

Ville Helasoja

The Social Patterning of Health, Smoking and Drinking in Estonia, Latvia, Lithuania and Finland in 1994–2004

Publications of the National Public Health Institute  10/2008

Department Health Promotion and Chronic Disease Prevention
National Public Health Institute, Helsinki, Finland

and

Department of Public Health
University of Helsinki, Finland

Helsinki, Finland 2008

Ville Helasoja

THE SOCIAL PATTERNING OF HEALTH,
SMOKING AND DRINKING IN ESTONIA, LATVIA,
LITHUANIA AND FINLAND IN 1994-2004

ACADEMIC DISSERTATION

*To be presented with the permission of the Faculty of Medicine of the
University of Helsinki, for public examination in Auditorium XII,
University Main Building, on April 26th, 2008, at 10 o'clock am.*

National Public Health Institute, Helsinki, Finland

and

Department of Public Health, University of Helsinki, Finland

Helsinki 2008

**Publications of the National Public Health Institute
KTL A10 / 2008**

Copyright National Public Health Institute

Julkaisija-Utgivare-Publisher

Kansanterveyslaitos (KTL)

Mannerheimintie 166

00300 Helsinki

Puh. vaihde (09) 474 41, telefax (09) 4744 8408

Folkhälsoinstitutet

Mannerheimvägen 166

00300 Helsingfors

Tel. växel (09) 474 41, telefax (09) 4744 8408

National Public Health Institute

Mannerheimintie 166

FIN-00300 Helsinki, Finland

Telephone +358 9 474 41, telefax +358 9 4744 8408

ISBN 978-951-740-793-9

ISSN 0359-3584

ISBN 978-951-740-794-6 (pdf)

ISSN 1458-6290 (pdf)

Yliopistopaino

Helsinki 2008

S u p e r v i s e d b y

Professor Eero Lahelma
Department of Public Health
University of Helsinki
Finland

PhD Ritva Prättälä
Department of Epidemiology and Health Promotion
National Public Health Institute (KTL)
Helsinki, Finland

R e v i e w e d b y

Docent Ossi Rahkonen, PhD
Department of Public Health
University of Helsinki
Finland

Professor Arja Rimpelä, MD, PhD
Department of Public Health
University of Tampere
Finland

O p p o n e n t

Professor Olle Lundberg
Centre for Health Equity Studies, CHES
Stockholm University/Karolinska Institutet
Sweden

Ville Helasoja, The social patterning of health, smoking and drinking in Estonia, Latvia, Lithuania and Finland in 1994-2004.

Publications of the National Public Health Institute, A10/2008, 75 Pages

ISBN 978-951-740-793-9; 978-951-740-794-6 (pdf-version)

ISSN 0359-3584; 1458-6290 (pdf-version)

<http://www.ktl.fi/eteo/finbalt>

ABSTRACT

The Baltic countries share public health problems typical of most Eastern European transition economies: morbidity and mortality from non-communicable diseases is higher than in Western European countries. This situation has many similarities compared to a neighbouring country, Finland during the late 1960s. There are reasons to expect that health disadvantage may be increasing among the less advantaged population groups in the Baltic countries. The evidence on social differences in health in the Baltic countries is, however, scattered to studies using different methodologies making comparisons difficult.

This study aims to bridge the evidence gap by providing comparable standardized cross-sectional and time trend analyses to the social patterning of variation in health and two key health behaviours i.e. smoking and drinking in Estonia, Latvia, Lithuania and Finland in 1994-2004 representing Eastern European transition countries and a stable Western European country.

The data consisted of similar cross-sectional postal surveys conducted in 1994, 1996, 1998, 2000, 2002 and 2004 on adult populations (aged 20–64 years) in Estonia (n=9049), Latvia (n=7685), Lithuania (n=11634) and Finland (n=18821) in connection with the Finbalt Health Monitor –project. The main statistical method was logistic regression analysis.

Perceived health was found to be worse among both men and women in the Baltic countries than in Finland. Poor health was associated with older age and lower education in all countries studied. Urbanization and marital status were

not consistently related to health. The existing educational inequalities in health remained generally stable over time from 1994 to 2004. In the Baltic countries, however, improvement in perceived health was mainly found among the better educated men and women.

Daily smoking was associated with young age, lower education and psychological distress in all countries. Among women smoking was also associated with urbanisation in all countries except Estonia. Among Lithuanian women, the educational gradient in smoking was weakest, and the overall prevalence of smoking increased over time.

Drinking was generally associated with young age among men and women, and with education among women. Better educated women were more often frequent drinkers and less educated binge drinkers. The exception was that in Latvian men and women both frequent drinking and binge drinking were associated with low education.

In conclusion, the Baltic countries are likely to resemble Western European countries rather than other transition societies. While health inequalities did not markedly change, substantial inequalities do remain, and there were indications of favourable developments mainly among the better educated. Pressures towards increasing health inequalities may therefore be visible in the future, which would be in accordance with the results on smoking and drinking in this study.

Keywords: Baltic, perceived health, social, smoking, alcohol

Ville Helasoja, Terveyden, tupakoinnin ja alkoholinkäytön sosiaaliset erot Virossa, Latviassa, Liettuassa ja Suomessa vuosina 1994-2004.

Kansanterveyslaitoksen julkaisuja, A10/2008, 75 sivua

ISBN 978-951-740-793-9; 978-951-740-794-6 (pdf-versio)

ISSN 0359-3584; 1458-6290 (pdf-versio)

<http://www.ktl.fi/eteo/finbalt>

TIIVISTELMÄ

Baltian maissa esiintyy tyypillisiä Itä-Euroopan siirtymätalousmaiden kansanterveysongelmia: aikuisväestön sairastavuus ja kuolleisuus kroonisiin tauteihin on yleisempää kuin Länsi-Euroopassa. Kansanterveystilanne oli samankaltainen Suomessa 1960 luvun lopussa. Aiemman tutkimuksen perusteella on syytä olettaa, että sosiaaliset terveyserot ovat kasvamassa Baltian maissa. Tiedot ovat kuitenkin hajallaan eri tavoin tehdyissä tutkimuksissa ja vertailujen tekeminen on vaikeaa.

Tämä tutkimus pyrkii tarjoamaan vertailukelpoisen poikkileikkaus- ja aikatrendinäkökulman itseraportoituun terveydentilaan, tupakointiin ja alkoholinkäyttöön Virossa, Latviassa, Liettuassa ja Suomessa vuosina 1994-2004. Baltian maat edustavat tässä yhteydessä Itä-Eurooppalaisia siirtymätalousmaita ja Suomi yhteiskunnallisesti vakaata Länsi-Euroopan maata.

Aineisto koostui Finbalt Health Monitor –projektin yhteydessä vuosina 1994, 1996, 1998, 2000, 2002 ja 2004 toteutetuista keskenään samankaltaisista postikyselyistä. Kohderyhmänä oli aikuisväestö (20-64 vuotiaat) Virossa (n=9049), Latviassa (n=7685), Liettuassa (n=11634) ja Suomessa (n=18821). Pääasiallinen tilastomenetelmä oli logistinen regressioanalyysi.

Sekä miesten, että naisten koettu terveys oli Baltian maissa huonompi kuin Suomessa. Huono terveys oli yhteydessä vanhempaan ikään ja vähäiseen koulutukseen kaikissa maissa. Olemassa olevat erot säilyivät pääosin muuttumattomina vuosien 1994 ja 2004 välisenä aikana. Baltian maissa havaittu

koetun terveydentilan paraneminen tapahtui kuitenkin keskimääräistä paremmin koulutettujen keskuudessa.

Päivittäistupakointi oli yhteydessä nuoreen ikään, vähäiseen koulutukseen ja psyykkisiin ongelmiin kaikissa maissa. Naisilla tupakointi oli myös yhteydessä asuinpaikan kaupungistuneisuuteen kaikissa muissa maissa paitsi Virossa. Liettualaisnaisilla koulutuksen ja tupakoinnin yhteys oli heikoin ja tupakointi yleistyi tutkittavalla ajanjaksolla.

Alkoholin käyttö oli yhteydessä nuoreen ikään sekä miehillä, että naisilla, ja lisäksi koulutukseen naisilla. Enemmän koulutetut naiset olivat useammin säännöllisiä alkoholinkäyttäjiä, mutta vähemmän koulutetut naiset useammin humalajuojia. Poikkeuksena Latviassa sekä säännöllinen että humalajuominen olivat yhteydessä vähäiseen koulutukseen.

Kokonaisuutena osoittautui, että muiden siirtymätalousmaiden piirteiden sijaan Baltian maista löytyi pikemminkin länsieurooppalaisia ominaisuuksia. Vaikka suuria muutoksia sosiaalisissa terveyseroissa ei ilmaantunutkaan, huomattavat erot ovat vallitseva tilanne, ja myönteistä kehitystä havaittiin lähinnä paremmin koulutettujen keskuudessa. Myös tupakointia ja alkoholinkäyttöä koskevat tulokset antavat aihetta olettaa, että terveyserot saattavat tulevaisuudessa kasvaa.

Avansanat: Baltia, koettu terveys, sosiaalinen, tupakointi, alkoholi

ACKNOWLEDGEMENTS

This thesis would not have been possible without close collaboration with Estonian, Latvian and Lithuanian research teams. In addition, the basis of the analytic approach applied in this thesis dates back to previous research carried out in the Finnish National Public Health Institute since the 1970's. Therefore, the following persons are warmly acknowledged: MD MSc Anu Kasmel, MD PhD Jurate Klumbiene, Professor Eero Lahelma, Professor Aulikki Nissinen, MD PhD Kristiina Patja, PhD Janina Petkeviciene, PhD Ritva Prättälä, MD Iveta Pudule, Professor Pekka Puska, MD PhD Mare Tekkel. The official referees Docent Ossi Rahkonen and Professor Arja Rimpelä are also acknowledged with gratitude.

Helsinki, February 2008

CONTENTS

Abstract

Tiivistelmä

Acknowledgements

List of original publications

1	Introduction	11
2	Review of the literature	13
2.1	Social and behavioural determinants of health in Western Europe.....	13
2.2	Social determinants of Eastern European health crisis	15
2.3	Behavioural determinants of Eastern European health crisis	18
2.4	The social patterning of health in the Baltic countries and Finland.....	20
2.5	The social patterning of smoking in the Baltic countries and Finland.....	23
2.6	The social patterning of drinking habits in the Baltic countries and Finland	24
3	Aims of the study	26
4	Materials and methods	28
4.1	Data sources	28
4.2	Independent variables	29
4.3	Dependent variables	31
4.3.1	Health status (I and II).....	31
4.3.2	Smoking and psychological distress (III).....	32
4.3.3	Alcohol consumption (IV)	33
4.4	Statistical methods	34
4.5	Quality of the data.....	35
5	Results.....	38
5.1	Self reported health (I)	38
5.1.1	Overall prevalence of perceived ill health.....	38
5.1.2	The social patterning of health	39
5.1.3	The social patterning of diseases.....	40
5.2	Changes over time in the educational differences in health (II).....	41

5.3	Smoking (III)	42
5.3.1	Overall prevalence of smoking during 1994-2002.....	42
5.3.2	The social patterning of daily smoking	43
5.3.3	Associations between daily smoking and psychological distress.....	44
5.4	Drinking (IV)	44
5.4.1	Frequent drinking	44
5.4.2	Binge drinking.....	46
6	Discussion	48
6.1	Main findings	48
6.2	Methodological considerations	49
6.3	The difference in average health status between the Baltic countries and Finland.....	50
6.4	The importance of age.....	51
6.5	Consistent educational differences.....	52
6.6	Inconsistent urban-rural differences.....	54
6.7	Inconsistent marital status differences	55
6.8	Minor ethnic differences	56
6.9	Minor changes over time.....	57
7	Conclusions.....	60
8	References.....	62

LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following original articles referred to in the text by their Roman numerals:

- I** Helasoja, V., Lahelma, E., Prattala, R., Kasmel, A., Klumbiene, J. and Pudule, I., 2006. The sociodemographic patterning of health in Estonia, Latvia, Lithuania and Finland. *Eur J Public Health*. 16, 8-20.

- II** Helasoja, V., Lahelma, E., Prattala, R., Klumbiene, J., Pudule, I. and Tekkel, M., 2006. Trends in the magnitude of educational inequalities in health in Estonia, Latvia, Lithuania and Finland during 1994-2004. *Public Health*. 120, 841-853.

- III** Helasoja, V. V., Lahelma, E., Prattala, R. S., Patja, K. M., Klumbiene, J., Pudule, I. and Kasmel, A., 2006. Determinants of daily smoking in Estonia, Latvia, Lithuania, and Finland in 1994-2002. *Scand J Public Health*. 34, 353-362.

- IV** Helasoja, V., Lahelma, E., Prattala, R., Petkeviciene, J., Pudule, I. and Tekkel, M., 2007. The sociodemographic patterning of drinking and binge drinking in Estonia, Latvia, Lithuania and Finland, 1994-2002. *BMC Public Health*. Sep 13;7:241. <http://www.biomedcentral.com/1471-2458/7/241>

These articles are reproduced with the kind permission of their copyright holders.

1 INTRODUCTION

Socioeconomic and sociodemographic differences in health exist throughout industrialized countries (Mackenbach and Bakker, 2002). A key concern in the past decades has been whether these socioeconomic health inequalities are widening or narrowing over time (Townsend et al., 1988). In Western Europe the inequalities in mortality have been widening (Mackenbach et al., 2003), but results concerning other dimensions of health have been less consistent (Kunst et al., 2005). There is less evidence from the Eastern European countries. However, the collapse of communism in the early 1990s revealed that the Eastern European countries have worse health according to almost all available health indicators when compared to Western European countries (Bobak and Marmot, 1996).

Differences in health behaviours and changes in the living conditions have been suggested as causes for this so-called East-West health divide (Bobak and Marmot, 1996). Partly different factors may be emphasized if one is trying to quantify the overall East-West health gap, or if the main interest is in understanding the socioeconomic health inequalities within the studied countries. Nevertheless, evidence from Eastern European post-communist countries gives reasons to expect that health disadvantage is increasing among the less advantaged population groups (McKee and Shkolnikov, 2001; McKee and Jacobson, 2000; Marmot and Bobak, 2000; Marmot, 1999; Siegrist, 2000)

Public health problems in Estonia, Latvia and Lithuania are typical to Eastern European transition economies: mortality and morbidity for non-communicable diseases is higher than in Western Europe (WHO, 2003). The rapid social changes may have affected the social variation in health also in these countries (Leinsalu, 2004).

The northern neighbour of the Baltic countries, Finland, has experienced similar public health problems as the Baltic countries do today during the 1960-80s (Puska et al., 1995). Finland has also other common historical features with the

Baltic countries. All these four North-Eastern European countries received their independence from Russia after the First World War. In the aftermath of the Second World War Estonia, Latvia and Lithuania became part of the Soviet Union. They gained their independence back again in the beginning of the 1990s during the collapse of the Soviet regime. Finland, in contrast, retained its independence after the Second World War and its socioeconomic conditions caught the Western European standards. The Baltic region and Finland together provide therefore a 'natural laboratory' of social developments that characterize the general East-West health divide.

In order to better understand the social and structural basis of the public health problems in the Baltic countries and to take advantage of Finnish health promotion experiences the Finbalt Health Monitor project was initiated in the 1990s as collaboration between public health experts of Finland and the Baltic countries (Prattala et al., 2003a). The core of the project is a nationally representative postal survey conducted every second year. The Finbalt project has collected unique, standardized comparative data on trends in health status and health behaviours from Estonia, Latvia, Lithuania and Finland (Puska et al., 2003).

