Original Research


A. Baburin a,b,*, T. Lai c, M. Leinsalu d,e

a Department of Epidemiology and Biostatistics, National Institute for Health Development, Tallinn, Estonia
b Tampere School of Public Health, University of Tampere, Tampere, Finland
c Department of Public Health, University of Tartu, Estonia
d Stockholm Centre on Health of Societies in Transition, Södertörn University, Huddinge, Sweden
e Centre for Health Equity Studies, Stockholm University/Karolinska Institutet, Stockholm, Sweden

ARTICLE INFO

Article history:
Received 9 August 2010
Received in revised form 14 June 2011
Accepted 9 September 2011
Available online 20 October 2011

Keywords:
Avoidable deaths
Ethnic minorities
Social inequalities
Alcohol and health
Eastern Europe

SUMMARY

Objectives: A considerable increase in social inequalities in mortality was observed in Eastern Europe during the post-communist transition. This study evaluated the contribution of avoidable causes of death to the difference in life expectancy between Estonians and non-Estonians in Estonia.

Study design: Descriptive study.

Methods: Temporary life expectancy (TLE) was calculated for Estonian and non-Estonian men and women aged 0–74 years in 2005–2007. The ethnic TLE gap was decomposed by age and cause of death (classified as preventable or treatable).

Results: The TLE of non-Estonian men was 3.53 years less than that of Estonian men, and the TLE of non-Estonian women was 1.36 years less than that of Estonian women. Preventable causes of death contributed 2.19 years to the gap for men and 0.78 years to the gap for women, while treatable causes contributed 0.67 and 0.33 years, respectively. Cardiovascular and respiratory conditions were the major treatable causes of death, with ischaemic heart disease alone contributing 0.29 and 0.08 years to the gap for men and women, respectively. Conditions related to alcohol and substance use represented the largest proportion of preventable causes of death.

Conclusions: Inequalities in health behaviours underlie the ethnic TLE gap in Estonia, rather than inequalities in access to health care or the quality of health care. Public health interventions should prioritize primary prevention aimed at alcohol and substance use, and should be implemented in conjunction with wider social policy measures.

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Introduction

The concept of avoidable mortality originates from the work of Rutstein et al. who introduced this notion as a marker of the quality of medical care.1 The concept relies on routinely-collected mortality data to monitor deaths that are held to be preventable at the time of their occurrence.2–4 A distinction is often made between causes that are treatable and those that are preventable by intersectoral health policies.1,3,5,6

The mortality gap between Eastern and Western Europe has been well documented,7,8 and it has been suggested that treatable conditions may be one of the possible explanations for this gap.9 In Western Europe, mortality from treatable causes of death has been decreasing steadily over the past 50 years, while in Eastern Europe, the decline has been slower and has been counterbalanced by the increasing mortality from non-treatable causes.10,11 In the former Soviet republics, mortality rates from treatable causes did not show any decline between the 1960s and the 1980s.12 The subsequent increase in mortality rates from treatable causes in the early 1990s highlighted the declining quality of health care after the collapse of the old system.12 Since the mid-1990s, mortality rates from treatable causes have been decreasing in the Baltic countries, but reversed in Russia in 1998.12,13

In Estonia, average life expectancy at birth has increased steadily since 1994, and reached 67.3 years for men and 78.1 years for women in 2005.14 Although this suggests some progress in population health, the gain in life expectancy has not been equal for everyone and there are large gaps in mortality rates between genders, educational levels and ethnic groups.15–17 In 2000, educational inequalities in mortality were considerably greater in Eastern Europe (including the Baltic countries) than in Western Europe.18 Part of this variation has been attributed to treatable causes of death.19,19 In Estonia, these causes (mainly infectious diseases and cardiorespiratory conditions) explain approximately one-quarter of the difference in life expectancy between high- and low-educated groups aged 35–69 years.18 The extent to which avoidable causes of death can explain the inequalities in mortality found across other social dimensions in Estonia is not clear.

Previous research in Estonia has shown that, in 2000, Russian men and women had considerably lower life expectancies than Estonians.16 This study aimed to evaluate the contribution of avoidable causes of death to the mortality differences between Estonians and non-Estonians, the latter group comprising largely Russian-speaking ethnic minorities. The more specific aims were:

• to estimate the contribution of avoidable deaths to the difference in life expectancy between Estonians and non-Estonians;
• to determine which preventable and which treatable causes of death make the greatest contribution to this difference.

