Convergence or Divergence in Health Trends in Germany – Analyzing the Risk Profile of Young People with the German Mikrocensus

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1. Introduction/Background

Life expectancy is an important indicator for population health. Until the 1970s, life expectancy at birth in Germany was almost equal between the East and the West. Since then, life expectancy has increased constantly in the West, while it almost stagnated in the East. With Germany's reunification 1989/90 life expectancy in the East has increased rapidly and is almost at the same level of East Germany. These improvements are mostly due to improvements in cardiovascular mortality. (Nolte et al. 2000a). This development suggests healthier lifestyles and a reduction of risk factors leading to cardiovascular mortality, i.e. smoking, hypertension, high cholesterol and diabetes.

On the other hand, there is a growing concern of deteriorating health in children and young adults for Germany as a whole. Although infant mortality and infectious diseases are almost negligible, physical, psychological and social impairments seem to advance (Hurrelmann et al. 2003, Robert Koch Institut 2006). These include mental health, allergies, self perceived health and life quality, risk of accidents, experiences with violence, consumption of drugs (alcohol, cigarettes, cannabis), diet, physical activity and social environment. With regard to mortality and cardiovascular diseases, the relatively high share of smokers and overweight or obese children is of particular importance, since life styles that are acquired at younger ages will often be maintained throughout adult life and in old age (Hurrelmann et al. 2003). Approximately 20% of the 11 to 17 years old youth are smoking on an occasional or regular basis (BZgA 2005, Lampert und Thamm 2007). The share of smokers for older age groups is even higher (Hurrelmann und Albert 2006). Likewise, 10-20% of the youth is overweight or obese, with an increasing tendency (Robert Koch Institut 2004, Kurth und Schaffrath Rosario 2007).

Moreover, accidents and injuries are of special importance for health, since they are potentially avoidable. Children and young adults are at the greatest risk for

injuries and accidents (Hurrelmann et al. 2003), with fall accidents at the first position BZgA 2005).

A worsening health status of children and young adults might have consequences for the health of older populations in the future. Therefore, this paper investigates how the two risk factors *smoking* and *overweight/obesity*, as well as the health variable *accident/sickness within the last four weeks* have been developing in Germany. The first question is if there are age effects in the health variable and the two risk factors, i.e. what is the age distribution of the risk of reporting a sickness or accident, as well as of smoking, and overweight or obesity. The second question is if there are differences in the particular risks between birth cohorts. Finally, it is examined if these age and cohort effects differ by sex, between East and West Germany, between community size and between federal states.

2. Methods and Data

The analyses are based on the Scientific Use File of the German Microcensus for the years 1995, 1999, 2003 and 2005. The German Microcensus is a 1% percent household sample that is conducted once a year. The Scientific Use File (SUF) is a 75% subsample of that original sample that is provided for scientific usage without restrictions. Used health measures are based on questions on smoking habits, body mass index and accidents or sicknesses. Logistic Regression models are applied in order to look for age and cohort effects.

In the years 1995, 1999 and 2003 45% of the original sample was asked health questions in a health question battery, whereby the response to these health items is voluntarily. The smoking variable is generated from the two questions “Are you a current smoker?” and “Did you smoke in the past?” This newly created variable has three categories: current smoker, former smoker and never smoker. For the logistic regressions, the categories current smoker and former smoker are summarized as ever smoker (=1) versus never smoker (=0). Body mass index is calculated using self-reported information on height and weight. The exact wording of the questions is “How tall are you?” and “How much do you weigh?” For those participants under age 18, age specific BMIs for children and young adults are calculated according to Kromeyer-Hauschild et al. 2001). For males beyond age 18 those with a body mass

index below 20 kg/m² are underweight, with a body mass index between 20 and 25 kg/m² are classified normal weight. Those with a BMI ≥25 and <30 kg/m² are overweight and those with a BMI ≥30 kg/m² are classified obese. For females beyond age 18 a BMI below 19 kg/m² means underweight, a BMI between 19 and 24 kg/m² falls in the normal weight category. Those with a BMI ≥24 and <30 are overweight and those with a BMI ≥ 30 are considered obese. For the logistic regression the categories overweight and obesity were summarized as obese (=1) versus normal weight (=0). The exact wording of the questions for accident or sickness is: Were you sick (also chronically) or injured by accident within the last four weeks (including today)? For the logistic regression, those who reported either sickness or accident were summarized as unhealthy (=1) compared to being healthy (=0).