This thesis makes use of the Finbalt data, and provides new insights into the social inequalities in health in the Baltic post-communist societies and Finland. In addition, it provides the first comparative analysis of the social variation in health and key health behaviours in these countries representing Eastern European transition economies and a stable Western European country. The analytical strategy is to compare population group differences in perceived health, smoking and drinking in Estonia, Latvia, Lithuania and Finland during 1994-2004.

2 REVIEW OF THE LITERATURE

Research on the social determinants of health in Western Europe including Finland has produced a fairly coherent picture of stable societies. However much less is known about post communist societies. Starting from several public health and sociological considerations this literature review proceeds to Eastern European studies and particularly studies on health and health behaviours in the Baltic countries in comparison to Finland.

Social determinant (Macintyre, 1986) is used as a general term referring to major well established sociodemographic (gender, age marital status etc.) and socioeconomic (educational and occupational class etc.) factors contributing to health.

2.1 Social and behavioural determinants of health in Western Europe

In European countries the available evidence shows, that those who have a lower socioeconomic position tend to have poorer health and shorter life expectancy than those in higher socioeconomic positions (Mackenbach and Bakker, 2002; Mackenbach et al., 1997; Mackenbach et al., 2003; Kunst et al., 2005). Explanations for socioeconomic differences in health have followed various theoretical approaches. A well known classification of the explanations into artefact, selection, behavioural and materialist, was presented in the Black report in 1980 (Townsend et al., 1988; Macintyre, 1997). More recently (Mackenbach and Bakker, 2002), the explanations have been grouped into three theoretical perspectives: selection versus causation perspective, life-course perspective and specific determinant perspective. The selection versus causation perspective implies that health may determine socioeconomic position as well as socioeconomic position may determine health. The life-course perspective takes into account the fact that many diseases require long-term exposure to risk factors and that childhood socioeconomic status influences socioeconomic status as well as health in adulthood (Mackenbach and Bakker, 2002).

The specific determinant explanations involve material, behavioural and psychosocial factors. Material and structural deprivation, such as lack of money, may directly limit possibilities to health promoting activities (Lynch et al., 1997). Those in lower socioeconomic position are also likely to be exposed to increased hazards in their work and physical environment. Access to effective health care may also vary according to socioeconomic position (Hetemaa et al., 2004). Behavioural explanations of inequalities in health refer to cultural and lifestyle (Abel, 1991) differences between socioeconomic groups. The group specific orientations in health behaviours, such as smoking, drinking and physical activity are assumed to contribute to differences in health outcomes. However, cultural factors have also been seen as structural as material factors (Vagero and Illsley, 1995). From this point of view, explanations could be divided into structural and individual approaches. It has also been suggested, that psychosocial stress associated with disadvantaged socioeconomic position, may affect directly via biological mechanisms and indirectly through deteriorative and addictive health behaviours (Cockerham, 1997; Marmot and Feeney, 1997).

A key concern in the past decades has been whether socioeconomic health inequalities are widening or narrowing over time (Townsend et al., 1988; Mackenbach et al., 2003; Kunst et al., 2005; Lahelma et al., 2002). Especially in international comparisons we need to recognise that the reasons for the changes in the inequalities may differ even between the countries sharing largely similar social structures. A research interest in the trends of health inequalities serves scientific as well as practical needs since differential developments may take place among the better off and among the worse off, and therefore differential policy initiatives are needed (Mackenbach and Bakker, 2002).

From the Northern European countries there is evidence on generally increasing socioeconomic inequalities in premature mortality (Mackenbach et al., 2003) (Pensola and Valkonen, 2000). Studies on trends in inequalities in morbidity show less consistent results. Explanations for the slightly differential trends include that morbidity and especially premature mortality are temporally different phenomena, and that socioeconomic inequalities in health are indeed deeply rooted in modern societies (Kunst et al., 2005; Dalstra et al., 2002). While relatively stable western societies may not face pressures towards rapid

changes in their socioeconomic patterning of health, the evidence from Eastern European post-communist countries gives reasons to expect that health disadvantage is increasing among the lower socioeconomic groups (McKee and Shkolnikov, 2001; McKee and Jacobson, 2000; Marmot and Bobak, 2000; Marmot, 1999; Siegrist, 2000).

2.2 Social determinants of Eastern European health crisis

Average life expectancy was lower in Eastern than in Western Europe already in the beginning of the 20th century. However, differences remained relatively small until the early 1960s. Since then life expectancy in the western market economies continued to improve considerably in comparison to centrally planned communist countries where it remained similar or worsened (Leinsalu, 2004; Pikhart, 2002; Palosuo, 2003). The collapse of communism in the early 1990s brought the large mortality and health gap between Eastern and Western Europe high to public health research agenda. Currently it is recognised that diversity within European region needs to be taken into account in setting health policy priorities (McKee and Jacobson, 2000).

Potential explanations for the observed East-West differences in health have included, among many others, quality of medical care, environmental pollution and socioeconomic forces. The suggested mediating factors behind social and economic differences have been lifestyle or health behaviours and psychosocial stress (Bobak and Marmot, 1996). The analytical approaches to health crisis in a transition society can also be grouped into lifestyle, social inequality and psychosocial stress explanations. The explanations utilize overlapping concepts and may not be considered as contradictory, but rather emphasizing different aspects of similar processes (Palosuo, 2003).

In officially 'classless' communist countries social stratification was a sensitive issue and the evidence before the early 1990s is scarce, but it is likely, however, that inequalities in health according to gender, age, marital status, education, occupation and region were probably even more substantial than in the Western

countries (Leinsalu, 2004). Socioedemographic differences in health and health behaviours are therefore fundamental research topics in order to understand the reasons behind the East-West health divide. Moreover, they are ethical and political topics as most of these inequalities in health can be considered unfair and preventable. Finally, they are practical topics because substantial public health potential lies in the improvement of the situation of the less advantaged population groups and nations. (Mackenbach and Bakker, 2002)

Comparative analysis of the social variation of health in societies in transition is troubled because the commonly used factors such as education and income may relate to each other in an unexpectable way (Palosuo, 2003). Therefore, their direct and indirect relations to the phenomenon of interest may also be complex to interpret. This is the case especially if there is no comparable information from more stable societies. In international comparisons the socio-cultural context may also affect the reporting (Manderbacka, 1998).

It has been recognised that men and women are facing partially different health risks in transition conditions. Socioeconomic gradients in health tend to be steeper among men (McKee and Shkolnikov, 2001). A particularly vulnerable group is suspected to be men living outside marriage, possibly due to that already during the communist regime 'neo-traditional' networks and family-based coping strategies became an essential way of getting everyday activities running (Watson, 1995). Age is also a basic determinant of health, and its specific relevance in transition is partially due to age groups facing different challenges. For example older persons may have more difficulties in adapting to new social conditions, but young workers may be more susceptible to losing job and becoming unemployed than older workers (Vodopivec, 2002). In general, the age gradient in health can be very different in a transition society e.g. Russia compared to a Nordic country. The short life span in Russia is supposed to reflect high levels of ill health and risk factors and a rapid age related decline in physical functioning (Bobak et al., 2004a; Silventoinen and Lahelma, 2002).

The communist regime had specific characteristics concerning the role of education in socioeconomic status. Equal educational opportunities were generally available, but educational level was actually related to parental

educational level (Bobak et al., 2000a). Own education was not, however, as directly linked to material advantage as in the market economies, and many manual occupations had a comparatively high income including other benefits, such as employer provided health care. It has been discussed whether these features may be still visible also in the differential patterning of health (Luschen et al., 1997; Nolte and McKee, 2004; Palosuo et al., 1998; Palosuo et al., 2000; Heistaro et al., 2001). Interpreting the educational gradient in health in transition societies is further complicated due to the sudden loss of traditional occupations, such as those in heavy industry or army, and new labour market demands have left also many people with formally high qualifications without appropriate job and income. With certain reservations, however, it may be concluded that, education is likely to represent people's long-term life-chances better than more volatile income or employment status. Education provides human capital, also in times of social and economic transformation (Vodopivec, 2002). Moreover, inequalities in health within individual Eastern European countries have been found to be related to education (Bobak et al., 2000a; Mackenbach et al., 1999).

The specific feature in the urban-rural differences in post-communist countries relates to history of collectivized agriculture and towns built around industrial complexes (Bobak and Marmot, 1996; Hertzman et al., 1996; Leinsalu, 2004). There is substantial variation between the countries in this respect, and simple conclusions do not make justice to the diversity of the real situation, but generally areas having a less market competitive infrastructure are likely to present particularly poor health. Typically these problems are associated with rural areas and degenerating industrial towns and cities. Concerning crude mortality statistics, some of these regional differences may be partly an artefact due to rural population being less educated and older. Urbanisation can also be seen as an indirect indicator of lifestyles or the environment, which is a relevant issue in understanding the behavioural patterning, as new habits tend to be first adopted by higher socioeconomic and especially urban groups (Karisto et al., 1993; Palosuo, 2003).

Studies on post-communist countries have identified a number of relevant health related factors, which can be considered in-between the sociodemographic and the psychosocial factors. Among them are effort/reward imbalance at work

(Siegrist and Marmot, 2004; Pikhart et al., 2001) and various indicators of social cohesion (Carlson, 1998). These considerations as such are beyond the scope of this thesis, but they have relevance from the point of understanding individual behaviours in post communist countries.

2.3 Behavioural determinants of Eastern European health crisis

A commonly adopted classification of health behaviours is health-enhancing behaviours, health maintaining behaviours and health damaging behaviours (McQueen, 1987). Typically analyses have focused on the four main areas, each having evidence-based association with non-communicable diseases: smoking, alcohol consumption, physical activity and food habits/nutrition or their combinations (Laaksonen et al., 2005).

Health behaviours are sometimes regarded as having no or at least different meaning in the post-communist societies, because the former socialist regime largely denied social problems, and people depended on the omnipotent central state, so that health promotion based on the community and self-empowerment did not develop (Makara, 1994). Soviet-style socialism with its negation of individual initiative in health matters promoted the development of a passive orientation toward healthy living, and even after the collapse pro-socialists demonstrate less activity toward achieving health than antisocialists in Russia (Cockerham et al., 2002). However, multiple consequences of socioeconomic life chance factors such as material conditions and group norms may also play a role behind adverse health related lifestyles (Cockerham, 2000). Nevertheless, there is etiological and population level evidence on the contribution of major risk behaviours such as smoking, heavy drinking and obesity to public health, and therefore obtaining basic population level information on these behavioural factors is crucial (Puska et al., 1995).

Transnational tobacco industry found the Eastern European countries as a promising market area in the beginning of the 1990s. In many of these countries tobacco legislation and public health policy resources have been minor

compared to Western Europe (Puska, 1997). As a result, the Eastern European countries are a kind of natural laboratory testing the basic assumptions of the smoking epidemic theory (Lopez et al., 1994). According to this epidemic framework, smoking first spreads to the advantaged socioeconomic groups, followed by the general population. When smoking has become a common habit, the better-off groups are already quitting, a trend seen during the last 50 years in many Western European countries (Peto et al., 1994; Cavelaars et al., 2000; Mackenbach et al., 2004). Now Central and Eastern Europe may face similar changes in smoking. In the future, the largest public health impact is anticipated to be found among women, with increasing socioeconomic differences in smoking (Graham, 1996; Piha et al., 1993). Smoking alone cannot explain the East-West difference in the overall levels of morbidity or premature mortality, but it is possible that especially for men and possibly for women (Brown, 2002) in the future it will constitute a major behavioural health risk in Central and Eastern Europe and from the point of sociodemographic differences it will be a crucial factor. Gender, age and social class/position are therefore key sociodemographic determinants concerning studies on smoking.

Along with liberalized tobacco markets also the regulation of alcohol supply has been modest in many Eastern European countries (Simpura, 1995; Simpura, 1997; Allebeck, 2001). The other common feature is that many of these countries share a number of material conditions, such as unemployment, that are often associated with increased risk of alcohol related problems. In other words, there are firm grounds for an alcohol based health crisis. The actual situation appears, however, to vary substantially depending on the local traditions and circumstances. The major differences relate to the consumption patterns at the individual and aggregate level. It has been argued that the prevalence of binge drinking is probably a more important factor behind alcohol related harm than the total consumption level (Bobak et al., 1999; Bobak et al., 2004b) .

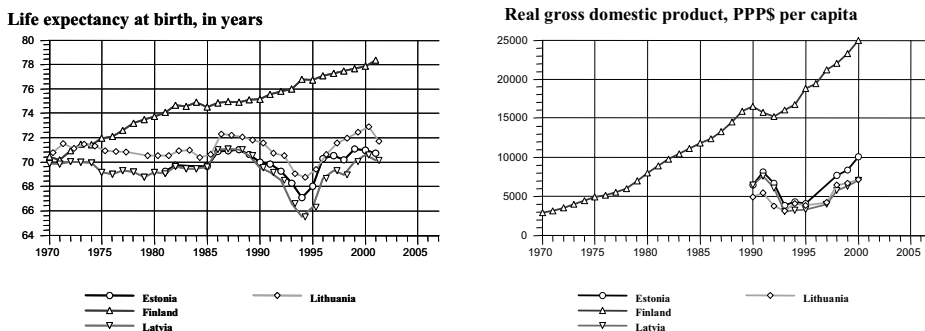
The mainstream alcohol research from Western Europe has claimed that frequent but moderate consumption is more common among those with higher socioeconomic status, while harmful drinking patterns concentrate among the least advantaged (Hupkens, 1998). It appears that also in the Eastern European countries, drinking habits have a social gradient (Shkolnikov et al., 1998; Balabanova and McKee, 1999) (McKee and Shkolnikov, 2001). Thus, the

current evidence on alcohol consumption levels or habits may not provide a clear-cut explanation for the East-West health gap as such, but excessive drinking is likely to be a crucial factor behind the social patterning of health. More comparative evidence is needed to efficiently implement preventive alcohol policies at the European level (Allebeck, 2001), as it is recognised that mere regulation of supply does not necessarily lead to diminished alcohol-related harm (Moskalewicz and Simpura, 2000).

There is also evidence on the international differences in food habits, and physical activity. However, issues related to energy intake and consumption and their multiple health effects on the population level present several methodological problems. Despite their importance, the practical problem for comparative studies is that culturally varying food habits and ways of work-related as well as leisure-time physical activity provide only very few easily measurable indicators that could be used in self-administered studies. (Roos et al., 2001; Prattala et al., 2003b).

2.4 The social patterning of health in the Baltic countries and Finland

Three periods of post World War II evolution in life expectancy can be discerned in the Baltic countries and the Soviet Union. Up to the 1960s there was a first period of increase, secondly in the 1960s to 1970s there was a stagnation and decline, and thirdly in the 1980s there was a moderate rise in life expectancy (Zvidrins and Krumins, 1993). In Finland life expectancy has increased over the last century. In the 1950s the rapid increase was mainly due to decreased mortality from communicable diseases. During 1960s increase in life expectancy was somewhat reduced due to non-communicable diseases, especially cardiovascular mortality among men, but since 1970s life expectancy has again increased rapidly (Pensola and Valkonen, 2000). Thus, the major deviation in trends of health and life expectancy between the Baltic countries and Finland, has taken place since the 1970s. (Life expectancy in Figure 1)



* GDP expressed in purchasing power parity (PPP) is adjusted to the relative domestic purchasing power of the national currency as compared to the US dollar, rather than using the official exchange rate. Multipliers (PPPs) are estimated periodically, using the cost of the standard basket of goods.

Figure 1. Life expectancy at birth and real gross domestic product (PPP\$)* in Estonia, Latvia, Lithuania and Finland (HFA)

Currently the Baltic countries share public health problems typical of less wealthy (GDP in Figure 1) Eastern European transition economies: mortality and morbidity from cardiovascular and other non-communicable diseases is higher than in Western European countries (WHO, 2003). In addition, there are socioeconomic and sociodemographic inequalities for several domains of health (Leinsalu, 2004; Monden, 2004; Kalediene and Petrauskiene, 2005).

