger	1-3 ganger	4 ganger eller mer
Skolehelsetjenesten.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helsestasjon for ungdom.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vanlig lege (Allmennpraktiserende lege)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PP-tjenesten.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psykolog eller psykiater..... (privat eller på poliklinikk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Familierådgivning.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen spesialist (privat eller på poliklinikk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legevakt (privat eller offentlig).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sykehusinnleggelse.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sosialtjenesten i kommunen.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fysioterapeut.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tannlege/skoletannlege.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alternativ behandler.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## U8. UTDANNING OG UTDANNINGSPLANER

### 8.1 Hva er den høyeste utdanning du har tenkt å ta?

(Sett bare ett kryss)

Universitet eller høyskoleutdanning av høyere grad.....	<input type="checkbox"/> 1
(F.eks. lektor, advokat, sivilingeniør, tannlege, lege, psykolog, siviløkonom)	
Universitet eller høyskoleutdanning på mellomnivå.....	<input type="checkbox"/> 2
(F.eks. cand.mag., lærer, sosionom, sykepleier, politi, ingeniør, journalist)	
Videregående allmennfaglig/økonomisk administrative fag....	<input type="checkbox"/> 3
Yrkesfaglig utdanning på videregående skole.....	<input type="checkbox"/> 4
(kokk, frisør, byggefag, elektrofag, helse- og sosialfag o.l.)	
Ett år på videregående skole.....	<input type="checkbox"/> 5
Annet:.....	<input type="checkbox"/> 6
Har ikke bestemt meg.....	<input type="checkbox"/> 7

### 8.2 Hvor mye egne penger brukte du siste uke?kr

(Småinnkjøp pluss større gjenstander som f.eks. musikkinnlegg o.l.)

JA NEI

### 8.3 Har du lønnet arbeid i løpet av skoleåret?.....

Hvis du svarte «JA»:

Hvor mange timer i uka arbeider du? ca.  hele timer

Hvor mye tjener du i gjennomsnitt pr. måned på dette arbeidet? kr

### 8.4 Hvilken karakter fikk du siste gangen i karakterboken? (Sett bare inn hele tallkarakterer)

Matte Norsk skriftlig Engelsk Samfunnsfag

## U9. OPPVEKST OG TILHØRIGHET

### 9.1 Hvor lenge har du bodd i Norge? hele år

### 9.2 Hvor lenge har du bodd der du bor nå? hele år

### 9.3 Har du flyttet i løpet av de siste 5 årene? (Sett bare ett kryss)

Nei Ja, en gang Ja, 2-4 ganger Ja, 5 ganger eller flere

1  2  3  4

### 9.4 Mine foreldre er: (Sett bare ett kryss)

Gift/samboere Ugift Skilt/separert En eller begge er døde Annet

1  2  3  4  5

### 9.5 Hvor er dine foreldre født?

Norge Annet land Hvilket land:

Far:   Far: \_\_\_\_\_

Mor:   Mor: \_\_\_\_\_



## U9. Oppvekst og tilhørighet (fortsettelse)

9.6 Jeg tror vår familie, sett i forhold til andre i Norge, har:  
(Sett bare ett kryss)  
Dårlig råd    Middels råd    God råd    Svært god råd    T

1     2     3     4

9.7 Er far og/eller mor i arbeid nå?

Ja, heltid    Ja, deltid    Arbeidsløs/trygdet    Hjemmeværende    Går på skole/studerer    Død

Far:  1     2     3     4     5     6

Mor:  1     2     3     4     5     6

Hvis far og/eller mor er i arbeid, hvilket yrke har de?

Far: \_\_\_\_\_

Skriv kort hva han gjør på jobben:

\_\_\_\_\_

Mor: \_\_\_\_\_

Skriv kort hva hun gjør på jobben:

\_\_\_\_\_

## U10. FAMILIE OG VENNER

10.1 Hvem bor du sammen med nå? (Sett bare ett kryss)

(Ta ikke med søsken og halvsøsken.)