Ethnic differences in avoidable mortality can indicate the optimal way to implement public health resources and plan health services in order to reduce inequalities in health.

Methods

Data

Population and cause-specific mortality data by age, gender and ethnic group were obtained from Statistics Estonia for 2005–2007. Three-year data were combined to reduce the yearly effect of small numbers of deaths. Official population data for the intercensal period are extrapolated on the basis of the 2000 Census and the net natural increase. Due to the larger outmigration, approximately equal among Estonians and non-Estonians, the total population decreased by approximately 1% in 2000–2007.20 As migration is not covered in the population accounts, the population data are slightly overestimated. Consequently, this may have resulted in some underestimation of mortality rates, although this will only have had a marginal effect, if any, on ethnic differences in mortality. Population data are only available separately for ethnic Estonians.14 As such, in order to obtain population estimates for non-Estonians, the number of Estonians was subtracted from the total population in each age group. In Estonian vital statistics, ethnicity relies on the person’s self-identification, reported either by the person themselves (at census) or by relatives (in case of death). Estonians form the majority (67.9%) of the 1.3 million population, with Russians being the second largest group (25.7%), followed by Ukrainians (2.1%) and Belarusians (1.3%).21

The 10th Revision of the International Statistical Classification of Diseases22 has been used in Estonia since 1997. The selection of avoidable causes of death was based on the lists developed by Nolte and McKee (2004),4 and Page et al. (2006),4 and consisted of 53 items (Table 1). These causes of death were further divided into preventable (19 items) and treatable conditions (34 items). Preventable causes of death can be avoided by means of intersectoral policies and activities that target lifestyle and health behaviours. Deaths from treatable causes, on the other hand, can be avoided by clinical intervention, early detection and/or effective treatment even if the disorder has already developed.6 However, the distinction between these groups is not always explicit and it may change as an impact of medical innovations on mortality. For example, medical treatment and primary prevention are both relevant to avoiding deaths from ischaemic heart disease and melanoma of the skin.6,23 These were categorized as treatable causes of death. All other causes were combined under non-avoidable conditions.

This analysis was restricted to the population aged 0–74 years because it is more difficult to determine a single cause of death and classify the death as preventable or treatable in older people.2,5

Analysis

All analyses were performed separately for men and women. For descriptive purposes, age-standardized mortality rates were calculated for each cause of death using direct standardization with 5-year age groups and the European standard population.24 Abridged life tables were first calculated using Chiang’s method.25 Next, the temporary life expectancy (TLE)
Table 1 – Age-standardized mortality rates (ASMR) per 100,000 for avoidable causes of death among Estonian and non-Estonian men and women aged 0–74 years in Estonia, 2005–2007.