In the 1990s and early 2000s, comparative studies on public health including all three Baltic countries have mainly focused on specific health behaviours such as smoking, drinking and food habits (Pomerleau et al., 2002; Pomerleau et al., 2001a; Pomerleau et al., 2001b; Pomerleau et al., 2000b; Pomerleau et al., 2000a; McKee et al., 2000). Comparative studies on social differences in health as such have been less numerous. There is, however, evidence on social inequalities in self-assessed poor health from all the Baltic countries (Monden, 2005). These social variations in self-assessed health have been rather stable in the second half of the 1990s, but the economically inactive population seems to have become more disadvantaged.

Quantifying the contribution of the macro-level political changes to health at the individual or population level is a complex task. All three Baltic countries have faced several social and economic challenges during the 1990s and early 2000s and they have followed partly different socio-political paths. Estonia is usually considered most market liberalist Baltic state (Vodopivec, 2002) having the highest real gross domestic product (WHO, 2003) in the 1990s, while Lithuania and Latvia have been taking more moderate steps in their economic transition. In general, the Baltic countries were substantially worse-off in economic terms compared to Finland during 1990s (Figure 1).

In Estonia there has been an increase in educational (Leinsalu et al., 2003b) and ethnic (Leinsalu et al., 2004) inequalities in premature mortality during the economic growth of the transition period (WHO, 2003). In all Baltic countries, however, the public health sector has been activated and there are processes that may be protective against the pressures towards increasing inequalities in health (Aris, 2004; Brown, 2004; Parfitt, 2004).

In short, it appears that among several other sociodemographic dimensions, health disadvantage may concentrate especially to older, less educated, rural and non-married people in the Baltic countries. In these respects these countries share many common features with Finland a couple of decades ago, but the tradition of non-communicable disease prevention has been less emphasized than in Finland (Puska et al., 1995).

Nevertheless, socioeconomic differences in health are still a prominent issue in Finland as well, because mortality differentials have been increasing during the last decades (Mackenbach et al., 2003; Pensola and Valkonen, 2000). Despite the general progress on the population level, the health status and life-expectancy are still worse among the Finns in low socioeconomic positions (Aromaa et al., 1999; Lahelma et al., 1997; Martikainen et al., 2003). This socioeconomic patterning remained rather constant even during economic recession in Finland in the early 1990s (Lahelma et al., 2002).

2.5 The social patterning of smoking in the Baltic countries and Finland

The Baltic countries are at different stages of the tobacco epidemic, although none of them provides a perfect example of any specific stage. Smoking has traditionally been common among Baltic men, while rates among women are on the rise (Aareleid et al., 1994; Buivydaite et al., 2003; Domarkiene et al., 2003; Leinsalu and Rahu, 1993; Petrauskaite and Gurevicius, 1996). In a comparative study conducted in 1997 (Pudule et al., 1999), the smoking prevalence in Estonian, Latvian and Lithuanian men was 54%, 56% and 53%, respectively. In this same study, the prevalence in women was on a similar level as in Western European countries in Estonia (24 %), but in Latvia (11%) and especially in Lithuania (8%) smoking was less prevalent.

The sociodemographic differences in smoking within each of the Baltic countries are typical for Eastern Europe. Along with sex, age is an important factor, the lowest smoking prevalence being found in the oldest age groups, particularly among women. Lower educated men smoke more often, but among women this association is less consistent. Smoking rates have been found to vary between urban and rural areas in Latvia and Lithuania but less so in Estonia. Income and marital status are associated with smoking in the Baltic countries to varying degrees (Pudule et al., 1999; Parna et al., 2002; Regaliene et al., 2002; Klumbiene et al., 2002).

Smoking habits may be changing, but whether the smoking epidemic model (Lopez et al., 1994) accurately predicts developments in these countries is uncertain. In an earlier study (Puska et al., 2003), there were indications of increasing smoking prevalence among traditionally almost smoke-free Lithuanian women during 1994-1998. In attempting to understand why certain groups take up smoking, information about the basic social dynamics of smoking may be insufficient, as the Baltic populations in social transition also face psychological pressures (Carlson, 1998). Smoking is a possible coping strategy, and the unhealthy behaviours could be a link between psychosocial problems and poor health (Cockerham, 1997). In many industrialized countries,

psychosocial problems and smoking are rather consistently associated (Haukkala, 2002), but this may not be the case if smoking is a trendy habit among the better-off. Within the Baltic region, this might be the situation among Lithuanian women.

2.6 The social patterning of drinking habits in the Baltic countries and Finland

In all of the Baltic countries, alcohol consumption increased during the Soviet era. The peak was reached in the early 1980s. A decrease in consumption in the 1980s coincided with the anti-alcohol campaign waged throughout the Soviet Union. In the early 1990s alcohol consumption was influenced by the rapid social changes including liberalisation of markets, illegal production and other features typical to transition countries (Lagerspetz, 1992; Mikalkevicius and Sinkunas, 1992; Seps, 1992).

Estimates of per capita consumption of alcohol in the Baltic countries during 1990s and 2000s suffer from several methodological shortcomings and variation depending on the source is substantial (WHO, 2003; Statistics-Finland, 2003; Statistics-Lithuania, 1999; Stakes, 2000; Josing, 2003; Kedaviciene and Piliavecas, 2003). For example, according to Stakes (National Research and Development Centre for Welfare and Health), Estonian consumption was only 2.4 litres in 1998 (Stakes, 2000). However, when unrecorded consumption was taken into account rather different estimates of the consumption in the early-to-mid 1990s were obtained in Estonia (12.4 lt), Latvia (22.1 lt) and Lithuania (10.2 lt) (Harkin et al., 1997).

Despite the relatively low recorded alcohol consumption level (Allebeck, 2001; WHO, 2003), the Baltic countries and Finland suffer from harmful consequences related to the heavy use of alcoholic beverages. This may be partly due to the undercoverage of consumption statistics, but people's drinking patterns (Bobak et al., 2004b) may also contribute. These countries are usually regarded as sharing a northern European drinking pattern (Simpura, 1995) characterised by high consumption at weekends. This northern pattern is known to contribute to

harmful consequences of drinking, including socioeconomic inequalities in premature mortality (Laatikainen et al., 2003).

In the Baltic countries heavy alcohol use is recognised as a social problem (Simpura et al., 1999), and there is aggregate level evidence on the negative consequences of drinking and alcoholism (Ahven, 2003; Kedaviciene and Piliavecas, 2003). In a comparative cross-sectional study in 1997 involving all three Baltic countries, weekly alcohol consumption was associated with young age among both sexes, and with higher income among women (McKee et al., 2000). In many Eastern and Western European countries, heavy drinking is patterned by sociodemographic factors, such as age, sex, ethnicity, family status, socioeconomic status and living environment (McKee and Shkolnikov, 2001).

Limited evidence exists, however, on changes in the sociodemographic patterning of heavy drinking in the 1990s and early 2000s in the Baltic countries, although mortality studies suggest that this may become an even more important issue in the near future (Leinsalu et al., 2003b; Chenet et al., 2001).

3 AIMS OF THE STUDY

The evidence from the comparatively stable Western European countries and Eastern European transition countries points out that for populations with limited previous health research, baseline information for health promotion and policy planning, as well as, international comparative projects, is needed. In obtaining such information three main aspects need to be considered. Firstly, survey studies are often the only affordable way to obtain nationally representative evidence on health status and health behaviours. Secondly, evidence on the well established fundamental social (Macintyre, 1986) determinants, i.e. gender, age, socioeconomic status, urbanisation and marital status is vital. Thirdly, the most urgent and measurable behavioural factors are smoking and alcohol drinking.

Systematic comparisons of Baltic and Western European countries following these principles are still few. As a result, answering to the question: Which groups are winning and which groups are losing in terms of health over the years of independence in 1990s and 2000s in the Baltic countries? turns out to be complex. It is assumed that inequalities do exist according to several social determinants and they may be changing over time, but the body of evidence is scattered to studies using different methodologies, which makes comparisons difficult.

The main purpose of this study is to bridge this public health evidence gap concerning the Baltic countries by providing cross-sectional and time trend analyses on inequalities in health and key health behaviours in the Baltic countries compared to Finland. This study will examine the key social determinants of health and smoking and drinking in Estonia, Latvia, Lithuania and Finland in 1994-2004. The population groups within the countries will be compared in order to identify variations in the social patterning. Four specific research questions that will be answered in separate substudies (each substudy is referred by its roman numeral) are posed:

I What is the patterning of health by social determinants in Estonia, Latvia, Lithuania and Finland in 1994-2000?

II What are the trends over time in the patterning of health by education in Estonia, Latvia, Lithuania and Finland in 1994-2004?

III What is the patterning of daily smoking by social determinants in Estonia, Latvia, Lithuania and Finland in 1994-2002?

IV What is the patterning of heavy drinking by social determinants in Estonia, Latvia, Lithuania and Finland in 1994-2002?

4 MATERIALS AND METHODS

4.1 Data sources

The data were gathered from cross-sectional postal surveys of the Finbalt Health Monitor project since 1994 every second year in the Baltic countries and Finland (Table 1). The methodology and questionnaires used in the surveys have been harmonized in order to allow maximal comparability between the participating countries (Prattala et al., 2003a). Each survey is based on a nationally representative random sample drawn from the population register containing all citizens. The sampling unit has been the individual in all the surveys and substitution of non-respondents has not been used.

Table 1. Basic characteristics of the study materials by country and year.

	Estonia	Latvia	Lithuania	Finland
	N (response rate)*	N (response rate)*	N (response rate)*	N (response rate)*
Year of the study				
1994	1189 (83 %)	-	1858 (64 %)	3136 (70 %)
1996	1396 (77 %)	-	2018 (69 %)	3274 (72 %)
1998	1223 (68 %)	2121 (77 %)	1874 (62 %)	3198 (70 %)
2000	1244 (63 %)	2169 (80 %)	2195 (74 %)	3188 (70 %)
2002	1219 (67 %)	1816 (68 %)	1879 (64 %)	2968 (65%)
2004	2778 (62 %)	1579 (60 %)	1810 (62 %)	3057 (68 %)
Total material 1994-2004	9049	7685	11634	18821

* N consists of age groups 20-64, response rate includes also age groups 15-19 years

The origins of the Finbalt project date back to the 1970s when comprehensive work to prevent major non-communicable diseases by intervention to change risk-related lifestyles in the population were initiated in Finland. In these projects a simple system to monitor target behaviours was developed. In 1978 the National Public Health Institute (KTL) of Finland launched a similar system for national monitoring of health behaviours among the Finnish adult population. After the political change in Eastern Europe during the early 1990s, contacts between public health experts of Finland and the Baltic countries increased rapidly. In Estonia the first national health behaviour survey was carried out in

1990 as Finnish-Estonian collaboration, and related to a joint smoking-cessation TV programme. Thereafter, the surveys have been carried out every second year in Estonia. Within this framework, Lithuania initiated its own health behaviour monitoring system in 1994 and Latvia in 1998. Since then all the Baltic countries have carried out the surveys every second year, following the common Finbalt Health Monitor protocol and procedures. (Puska et al., 2003)

4.2 Independent variables

The independent social variables should be relevant from the point of variation and inequalities in health in different societies. Moreover, they should be reliable, comparable and measurable with a self-administered questionnaire. Following these principles, gender, age, education, level of urbanisation and marital status are the main social (Macintyre, 1986) determinants in this study. In addition, ethnic differences within the countries are checked systematically (Table 2).

Socioeconomic status was measured by education. The other commonly used indicators such as income, employment status or occupation (Mackenbach and Kunst, 1997; Lahelma et al., 2002) were not taken into analysis because education was considered to represent people's actual long term life-chances better than for example more volatile income or occupational status. Also within the Finbalt project (Prattala et al., 2003a) education has been considered as the best solution for a single socioeconomic measure taking local conditions into account while also allowing precise comparisons between the countries. In the Finbalt setting differences between urban and rural areas are an important aspect as these countries have partly different urbanisational development and agricultural history. Marital status is a well known correlate of health status and health behaviours. It is also possibly related to material well-being especially in the societies with low-level redistributive welfare activities.

Table 2. Distributions of social determinants in 1994-2004 (Latvia 1998-2004).

	Estonia		Latvia		Lithuania		Finland	
	Men 3833 %	Women 5216 %	Men 3312 %	Women 4373 %	Men 5132 %	Women 6502 %	Men 8765 %	Women 10056 %
Age								
20-34 years	34	31	37	32	35	33	29	31
35-49 years	36	35	34	34	36	37	37	37
50-64 years	30	34	29	34	29	30	34	32
Education*								
High**	22	30	19	26	29	39	32	43
Intermediate**	56	55	58	58	54	47	42	37
Low**	22	16	24	16	17	15	26	20
Level of urbanization								
Cities	47	51	44	49	42	47	40	43
Towns	20	19	22	22	27	28	26	25
Villages	33	29	34	29	31	25	34	32
Marital-status								
Married or cohabiting	70	64	70	62	75	68	69	71
Other	30	36	30	38	25	32	31	29
Ethnic origin								
Native	71	68	56	57	85	85	94	94
Non-native	29	32	44	43	15	15	6	6

* In Estonia, year 2004 not included

** Educational levels trichotomized followingly: 1) high: 14 years or more, 2) intermediate: 10-13 years and 3) low: 9 years or less, except in Latvia followingly: 1) high: university, 2) intermediate: secondary or vocational and 3) low: primary education

For Estonia, Lithuania and Finland, education was measured as the total number of years of schooling given in the questionnaire, and was trichotomized as follows: (i) high, 14 years or more; (ii) intermediate, 10–13 years; and (iii) low, 9 years or less of education. Education in Latvia was not measured in years, but instead by educational degrees (primary, secondary, vocational and university) which was nevertheless an ordinal measurement. Education was trichotomized as follows: (i) high, i.e. university; (ii) intermediate, i.e. secondary or vocational; and (iii) low, i.e. primary education. In all four countries the level of urbanization was based on an administrative classification of the address of the respondent. Ethnic origin was dichotomized as ‘natives’ and ‘others’. In the Baltic countries ‘others’ were mainly Russians.

4.3 Dependent variables

4.3.1 Health status (I and II)

Three self-reported health indicators were included: (i) perceived health; (ii) diagnosed diseases; (iii) symptoms (Table 3). Perceived health was asked by the following question ‘How would you assess your present state of health?: 1) good, 2) reasonably good, 3) average, 4) rather poor, 5) poor’. This is a widely used general measure of health and well-being (Manderbacka, 1998), which has been shown to be reliable (Martikainen et al., 1999), and consistently associated to mortality (Idler and Benyamini, 1997). It was categorized firstly by using a common dichotomization: less-than-good (3,4,5) and other (1,2). As the average category was very common in the Baltic countries, the analyses were secondly conducted using the following dichotomization: poor (4,5) and other (1,2,3).