Mor og far    Bare mor    Bare far    Omtrent like mye hos mor og far

1     2     3     4

Mor el. far og ny samboer el. ektefelle    Fosterforeldre    Andre

5     6     7

10.2 Hvor mange søsken eller halvsøsken bor du sammen med?

Antall søsken

10.3 Hvor mange av disse er like gamle eller eldre enn deg?

Antall søsken

10.4 Når du tenker på familien din, vil du si at:  
(Sett ett kryss for hver linje)

	Helt enig	Delvis enig	Delvis uenig	Helt uenig
Jeg føler meg knyttet til familien min .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg blir tatt på alvor i familien min .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Familien legger vekt på mine meninger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg betyr mye for familien min .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kan regne med familien min når jeg trenger hjelp .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10.5 Hvilket forhold har du til dine foreldre?

(Sett ett kryss for hver linje)

	Stemmer meget godt	Stemmer ganske godt	Stemmer ikke særlig godt	Stemmer ikke i det hele tatt
Foreldrene mine vet hvor jeg er og hva jeg gjør i helgene .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foreldrene mine vet hvor jeg er og hva jeg gjør på hverdagene .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foreldrene mine vet hvem jeg er sammen med i fritida .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foreldrene mine liker vennene jeg er sammen med på fritida .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10.6 Når du tenker på vennene dine, vil du si at: (Sett ett kryss for hver linje)

	Helt enig	Delvis enig	Delvis uenig	Helt uenig
Jeg føler meg nært knyttet til vennene mine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vennene mine legger vekt på mine meninger.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kan bidra/være til støtte for vennene mine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kan regne med vennene mine når jeg trenger hjelp .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10.7 Hvor mange personer utenfor din nære familie står deg så nær at du kan regne med å få hjelp hvis du:

Har personlige problemer    Antall personer

Har praktiske problemer (f.eks. m/ skolearbeidet)    Antall personer

10.8 Har du selv vært utsatt for vold (blitt slått, sparket e.l.) de siste 12 mnd.? (Sett bare ett kryss)

Aldri    Ja, bare av ungdom    Ja, bare av voksne    Ja, av både ungdom og voksne

1     2     3     4

## U11. SEKSUELL ADFERD OG PREVENSJON

11.1 Har du noen gang hatt samleie?    Ja, med en partner    Ja, med flere partnere    Nei

Hvis du svarte «NEI»; hopp til U12

11.2 Alder første gang? ..... Jeg var   år

11.3 Brukte du/dere prevensjon ved siste samleie?

Nei    Ja, kondom    Ja, p-pille/p-sprøyte    Ja, annet    Vet ikke

1     2     3     4     5

JA    NEI    Vet ikke

11.4 Har du noen gang blitt gravid/gjort ei jente gravid?   

Hvis du svarte «JA»;

Hvor gammel var du da dette skjedde?    Jeg var   år

JA    NEI    Vet ikke

Ble det utført abort? .....

## U12. BRUK AV MEDISINER M.M

12.1 Hvor ofte har du i løpet av de 4 siste ukene brukt følgende medisiner? (Sett ett kryss for hver linje)

Med medisiner mener vi her medisiner kjøpt på apotek. Kosttilskudd og vitaminer regnes ikke med her.

	Aldri	Daglig	Hver uke, men ikke daglig	Sjeldnere enn hver uke	Ikke brukt siste 4 uker
Smertestillende uten resept	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smertestillende på resept ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allergi-medisin .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Astma-medisin .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sovemedisin .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beroligende medisin .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medisin mot depresjon .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen medisin på resept ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12.2 Skriv navnet på medisinen som du har krysset av for ovenfor, og hva grunnen var til at du tok medisinen (sykdom eller symptom):

(Kryss av for hvor lenge du har brukt medisinen)

Navn på medisinen: (ett navn pr. linje):	Grunn til bruk av medisinen:	Hvor lenge har du brukt medisinen?	
		Inntil 1 år	Et år eller mer
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Dersom det ikke er nok plass her, kan du fortsette på eget ark som du legger ved.

## SPØRSMÅL TIL JENTENE

12.3 Har du fått menstruasjon («mensen»)? .....    JA    NEI

Hvis du svarte «NEI»; hopp til 12.5

12.4 Hvor gammel var du da du fikk din første menstruasjon?

Jeg var   år

12.5 Bruker du, eller har du brukt:

(Sett ett kryss for hver linje)

Nå    Før, men ikke nå    Aldri

P-pille/minipille/ p-sprøyte .....

Annen prevensjon .....