<table>
<thead>
<tr>
<th>Causes of death</th>
<th>ICD-10 code</th>
<th>ASMR per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>All deaths</td>
<td>1076.7</td>
<td>1367.2</td>
</tr>
<tr>
<td>Preventable causes of death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis</td>
<td>358.4</td>
<td>505.7</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Cancer of lip, oral cavity and pharynx</td>
<td>12.4</td>
<td>14.8</td>
</tr>
<tr>
<td>Cancer of oesophagus</td>
<td>7.6</td>
<td>6.9</td>
</tr>
<tr>
<td>Cancer of stomach</td>
<td>22.5</td>
<td>37.8</td>
</tr>
<tr>
<td>Cancer of liver</td>
<td>6.0</td>
<td>6.2</td>
</tr>
<tr>
<td>Cancer of lung</td>
<td>79.3</td>
<td>86.2</td>
</tr>
<tr>
<td>Alcohol-related diseases</td>
<td>65.7</td>
<td>91.3</td>
</tr>
<tr>
<td>Intestinal infections</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>6.5</td>
<td>11.1</td>
</tr>
<tr>
<td>Whooping cough</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Septicaemia</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Cancer of colon and rectum</td>
<td>21.5</td>
<td>28.7</td>
</tr>
<tr>
<td>Melanoma of skin</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Cancer of skin</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Cancer of breast</td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Cancer of cervix uteri</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Cancer of uterus</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Cancer of testis</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>Cancer of bladder</td>
<td>6.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Cancer of thyroid</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Hodgkin’s disease</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>8.4</td>
<td>5.8</td>
</tr>
<tr>
<td>Diseases of the thyroid</td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>12.9</td>
<td>12.7</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>8.3</td>
<td>5.0</td>
</tr>
<tr>
<td>Chronic rheumatic heart disease</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Hypertensive disease</td>
<td>42.0</td>
<td>45.1</td>
</tr>
<tr>
<td>Ischaemic heart disease</td>
<td>217.0</td>
<td>278.2</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>85.9</td>
<td>103.9</td>
</tr>
<tr>
<td>Chronic respiratory diseases</td>
<td>25.0</td>
<td>28.0</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>14.3</td>
<td>27.1</td>
</tr>
<tr>
<td>Peptic ulcer</td>
<td>6.3</td>
<td>9.0</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Abdominal hernia</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Cholelithiasis and cholecystitis</td>
<td>0.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Nephritis and nephrosis</td>
<td>0.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Obstructive uropathy</td>
<td>2.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Maternal death</td>
<td>0.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Perinatal deaths</td>
<td>1.7</td>
<td>2.1</td>
</tr>
</tbody>
</table>
from birth to 75th birthday was calculated for both ethnic groups. Using Arriaga’s formula, the differences in TLE between ethnic groups were decomposed by age\textsuperscript{26} and by cause of death.\textsuperscript{27}

All analyses were performed using Microsoft Excel. A spreadsheet template provided by the UK Office for National Statistics was used for life-table calculations.\textsuperscript{28}

### Results

Overall, 26,968 deaths were reported in the population aged 0–74 years in 2005–2007, with 8451 deaths classified as preventable and 12,459 deaths classified as treatable. Age-standardized mortality rates were higher among non-Estonian men and women for both preventable and treatable causes of death (Table 1). The difference in TLE\textsubscript{0–74} between Estonians and non-Estonians was 3.53 years for men and 1.36 years for women, with Estonians living longer in both cases (Table 2). The largest contribution to the total male TLE gap (2.07 years, i.e. 58.8\%) came from those aged 20–65 years, followed by ischaemic heart disease (0.29 years), chronic respiratory diseases (0.06 years) and pneumonia (0.16 years), cerebrovascular disease (0.14 years), accidental poisonings (0.11 years) and chronic liver disease (0.08 years).

For women, the most important preventable causes of death were alcohol-related diseases (0.24 years), HIV/AIDS (0.14 years), accidental poisonings (0.11 years), homicide (0.08 years) and chronic liver disease (0.08 years).

The treatable cause of death with the greatest impact on the male TLE gap was ischaemic heart disease (0.29 years), followed by pneumonia (0.16 years), cerebrovascular disease (0.10 years), chronic respiratory diseases (0.06 years) and suicide (0.06 years).