Table 3. Prevalence of health, smoking and alcohol drinking in 1994-2004

N	Estonia		Latvia		Lithuania		Finland	
	Men 3833 %	Women 5216 %	Men 3312 %	Women 4373 %	Men 5132 %	Women 6502 %	Men 8765 %	Women 10056 %
Less than good health*	63	66	58	64	55	64	35	31
One or more diag. disease*	33	38	25	35	42	45	29	25
Three or more symptoms*	14	26	8	15	8	14	8	15
Daily smoking**	47	21	54	19	46	11	29	19
Frequent drinking***	12	9	12	13	11	11	21	27
Binge drinking****	21	9	27	14	19	13	26	19

* 1994-2004, ** 1994-2002, *** 1994-2002 (Lithuania 1996-2002), **** 2000-2002, In Latvia 1994 and 1996 not available

frequent drinking: at least 15 portions weekly among men, and at least five among women

binge drinking: at least six portions per one occasion at least weekly among men and at least monthly among women

The number of diseases was measured by a checklist of eight items: ‘Have you had any of the following diseases diagnosed or treated by a doctor during the last year? (yes/no): elevated blood pressure, diabetes, myocardial infarction, angina

pectoris, heart failure, rheumatic arthritis, back problems or chronic bronchitis'. The number of symptoms was also measured by a checklist of eight items: 'Have you had any of the following symptoms or complaints during the last month (30 days)? (yes/no): chest pain during exercise, joint pain, back pain, swelling in the feet, varicose veins, eczema, constipation or toothache'. This checklist also contained headache, insomnia and depression but these psychological items were excluded in order to add conceptual consistency to the summary measure. The checklists allowed 'yes' or empty response alternatives, except that in Estonia in 1996 and 2000 there was also a 'no' alternative. We categorized the empty responses as 'no'. The two checklists were dichotomized as follows: (i) one or more diseases and other, (ii) three or more symptoms and other.

4.3.2 Smoking and psychological distress (III)

Daily smoking was studied with an index (Helakorpi et al., 2002) based on the following questions: 'Have you ever smoked?', 'Have you ever smoked at least 100 times?', 'Have you ever smoked regularly/daily (i.e. almost every day for at least one year)?' and 'When did you last smoke?'. This index was dichotomized as: 1) daily smokers and 2) others (Table 3). Those with insufficient information on smoking were coded as others.

Psychological distress was asked with the question: 'Have you been feeling tense, stressed or under a lot of pressure during the last month (30 days)?', with response options: 1) not at all, 2) yes - somewhat but not more than is usual for people in general, 3) yes - more than is usual for people in general and 4) yes - my life is nearly unbearable. In the analysis, categories 3 and 4 were grouped together to indicate distress.

4.3.3 Alcohol consumption (IV)

There is no general consensus on the exact limits of moderate consumption or binge drinking and various cut off points as grams of alcohol (Malyutina et al., 2002) or qualitative characteristics of drinking occasions (Mustonen and Makela, 1999) have been suggested. We analysed alcohol consumption with two indicators: frequent drinking and binge drinking (Table 3).

Frequent drinking was measured with the following question: 'How many glasses (regular restaurant portions) or bottles of the following drinks have you consumed during the last week (7 days)? If you have not had any, mark 0, i. medium strong or strong beer __ bottles, ii. free-mixed highballs __ bottles, iii. strong alcohol, spirits __ restaurant portions (4 cl.), iv. wine or equivalent __ glasses. In Finland an additional beverage, 'cider or other light wine', was included with 'wine' in our analysis. In Lithuania, the consumption of 'free-mixed highballs' was not asked. Empty responses were included in the 0 consumption category. Distribution of weekly alcohol consumption was skewed to the left in all countries (skewness 4.95-9.03), indicating that the proportion of non-drinkers and moderate drinkers was substantial. The criterion for a frequent drinker was at least 15 portions per week among men, and at least five portions per week among women.

A simple measure of consuming five or six drinks per one occasion has been related to increased risk of mortality (Laatikainen et al., 2003). Also Finbalt surveys of the years 2000 and 2002 have asked binge drinking with the following question: 'How often do you drink at least six (regular restaurant) portions of alcohol per one occasion? 1) never, 2) less than once a month, 3) once a month, 4) once a week, 5) daily or almost daily. The weakness is that excessive use of alcohol among women may be better indicated as studies suggest that simple questions on alcohol consumption are likely to underestimate gender differences in the prevalence of heavier drinking (Knibbe and Bloomfield, 2001). In all countries the mean weekly consumption was higher among those who more often drank six or more portions. Asymptotic statistical significance for difference in the Kruskal-Wallis test was $p < 0.001$ among men

and women in all countries. In this study the criterion for binge drinking was six or more portions per one occasion at least once a week among men, and at least once a month among women.

4.4 Statistical methods

The basic description was carried out with unadjusted prevalence rates of studied indicators among both genders. Age adjusted annual and total prevalence rates were calculated using three age groups with equal weights. Their confidence intervals (95 %) were estimated using re-scaling factor (Waller et al., 1994) but assuming normal distribution instead of binomial distribution.

The main method of analysing the patterning of sociodemographic differences in health, smoking and heavy drinking was logistic regression analysis (SPSS-inc., 1990). All models were fitted separately for each country and gender, and the main effects were fitted in their assumed temporal order. The overall effect was added first, followed by the independent explanatory variables. Models consisting of the overall effect and each explanatory variable only were also examined. The statistical significance of the terms was assessed by scaled deviance and change of the degrees of freedom (Δ SD and Δ DF). The main criterion for a statistically significant effect was $p < 0.05$. The results are presented as odds ratios (OR) and their 95% confidence intervals (CI). Partially different set of independent variables and categorizations were used in each substudy in order to obtain sufficient statistical power.

Changes over time in the associations were assessed by including interactions between study year and each of the other factors separately into the mutually adjusted main effects model. Ethnic differences in Estonia and Latvia were assessed separately according to requirements of each substudy.

In the substudy II focusing on time trends, further modelling approaches were used. Firstly we assessed the 'trends in inequalities' (Dalstra et al., 2002) by

estimating the magnitude of educational differences in perceived health, diseases and symptoms with trichotomous education variable. Inequality indices (Mackenbach and Kunst, 1997) from logistic regression analysis were then calculated using similar approach as above with the exception that education was fitted as a continuous variable. This index is a total effect measure since it takes into account both the strength of the differences in health between the educational groups and the distribution of the study population across these groups. The index can be interpreted as the average change in ill-health (in terms of the odds ratio) for each step down the educational hierarchy. Finally, 'inequalities in trends' were studied by calculating country and gender specific total time trend indices for continuous study year and then similar trends within each educational category with control for age.

4.5 Quality of the data

The response rates in our study were comparatively high, but non-response is still a potential cause of bias. We lack comparable data about non-response for different sociodemographic grA further concern is that the response rates have been varying over time, and a decline has been the general tendency. Therefore, overall country specific trends of our study are probably more favourable than the true ones. Time trends should also be interpreted cautiously but late response as well as unit and item non-response among the respondents have been analysed in detail. The bias has been found to be generally small and its direction similar in all countries. However, it is likely that people with social problems are overrepresented among the non-respondents (Helasoja et al., 2002). Therefore, poor health, smoking and heavy drinking may be underestimated in the data.

with caution because our data allowed the overall magnitude at a given point of time to be measured with sufficient precision, but small changes in that magnitude may not reach statistical significance.

A comparison with census information suggests that our data slightly underrepresent the youngest age group in all countries except Latvia. Our data

also contain more women than the official statistics (Statistical-office-of-Estonia, 1999; Central-Statistical-Bureau-of-Latvia, 1998; Statistics-Lithuania, 1999; Statistics-Finland, 1997). Educational levels are difficult to compare as can be seen from the proportions of those with at least third level education in 1996 in Estonia (53%), Latvia (60%), Lithuania (59%) and Finland (52%) (Statistical-office-of-Estonia, 1999). It is therefore possible that trichotomous education of this study distinguishes the upper and lower end of the educational scale but the intermediate category is more heterogeneous. The lowest education group may also be more selected and the highest less selected by the end of the study period as the general education level increased in all countries.

The actual size of inequalities can be measured in several ways (Mackenbach and Kunst, 1997; Murray et al., 1999; Manor et al., 1997; Kunst et al., 1998). Concentrating on the overall magnitude or disadvantage among the lowest educated only may be insufficient as gradients may exist across the socioeconomic grades (Marmot and Feeney, 1997). In this study, efforts were made to avoid these interpretational problems by using both categorized and continuous education variables.

The proportion of urban population in 1997 in Estonia (70%), Latvia (65%), Lithuania (68%) and Finland (62%) corresponds to combined proportions of respondents in cities and towns in our data. A comparable estimate of the prevalence of marriage during our study period could not be obtained from the official statistics of the Baltic countries. The Finnish statistics (Statistics-Finland, 1997) indicated a lower proportion of married men (52%) and women (55%) than in our data. However, our 'married' category includes cohabitation. The ethnic distribution of our data was rather similar to the corresponding proportions of native citizens in official statistics from Estonia (65%), Latvia (56%) Lithuania (82%) and Finland (93%). (Statistical-office-of-Estonia, 1999; Central-Statistical-Bureau-of-Latvia, 1998; Statistics-Lithuania, 1999; Statistics-Finland, 1997).

Our material probably underestimated the total smoking prevalence, which may influence the findings of sociodemographic differences (Bostrom et al., 1993).

Rural women, for instance, may underreport their smoking more often than urban women (Laatikainen et al., 1999).

We estimated also the consumption of pure alcohol in our data (IV). According to the estimated coverage rates of this study, underreporting in alcohol consumption was likely to be substantial - particularly in the Baltic countries. Research into heavy drinking is compromised when alcohol consumption of the majority of respondents falls within the limits of moderate drinking (Meister et al., 2000) in populations with traditionally irregular drinking patterns (Poikolainen, 1995; Poikolainen et al., 2002). However, the portions that people actually drink may be larger than in our total consumption estimates (Lemmens, 1994). In addition, our data showed a consistent association between the frequency of binge drinking and mean weekly consumption which suggests that, despite underreporting, the data can serve to identify subgroups where drinking problems are most likely to exist (Poikolainen and Simpura, 1983).

It has been argued that in the Baltic countries, lay people may respond to alcohol surveys in a way they expect the authorities would like them to respond (Mikalkevicius and Sinkunas, 1992; Seps, 1992; Lagerspetz, 1992). Another study indicating considerably higher underreporting of alcohol consumption in Russian Karelia than in Finnish Karelia partly supports this argument (Laatikainen et al., 2002). As our postal survey resulted in a higher prevalence of weekly consumption of alcohol, especially among women (Estonia 52% vs. 26%, Latvia 57% vs. 8%, Lithuania 65% vs. 14%), than did another study using personal face to face interviews (McKee et al., 2000), the social undesirability effect leading to underreporting may exist. In our study the bias appeared to be smaller possibly because respondents could answer in more anonymous way.

In sum, the Finbalt data used in this study represents typical advantages and limitations encountered in self-administered surveys and therefore absolute prevalence and consumption levels should be treated with caution. On the other hand, the bias has been basically similar in all countries and study years allowing comparisons of patterns and trends.

5 RESULTS

5.1 Self reported health (I)

5.1.1 Overall prevalence of perceived ill health

Less-than-good perceived health (average, rather poor or poor) was more prevalent in the Baltic countries than in Finland (Figure 2). This was mainly due to the average category being particularly large in the Baltic countries. The diagnosed diseases were more prevalent in Lithuania than in the other countries. There were no consistent gender differences, except that women reported more often symptoms in all countries.

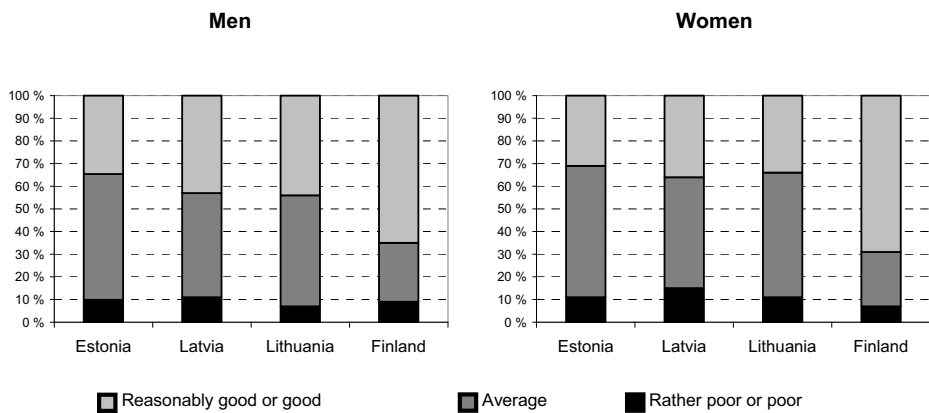


Figure 2. Distribution (%) of perceived health in Estonia, Latvia, Lithuania and Finland in 1994-2000 (Latvia 1998-2000)

5.1.2 The social patterning of health

According to logistic regression analyses both less-than-good and poor perceived health were worse in the older age groups. The lower educated men and women in all countries reported more often less-than-good health (Table 4). The educational gradient was smallest in Finland among both genders. Poor health was also more common among the lower educated, with the exception of Estonian men. Moreover, the differences between the high and intermediate level education groups were not statistically significant among Lithuanian and Finnish men, or Estonian women.

Table 4. Less than good health by education in 1994-2000 (Latvia 1998-2000). Odds ratios (OR) and their 95% confidence intervals (CI) adjusted for age, urbanisation and marital status

	Estonia	Latvia	Lithuania	Finland
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
men				
High	1.00	1.00	1.00	1.00
Intermediate	1.47 (1.16-1.87)	1.59 (1.22-2.08)	1.37 (1.15-1.64)	1.54 (1.33-1.77)
Low	2.03 (1.49-2.77)	2.00 (1.45-2.76)	2.27 (1.78-2.89)	1.89 (1.61-2.21)
women				
High	1.00	1.00	1.00	1.00
Intermediate	1.69 (1.40-2.04)	2.01 (1.63-2.48)	1.80 (1.55-2.08)	1.49 (1.31-1.70)
Low	3.32 (2.43-4.55)	2.77 (2.04-3.77)	2.07 (1.61-2.66)	1.89 (1.63-2.20)

The differences between urban and rural areas were generally small and inconsistent. However, the rural Estonian men and Lithuanian men and women reported poorer health. When less-than-good health was examined. Similar patterns were found for Estonian and Latvian men for poor health.

Health was poorer among the non-married in Finland with both cut-off points of perceived health. When poor health only was examined, the same pattern was found for both genders in all countries. However, the differences were not

statistically significant for Estonian men or Latvian women. Non-native Estonian men and women and Latvian women reported poorer health than their native counterparts.

5.1.3 The social patterning of diseases

Older and less educated (Table 5) men and women reported generally more diseases. The educational gradient was found in Lithuanian and Finnish men and women, and Estonian women. The differences between urban and rural areas as well as between married and non-married were mainly small and inconsistent. Non-native Estonian men and women reported diseases more often than the natives.

Table 5. One or more diseases by education in 1994-2000 (Latvia 1998-2000). Odds ratios (OR) and their 95% confidence intervals (CI) adjusted for age, urbanisation and marital status

	Estonia	Latvia	Lithuania	Finland
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
men				
High	1.00	1.00	1.00	1.00
Intermediate	0.99 (0.77-1.28)	1.35 (0.98-1.85)	1.06 (0.89-1.26)	1.49 (1.27-1.75)
Low	1.30 (0.97-1.75)	1.24 (0.86-1.78)	1.45 (1.17-1.81)	1.74 (1.47-2.06)
women				
High	1.00	1.00	1.00	1.00
Intermediate	1.28 (1.05-1.56)	0.99 (0.79-1.24)	1.44 (1.25-1.66)	1.48 (1.28-1.71)
Low	1.55 (1.20-2.00)	1.04 (0.77-1.40)	1.57 (1.27-1.94)	1.60 (1.36-1.89)

5.1.4. The social patterning of symptoms

Older and less educated men and women reported more symptoms in all countries. The educational gradient (Table 6) was not, however statistically significant among Estonian and Latvian men. There were no consistent

differences between urban and rural areas as well as between marital status groups. Non-native Estonian and Latvian women reported more symptoms than their native counterparts.