Due to changes in the sampling procedure, for the year 2005 the whole 1% sample was asked the health questions. But since logistic regression is performed with unweighted data, this unbalanced sample structure can be neglected in our analysis.
For the analyses, all four years are summarized, since they all contain the same health questions, except for obesity that is not included in the 1995 survey. Thus, for obesity only the years 1999, 2003 and 2005 are considered.

Independent variables that are controlled for are age, cohort, sex, family status, time period, nationality, income type, educational status, federal state and community size. The models for obesity control also for smoking.
Finally, in the logistic regression analyses for smoking 986.834 persons and for the risk to report an accident or sickness within the last four weeks 1.008.919 persons were included. For obesity 660.402 people were included.

For all models for the age effect the reference group is ages 20-24, for the cohort effect it is the cohort 1946-1955, which we name the Post-World-War II cohort (Post WWII cohort). From this time on, Germany was divided into the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR). A second cohort which is of special interest to us, is the so-called reunification –cohort that was aged 10 to 14 at the time of the reunification. This is the youngest age group in our analysis.

3. Results

3.1. Risk of Smoking

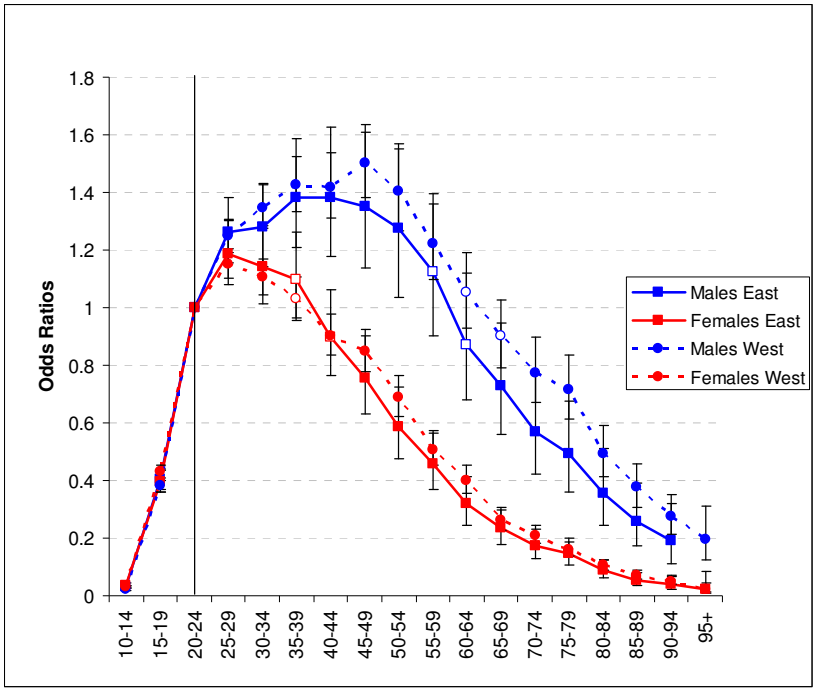
The analysis shows that overall there is no difference in the risk of smoking between East and West Germany. Sex specific-analysis, however, show that males in West Germany have a 25% (OR=0.85) lower risk of smoking in comparison to East German males. On the contrary, West German females have a 20% (OR=1.20) higher smoking risk than females in East Germany.

Looking at the age distribution, for smoking, a clear age effect can be found. Compared to the reference group (age 20-24), the risk of smoking increases with every age group, with a peak at age 35-39. At this age, the risk to smoke is 23% higher compared to the reference group. After that age the risk of smoking decreases again with lower risks compared to the reference group from age group 55-59 onwards.

The gender specific analysis shows that there are differences in the risk to smoke between males and females (Figure 1). Up to age 29 there are no significant differences in the age effect between males and females. But, whereas females have there highest risk to smoke at age 25-29 (plus 16 percent compared to reference group), males have their highest risk at age 45-49 with a 50% higher risk to smoke compared to the reference group. For females the risk to smoke is steadily decreasing from age 30 onwards with a risk below that of the reference group beyond age 40-44. For males the risk of smoking is decreasing at age group 50-54, but it is not until age 60-64 that their risk is below that of the reference group. These differences are significant.