### Table 1 – Contribution of individual causes of death to the TLE gap in years (%)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Contribution of preventable causes to the TLE gap by age group in years (%)</th>
<th>Contribution of treatable causes to the TLE gap by age group in years (%)</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–1</td>
<td>0.10 (2.8)</td>
<td>0.10 (2.0)</td>
<td>0.02 (1.3)</td>
<td>0.01 (1.2)</td>
</tr>
<tr>
<td>1–4</td>
<td>0.03 (0.9)</td>
<td>0.03 (1.4)</td>
<td>0.01 (1.3)</td>
<td>0.02 (1.2)</td>
</tr>
<tr>
<td>5–9</td>
<td>0.02 (0.7)</td>
<td>0.01 (0.5)</td>
<td>0.00 (0.0)</td>
<td>0.00 (0.0)</td>
</tr>
<tr>
<td>10–14</td>
<td>0.01 (0.2)</td>
<td>0.00 (0.0)</td>
<td>0.00 (0.0)</td>
<td>0.00 (0.0)</td>
</tr>
<tr>
<td>15–19</td>
<td>0.04 (1.2)</td>
<td>0.04 (1.8)</td>
<td>0.00 (0.0)</td>
<td>0.00 (0.0)</td>
</tr>
<tr>
<td>20–24</td>
<td>0.11 (7.7)</td>
<td>0.16 (13.6)</td>
<td>0.01 (1.5)</td>
<td>0.01 (1.5)</td>
</tr>
<tr>
<td>25–29</td>
<td>0.22 (22.2)</td>
<td>0.29 (26.9)</td>
<td>0.05 (7.5)</td>
<td>0.05 (7.5)</td>
</tr>
<tr>
<td>30–34</td>
<td>0.42 (12.2)</td>
<td>0.45 (14.4)</td>
<td>0.07 (10.4)</td>
<td>0.07 (10.4)</td>
</tr>
<tr>
<td>35–39</td>
<td>0.42 (12.2)</td>
<td>0.31 (14.1)</td>
<td>0.03 (4.5)</td>
<td>0.03 (4.5)</td>
</tr>
<tr>
<td>40–44</td>
<td>0.23 (6.4)</td>
<td>0.13 (6.0)</td>
<td>0.06 (9.0)</td>
<td>0.06 (9.0)</td>
</tr>
<tr>
<td>45–49</td>
<td>0.24 (6.8)</td>
<td>0.14 (6.4)</td>
<td>0.07 (10.4)</td>
<td>0.07 (10.4)</td>
</tr>
<tr>
<td>50–54</td>
<td>0.27 (7.8)</td>
<td>0.13 (5.8)</td>
<td>0.09 (13.4)</td>
<td>0.09 (13.4)</td>
</tr>
<tr>
<td>55–59</td>
<td>0.20 (5.7)</td>
<td>0.10 (4.5)</td>
<td>0.11 (16.4)</td>
<td>0.11 (16.4)</td>
</tr>
<tr>
<td>60–64</td>
<td>0.15 (4.3)</td>
<td>0.05 (2.2)</td>
<td>0.08 (11.9)</td>
<td>0.08 (11.9)</td>
</tr>
<tr>
<td>65–69</td>
<td>0.13 (3.2)</td>
<td>0.03 (1.4)</td>
<td>0.08 (11.9)</td>
<td>0.08 (11.9)</td>
</tr>
<tr>
<td>70–74</td>
<td>0.04 (1.2)</td>
<td>0.01 (0.3)</td>
<td>0.03 (4.5)</td>
<td>0.03 (4.5)</td>
</tr>
<tr>
<td>Total</td>
<td>–3.53 (100)</td>
<td>–2.19 (100)</td>
<td>–0.67 (100)</td>
<td>–0.67 (100)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Causes of death</th>
<th>ICD-10 code</th>
<th>ASMR per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Misadventures to patients during surgical and medical care</td>
<td>Y60–Y69, Y83–Y84</td>
<td>0.2</td>
</tr>
</tbody>
</table>

\(\text{Total} = \frac{\text{Total number of deaths}}{\text{Total population}}\)
tuberculosis (0.05 years). Cerebrovascular and ischaemic heart
disease had the greatest impact on the female TLE gap (0.09
and 0.08 years respectively), while pneumonia contributed
0.05 years and chronic respiratory diseases contributed 0.04
years.

In 2005–2007, very few avoidable causes of death were
more common among Estonians than Russians, and the
ethnic TLE gap narrowed somewhat. These causes reduced the
TLE gap by 0.14 years for men (preventable 0.06 and
treatable 0.08) and 0.16 years for women (preventable 0.05 and
treatable 0.11). The largest contribution to the narrowing of
the male TLE gap was made by road traffic accidents (0.05
years); among women, lung cancer (0.03 years), birth defects (0.03 years), leukaemia (0.03 years)
and epilepsy (0.01 years) made the largest contribution.

Discussion

The results show that in 2005–2007, non-Estonian men ex-
pected to live, on average, 3.53 years less than Estonian men
between birth and 75 years of age, with the difference
between non-Estonian and Estonian women being 1.36 years.
The greatest differences in TLE were found among those aged
>20 years. Avoidable causes of death accounted for more
than 80% of total ethnic TLE differences. Preventable causes
of death contributed approximately three times more than
treatable causes of death to the male ethnic TLE gap, and
about two times more for the female gap. Cardiorespiratory
conditions were the major treatable causes of death, with
ischaemic heart disease alone contributing approximately 8%
and 6% to the total TLE gap, respectively, for men and
women. Conditions related to alcohol and substance use
represented the greatest proportion of preventable causes of
death.