Table 6. Three or more symptoms by education in 1994-2000 (Latvia 1998-2000). Odds ratios (OR) and their 95% confidence intervals (CI) adjusted for age, urbanisation and marital status

	Estonia	Latvia	Lithuania	Finland
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
men				
High	1.00	1.00	1.00	1.00
Intermediate	0.92 (0.65-1.31)	1.10 (0.68-1.77)	1.23 (0.87-1.76)	1.66 (1.28-2.15)
Low	1.18 (0.79-1.76)	1.57 (0.92-2.68)	1.94 (1.32-2.84)	1.68 (1.27-2.22)
women				
High	1.00	1.00	1.00	1.00
Intermediate	1.06 (0.86-1.32)	1.57 (1.12-2.22)	1.24 (1.00-1.53)	1.36 (1.15-1.61)
Low	1.44 (1.09-1.90)	1.97 (1.31-2.96)	2.05 (1.59-2.65)	1.46 (1.20-1.77)

5.2 Changes over time in the educational differences in health (II)

The overall prevalence (Figure 3) as well as educational inequalities of all three health indicators remained generally stable in the three Baltic countries and Finland from 1994 to 2004. In the Baltic countries, however, improvement in perceived health was mainly found among the better educated men and women. Diagnosed diseases increased in the Baltic countries, except Lithuania, where diseases decreased among the better educated women. Symptoms increased among the better educated Estonian and Finnish women.

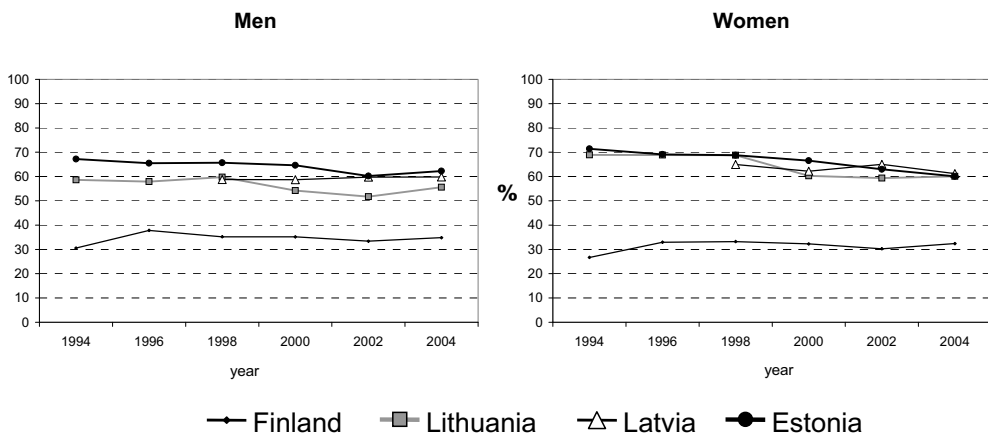


Figure 3. Age adjusted prevalence (%) of less-than-good perceived health in Estonia, Latvia, Lithuania and Finland in 1994-2004

5.3 Smoking (III)

5.3.1 Overall prevalence of smoking during 1994-2002

During the period 1994-2002 men were more often daily smokers than women (Figure 4). This gender difference in smoking was smallest in Finland and largest in Lithuania. Men in Finland were smokers less often than men in the Baltic countries, and among women, Lithuanians smoked least often. Quitting was more common in Finland than in the Baltic countries. The overall prevalence of daily smoking increased among Lithuanian women from 6% in 1994 to 13% in 2002, but decreased slightly among Estonian men and women.

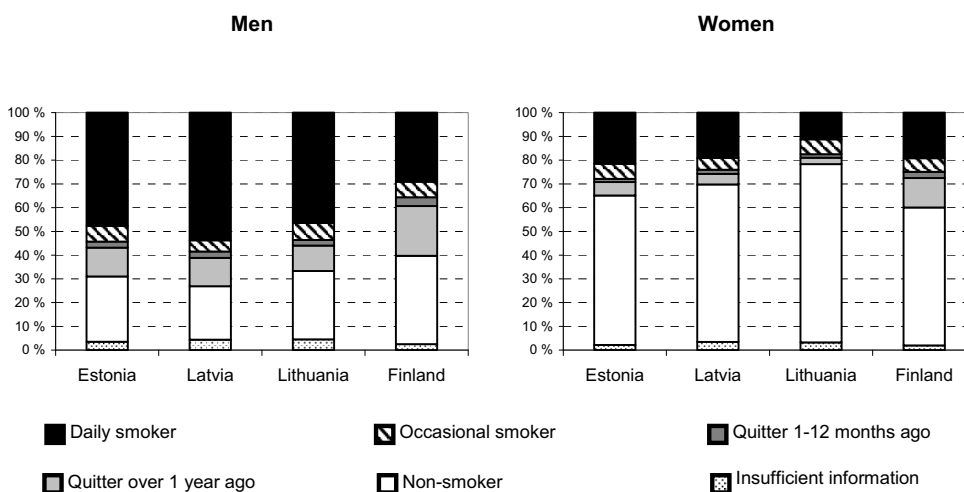


Figure 4. Smoking status in Estonia, Latvia, Lithuania and Finland in 1994-2000 (Latvia 1998-2000)

5.3.2 The social patterning of daily smoking

Smoking was least common in the oldest age group among men and women in all the countries. The age gradient was more marked among women as in all countries, except Estonia, the intermediate age group also differed from the youngest age group. The educational gradient (Table 7) was generally consistent, smoking being more common among the less educated in all countries among men and women. The exception was that in Lithuanian women smoking among the lowest educated did not differ from the highest educated. Among Latvian men year-specific odds ratios suggested an increase over time in educational differences. Smoking did not vary by level of urbanization among the Baltic men. Finnish rural men, however, were less often smokers than their urban peers. Smoking also was less common among rural Latvian, Lithuanian and Finnish women. In Latvian women daily smoking was more common among the non-natives.

Table 7. Daily smoking by education in 1994-2002 (Latvia 1998-2002). Odds ratios (OR) and their 95% confidence intervals (CI) adjusted for study year, age and urbanisation

	Estonia	Latvia	Lithuania	Finland
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
men				
High	1.00	1.00	1.00	1.00
Intermediate	1.85 (1.51-2.27)	2.45 (1.97-3.06)	2.10 (1.81-2.44)	2.33 (2.04-2.66)
Low	2.18 (1.69-2.81)	3.32 (2.55-4.31)	2.20 (1.79-2.70)	2.80 (2.40-3.27)
women				
High	1.00	1.00	1.00	1.00
Intermediate	1.65 (1.35-2.02)	2.04 (1.62-2.57)	1.40 (1.16-1.68)	2.27 (1.98-2.59)
Low	1.90 (1.42-2.52)	3.09 (2.28-4.18)	0.86 (0.59-1.26)	3.00 (2.53-3.55)

5.3.3 Associations between daily smoking and psychological distress

Smoking was more common among men and women reporting distress except in Latvian men. In Estonian men and Latvian and Finnish women, the youngest age group showed the most consistent differences in smoking according to distress. No statistically significant interactions between distress and education or urbanization were found in any country indicating that distressed respondents were more often smokers irrespective of their education or place of residence.

5.4 Drinking (IV)

5.4.1 Frequent drinking

Finnish men and women reported more frequent drinking (at least 15 portions weekly among men and at least 5 portions among women) than the Balts. In

Lithuanian men, and women in all countries except Latvia frequent drinking increased during 1994-2002.

Table 8. Frequent drinking* by education in 1994-2002 (Latvia 1998-2002, Lithuania 1996-2002). Odds ratios (OR) and their 95% confidence intervals (CI) adjusted for age, urbanisation and marital status

	Estonia	Latvia	Lithuania	Finland
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
men				
High	1.00	1.00	1.00	1.00
Intermediate	0.84 (0.62-1.13)	1.43 (1.00-2.02)	0.92 (0.72-1.17)	0.97 (0.85-1.11)
Low	1.03 (0.71-1.50)	1.50 (1.00-2.26)	1.07 (0.75-1.54)	0.75 (0.63-0.88)
women				
High	1.00	1.00	1.00	1.00
Intermediate	0.81 (0.63-1.04)	1.41 (1.09-1.82)	0.84 (0.69-1.03)	0.89 (0.80-1.00)
Low	0.60 (0.38-0.92)	1.60 (1.13-2.26)	0.60 (0.40-0.91)	0.65 (0.56-0.76)

*frequent drinking: at least 15 portions weekly among men, and at least five among women

In all countries younger, and in Latvia also the less-educated men and women (Table 8) reported more often frequent drinking. Among Finnish men, and among women from all countries except Latvia, a similar educational gradient was found; the better-educated were more often frequent drinkers. The educational gradient was steepest among Finnish men and women aged 49-64 years. In Latvian women, the educational gradient was steepest in the age group of 34-39 years. In Latvia and Finland, urban men, and in all countries, urban women, were more often frequent drinkers. Frequent drinking was more common among non-married Lithuanian and Finnish men, and Finnish women.

Frequent drinking was more often reported by the non-natives than the native Estonian women. In Latvian men, the age gradient was steeper among non-natives than among natives. In Estonian men, the educational gradient was observed only among non-natives, where frequent drinking was most common among the low-educated.

5.4.2 Binge drinking

Binge drinking was more prevalent among men in all countries (Figure 5). Younger women reported more binge drinking than their older counterparts in all countries, but we found no consistent age gradient among men. Less-educated Estonian and Latvian men, and the less-educated women in all countries were more often binge drinkers (Table 9). In Estonian men, however, the difference between the low-educated and the higher-educated was statistically non-significant. Urban Finnish men and women, and urban Latvian women were more often binge drinkers than their less urban counterparts. Non-married Estonian men, and Finnish men and women were more often binge drinkers than the married. Non-native Estonian women reported also more binge drinking than the natives.

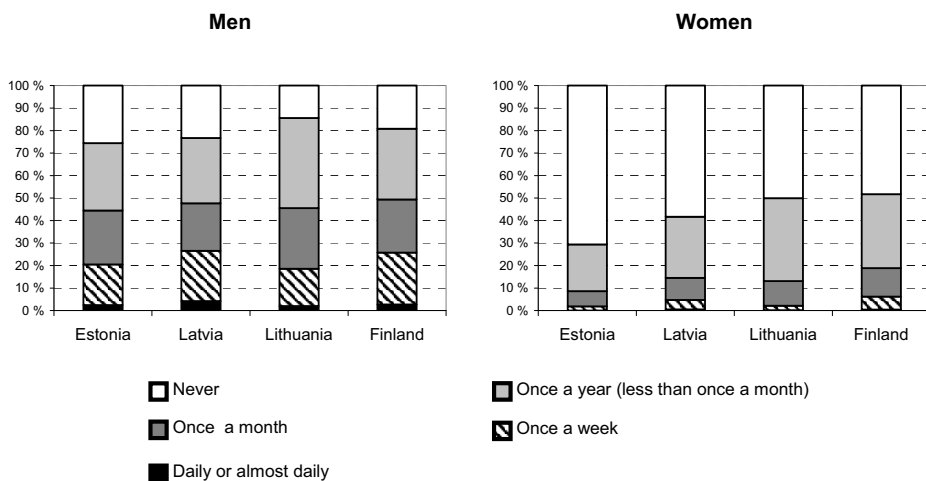


Figure 5. The frequency of binge drinking in Estonia, Latvia, Lithuania and Finland in 2000-2002

Table 9. Binge drinking* by education in 2000-2002. Odds ratios (OR) and their 95% confidence intervals (CI) adjusted for age, urbanisation and marital status

	Estonia	Latvia	Lithuania	Finland
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
men				
High	1.00	1.00	1.00	1.00
Intermediate	1.68 (1.11-2.54)	1.66 (1.20-2.29)	1.22 (0.92-1.61)	1.16 (0.94-1.42)
Low	1.66 (0.98-2.82)	1.75 (1.20-2.55)	1.06 (0.70-1.61)	1.07 (0.83-1.38)
women				
High	1.00	1.00	1.00	1.00
Intermediate	1.37 (0.89-2.09)	1.54 (1.14-2.09)	1.10 (0.84-1.45)	1.77 (1.44-2.17)
Low	2.09 (1.09-4.01)	2.05 (1.36-3.10)	1.60 (1.01-2.54)	1.61 (1.20-2.17)

*binge drinking: at least six portions per one occasion at least weekly among men and at least monthly among women

6 DISCUSSION

This study sought to provide systematic evidence on the social patterns-, and trends over time in health and health behaviours, i.e. smoking and drinking, in Estonia, Latvia and Lithuania in comparison to Finland in 1994-2004.

6.1 Main findings

Generally, the social patterning of health was similar among men and women, but men smoked and drank heavily considerably more than women in all countries.

Perceived health was worse in the Baltic countries than in Finland, but poor health was associated with older age and lower education in all countries studied. However, urbanization and marital status were not consistently related to health. The existing educational inequalities in health remained generally stable over time from 1994 to 2004. In the Baltic countries, however, improvement in perceived health was mainly found among the better educated men and women.

Smoking was associated with young age, lower education and distress in all countries. Among women smoking was also associated with urbanisation in all countries except Estonia. The educational gradient in smoking was weakest, and the overall prevalence of smoking increased over time among Lithuanian women.

Drinking was generally associated with young age among men and women, and with education among women. Better educated women were more often frequent drinkers and less educated binge drinkers. The exception was that in Latvian men and women both frequent drinking and binge drinking were associated with low education.

6.2 Methodological considerations

An advantage of this study was comparable and harmonised data from four neighbouring countries with unique opportunity for comparisons of trends over time. The data were, however, based on self-reported information, and therefore we did not have as precise indicators as in health examination studies. In addition a number of analytical choices were made that have to be taken into account in interpreting the results.

Firstly, the study was devoted to descriptive issues to a substantial degree because previous evidence from the studied area was limited. Another analytical choice was that education was used as a 'general proxy indicator' of socioeconomic status. This study cannot therefore quantify the contribution of income or occupation to the observed educational patterns. Further studies may address more elaborated questions about the causal pathways and further determinants underlying the basic social patterning analysed in this study.

Finally, this study concentrated mainly on comparisons of the patterning of relative differences instead of absolute differences. Theoretical reason for this was that relative measures can be considered more relevant in research seeking explanations, while absolute figures are crucial from health policy perspective. The practical reason for using relative indicators was that in international comparisons absolute levels may differ between populations due to various methodological reasons (Manderbacka, 1998).

6.3 The difference in average health status between the Baltic countries and Finland

A high prevalence of the average category of perceived health was found consistently in all three Baltic countries but not in Finland. Reasons for this may be linguistic, cultural or even political (Palosuo et al., 1998). For example it has been argued that it was beneficial during the communist regime to be 'normal' or 'average', and people may still be unwilling to use the extreme ends of scales in surveys (Kasmel et al., 2004; Pikhart, 2002).

Our results are consistent with previous evidence as overall prevalence of average perceived health varied between 50 % and 55 % in the Baltic countries during 1994 and 1999 (Monden, 2005). There is also previous evidence (Leinsalu, 2002) on the high prevalence of average perceived health in Estonia (men 51%, women 53%). Furthermore, in a study of seven post-communist countries (Bobak et al., 2000b), the overall prevalence of poor health varied between 12 and 16% in the Baltic countries, and these figures too, are close to our estimates.

A potential explanation for the difference between the Baltic countries and Finland in average perceived health is that the respondents perceive 'good' health as more than just lack of ill health. Therefore it is possible that the differences between the Baltic countries and Finland might reflect a gap in the general well-being. This was the case at least in the early 1990s, when perceived health and life control as well as economic satisfaction were worse in the Baltic countries than in Finland (Carlson, 1998).