Hvilken type prevensjon?:

\_\_\_\_\_

12.6 Til deg som bruker p-pille/minipille:

Hvilket merke bruker du nå?:

\_\_\_\_\_

Etikett

U/T

# Helse-undersøkelsen i Oslo

T

Dato for utfylling:

Dag

Måned

År

## HER KOMMER FLERE SPØRSMÅL!!!

Du synes kanskje vi allerede har spurt deg om det meste - men enda er det mer vi gjerne vil vite. Dette skjemaet har blant annet spørsmål om de sterke og svake sidene dine, om skolesituasjonen, om kultur og kontakt og om idrett og aktivitet.

Vi håper du tar deg tid til å tenke gjennom det vi spør om og at du svarer det **du** mener er riktig for **deg**.

Lykke til!

T

### U/T1. DINE STERKE OG SVAKE SIDER

1.1 Svar på grunnlag av slik du har hatt det de siste 6 månedene. (Sett ett kryss for hver linje)

	Stemmer ikke	Stemmer delvis	Stemmer helt		Stemmer ikke	Stemmer delvis	Stemmer helt
Jeg prøver å være hyggelig mot andre. Jeg bryr meg om hva de føler.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg er ofte lei meg, nedfor eller på gråten.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er rastløs. Jeg kan ikke være lenge i ro	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg blir som regel likt av andre på min alder...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg får ofte hodepine, vondt i magen eller kvalme .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg blir lett forstyrret. Jeg synes det er vanskelig å konsentrere meg .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg deler gjerne med andre (mat, spill, blyanter osv.) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg blir nervøs i nye situasjoner. Jeg blir lett usikker .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg blir veldig sint og har et hissig temperament.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg er snill mot de som er yngre enn meg .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er vanligvis for meg selv. Jeg gjør som regel ting alene.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg blir ofte beskyldt for å lyve eller jukse .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg gjør vanligvis det jeg får beskjed om.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Andre barn eller unge erter eller plager meg ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg bekymrer meg mye.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg tilbyr meg ofte å hjelpe andre (foreldre, lærere, andre barn/unge).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er hjelpsom hvis noen er såret, oppskaket eller føler seg dårlig .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg tenker meg om før jeg handler (gjør noe)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er stadig urolig, det kribler i kroppen.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg tar ting som ikke er mine, hjemme, på skolen eller andre steder.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har en eller flere gode venner .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg kommer bedre overens med voksne enn de på min egen alder .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg slåss mye. Jeg kan presse andre til å gjøre det jeg vil .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jeg er redd for mye. Jeg blir lett skremt .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	Jeg fullfører oppgaver. Jeg er god til å holde på oppmerksomheten.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					1	2	3

## U/T2. BEKYMRINGER OG PROBLEMER

2.1 Har du i løpet av de siste 12 månedene hatt noen av disse problemene? (Sett ett kryss for hver linje)

	Nei, aldri	Ja, av og til	Flere ganger	Svært ofte
Krangler, eller konflikter med foreldrene dine .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bekymringer i forhold til seksualitet.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psykiske problemer hos foreldre/foresatte .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Problemer i forhold til venner .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Økonomiske problemer hos foreldre/foresatte .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rusproblemer hos foreldre/foresatte .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andre problemer.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

## U/T3. SKOLESITUASJONEN DIN

3.1 Hvordan har du det på skolen? (Sett ett kryss for hver linje)

	Helt enig	Delvis enig	Delvis uenig	Helt uenig
Jeg trives i klassen.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har mye til felles med andre i klassen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg føler meg knyttet til klassen .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Klassen legger vekt på mine meninger...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lærerne legger vekt på meningene mine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lærerne mine setter pris på meg.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lærerne hjelper meg med fagene når jeg trenger det.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lærerne hjelper meg med personlige problemer hvis jeg trenger det.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

3.2 Hvor lett er det for deg å få nye venner på skolen?

(Sett ett kryss for hver linje)

	Alltid lett	Som regel lett	Som regel vanskelig	Alltid vanskelig
Blant ungdom med norsk bakgrunn .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blant ungdom med Innvandrerbakgrunn .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

## U/T4. FORHOLDET TIL FAMILIEN DIN

4.1 Hvor viktig er det for deg: (Sett ett kryss for hver linje)

	Meget viktig	Ganske viktig	Litt viktig	Ikke viktig i det hele tatt
Å tilfredsstillere behovene til familien din, selv om dine egne behov er forskjellige fra deres.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Å unngå krangling med andre medlemmer av familien.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Å sette familiens behov foran dine egne.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Å dele tingene (eiendelene) dine med andre i familien .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Å dele pengene dine med familien din.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Å leve opp til forventningene fra familien din .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