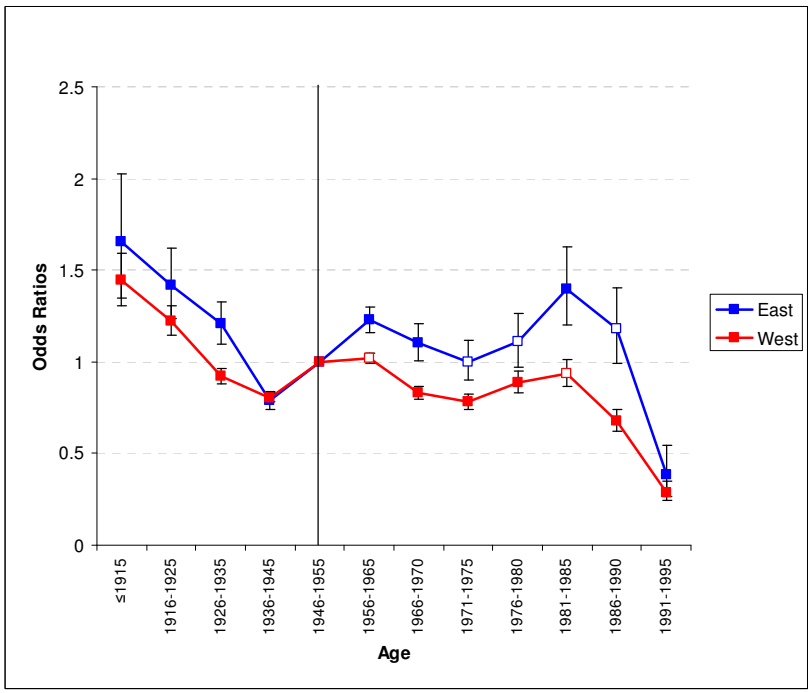
The separate analysis for East and West Germany shows no significant differences in the age effect between males and females in both parts of Germany (Figure 1). There were also no significant differences in the age effect for community size found.

Figure 1: Age Effect for the Risk of Smoking for Males and Females is East and West Germany



Adjusted for: cohort, time period, nationality, family status, income type, educational status, Federal State, Community size
□; ○ = values are not significant at the 0.05 level ■; ● = values are significant at the 0.05 level

Figure 2: Cohort Effect for the Risk of Smoking for East and West Germany



Adjusted for: age, sex, time period, nationality, family status, income type, educational status, federal state, community size
□; ○ = values are not significant at the 0.05 level ■; ● = values are significant at the 0.05 level

Cohort effects for Germany as a whole (not shown) show the highest risk of smoking in the oldest cohorts. This is particularly true for males. There is a continuous decline over succeeding cohorts up to the Post WWII cohort. Thereafter there is a stagnation followed again by a decline from the reunification cohort onwards. No cohort patterns exist for females with the exception from the re-unification cohorts onwards, where a decline similar to that of males is observed.

East and West Germany reflect this overall pattern. Figure 2 shows that the increase in the smoking risk from the Post-WWII cohort onwards is larger in East than in West Germany. This is also true for the decrease from the reunification cohort onwards which results in a convergence of the two parts of the country.

The analysis by federal state showed that the federal states follow the general East West pattern. Saxony (East Germany) is the federal with the lowest risk to smoke compared to all other states. Within Saxony, however, the cohort effect is stronger than in Schleswig Holstein (West Germany), the federal state with highest smoking risk. Finally, no significant differences were found for community size.