As premature mortality is higher in the Baltic countries than in Finland one might have expected that it would also be visible for poor perceived health, diseases and symptoms. Our data indicated, however, mainly differences in good perceived health. A reason for the inconsistency between self-reported poor health and mortality may be that the external (Varnik et al., 2001) causes of

death are not reflected in our data. In addition, it may be that people's own health perceptions do not refer exactly to a similar physical health status in the Baltic countries and Finland. It has been found that age peers are an important point of reference for perceiving one's own health (Manderbacka, 1998). Mortality indicators may therefore be more sensitive to conditions among the marginal groups than morbidity indicators from surveys, which tend to reflect the health situation among the majority of the population (Leinsalu, 2004).

Thus, there may be a smaller gap in poor self-reported health than what is found for diseases or mortality because of different reporting due to social comparison. Similarly, our data may also underestimate differences between urban and rural areas. It may also be difficult to determine an ideal cut-off point for perceived health in the Baltic countries, but our findings suggest that the difference between good and average health may be more relevant than, for example, in Russia (Palosuo, 2000).

6.4 The importance of age

Age was consistently associated with all our studied outcomes in all countries. Age related worsening of perceived health is expected and found in many studies (Bobak et al., 2004a).

Age differences of smoking were less marked among men than in women, probably because smoking has traditionally been common among men. In contrast to an earlier study (Pudule et al., 1999) which found the highest levels of smoking in the intermediate age group of 35-49 years in both sexes, we observed smoking to be most common among women aged 20-34 years. This age gradient, which is also partly supported by a study on adolescent smoking (Nurk et al., 1999), suggests that a cohort effect will increase the overall prevalence of female smoking in the future if the proportion of quitters remains as low as in our study. The association between smoking and distress was also most consistent in the youngest age group in both Estonian men and Latvian and

Finnish women. This issue warrants further research, as it may have public health relevance if younger people react to psychological pressures by smoking.

As with other comparative studies on alcohol (McKee et al., 2000), age was the most consistent determinant across all countries studied and in both genders. In men, however, no consistent age differences existed in binge drinking, possibly indicating that this traditional habit remains popular among all male cohorts.

6.5 Consistent educational differences

Health problems related to low socioeconomic status usually cumulate in men in the post-communist countries, and therefore one might have expected to find a stronger association with education among men. However, this was not the case, as a statistically significant educational gradient was found even more consistently among women in all of the countries (Figure 6).

	Estonia		Latvia		Lithuania		Finland	
	men	women	men	women	men	women	men	women
Less than good health	↑	↑	↑	↑	↑	↑	↑	↑
Diseases		↑			↑	↑	↑	↑
Symptoms		↑		↑	↑	↑	↑	↑
Smoking	↑	↑	↑	↑	↑		↑	↑
Frequent drinking		↓		↑		↓	↓	↓
Binge drinking	↑	↑	↑	↑		↑		↑

↑ = more common with decreasing education empty = no association ↓ = less common with decreasing education

Figure 6. Summary of educational differences in health, smoking and drinking.

Overall, the educational gradient in perceived health was mainly similar across all studied countries and health outcomes but the most consistent patterns were found with less-than-good perceived health. Among Estonian men the educational gradient in health indicators was generally weakest even though one might have expected clear differences (Leinsalu et al., 2003b). The main message was, however, clear: lower educated men and women reported poorer health in all countries which has mainly been the case in earlier studies from the Baltic countries (Monden, 2005) as well as from Finland and other Nordic countries (Lahelma et al., 2002).

There are findings suggesting that a high level of education might be a stronger protective factor for health in a stable market economy (Finland) than in a post-communist society (Russia) (Palosuo, 2003). Our results from the Baltic countries did not support a differential effect of social stratification on health. In a more general view, they may be in line with the assumption of the relative advantage of education in times of transformation (Vodopivec, 2002).

The educational pattern of smoking was somewhat unclear, however. The reasons for the lack of clear-cut differences between those with low and intermediate education remain open. Possibly, people with intermediate education have resources and living conditions enabling smoking, but they lack the health-promoting behaviour typical of the highest educated.

Nevertheless, the main message from our results concerning smoking was clear: higher education was associated with less smoking in both sexes in all four countries, suggesting that in general the Baltic countries have similar educational differences in smoking as Finland and many North European countries (Giskes et al., 2005). None of the countries can therefore be classified as clearly 'premodern' with regard to the smoking epidemic (Lopez et al., 1994). We found also that persons with distress, except Latvian men, were more often smokers than those with no distress, particularly among women. Smoking being related to distress also in Lithuanian women may further support that it is not a habit of the better-off, although the educational gradient was not as consistent as in other studied countries.

The alcohol consumption gradient was consistent among men in Latvia, and to some extent in Estonia: the less-educated were more often heavy drinkers. This is in accordance with other surveys (Leinsalu et al., 2003a; Brigis, 2004) and follows the general message of mortality studies, which suggests that excessive alcohol consumption is more common among the less-educated (Varnik et al., 2001; Leinsalu et al., 2003b). The educational gradient among women in Estonia, Lithuania and Finland showed that while the better-educated were more likely to be frequent drinkers, the less-educated were more often binge drinkers, which follows the typical European drinking pattern particularly common in Northern Europe (Simpura, 1995). In Latvian women, however, the pattern resembled that of Latvian men, with the less-educated drinking more according to both measures.

Explanations for excessive drinking among the less-educated in Latvia include low price as well as illegal production and sale of alcohol (Goldmanis et al., 2003). However, these phenomena also exist in the other countries studied. One partial explanation for the consistent educational gradient among Latvian men only may be that the response rates were highest in Latvia and the difference between the respondents and non-respondents was probably smaller than in other countries studied. Previous surveys measuring weekly alcohol consumption among Baltic men (McKee et al., 2000), however, suggest less marked educational differences.

6.6 Inconsistent urban-rural differences

As with most other transition economies, the Baltic countries, especially Estonia and Latvia, have also faced difficulties with the privatization of agriculture. Therefore we expected that the multiple social changes and pressures might result in poorer health within the rural areas. However, we did not find a universal pattern, although health was somewhat poorer among rural Estonian and Latvian men and also Lithuanian men and women, which is also in line with previous evidence from Estonia (Leinsalu, 2004) and Lithuania (Grabauskas and Kalediene, 2002). The small differences between urban and rural areas can also be due to the fact that in our study we were able to adjust the figures for

education, which is not always possible in mortality studies. Indirect support is provided by a previous study with similar small urban-rural differences in perceived health in all Baltic countries except Estonia (Monden, 2005).

As in previous studies (Pudule et al., 1999; Parna et al., 2002), smoking was an urban habit among women in Latvia and Lithuania, but in Estonia urban-rural differences were less consistent. One suggested explanation is that the Estonian countryside is actually less 'rural' than in the other Baltic countries (Pudule et al., 1999). Female smoking may be related to traditional role expectations because urban women in all four countries tended also to drink more. In Finland especially, the differences were consistent, which agrees with previous evidence (Winter et al., 2002). Thus, there may be a challenge for health promotion if smoking and drinking are indeed associated with modern urban life styles among women.

6.7 Inconsistent marital status differences

Our results concerning marital status were somewhat mixed. It has been argued that 'neo-traditional' networks are of particular importance in the post-communist countries, especially for the health of men (Watson, 1995). Thus, health might be worse among non-married men in the Baltic countries, but we found indications of this only for poor perceived health, with no gender differences. However, it has been found that the prevalence of poor health in Lithuania is even lower among non-married men, possibly due to health problems accumulating among divorced men (Pikhart, 2002). This could lie behind our results too, but because of a limited number of divorced respondents we were unable to analyse them as a separate category.

The association of marital status with drinking was generally similar in all countries, as the non-married drank more. This was the case in Finland especially, while the association was less consistent in the Baltic countries. These results provided slight support, however, to the assumption that divorced men may be a group with increased health risks. For women, small differences between marital status groups in the Baltic countries may be partly due to that

our results were not adjusted for parenthood, which has been associated with women's drinking elsewhere (Ahlstrom et al., 2001).

6.8 Minor ethnic differences

There were no consistent differences in the sociodemographic patterning of health between the natives and the non-natives in Estonia and Latvia. Therefore, it is possible that the sociodemographic factors have broadly similar effects among key ethnic groups in these countries. However, all observed differences between ethnic groups were similar: health was worse among the non-natives. This is supported by another study in Estonia (Leinsalu, 2002) but from Latvia there is evidence on generally small ethnic difference (Monden, 2004).

Among Estonian men the only group with worsening trend in perceived health was the lowest educated non-natives. These tendencies lack statistical significance, but they are in line with previous evidence on employment (Vodopivec, 2002) and mortality (Leinsalu et al., 2004) suggesting that health disadvantage associated with low education may cumulate especially among non-native Estonian males. There is previous Baltic evidence that the economically inactive may become more disadvantaged even when the social variation remains generally stable (Monden, 2005). Direct interpretations may not exist, however, as the same study found ethnic differences in health only among Estonian women.

Ethnic differences in smoking and drinking were generally small and inconsistent and did not provide a firm basis for speculations of behavioural explanations to observed mortality patterns (Leinsalu et al., 2004). The general direction in our results was, however, that non-natives tended to smoke and drink more. In contrast to an earlier study we found ethnic differences in smoking among Latvian women (Pudule et al., 1999). From Estonia, however, there is earlier evidence on small ethnic differences in smoking (Parna et al., 2002). In Estonia non-native women drank more often than did the natives

which partly contrasts with an earlier survey (McKee et al., 2000), but agrees with ethnic differences in mortality due to alcohol (Leinsalu et al., 2004). For Estonian men a steeper educational gradient in frequent drinking existed among the non-natives, which agrees with the educational gradient found in alcohol-related mortality (Rahu et al., 2003).

6.9 Minor changes over time

A major result of this study was that the educational patterning of health remained surprisingly stable in both genders in the three Baltic countries experiencing numerous social changes as well in the more stable referent, Finland (Statistics-Lithuania, 2005; Vodopivec, 2002). This overall finding is in line with another comparative study (Monden, 2005). It may also be noted that the magnitude of the inequality, and inconsistencies in the trends of relative differences resembled generally those found in Western Europe and Nordic countries (Dalstra et al., 2002; Kunst et al., 2005; Lahelma et al., 2002). Additionally, there was no tendency of the intermediate educated group to have consistently similar trends with high or low educated, suggesting that no marked concentration of the social gradient in health took place over the studied years.

In Estonia, perceived health improved especially among the highest educated men, but otherwise we did not observe similar increases in inequalities according any health indicator in our study that would be comparable to the increases found in mortality inequalities (Leinsalu et al., 2003b; Leinsalu et al., 2004). Although the association of poor perceived health and mortality is generally consistent (Idler and Benyamini, 1997), the effects of social change on these measures may not be straightforward. For example, in Finland the association between unemployment and mortality weakened as the general unemployment rate increased during the recession in the early 1990s (Martikainen and Valkonen, 1996), and social patterning of perceived health remained rather stable (Lahelma et al., 1997).

The partly contrasting overall time trends by perceived health, diseases and symptoms is possibly due to the fact that they are measuring different domains of health. The number of diagnosed diseases can be partly related to functioning of health care system and awareness of the respondent. Therefore, increasing trends in diseases in Estonia and Latvia may not be considered simply an unfavourable development (Parfitt, 2004; Brown, 2004). A similar process may also take place in Lithuania, where reporting diseases decreased among the better educated women but increased among the less educated men (Aris, 2004).

Our general findings concerning Lithuania, i.e. that there was a decrease over time in ill health especially among the better educated women, correspond to the previous results on health behaviour (Grabauskas et al., 2005) and mortality. It has been found that increasing inequalities in mortality by education have occurred due to a declining mortality rate in people with higher education and conversely, an increasing mortality rate among the less educated. Mortality inequalities by education among females exceeded those among males in Lithuania (Kalediene and Petrauskiene, 2000; Kalediene and Petrauskiene, 2005)

Among Estonian women, and to some extent among men as well, the overall prevalence of smoking decreased slightly over time. Concerning the future it remains, however, an open question whether the Estonians are reaching a levelling-off stage in their smoking epidemic. In many EU-countries, the prevalence of smoking has steadily declined among men since the 1980s (Giskes et al., 2005), and in favourable conditions similar developments might also be seen in Estonia. Among Lithuanian women, in contrast, there may be an increase in smoking according to the general assumptions of the smoking epidemic framework (Lopez et al., 1994). In this vein, the Baltic countries may also face increasing social inequality in smoking, seen in many Western European countries. Moreover, social inequality in smoking will probably impact on women more than previously expected. The relative change should not, however, lead to forgetting that smoking remains highly prevalent among men in all Baltic countries and constitutes a major public health problem.

The possible contribution of drinking habits to the increasing educational differences in mortality (Leinsalu et al., 2003b) and the age and educational

gradients of drinking found in this study, call for further research on binge drinking with longer time trends. Moreover, other studies (McKee et al., 2000), support the consistent age gradient in binge drinking among women, where young women are more often binge drinkers, which may suggest an emerging trend (Zaborskis et al., 2006) in drinking habits. The time-trend data for binge drinking were short, but the increase over time in frequent drinking among women in all countries studied except Latvia may suggest change. The Finnish experience shows that drinking habits may change within a relatively short period of time (Simpura et al., 1995).

7 CONCLUSIONS

This study aimed to provide a novel evidence on the social basis of key public health issues in three post communist countries, Estonia, Latvia and Lithuania, by comparing them to a neighbouring stable market economy, Finland. The study period covered a decade from 1994 to 2004, characterised by a relative stabilisation since the worst conditions of the Baltic major social transition.

Generally our findings indicated that the Baltic countries resembled Western European countries rather than specific 'transition' societies. There was a substantial gap in perceived health compared to Finland, but the existing major social inequalities in health were very similar in all four countries studied. While health inequalities did not markedly change, substantial inequalities do remain, and in the Baltic countries there were indications of favourable developments mainly among the better educated.

Increasing health inequalities may therefore be visible in the future. This is supported also by our results on smoking. Estonia, Latvia and Finland, show characteristics more typical to the 'mature' phase of the smoking epidemic. The overall prevalence of smoking may not be increasing in these countries, whereas in Lithuania there may be pressures for women increasingly taking the smoking habit. Furthermore, smoking can be expected to be more unequally distributed in the future in all the studied countries.

The overall picture supports also the continuing power of traditional drinking habits in this part of North Eastern Europe. Thus frequent drinking and binge drinking are still much more common among men than women. However, in the future young and less-educated women should be included as a new target group for prevention of excessive drinking in all four countries studied.

The major challenge is now how to turn this evident health promotion potential into reality. This depends on political will and is largely out of researchers'

control. Scientific evidence, however, may serve in awakening consciousness among the decision makers. Therefore, a future task for the Finbalt project might be to move beyond description towards setting and promoting practical achievable targets for health promotion interventions and using regular surveys in their international evaluation. In this sense, the simple, cheap and feasible monitoring tool developed within North Karelia project (Puska et al., 1995) would be taken back again closer to its original purpose.