## U/T5. KULTUR OG KONTAKT

5.1 Hvordan er det å ha kontakt med folk fra forskjellige kulturer? (Sett ett kryss for hver linje)

	Helt enig	Delvis enig	Delvis uenig	Helt uenig
Jeg liker meg like godt blant nordmenn som blant folk fra andre land og kulturer .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg foretrekker å være sammen med folk fra det landet jeg kommer fra .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg synes at folk fra andre land og kulturer burde tilpasse seg norske kulturtradisjoner og ikke holde på sine egne .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har like godt forhold til nordmenn som til folk fra andre land og kulturer .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Siden jeg bor i Norge, er det best jeg lever helt som nordmenn .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg synes at folk fra andre land og kulturer skal leve som de gjør i hjemlandet sitt, selv om de bor i Norge. ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg synes det er vanskelig å velge om jeg skal leve som nordmenn, eller som folk fra andre land og kulturer .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Det er ofte vanskelig for ungdom med norsk og innvandrer bakgrunn å være sammen på fritida, fordi vi har ulike regler vi må følge.....

Foreldrene mine har godt kjennskap til hva ungdommene her i Norge gjør på fritida. ....

Jeg synes det er vanskelig å bestemme om jeg skal leve som nordmenn, eller som folk fra andre land og kulturer. ....

1 2 3 4

5.2 Du kan føle deg som medlem av ulike etniske eller kulturelle grupper, som pakistanere, vietnamesere, eller andre, og du kan føle at du er en del av et større samfunn som for eksempel Norge.

Hvordan ser du på deg selv?

(Sett ett kryss for hver linje)

	Helt enig	Delvis enig	Delvis uenig	Helt uenig
Jeg ser på meg selv som norsk .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg ser på meg selv som pakistaner/ vietnameser/ chilener/ iraner/ annet .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg føler jeg er en del av kulturen til pakistanere/ vietnamesere/ chilener/ iraner/ annet .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er glad for å være norsk .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er stolt av å være pakistaner/ vietnameser/ chilener/ iraner/ annet.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg føler at jeg er en del av den norske kulturen .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er glad for å være pakistaner/ vietnameser/ chilener/ iraner/ annet.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er stolt av å være norsk.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

5.3 Når folk med forskjellig bakgrunn er sammen, kan noen føle seg urettferdig behandlet. Følgende utsagn handler om dette.

(Sett ett kryss for hver linje)

	Helt enig	Delvis enig	Delvis uenig	Helt uenig
Jeg synes at andre har oppført seg urettferdig eller negativt overfor folk fra min kultur.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg føler meg ikke akseptert av folk fra andre kulturer .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg føler at folk fra andre kulturer har i mot meg .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har blitt etret og fornærmet på grunn av min kulturelle bakgrunn.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har blitt truet eller angrepet på grunn av min kulturelle bakgrunn.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4



## U/T6. KRIGSOPPLEVELSER

- 6.1 Har noen av foreldrene dine opplevd krig og følgene av krig på nært hold? .....  JA  NEI  Vet ikke
- 6.2 Har du noen gang opplevd krig og følgene av krig på nært hold? .....

## U/T7. SORG

7.1 Har du opplevd sorg, som har eller har hatt betydning for din helse? (Sett bare ett kryss)

- |                            |                            |                            |                            |
|----------------------------|----------------------------|----------------------------|----------------------------|
| Ja, en gang for            | Ja, flere ganger for       | Ja, har nå                 | Nei                        |
| <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

7.2 Hvilke helseplager fikk du i så fall av hendelsen? (den siste, hvis du har opplevd flere)

- |                            |                            |                            |   |
|----------------------------|----------------------------|----------------------------|---|
| Mest kroppslige            | Mest følelsesmessige       | Begge omtrent like mye     | T |
| <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |   |

7.3 Omtrent hvor lenge varte/ har helseplagene vart? (den siste, hvis du har opplevd flere)

- |   |            |   |               |   |    |
|---|------------|---|---------------|---|----|
| <input type="text"/> <input type="text"/> | uker eller | <input type="text"/> <input type="text"/> | måneder eller | <input type="text"/> <input type="text"/> | år |
|---|------------|---|---------------|---|----|