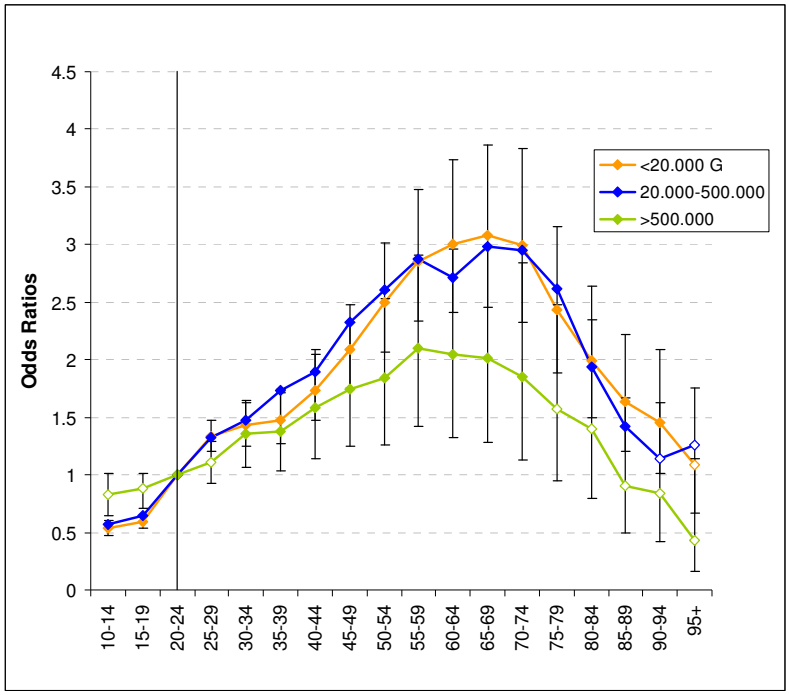
3.2. Risk of Overweight or Obesity

Overall, the risk of being overweight or obese is 20% lower in West Germany than in East Germany. West German males have a 13% lower obesity risk, West German females even a 28% lower risk of being obese.

For obesity a significant age effect can be observed. Those age groups younger than the reference group (20-24) have a lower obesity risk, those older than the reference group a higher obesity risk, which is steadily increasing. The obesity risk is highest for the ages 55-69, with a 2.8 higher risk to be obese than the reference group. Beyond age 70 the risk of obesity decreases but doesn't fall below the value of the reference group. The sex specific analysis shows that there exist differences in the age effect between males and females. Until age 49 the obesity risk of females is below that of males, albeit differences are only significant until age 39. Beyond age 50 females show a higher obesity risk than males. Whereas the obesity risk for males is highest at ages 55 and 69, females have their highest risk between ages 65 and 75. However, these differences are not significant. Looking at East and West Germany the age effect is stronger in the East than in the West. For example, in both regions is

the obesity risk highest at age 65-69, but in East Germany it is 3.8 times higher compared to the reference group whereas in the West it is only 2.8 times higher. But also here, differences are not statistically significant. This picture remains when looking at males and females within East and West Germany, but also with non-significant differences. Figure 3 shows the age effect for the risk to be overweight or obese by community size. Except for the two youngest age groups (10-14 and 15-19) the risk to be obese is lower in communities with more than 500.000 inhabitants in comparisons to communities with 20.000 to 500.000 or less than 20.000 inhabitants. Gender specific analyses show that this picture holds true for females, but not for males. Their obesity risk beyond age 50 is above that of the two smaller community types. However, these differences are not statistically significant.