8 REFERENCES

- Aareleid, T., Leinsalu, M., Rahu, M. and Baburin, A., 1994. Lung cancer in Estonia in 1968-87: time trends and public health implications. *Eur J Cancer Prev.* 3, 419-425.
- Abel, T., 1991. Measuring health lifestyles in a comparative analysis: theoretical issues and empirical findings. *Soc Sci Med.* 32, 899-908.
- Ahlstrom, S., Bloomfield, K. and Knibbe, R., 2001. Gender Differences in Drinking Patterns in Nine European Countries: Descriptive Findings. *Subst Abus.* 22, 69-85.
- Ahven, A., 2003. Alcohol-related crime in Estonia. In *Baltic countries-Finland, Seminar on alcohol policy and crime*, Finnish National Council for Crime Prevention, Tallinn, Estonia, pp. 19-22.
- Allebeck, P., 2001. Alcohol policy in Europe. What can the European Union do? *Eur J Public Health.* 11, 1-3.
- Aris, B., 2004. Little by little. *Lancet.* 364, 745-748.
- Aromaa, A., Koskinen, S. and Huttunen, J. (Eds.), 1999. *Health in Finland*, Edita, Helsinki.
- Balabanova, D. and McKee, M., 1999. Patterns of alcohol consumption in Bulgaria. *Alcohol Alcohol.* 34, 622-628.
- Bobak, M., Hertzman, C., Skodova, Z. and Marmot, M., 2000a. Own education, current conditions, parental material circumstances, and risk of myocardial infarction in a former communist country. *J Epidemiol Community Health.* 54, 91-96.
- Bobak, M., Kristenson, M., Pikhart, H. and Marmot, M., 2004a. Life span and disability: a cross sectional comparison of Russian and Swedish community based data. *Bmj.* 329, 767. Epub 2004 Sep 17.
- Bobak, M. and Marmot, M., 1996. East-West mortality divide and its potential explanations: proposed research agenda. *Bmj.* 312, 421-425.
- Bobak, M., McKee, M., Rose, R. and Marmot, M., 1999. Alcohol consumption in a national sample of the Russian population. *Addiction.* 94, 857-866.

- Bobak, M., Pikhart, H., Rose, R., Hertzman, C. and Marmot, M., 2000b. Socioeconomic factors, material inequalities, and perceived control in self-rated health: cross-sectional data from seven post-communist countries. *Soc Sci Med.* 51, 1343-1350.
- Bobak, M., Room, R., Pikhart, H., Kubinova, R., Malyutina, S., Pajak, A., Kurilovitch, S., Topor, R., Nikitin, Y. and Marmot, M., 2004b. Contribution of drinking patterns to differences in rates of alcohol related problems between three urban populations. *J Epidemiol Community Health.* 58, 238-242.
- Bostrom, G., Hallqvist, J., Haglund, B. J., Romelsjo, A., Svanstrom, L. and Diderichsen, F., 1993. Socioeconomic differences in smoking in an urban Swedish population. The bias introduced by non-participation in a mailed questionnaire. *Scand J Soc Med.* 21, 77-82.
- Brigis, G. (Eds.), 2004. Analysis of population health survey. Health survey results of Latvian population in 2003. Central Statistical Bureau of Latvia, Riga.
- Brown, H., 2004. Looking to the future in Latvia. *Lancet.* 364, 2083-2086.
- Brown, P., 2002. Smoking increases among teenagers in eastern Europe. *Bmj.* 324, 442.
- Buivydaite, K., Domarkiene, S., Reklaitiene, R. and Tamosiunas, A., 2003. [The prevalence and trends of the smoking habits among middle-aged Kaunas population during 20 years and their relation with sociodemographic status]. *Medicina (Kaunas).* 39, 999-1006.
- Carlson, P., 1998. Self-perceived health in East and West Europe: another European health divide. *Soc Sci Med.* 46, 1355-1366.
- Cavelaars, A. E., Kunst, A. E., Geurts, J. J., Crialesi, R., Grotvedt, L., Helmert, U., Lahelma, E., Lundberg, O., Matheson, J., Mielck, A., Rasmussen, N. K., Regidor, E., do Rosario-Giraldes, M., Spuhler, T. and Mackenbach, J. P., 2000. Educational differences in smoking: international comparison. *Bmj.* 320, 1102-1107.
- Central-Statistical-Bureau-of-Latvia, 1998. Statistical yearbook of Latvia. BaltMedia, Riga.
- Chenet, L., Britton, A., Kalediene, R. and Petrauskiene, J., 2001. Daily variations in deaths in Lithuania: the possible contribution of binge drinking. *Int J Epidemiol.* 30, 743-748.

Cockerham, W. C., 1997. The social determinants of the decline of life expectancy in Russia and eastern Europe: a lifestyle explanation. *J Health Soc Behav.* 38, 117-130.

Cockerham, W. C., 2000. Health lifestyles in Russia. *Soc Sci Med.* 51, 1313-1324.

Cockerham, W. C., Snead, M. C. and Dewaal, D. F., 2002. Health lifestyles in Russia and the socialist heritage. *J Health Soc Behav.* 43, 42-55.

Dalstra, J. A., Kunst, A. E., Geurts, J. J., Frenken, F. J. and Mackenbach, J. P., 2002. Trends in socioeconomic health inequalities in the Netherlands, 1981-1999. *J Epidemiol Community Health.* 56, 927-934.

Domarkiene, S., Tamosiunas, A., Reklaitiene, R., Sidlauskiene, D., Jureniene, K., Margeviciene, L., Buivydaite, K. and Kazlauskaite, M., 2003. Trends in main cardiovascular risk factors among middle-aged Kaunas population between 1983 and 2002. *Medicina (Kaunas).* 39, 1193-1199.

Giskes, K., Kunst, A. E., Benach, J., Borrell, C., Costa, G., Dahl, E., Dalstra, J. A., Federico, B., Helmert, U., Judge, K., Lahelma, E., Moussa, K., Ostergren, P. O., Platt, S., Prattala, R., Rasmussen, N. K. and Mackenbach, J. P., 2005. Trends in smoking behaviour between 1985 and 2000 in nine European countries by education. *J Epidemiol Community Health.* 59, 395-401.

Goldmanis, M., Koroleva, I. and Lace, I., 2003. Drug abuse prevalence in Latvia. Chapter II Population survey. Narcology centre, Riga.

Grabauskas, V. and Kalediene, R., 2002. Tackling social inequality through the development of health policy in Lithuania. *Scand J Public Health. Suppl.* 12-19.

Grabauskas, V., Klumbiene, J., Petkeviciene, J., Katvickis, A., Satchkute, A., Helasoja, V., Paalanen, L. and Prattala, R., 2005. Health behaviour among Lithuanian adult population, 2004. Publications of the National Public Health Institute B4/2005, Helsinki.

Graham, H., 1996. Smoking prevalence among women in the European community 1950-1990. *Soc Sci Med.* 43, 243-254.

Harkin, A., Anderson, P. and Goos, C., 1997. Smoking, drinking and drug taking in the European Union. WHO, Copenhagen.

Haukkala, A., 2002. Depressive symptoms and hostility in relation to socioeconomic status, smoking cessation, and obesity. Academic Dissertation. Publications of the National Public Health Institute A14/2002, Helsinki.

Heistaro, S., Laatikainen, T., Vartiainen, E., Puska, P., Uutela, A., Pokusajeva, S. and Uhanov, M., 2001. Self-reported health in the Republic of Karelia, Russia and in north Karelia, Finland in 1992. *Eur J Public Health*. 11, 74-80.

Helakorpi, S., Patja, K., Prattala, R., Aro, A. and Uutela, A., 2002. Health and health behaviour among Finnish adult population, spring 2002. Publications of the National Public Health Institute B12/2002, Helsinki.

Helasoja, V., Prattala, R., Dregval, L., Pudule, I. and Kasmel, A., 2002. Late response and item nonresponse in the Finbalt Health Monitor survey. *Eur J Public Health*. 12, 117-123.

Hertzman, C., Kelly, S. and Bobak, M. (Eds.), 1996. East-West life expectancy gap in Europe: environmental and non-environmental determinants, Kluwer, Dordrecht.

Hetema, T., Keskimäki, I., Salomaa, V., Mahonen, M., Manderbacka, K. and Koskinen, S., 2004. Socioeconomic inequities in invasive cardiac procedures after first myocardial infarction in Finland in 1995. *J Clin Epidemiol*. 57, 301-308.

Hupkens, C., 1998. Social class differences in eating and drinking behaviour. An international study. Academic dissertation. University of Maastricht, Delft.

Idler, E. L. and Benyamini, Y., 1997. Self-rated health and mortality: a review of twenty-seven community studies. *J Health Soc Behav*. 38, 21-37.

Josing, M., 2003. Alcohol consumption and illegal alcohol market in Estonia. In *Baltic countries-Finland, Seminar on alcohol policy and crime*, Finnish National Council for Crime Prevention, Tallinn, Estonia, pp. 31-38.

Kalediene, R. and Petrauskiene, J., 2000. Inequalities in life expectancy in Lithuania by level of education. *Scand J Public Health*. 28, 4-9.

Kalediene, R. and Petrauskiene, J., 2005. Inequalities in mortality by education and socioeconomic transition in Lithuania: equal opportunities? *Public Health Journal of the Royal Institute of Public Health*. 119, 808-815.

Karisto, A., Prattala, R. and Berg, M. A. 1993. The good, the bad and the ugly. Differences and changes in health related lifestyles. In *Regulating markets - Regulating people. On food and nutrition policy* (Eds, Kjaernes, U., Holm, L., Ekstrom, M., Fusso, E. and Prättälä, R.) Novus, Oslo, pp. 185-204.

Kasmel, A., Helasoja, V., Lipand, A., Prattala, R., Klumbiene, J. and Pudule, I., 2004. Association between health behaviour and self-reported health in Estonia, Finland, Latvia and Lithuania. *Eur J Public Health*. 14, 32-36.

Kedaviciene, D. and Piliavecas, A., 2003. Alcohol, Alcohol policy and Crime in Lithuania. In *Baltic countries-Finland, Seminar on alcohol policy and crime*, Finnish National Council for Crime Prevention, Tallinn, Estonia, pp. 47-63.

Klumbiene, J., Petkeviciene, J., Tamosiunas, A., Plieskiene, A., Miseviciene, I. and Milasauskiene, Z., 2002. [Trends in the prevalence of risk factors of noncommunicable diseases during 1987-1999]. *Medicina (Kaunas)*. 38, 77-85.

Knibbe, R. A. and Bloomfield, K., 2001. Alcohol Consumption Estimates in Surveys in Europe: Comparability and Sensitivity for Gender Differences. *Subst Abus*. 22, 23-38.

Kunst, A. E., Bos, V., Lahelma, E., Bartley, M., Lissau, I., Regidor, E., Mielck, A., Cardano, M., Dalstra, J. A., Geurts, J. J., Helmert, U., Lennartsson, C., Ramm, J., Spadea, T., Stronegger, W. J. and Mackenbach, J. P., 2005. Trends in socioeconomic inequalities in self-assessed health in 10 European countries. *Int J Epidemiol*. 34, 306-308.

Kunst, A. E., Groenhouf, F., Borgan, J. K., Costa, G., Desplanques, G., Faggiano, F., Hemstrom, O., Martikainen, P., Vagero, D., Valkonen, T. and Mackenbach, J. P., 1998. Socio-economic inequalities in mortality. Methodological problems illustrated with three examples from Europe. *Rev Epidemiol Sante Publique*. 46, 467-479.

Laaksonen, M., Roos, E., Rahkonen, O., Martikainen, P. and Lahelma, E., 2005. Influence of material and behavioural factors on occupational class differences in health. *J Epidemiol Community Health*. 59, 163-169.

Laatikainen, T., Alho, H., Vartiainen, E., Jousilahti, P., Sillanaukee, P. and Puska, P., 2002. Self-reported alcohol consumption and association to carbohydrate-deficient transferrin and gamma-glutamyltransferase in a random sample of the general population in the Republic of Karelia, Russia and in North Karelia, Finland. *Alcohol Alcohol*. 37, 282-288.

Laatikainen, T., Manninen, L., Poikolainen, K. and Vartiainen, E., 2003. Increased mortality related to heavy alcohol intake pattern. *J Epidemiol Community Health*. 57, 379-384.

Laatikainen, T., Vartiainen, E. and Puska, P., 1999. Comparing smoking and smoking cessation process in the Republic of Karelia, Russia and North Karelia, Finland. *J Epidemiol Community Health*. 53, 528-534.

Lagerspetz, M. 1992. Estonia: Changing problems in a re-emerging state. In *Social problems around the Baltic sea*. NAD publication no. 21, Vol. 21 (Eds, Simpura, J. and Tigerstedt, C.) Nordic Council for Alcohol and Drug Research, Helsinki, pp. 23-37.

Lahelma, E., Kivela, K., Roos, E., Tuominen, T., Dahl, E., Diderichsen, F., Elstad, J. I., Lissau, I., Lundberg, O., Rahkonen, O., Rasmussen, N. K. and Yngwe, M. A., 2002. Analysing changes of health inequalities in the Nordic welfare states. *Soc Sci Med*. 55, 609-625.

Lahelma, E., Rahkonen, O. and Huuhka, M., 1997. Changes in the social patterning of health? The case of Finland 1986-1994. *Soc Sci Med*. 44, 789-799.

Leinsalu, M., 2002. Social variation in self-rated health in Estonia: a cross-sectional study. *Soc Sci Med*. 55, 847-861.

Leinsalu, M., 2004. Troubled transitions. Social variation and long-term trends in health and mortality in Estonia. Academic Dissertation. Centre for Health Equity Studies, Stockholm University/Karolinska Institutet in collaboration with Södertörns högskola. *Health Equity Studies*, no 2, Stockholm.

Leinsalu, M., Aluoja, A., Noorkoiv, R. and Vasar, V., 2003a. Socioeconomic inequalities in physical and mental health and some possible explanatory mechanisms. Project Report (In Estonian). National Research and Development Program in Public Health, Tallinn.

Leinsalu, M. and Rahu, M., 1993. Time trends in cancer mortality in Estonia, 1965-1989. *Int J Cancer*. 53, 914-918.

Leinsalu, M., Vagero, D. and Kunst, A. E., 2003b. Estonia 1989-2000: enormous increase in mortality differences by education. *Int J Epidemiol*. 32, 1081-1087.

Leinsalu, M., Vagero, D. and Kunst, A. E., 2004. Increasing ethnic differences in mortality in Estonia after the collapse of the Soviet Union. *J Epidemiol Community Health*. 58, 583-589.

Lemmens, P. H., 1994. The alcohol content of self-report and 'standard' drinks. *Addiction*. 89, 593-601.

Lopez, A. D., Collishaw, N. E. and Piha, T., 1994. A descriptive model of the cigarette epidemic in developed countries. *Tob Control*. 3, 242-247.

Luschen, G., Niemann, S. and Apelt, P., 1997. The integration of two health systems: social stratification, work and health in East and West Germany. *Soc Sci Med*. 44, 883-899.

Lynch, J. W., Kaplan, G. A. and Salonen, J. T., 1997. Why do poor people behave poorly? Variation in adult health behaviours and psychosocial characteristics by stages of the socioeconomic lifecourse. *Soc Sci Med*. 44, 809-819.

Macintyre, S., 1986. The patterning of health by social position in contemporary Britain: directions for sociological research. *Soc Sci Med*. 23, 393-415.

Macintyre, S., 1997. The Black Report and beyond: what are the issues? *Soc Sci Med*. 44, 723-745.

Mackenbach, J. P. and Bakker, M. (Eds.), 2002. *Reducing inequalities in health : a European perspective*, Routledge, London.

Mackenbach, J. P., Bos, V., Andersen, O., Cardano, M., Costa, G., Harding, S., Reid, A., Hemstrom, O., Valkonen, T. and Kunst, A. E., 2003. Widening socioeconomic inequalities in mortality in six Western European countries. *Int J Epidemiol*. 32, 830-837.

Mackenbach, J. P., Huisman, M., Andersen, O., Bopp, M., Borgan, J. K., Borrell, C., Costa, G., Deboosere, P., Donkin, A., Gadeyne, S., Minder, C., Regidor, E., Spadea, T., Valkonen, T. and Kunst, A. E., 2004. Inequalities in lung cancer mortality by the educational level in 10 European populations. *Eur J Cancer*. 40, 126-135.