7.4 Hvis du har opplevd slik sorg, var den en følge av? (den siste, hvis du har opplevd flere) (Sett ett kryss for hver linje)

- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| Dødsfall av:             | JA                       | NEI                      |
| Foreldre.....            | <input type="checkbox"/> | <input type="checkbox"/> |
| Besteforeldre.....       | <input type="checkbox"/> | <input type="checkbox"/> |
| Søsken.....              | <input type="checkbox"/> | <input type="checkbox"/> |
| Annen nær slektning..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Venn.....                | <input type="checkbox"/> | <input type="checkbox"/> |
| Andre.....               | <input type="checkbox"/> | <input type="checkbox"/> |
| Alvorlig sykdom:.....    | <input type="checkbox"/> | <input type="checkbox"/> |
| Kjærlighetssorg:.....    | <input type="checkbox"/> | <input type="checkbox"/> |
| Annet:.....              | <input type="checkbox"/> | <input type="checkbox"/> |

Hvis «JA» på annet, spesifiser:

7.5 Har du fått profesjonell hjelp etter hendelsen? (den siste, hvis du har opplevd flere).....  JA  NEI

Hvis «JA»:  
Kryss av for hvem som har gitt denne hjelpen:  
(Sett ett kryss for hver linje)

- |                       |                          |                          |
|-----------------------|--------------------------|--------------------------|
| Allmennpraktiker..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Psykater.....         | <input type="checkbox"/> | <input type="checkbox"/> |
| Psykolog.....         | <input type="checkbox"/> | <input type="checkbox"/> |
| Lærer.....            | <input type="checkbox"/> | <input type="checkbox"/> |
| Annen rådgiver.....   | <input type="checkbox"/> | <input type="checkbox"/> |
| Prest.....            | <input type="checkbox"/> | <input type="checkbox"/> |
| Sorggruppe.....       | <input type="checkbox"/> | <input type="checkbox"/> |
| Annet.....            | <input type="checkbox"/> | <input type="checkbox"/> |

Hvis «JA» på annet, spesifiser:

7.6 Fikk du medisiner på resept som en del av behandlingen? (siste gang, hvis du har opplevd flere sorger)  JA  NEI

## U/T8. TANNHELSE

8.1 Dersom du skulle til tannlegen i morgen, hva ville du da føle?  
(Med tannlege menes også skoletannlege)  
(Sett kryss ved det alternativet som passer best)

- Jeg ville se frem til det som en ganske hyggelig opplevelse.....  1
- Ville ikke føle noe, det ville være det samme for meg.....  2
- Det ville gjøre meg litt urolig.....  3
- Jeg ville bli redd for at det skulle bli ubehagelig og vondt.....  4
- Jeg ville bli svært redd med tanke på hva tannlegen skulle gjøre.....  5

8.2 Når du venter på tannlegens venteværelse, eller venter på å bli hentet til tannlegen, hvordan føler du deg da? (Sett kryss ved det alternativet som passer best)

- Avslappet.....  1
- Litt urolig.....  2
- Anspent, nervøs.....  3
- Redd, engstelig.....  4
- Så redd at jeg av og til begynner å svette eller nesten føler meg syk.....  5

8.3 Når du sitter i tannlegestolen og venter på at tannlegen skal begynne behandlingen, hvordan føler du deg da? (Sett kryss ved det alternativet som passer best)

- Avslappet.....  1
- Litt urolig.....  2
- Anspent, nervøs.....  3
- Redd, engstelig.....  4
- Så redd at jeg av og til begynner å svette eller nesten føler meg syk.....  5

8.4 Tenk deg at du sitter i tannlegestolen og skal få tennene renset og pusset. Mens du sitter og venter på at tannlegen skal finne instrumentene som brukes til å pusse og skrape med, hvordan føler du deg da? (Sett kryss ved det alternativet som passer best)

- Avslappet.....  1
- Litt urolig.....  2
- Anspent, nervøs.....  3
- Redd, engstelig.....  4
- Så redd at jeg av og til begynner å svette eller nesten føler meg syk.....  5

8.5 Hvor redd er du for å få utført tannbehandlingen, alle forhold tatt i betraktning? (Sett kryss ved det alternativet som passer best)

- Ikke i det hele tatt.....  1
- Litt.....  2
- Noe.....  3
- Mye.....  4
- Veldig mye.....  5