Methodological considerations

In unlinked cross-sectional studies, results may be biased if
the mortality database and the population database do not
 correspond in terms of data coverage, reporting or classifica-
tion. This type of bias may lead to under- or overestimation of
the studied associations.29,30 In the 2000 Census, the propor-
tion of the population with unknown ethnicity was 0.6%.21 By

Fig. 1 – Contribution of selected causes of death to the difference in temporary life expectancy between Estonians and non-
adding the population with unknown ethnicity to the group of non-Estonians, the population denominators for this group may have been overestimated. The proportion of deaths with unknown ethnicity was 0.2% in 2005–2007. These cases were added to the deaths of non-Estonians in the respective age groups, thus counterbalancing the effect of overestimating the denominators. By classifying all non-Estonians into one group, the potential misclassification bias resulting from the difficulties of ethnic identification, chiefly of the Russian-speaking ethnic minorities, were minimized. If anything, the ethnic differences in TLE may have been underestimated.

In the 2000 Census, the educational distribution was fairly similar for Russians and Estonians aged ≥40 years. However, in the population aged 25–39 years, the proportion of those with a university education was considerably lower among Russian men. Therefore, the high contribution of men aged 20–39 years to the TLE gap between Estonian and non-Estonians in this study may reflect, in part, the lower educational level of the latter group.

Another important distinction is that 93% of Russians but only 56% of Estonians live in the cities. Rural/urban residence may affect the accessibility of medical care, especially specialist care, and may also affect lifestyle and health behaviours, thus influencing the causal associations.

**Interpretation of the results for preventable causes of death**

The greater contribution of preventable than treatable causes of death to the difference in TLE is explained, to some extent, by the younger age at which most of these deaths occur: younger age groups contribute more to overall life expectancy. A closer inspection of single preventable causes of death shows that alcohol plays a major role in explaining the ethnic TLE gap. Causes of death directly linked to heavy drinking, including alcohol poisoning (69% of all accidental poisonings), contributed approximately 24% to the total male and female ethnic TLE gap in the population aged 0–74 years. In addition, much of the mortality from chronic liver disease and oesophageal cancer, and external causes of death such as homicide, suicide, falls, fires and drowning, have been attributed to alcohol, and all these contributed to the ethnic TLE gap in this study.

Alcohol is an important causal factor of premature mortality in Eastern Europe, particularly Russia. Mortality rates from alcohol poisoning have been considerably higher in Russia over the last 30 years compared with the Baltic countries, Ukraine and Belarus. The only exception was in the mid-1980s, when mortality rates fell faster in Russia as a response to Gorbachev’s anti-alcohol campaign. The origins of hazardous drinking in Russia go back to Tsarist Russia, and are thus a deeply rooted cultural phenomenon. Russian-speaking minorities in Estonia are mostly post-war migrants or their descendants who may have maintained Russian drinking traditions even over generations. In addition, non-Estonians have found it difficult to adapt to the new political and economic order because of their ‘new’ minority status and their higher economic insecurity, thus aggravating their already harmful drinking patterns. The higher prevalence of depression among non-Estonians could also underlie their higher suicide rate in 2005–2007.

Differences in preventable cancer mortality are likely to be explained by factors from earlier life. According to the 2000 Census, 48% of all non-Estonians were foreign born, suggesting an even higher proportion among older birth cohorts. The different living standards in Estonia and Russia before World War II may explain the higher mortality from stomach cancer among non-Estonians, as stomach cancer has been related to infection with *Helicobacter pylori* in childhood as a result of poor living conditions and poverty. The differences in lung cancer mortality in 2005–2007 may reflect differences in the smoking epidemic between Estonia and Russia, with the epidemic starting later in Russia than in Estonia, and thus probably explaining the higher lung cancer mortality among Estonian women in this study. The prevalence of smoking among men is much higher in Russia than in Estonia, thus explaining the higher lung cancer mortality among non-Estonians.