Mackenbach, J. P. and Kunst, A. E., 1997. Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe. *Soc Sci Med*. 44, 757-771.

Mackenbach, J. P., Kunst, A. E., Cavelaars, A. E., Groenhof, F. and Geurts, J. J., 1997. Socioeconomic inequalities in morbidity and mortality in western Europe. The EU Working Group on Socioeconomic Inequalities in Health. *Lancet*. 349, 1655-1659.

Mackenbach, J. P., Kunst, A. E., Groenhof, F., Borgan, J. K., Costa, G., Faggiano, F., Jozan, P., Leinsalu, M., Martikainen, P., Rychtarikova, J. and Valkonen, T., 1999. Socioeconomic inequalities in mortality among women and among men: an international study. *Am J Public Health*. 89, 1800-1806.

Makara, P., 1994. Policy implications of differential health status in East and West Europe. The case of Hungary. *Soc Sci Med.* 39, 1295-1302.

Malyutina, S., Bobak, M., Kurilovitch, S., Gafarov, V., Simonova, G., Nikitin, Y. and Marmot, M., 2002. Relation between heavy and binge drinking and all-cause and cardiovascular mortality in Novosibirsk, Russia: a prospective cohort study. *Lancet.* 360, 1448-1454.

Manderbacka, K., 1998. Questions on survey questions on health. Academic Dissertation. University of Helsinki, Department of Sociology.

Manor, O., Matthews, S. and Power, C., 1997. Comparing measures of health inequality. *Soc Sci Med.* 45, 761-771.

Marmot, M., 1999. Epidemiology of socioeconomic status and health: are determinants within countries the same as between countries? *Ann N Y Acad Sci.* 896, 16-29.

Marmot, M. and Bobak, M., 2000. International comparators and poverty and health in Europe. *Bmj.* 321, 1124-1128.

Marmot, M. and Feeney, A., 1997. General explanations for social inequalities in health. *IARC Sci Publ.* 207-228.

Martikainen, P., Aromaa, A., Heliovaara, M., Klaukka, T., Knekt, P., Maatela, J. and Lahelma, E., 1999. Reliability of perceived health by sex and age. *Soc Sci Med.* 48, 1117-1122.

Martikainen, P., Kauppinen, T. M. and Valkonen, T., 2003. Effects of the characteristics of neighbourhoods and the characteristics of people on cause specific mortality: a register based follow up study of 252,000 men. *J Epidemiol Community Health.* 57, 210-217.

Martikainen, P. T. and Valkonen, T., 1996. Excess mortality of unemployed men and women during a period of rapidly increasing unemployment. *Lancet.* 348, 909-912.

McKee, M. and Jacobson, B., 2000. Public health in Europe. *Lancet.* 356, 665-670.

McKee, M., Pomerleau, J., Robertson, A., Pudule, I., Grinberga, D., Kadziauskiene, K., Abaravicius, A. and Vaask, S., 2000. Alcohol consumption in the Baltic Republics. *J Epidemiol Community Health.* 54, 361-366.

- McKee, M. and Shkolnikov, V., 2001. Understanding the toll of premature death among men in eastern Europe. *Bmj*. 323, 1051-1055.
- McQueen, D., 1987. A research programme in lifestyle and health: methodological and theoretical considerations. *Revue d'Epidemiologie et de Santé Publicue*. 35, 28-35.
- Meister, K. A., Whelan, E. M. and Kava, R., 2000. The health effects of moderate alcohol intake in humans: an epidemiologic review. *Crit Rev Clin Lab Sci*. 37, 261-296.
- Mikalkevicius, A. and Sinkunas, S. 1992. Ideology and alcohol problems in Lithuania. In *Social problems around the Baltic sea*. NAD publication no. 21., Vol. 21 (Eds, Simpura, J. and Tigerstedt, C.) Nordic Council for Alcohol and Drug Research, Helsinki, pp. 53-67.
- Monden, C., 2004. Socioeconomic health inequalities in Latvia: a cross-sectional study. *Scand J Public Health*. 32, 217-223.
- Monden, C. W., 2005. Changing social variations in self-assessed health in times of transition? The Baltic States 1994-1999. *Eur J Public Health*. 13, 13.
- Moskalewicz, J. and Simpura, J., 2000. The supply of alcoholic beverages in transitional conditions: the case of Central and Eastern Europe. *Addiction*. 95, S505-522.
- Murray, C. J., Gakidou, E. E. and Frenk, J., 1999. Health inequalities and social group differences: what should we measure? *Bull World Health Organ*. 77, 537-543.
- Mustonen, H. and Makela, K., 1999. Relationships between characteristics of drinking occasions and negative and positive experiences related to drinking. *Drug Alcohol Depend*. 56, 79-84.
- Nolte, E. and McKee, M., 2004. Changing health inequalities in east and west Germany since unification. *Soc Sci Med*. 58, 119-136.
- Nurk, E., Mittelmark, M. B., Suurorg, L., Tur, I. and Luiga, E., 1999. Trends in tobacco use among Estonian and Russian youth in Tallinn. *Scand J Public Health*. 27, 301-305.
- Palosuo, H., 2000. How good is 'normal' health? An exercise in Russian-Finnish comparative survey methodology. *The Finnish Review of East European Studies*. 7, 41-70.
- Palosuo, H., 2003. Health and well-being in Moscow and Helsinki. Academic Dissertation. STAKES Research report 129, Helsinki.

- Palosuo, H., 2000. Health-related lifestyles and alienation in Moscow and Helsinki. *Soc Sci Med.* 51, 1325-1341.
- Hokka, P., Palosuo, H., Zhuravleva, I., Parna, K., Mussalo-Rauhamaa, H. and Lakomova, N., 1999. Anxiety about environmental hazards among teenagers in Helsinki, Moscow and Tallinn. *Sci Total Environ.* 234, 95-107.
- Palosuo, H., Uutela, A., Zhuravleva, I. and Lakomova, N., 1998. Social patterning of ill health in Helsinki and Moscow: results from a comparative survey in 1991. *Soc Sci Med.* 46, 1121-1136.
- Parfitt, T., 2004. Estonian efficiency. *Lancet.* 364, 1475-1478.
- Parna, K., Rahu, K. and Rahu, M., 2002. Patterns of smoking in Estonia. *Addiction.* 97, 871-876.
- Pensola, T. H. and Valkonen, T., 2000. Mortality differences by parental social class from childhood to adulthood. *J Epidemiol Community Health.* 54, 525-529.
- Peto, R., Lopez, A., Boreham, J., Thun, M. and Heath, C., 1994. Mortality from smoking in developed countries 1950-2000. Oxford University Press, Oxford.
- Petrauskaite, R. and Gurevicius, R., 1996. Time trends in lung-cancer mortality rates among men in Lithuania, 1965-1994. *Int J Cancer.* 66, 294-296.
- Piha, T., Besselink, E. and Lopez, A. D., 1993. Tobacco or health. *World Health Stat Q.* 46, 188-194.
- Pikhart, H., 2002. Social and psychosocial determinants of self-rated health in Central and Eastern Europe. Kluwer Academic Publishers, Boston.
- Pikhart, H., Bobak, M., Siegrist, J., Pajak, A., Rywik, S., Kyshegyi, J., Gostautas, A., Skodova, Z. and Marmot, M., 2001. Psychosocial work characteristics and self rated health in four post-communist countries. *J Epidemiol Community Health.* 55, 624-630.
- Poikolainen, K., 1995. Alcohol and mortality: a review. *J Clin Epidemiol.* 48, 455-465.
- Poikolainen, K., Leppanen, K. and Vuori, E., 2002. Alcohol sales and fatal alcohol poisonings: a time-series analysis. *Addiction.* 97, 1037-1040.

- Poikolainen, K. and Simpura, J., 1983. One-year drinking history and mortality. *Prev Med.* 12, 709-714.
- Pomerleau, J., McKee, M., Robertson, A., Kadziauskiene, K., Abaravicius, A., Bartkeviciute, R., Vaask, S., Pudule, I. and Grinberga, D., 2001a. Dietary beliefs in the Baltic republics. *Public Health Nutr.* 4, 217-225.
- Pomerleau, J., McKee, M., Robertson, A., Kadziauskiene, K., Abaravicius, A., Vaask, S., Pudule, I. and Grinberga, D., 2001b. Macronutrient and food intake in the Baltic republics. *Eur J Clin Nutr.* 55, 200-207.
- Pomerleau, J., McKee, M., Robertson, A., Vaask, S., Kadziauskiene, K., Abaravicius, A., Bartkeviciute, R., Pudule, I. and Grinberga, D., 2000a. Physical inactivity in the Baltic countries. *Prev Med.* 31, 665-672.
- Pomerleau, J., McKee, M., Robertson, A., Vaask, S., Pudule, I., Grinberga, D., Abaravicius, A. and Bartkeviciute, R., 2002. Food security in the Baltic Republics. *Public Health Nutr.* 5, 397-404.
- Pomerleau, J., Pudule, I., Grinberga, D., Kadziauskiene, K., Abaravicius, A., Bartkeviciute, R., Vaask, S., Robertson, A. and McKee, M., 2000b. Patterns of body weight in the Baltic Republics. *Public Health Nutr.* 3, 3-10.
- Prattala, R., Helasoja, V. and Finbalt, g. 2003a. Finbalt Health Monitor, Monitoring health behaviour in Finland and the Baltic countries. In *Global Behavioural Risk Factor Surveillance* (Eds, McQueen, D. and Puska, P.) Kluwer Academic/Plenum Publishers, New York, pp. 57-72.
- Prattala, R. S., Groth, M. V., Oltersdorf, U. S., Roos, G. M., Sekula, W. and Tuomainen, H. M., 2003b. Use of butter and cheese in 10 European countries: a case of contrasting educational differences. *Eur J Public Health.* 13, 124-132.
- Pudule, I., Grinberga, D., Kadziauskiene, K., Abaravicius, A., Vaask, S., Robertson, A. and McKee, M., 1999. Patterns of smoking in the Baltic Republics. *J Epidemiol Community Health.* 53, 277-282.
- Puska, P. 1997. Smoking in Central & Eastern Europe. In *Smoke free Europe: A forum for networks*(Eds, Waller, M. and Lipponen, S.) Finnish Centre for Health Promotion, Helsinki, pp. 138-145.
- Puska, P., Helasoja, V., Prattala, R., Kasmel, A. and Klumbiene, J., 2003. Health behaviour in Estonia, Finland and Lithuania 1994-1998. Standardized comparison. *Eur J Public Health.* 13, 11-17.

Puska, P., Tuomilehto, J., Nissinen, A. and Vartiainen, E. (Eds.), 1995. The North Karelia Project: 20 year results and experiences, National Public Health Institute, Helsinki.

Rahu, M., Rahu, K., Baburin, A. and Leon, D., 2003. Educational differences in alcohol-related mortality in Estonia: do we need to know it? *Eesti Arst.* 82, 85-92.

Regaliene, G., Jatuliene, N., Paukstyte, I., Samuseva, J., Taskuniene, V., Bagdonas, V. and Varvuolis, A., 2002. [Prevalence of health affecting behavior factors among the population of Northern Lithuania]. *Medicina (Kaunas).* 38, 214-222.

Roos, G., Johansson, L., Kasmel, A., Klumbiene, J. and Prattala, R., 2001. Disparities in vegetable and fruit consumption: European cases from the north to the south. *Public Health Nutr.* 4, 35-43.

Seps, D. 1992. Alcohol problems in the Latvian cultural and political context. In *Social problems around the Baltic sea*. NAD publication no. 21., Vol. 21 (Eds, Simpura, J. and Tigerstedt, C.) Nordic Council for Alcohol and Drug Research, Helsinki, pp. 39-52.

Shkolnikov, V. M., Leon, D. A., Adamets, S., Andreev, E. and Deev, A., 1998. Educational level and adult mortality in Russia: an analysis of routine data 1979 to 1994. *Soc Sci Med.* 47, 357-369.

Siegrist, J., 2000. Place, social exchange and health: proposed sociological framework. *Soc Sci Med.* 51, 1283-1293.

Siegrist, J. and Marmot, M., 2004. Health inequalities and the psychosocial environment-two scientific challenges. *Soc Sci Med.* 58, 1463-1473.

Silventoinen, K. and Lahelma, E., 2002. Health inequalities by education and age in four Nordic countries, 1986 and 1994. *J Epidemiol Community Health.* 56, 253-258.

Simpura, J., 1995. Alcohol in eastern Europe: market prospects, prevention puzzles. *Addiction.* 90, 467-470.

Simpura, J., 1997. Alcohol and European transformation. *Addiction.* 92, S33-S41.

Simpura, J., Paakkanen, P. and Mustonen, H., 1995. New beverages, new drinking contexts? Signs of modernization in Finnish drinking habits from 1984 to 1992, compared with trends in the European Community. *Addiction.* 90, 673-683.

Simpura, J., Tigerstedt, C., Hanhinen, S., Lagerspetz, M., Leifman, H., Moskalewicz, J. and Torronen, J., 1999. Alcohol misuse as a health and social issue in the Baltic Sea region. A summary of findings from the Baltica Study. *Alcohol Alcohol.* 34, 805-823.

SPSS-inc., 1990. *SPSS Reference Guide.* SPSS-inc., USA.

Stakes, 2000. *Taskumatti 2000, Tilastotietoa alkoholista ja huumeista (Statistical information on alcohol and drugs, in Finnish).* Stakes, Helsinki.

Statistical-office-of-Estonia, 1999. *Statistical Yearbook of Estonia.* The Tallinn Book Printers Ltd., Tallinn.

Statistics-Finland, 1997. *Statistical yearbook of Finland.* Karisto, Hameenlinna.

Statistics-Finland, 2003. *Statistical Yearbook of Finland.* SDC Finland OY.

Statistics-Lithuania, 1999. *Statistical yearbook of Lithuania 1999.* Methodical Publishing Centre, Vilnius.

Statistics-Lithuania, 2005. *Statistical Yearbook of Lithuania 2004.* Methodical Publishing Centre, Vilnius.

Townsend, P., Davidson, N. and Whitehead, M. (Eds.), 1988. *Inequalities in Health. The Black Report & The Health Divide.*, Penguin Books, London.

Vagero, D. and Illsley, R., 1995. Explaining the difference. Beyond Black and Barker. A critical review of some issues in the decade following the Black Report. *European Sociological Review.* 11, 1-23.

Waller, J. L., Addy, C. L., Jackson, K. L. and Garrison, C. Z., 1994. Confidence intervals for weighted proportions. *Stat Med.* 13, 1071-1082.

Varnik, A., Wasserman, D., Palo, E. and Tooding, L. M., 2001. Registration of external causes of death in the Baltic States 1970-1997. *Eur J Public Health.* 11, 84-88.

Watson, P., 1995. Explaining rising mortality among men in eastern Europe. *Soc Sci Med.* 41, 923-934.

WHO, 2003. HFA-DB, Health for all database. WHO Regional office for Europe, Copenhagen, (<http://www.euro.who.int/hfad>).

Winter, T., Karvonen, S. and Rose, R. J., 2002. Does religiousness explain regional differences in alcohol use in Finland? *Alcohol Alcohol*. 37, 330-339.

Vodopivec, M., 2002. Worker reallocation during Estonia's transition to market. *International Journal of Manpower*. 23, 77-97.

Zaborskis, A., Sumskas, L., Maser, M. and Pudule, I., 2006. Trends in drinking habits among adolescents in the Baltic countries over the period of transition: HBSC survey results, 1993-2002. *BMC Public Health*. 6, 67.

Zvidrins, P. and Krumins, J., 1993. Morbidity and mortality in Estonia, Latvia and Lithuania in the 1980's. *Scand J Soc Med*. 21, 150-158.