## U/T9. FOREBYGGING AV SKADE

9.1 Når du er passasjer i bil, bruker du bilbelte når du sitter? (Sett ett kryss for hver linje)

	Aldri	Sjelden	Oftre	Alltid
Foran:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bak:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

9.2 Hvis du har stått slalåm / utfor i løpet av de siste 12 måneder, har du da fått kontrollert bindingene i forhold til din vekt? (Sett bare ett kryss)

Ja	Nei	Har ikke stått på ski	
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	T

9.3 Brukte du legg-/knebeskytter ved dine aktiviteter i løpet av de siste 12 måneder? (Sett ett kryss for hver linje)

	Aldri	Sjelden	Oftre	Alltid	Ikke aktuelt
Rulleskøyter/ rullebrett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Håndball .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fotball .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen ballsport .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slalåm/ utfor .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snøbrett .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ishockey .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen aktivitet .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5

Hvis "Annen aktivitet" - hvilken:

---

9.4 Brukte du hånledd-/ albuebeskytter ved dine aktiviteter i løpet av de siste 12 måneder? (Sett ett kryss for hver linje)

	Aldri	Sjelden	Oftre	Alltid	Ikke aktuelt
Syssel.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rulleskøyter/ rullebrett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Håndball .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen ballsport .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snøbrett .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ishockey .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen aktivitet .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5

Hvis "Annen aktivitet" - hvilken:

---

9.5 Brukte du hjelm ved dine aktiviteter i løpet av de siste 12 måneder? (Sett ett kryss for hver linje)

	Aldri	Sjelden	Oftre	Alltid	Ikke aktuelt
Syssel.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rulleskøyter/ rullebrett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slalåm-/ utfor.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snøbrett .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ishockey .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ridning.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen aktivitet .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5

Hvis "Annen aktivitet" - hvilken:

---

## U/T10. FYSISK AKTIVITET

10.1 Hvor ofte har du drevet med følgende aktiviteter i løpet av de siste 12 måneder?

Vinter er fra oktober til mars. Sommer er fra april til september.  
(Sett ett kryss for hver linje)

		Aldri	1-5 ganger i sesongen	1-3 ganger i mnd.	1 gang i uka	Flere ganger i uka
Sykling	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rulleskøyter/ rullebrett	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Håndball	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fotball	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen ballsport	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ishockey	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ridning	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kampsport	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fridrett	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Svømming i basseng	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slalåm/ utfor	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snøbrett	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telemark	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Langrenn	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen aktivitet	vinter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	sommer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		1	2	3	4	5

Hvis "Annen aktivitet" - hvilken:

---

Ikke skriv her:

7.4 (Annen sorg)	7.5 (Annen hjelp)
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9.3	9.4
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9.5	10.1
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>







## **Appendix IV**

### **Questionnaire:**

- Youth 2004



### 9. KOSTHOLD OG SLANKING

- 9.1 Hvor mye drikker du vanligvis av følgende? (1/2 liter = 3 glass)
- |                |         |         |         |         |
|----------------|---------|---------|---------|---------|
| Sjener         | 1-2 g   | 3 g     | 4 g     | 5 g     |
| for hver liter | pr. dag | pr. dag | pr. dag | pr. dag |
- Colas med sukker.....  
Colas med "light".....  
Fruktjuice.....
- 9.2 Hvor ofte spiser du vanligvis disse matvarene? (1/2 liter = 3 g, 3 g eller mer)
- |                |         |         |         |         |
|----------------|---------|---------|---------|---------|
| Sjener         | 1-2 g   | 3 g     | 4 g     | 5 g     |
| for hver liter | pr. dag | pr. dag | pr. dag | pr. dag |
- Frukt, bær.....  
Kolle grønnsaker.....  
På grønnsaker/salat.....  
Fett fisk (feks laks, makrel, sild, ørret).....  
Spokolesmatagot.....  
Chips, potetgull.....

### 9.3 Bruker du følgende kosttillskudd?

- (Sett ett kryss for hver type)
- |            |        |     |
|------------|--------|-----|
| Ja, daglig | iblant | Nei |
|------------|--------|-----|
- Tren, frakkepiller, fysiolekkappler.....  
Vitamin- og eller mineraltilskudd.....