Figure 3: Age Effect of the Risk to be Overweight or Obese by Community Size

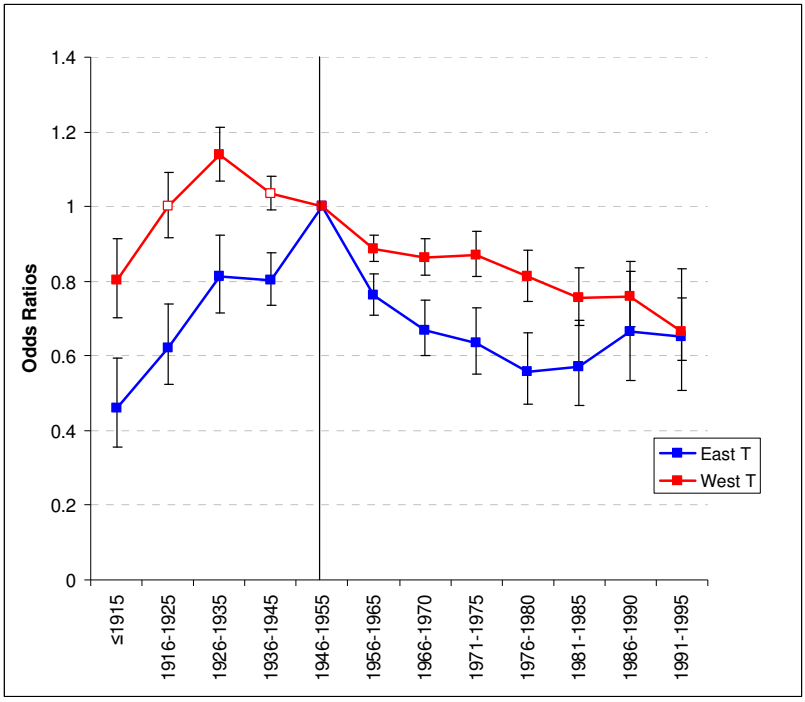


Adjusted for: cohort, sex, time period, nationality, family status, income type, educational status, federal states, smoking
○ = values are not significant at the 0.05 level ● = values are significant at the 0.05 level

The cohort analysis shows that the risk for overweight or obesity is higher in the cohorts born before the Post WWII cohort with a decreasing tendency from 1926-35 onwards. This tendency persists for the younger cohorts (not shown). The gender specific analysis shows significant differences between males and females from the post reunification cohorts onwards. Whereas the risk for males is further decreasing,

females show an increasing trend. Figure 4 depicts the cohort effect for the risk to be overweight or obese for East and West Germany. Both regions follow a different pattern. Whereas in West Germany the risk is higher for cohorts born before the post WWII cohort in the East the risk is significantly lower. For the cohorts born after the post WWII cohort, the obesity risk is stronger declining in the East than in the West. Looking at the after reunification cohorts it can be seen that this declining trend is continuing in the West, whereas it increases in the East, albeit differences are not statistically significant. These differences remain when analyzing males and females in East and West Germany.

Figure 4: Cohort Effect for the Risk to be Overweight or Obese for East and West Germany



Adjusted for: age, sex, time period, nationality, family status, income type, educational status, federal states, smoking
□ = values are not significant at the 0.05 level ■ = values are significant at the 0.05 level

There were no statistical significant differences in cohort effect by community size or federal state found.

3.3. Risk of Reporting an Accident or Sickness within the Last Four Weeks

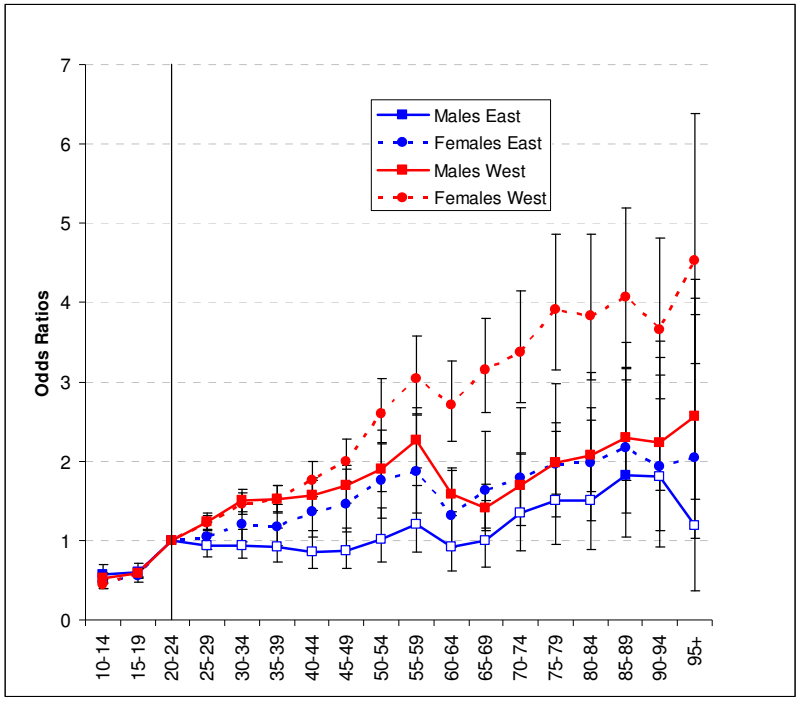
The risk of reporting an accident or sickness within the last four weeks is increasing with age. At age 55-59 there seems to be a small peak with a 2.57 times higher risk compared to the reference group (20-24). After a small decrease for the following age

group (60-64) the risk increases again and is three times higher at the oldest ages in comparison to the reference group.