Unlike other preventable deaths, HIV-related deaths in Estonia are a more recent phenomenon. The first HIV case was registered in 1988, but the registration of new cases did not increase explosively until 2000–2001, mainly in North-eastern Estonia where there is an overwhelming proportion of non-Estonians and accumulated social problems. In 2006, the incidence on HIV in Estonia was the highest in Europe. The HIV epidemic is primarily spreading among injecting drug users, who account for as much as 2.4% of 15–44-year-olds. This age group (20–39 years) made the greatest contribution to the ethnic TLE gap among men.

**Interpretation of the results for treatable causes of death**

Among treatable causes of death, cardiorespiratory conditions accounted for 95% of the male ethnic TLE gap and 88% of the female ethnic TLE gap, or 18% and 21% respectively in males and females of the total ethnic TLE gap. Mortality rates from both cardiovascular and respiratory diseases have declined considerably since 1994 in Estonia. The recent large decline in cardiovascular disease mortality in Eastern Europe has been attributed to improvements in diet and better medical care. Diet is unlikely to explain the difference in cardiovascular disease mortality in Estonia because the diet of non-Estonians is traditionally healthier than that of Estonians. The extent to which differences in access to medical care could explain the ethnic gap in cardiovascular mortality is not clear. Non-Estonians are more urbanized and may therefore have better access to specialist care; on the other hand, the co-payments system introduced in 2002 and 2003 may have increased the difference in the number of visits made to specialists between low and high-salaried groups. A more recent survey indicated that non-Estonians are less well-informed about health care resources and less inclined to seek medical help than Estonians.

The high contribution of alcohol- and tobacco-related preventable conditions to the ethnic TLE gap indicates that these factors may also be important in explaining the ethnic differences in treatable causes of death. Hazardous drinking is an important risk factor for cardiovascular mortality. Alcohol has also been associated with risk of colorectal and...
breast cancer,52 and tuberculosis,53,54 while pneumonia is a common cause of death among heavy drinkers.55 Differing exposure to tobacco smoke and environmental and occupational hazards may also explain ethnic differences in chronic respiratory disease mortality.16 With regard to tuberculosis, the HIV epidemic may have increased susceptibility among non-Estonians.43

Pilot projects for early detection of breast and cervical cancer were launched in 2002 and 2003.56 It has been argued that social inequalities in cancer mortality may be larger in countries without mass screening, as the uptake of elective screening may be worse among disadvantaged groups.57 In 2004, mammography and Pap test rates were lower among non-Estonian women, and they were more likely to have taken the initiative themselves.58 A recent study of breast cancer stage at diagnosis indicated that women in Ida-Viru county (approximately 80% non-Estonian) had >50% higher odds of being diagnosed with advanced cancer than women in Tallinn.59 Lower educational level, higher unemployment rates and poorer overall access to health care in the region were suggested to contribute to the delay of diagnosis.58

Conclusions

The National Health Development Plan suggests that the reduction of inequality between population groups could be one way to accelerate the achievement of European-Union-average life expectancy in Estonia.59 This study showed that relatively large ethnic disparities in life expectancy are potentially avoidable. However, inequalities in health behaviours underlie the ethnic TLE gap in Estonia, rather than inequalities in access to health care or the quality of health care.

Public health interventions should prioritize primary prevention aimed at hazardous alcohol and substance use, and tobacco consumption. Such interventions should be implemented in conjunction with wider social policy measures. Fiscal policies have been put forward as an effective tool to reduce alcohol and tobacco consumption in Estonia60; however, this has to be accompanied by better control of illegal supplies.

Addressing regional disparities in the quality of health care59 is also likely to contribute to better health of non-Estonians. In addition, language barriers in communication have to be removed at all levels of the health care system, including primary prevention practices, in order to avoid gaps in information.

Acknowledgements

The authors would like to thank Dr Sam Harper from the Department of Epidemiology, Biostatistics and Occupational Health, McGill University for his expert assistance. In addition, the authors would like to thank two unknown referees for their constructive comments.

Ethical approval

Not required.

Funding

The work of AB and TL was financed by the Estonian Ministry of Education and Research (target funding SF0940026s07 and SF0180060s09). ML’s contribution was supported by the Swedish Foundation for Baltic and East European Studies and by the Centre for Health Equity Studies (Stockholm, Sweden).

Competing interests

None declared.

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