### 9.4 Har du noen gang prøvd å slanke deg? (Sett bare ett kryss)

- Ja, i tillegg  Ja, nå  Ja, hele tiden

### 9.5 Har du noen gang vært til behandling for spiseforstyrrelser?

- Nei  Ja

### 9.6 Er det viktig for hva slags syn du har på deg selv at du er slank?

- Ja, svært viktig  Ja, noe sånn viktig  Nei, ikke særlig viktig

### 9.7 Har det i løpet av de siste 6 mnd. hendt at:

- Du selv syntes at du var for tykk?  Ja, litt  Ja, ganske  Ja, mye

### Du var redd for å legge på deg eller bli for tykk?

- Ja, veldig  Noe så  Ikke særlig  Nei

### Andre sa du var for tynn, mens du selv syntes at du var for tykk?

- Ja, ofte  Noen få ganger  Nei

### Du lotte at du mistet kontrollen mens du spiste og

- Kjarte ikke å stoppe for du hadde spist for mye?  Ja  Nei

### 9.8 Har du gjort noe av følgende for å kontrollere vekten de siste 12 mnd.?

- (Sett ett kryss for hver type)
- |        |        |     |
|--------|--------|-----|
| ganger | iblant | Nei |
|--------|--------|-----|
- Spisemåte 9.9 glieder bære, følelse, gutter, hopp til pkt. 10.1.

### 9.9 Har du i løpet av de to siste årene sinnet deg

- Ja, nei  Ikke litt  Ikke mye  Ikke mens  I 3 måneder eller mer?

### 10. SEKSUELL ADFERD OG PREVENSJON

#### 10.1 Har du noen gang hatt samleie

- Ja, med en partner  Ja, med flere partnere  Nei

#### Hvis «NEI» på pkt. 10.1, hopp til pkt. 11.1

#### 10.2 Alder første gang? Jeg var år

#### 10.3 Brukte du/ere prevensjon ved siste samleie?

- Nei  Kondom  P-pille/  Nedprevensjon/  sprøyte/ing  andre piller  Annet  Vet ikke

### 10.4 Har du noen gang blitt gravid/født et jente gravid?

- Ja  Nei  Vet ikke

### Hvis «NEI» hopp til pkt. 11.1

### 10.5 Hvor gammel var du da dette (sist) skjedde?

- Jeg var  år

### 10.6 Ble det utført abort?

- Ja  Nei  Vet ikke

### 11. BRUK AV MEDISINER

#### 11.1 Hvor ofte har du i løpet av de siste 4 ukene brukt

- følgende medisiner? (Sett ett kryss for hver type)

#### Med medisiner mener vi her medisiner

- født på apotek, kosttillskudd og

- vitaminer regnes ikke med her. Aldri  Daglig

- Smerstillende uten resept.....

- Smerstillende på resept.....

- Allergi-medisin.....

- Alma-medisin.....

- Beroligende medisin.....

- Medisin mot depresjon.....

- Annenn medisin på resept.....

#### 11.2 Skriv navnet på medisinene som du har krysset av for

- oventor og hva grunnen til at du tok medisinen

- (sykdom eller symptom):

- (Kryss av for hvor lenge du har brukt medisinen)

- Navn på medisin:

- Grunn til bruk

- av medisin:

- innl.

- Et år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

- innl.

- 1 år

- eller mer

# Ungdomshelse i Oslo, Oppland, Hedmark og Tromsø by

Dato for utfylling:

Dag  Måned  År

### 1. EGEN HELSE

#### 1.1 Hvordan er helsen din nå? (Sett bare ett kryss)

- Dårlig  1 Ikke helt god  2 God  3 Svært god  4

#### 1.2 Har du, eller har du hatt?

- Asma.....  Nei

- Høytone (pollenallergi, allergisk reaksjon,

- rennende nese, svei i øynene).....

- Ekssem.....

- Diabetes (sukkersyke).....

- Dysleksi.....

#### 1.3 Har du de siste 12 mnd hatt?

- Halsbetennelse (minst 3 ganger).....  Ja  Nei

- Brønnet eller langbetennelse.....

- Psykisk plage som det er søkt hjelp for.....

#### 1.4 Har du i løpet av de siste 12 mnd flere ganger vært

- plaget med smerter i? (Sett ett kryss for hver type)

- Hode (hodepine, migrene e.l.).....  Ja  Nei

- Nakke/skuldre.....

- Armer/ben/hofter.....

- Mage.....

- Rygge.....