The same trend can be observed analyzing males and females separately. But between males and females there exist differences in the age effect, with a higher risk for females than for males. This sex difference is not significant until age 50, but becomes greater with increasing age. There exist also differences in the age effect between East and West Germany. Except for the two youngest age groups, West Germans have a higher risk of reporting accidents and sicknesses than East Germans. Whereas at age 55-59 the risk for East Germans is 54% higher compared to the reference group, West Germans have a 2.8 times higher risk. These differences are significant except for the last three age groups.

Interestingly, these differences diminish when looking at males and females in East and West Germany, except for females in West Germany (Figure 5). Their risk is significantly higher compared to the other three groups.

Figure 5: Age Effect for the Risk of Reporting an Accident or Sickness within the last Four Weeks.

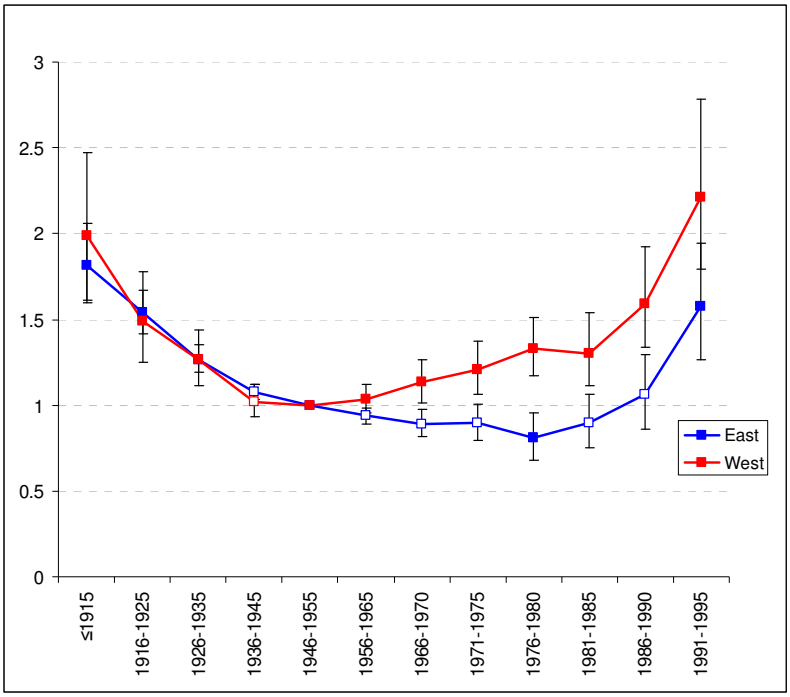


Adjusted for: cohort, time period, nationality, family status, income type, educational status, federal states, smoking, community size

□; ○ = values are not significant at the 0.05 level ■; ● = values are significant at the 0.05 level

For the post WWII cohorts a decreasing risk of reporting an accident or sickness within the last four weeks was observed. This risk increases slightly for the cohorts born afterwards. From the reunification cohort onwards a sharp increase of that risk is observed (not shown). For cohorts born before the Post WWII cohort, no significant sex differences could be observed. Since then, the risk for females is increasing, whereas it remains at the same level for females. With the reunification cohort, however, the risk of reporting an accident or sickness is increasing for both sexes. Figure 6 depicts differences in the cohort effect of the risk of reporting an accident or sickness within the last four weeks for East and West Germany. Also here, no differences in the cohorts born before the Post WWII cohort can be seen. Yet, for the cohorts born afterwards we can observe significant differences. Whereas the risk increases in the West, it remains almost constant in the East. From the reunification cohort onwards, the risk of reporting an accident or sickness increases in both parts of the country. Finally, no significant differences in cohort effect by community size or federal state were found.