#### Hvis du svarer «NEI» på alle spørsmålene under 1.4:

#### Hopp til pkt. 1.6

#### 1.5 Har disse smertene ført til at du har vært hjemme

- fra skolen/undervisningen i løpet av de siste 12 mnd?

- (Sett bare ett kryss)

- Nei  1 Ja, 1-2 dager  2 Ja, 3-5 dager  3 Ja, mer enn

- 10 dager  4 10 dager  5

#### 1.6 Hva veide du sist du veide deg? Hele kilo

- 1.7 Hvor høy var du sist du målte deg? Hele cm

### 2. MOSJON OG FYSISK AKTIVITET

#### 2.1 Utennom skoleidrett (studie-, arbeidsid): Hvor

- mange ganger i løpet av de siste 12 mnd har du vært utennom skoleidrett? (Sett ett kryss for hver gang)

- 0 ganger  1 gang  2 ganger  3 ganger  4 ganger  5 ganger  6 ganger

#### 2.2 Omrent hvor mange timer pr. uke bruker du på dette?

- 0 timer  1-2 timer  3-4 timer  5-7 timer  8-10 timer  11 timer  12 timer  13 timer  14 timer  15 timer  16 timer

### 2.3 Hvor stillsom er denne idretts-/morsjonsaktiviteten?

- (Sett bare ett kryss)

- Diver ikke  1 Litt  2 Ganske  3 Mye  4 Svært

- utennom anstrengende anstrengende anstrengende anstrengende

### 2.4 Hvor ofte har du drevet med følgende treningsaktiviteter i løpet

- av de siste 12 mnd. i snitt? (Sett ett kryss for hver aktivitet/gang)

- Utendørsidrett (feks. løp,  1  2  3  4  5

- svømming, langrenn,  1  2  3  4  5

- Lag-ballsporter (feks squash  1  2  3  4  5

- håndball, fotball, shockey).....

- Estetisk idrett  1  2  3  4  5

- (feks dans, turn, aerobic).....

- Sykledrett  1  2  3  4  5

- (feks trying, vekstrenning).....

- Kampsport (feks judo,  1  2  3  4  5

- karate, taekwondo).....

- Tennis  1  2  3  4  5

- tennis (feks tennis, badminton,  1  2  3  4  5

- band, golf, rullebrett/skøyeløp,  1  2  3  4  5

- Risikoidrett (feks øvepadling,  1  2  3  4  5

- folkloring, paragliding).....

- Annet: Kryss av  1  2  3  4  5

- og skriv aktivitet her:

#### Hvis du ikke driver med idretts/morsjon slik at du blir anspnst eller

- svett (utenom skoleid), gå direkte til du pkt. 2.5

#### 2.5 Hvor viktig er ulike årsaker til at du trener?

- (Sett ett kryss for hver utsegn)

- Synes det er gøy.....  Ikke

- Tenker klare.....  Viktig

- Er sammen med venner  Viktig

- når jeg trener.....

- Liker å konkurrere.....

- Det er sunt.....

- For sterke muskler.....

- Viser fremgang.....

- Slanker meg.....

- Andre synes jeg bør.....

#### 2.6 Har du sluttet med noen organisert

- idrettsaktivitet etter 10. klasse?  Ja  Nei

#### Hvis «JA»: hvor viktig er disse årsaker til at du har sluttet:

- ↑

- Vennene mine sluttet.....  Svært

- Det tok for mye tid.....  Viktig

- Jeg synes ikke jeg var flink nok.....

- Lyst til å gjøre andre ting.....

- Lite like miljøet/turneringen.....

- Lite interesse.....

- Begynte med annen aktivitet.....

- Det ble for dyrt.....

- Måtte jobbe med skolen.....

#### 2.7 Driver du eller har du drevet med konkurranselidrett?

- (Sett bare ett kryss)

- Ja, nå  Ja, før  Nei, aldri

#### 2.8 Har du noen gang prøvd dopingmidler? (Sett bare ett kryss)

- Nei  1 Ja, én gang  2 Ja, flere  3 Ja, jeg bruker  4 det regelmessig

#### 2.9 Utennom skole/arbeidstid: Hvor mange timer DT, ukedag

- TV, video og/eller PC (spill og internett)? (Sett bare ett kryss)

- Inntil 1 time  1-2 timer  3-5 timer  5 timer  6 timer