Figure 6: Cohort Effect of the Risk to report an accident or sickness within the last four weeks in East and West Germany



Adjusted for: age, time period, nationality, family status, income type, educational status, federal states, smoking, community size

□ = values are not significant at the 0.05 level ■ = values are significant at the 0.05 level

4. Discussion and Conclusion

The results show that there is a clear age effect for smoking with in an increased risk of smoking by age. However, there are sex differences in the age effect. It seems that at younger ages, males and females have the same likelihood to smoke but whereas females quit smoking relatively early, males smoke up to higher age groups. It is likely that females quit smoking with their motherhood, whereas males smoke up until higher ages and give up smoking because of health problems.

The cohort analysis for smoking shows differences for males and females born before the Post WWII cohort, with males at a higher risk for smoking. From the reunification cohort onwards the smoking risk is decreasing for both sexes. For East and West Germany a similar trend can be found, albeit the differences in the risk of smoking in comparison to the post WW II cohort are slightly higher in the East than in the West. From the reunification cohort onwards a clear decrease, as well as a converging trend in the risk of smoking is observed. These findings opposite the assumption that smoking has increased in the last years, especially at younger ages. This might be sign of the effectiveness of increased prevention efforts and anti-smoking campaigns.

Also for obesity a clear age effect is observed. Although not significant, the age effect in communities with more than 500.000 inhabitants is lower than in communities with a smaller population size. This reflects the idea that females in larger urban regions are less frequently obese because they conform more to the prevailing beauty ideal of slimness.

Overall, a decreasing trend in the risk of overweight or obesity was observed from the Post WWII cohort onwards, whereby the decline of the obesity risk was stronger in East Germany than in the West. From the reunification cohort onwards a decreasing trend can be observed in the West, whereas in the East the risk is increasing. It is interesting that the post world war II birth cohort has the highest obesity risk especially in East Germany. This might reflect the ‘thrifty phenotype hypothesis’ (for review see Leon 2004). This hypothesis proposes that poor nutrition in foetal and early infant life results in the development of a metabolism which is well equipped to survive in harsh environments. If the environment later in life, however, does provide high energy- food and is full of plenty, this leads to an increased risk of

a variety of health problems such as diabetes, and cardiovascular disease. Since we can assume nutritional deficiencies in pregnant females (and hence their fetuses) during World War II and shortly after (especially in East Germany due to the occupation by the UDSSR) in connection with opulent food especially in times of reconstructing Germany, these cohorts may have developed the thrifty phenotype to a larger extent than the previous or the following cohorts. Unfortunately, due to data limitations we cannot analyze the central indicator of the thrifty phenotype hypothesis, namely diabetes type II, however, it is well known that diabetes and obesity go hand in hand.

Finally, there was also an age effect for the risk of reporting a sickness or accident observed whereby the risk is increasing with age. This shows that although children might have higher prevalences of accidents, their risk of reporting a sickness or accident is below that of adults. There are clear sex differences in the age effect between males and females, especially at older ages. This reflects a higher morbidity of females at older ages. It is also striking that the age-specific increase in the risk for females is much higher for West German females. It remains unclear, if they are really more often sick or have accidents, or if they have a totally different concept of perceiving health with increasing age. The results for males conform the assumption that they are less frequently ill, and probably have a different perception of their body and health status than females. There was no considerable cohort effect found for the risk of reporting an accident or sickness within the last four weeks, with the exception of an increasing risk for the post reunification cohorts. To what extent this increase, which is not reflected in mortality, is caused by improvements in the medical system resulting in earlier and better diagnosis, a change in the answering behaviour, or a real deterioration in the health status of the youth has to remain open.

To some up, regarding the younger cohorts, both for East and West Germany there is a clear cohort effect of the risk of smoking starting from the reunification cohort onwards. The risk decreases over succeeding cohorts and, in addition, supports the assumption of converging health trends after reunification because declines in East Germany are larger than in West Germany. Cohort trends are different for obesity: in East Germany the risk of obesity increases from the reunification cohort onwards

while it decreases in West-Germany. For the general health variable the risk of sickness and accidents has been increasing from the re-unification cohort onwards in both parts of the country. These results do only partly support the fears of a deteriorating health of our youth. But it needs to be considered that the data are very limited, i.e. other factors contributing to children and youth's health, e.g. alcohol consumption, self perceived health, or stress levels are excluded.

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