

**Gender specific trends in socio-economic differentials in all-cause mortality
in Austria between 1981/82 and 1991/92**

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Abstract

Comparative international studies regularly find an increase in mortality differentials by education and socio-economic group. We are interested in finding out whether the same is true for Austria, a country for which no previous comparable study exists. Based on linked death and census records for the Austrian population of the years 1981/82 and 1991/92, we observe a widening gap in educational and occupational differentials of Austrian males in relative and absolute mortality from all causes. The increase is restricted to ages 50 to 74 while mortality differentials at younger and older ages remained unchanged or slightly declined. The growing gap results from increasing mortality advantages for men with tertiary education, that is, in the highest educational group. Their absolute mortality and relative mortality risks decreased faster than that of all other educational groups. Educational differentials among women remained unchanged.

Introduction

Do people with more education and from higher social strata live longer than less educated and if so, by how many years, is a political and scientific question of utmost importance. Despite the overriding importance of this issue, Austria has been one of the few countries in Europe that lacks detailed empirical information on socioeconomic mortality differentials. Earlier studies [1-2] are based on ecological analyses that correlate aggregated death rates for geographical areas with socioeconomic and other characteristics prevalent in these areas. Studies based on sub-populations conducted by the Austrian social security administration („Hauptverband der österreichischen Sozialversicherungsträger“) suggest that at age 60, life expectancy of retired manual workers is on average 2.5 years lower than that of retired non-manual workers. The first study on the basis of individual census and death records for the total Austrian population was conducted by Doblhammer [3-4].

One of the many problems in analyzing socioeconomic differentials in adult mortality arises from the fact that death certificates usually do not provide information on the socioeconomic status of the deceased. In Austria, data on education or on the occupational status of the deceased cannot be derived from death certificates. To solve this problem, two data sources have been linked: death certificates and census data. Death and census records for the year 1981/82 have been merged and mortality differentials by education, occupational status, family status, and parity have been documented for Austria for the first time.

Between 1981 and 1991, life expectancy at birth increased by 3.14 years for males and 2.64 years for females [5]. The rise in life expectancy primarily resulted from a decrease in mortality rates at the highest ages. The question is whether all socioeconomic groups participated equally in the reduction of mortality or whether certain groups lagged behind. Mackenbach et al. [6] have shown that relative socioeconomic inequalities grew between 1981/85 and 1991/95 in Finland, Sweden, Norway, Denmark, England and Wales, and Italy

(Turin) while absolute differences remained stable, with the exception of Finland. In the above countries (with the exception of Italy), about 50 per cent of the widening relative gap in total mortality is due to changes in cardiovascular disease. Mortality from cardiovascular disease declined proportionally faster among higher social groups. A series of recent studies has led to growing evidence that inequalities in mortality have widened in many populations [6-19]. Care needs to be taken, however, to attribute a single cause of death to the growing gap since “it seems unlikely that there exists any major single explanation for changes in inequalities in mortality” [17, p. 274].

The present study is based on data used by Doblhammer [3] for the year 1981/82 as well as on the merging of death and census records for the year 1991/92. These are the only two years with linked census and death records in Austria. It is the first study that documents trends in the mortality differentials of Austrian males and females. At this point in time, we do not have cause-specific information available and therefore restrict our analysis to all-cause mortality.

Material and Methods

Data sources and merging death certificates with census records

This study is based on death records from the periods 12 May 1981 to 11 May 1982 and 15 May 1991 to 14 May 1992. The death records have been merged on an individual level with census records from the 1981 and the 1991 census, respectively. As in Austria no personal identification number exists and names are deleted from census records, death and census records can only be merged by means of the following five variables:

1. birth date (day, month, year),

2. family status (single, widowed, divorced, and married)
3. year of marriage (if married),
4. residential address of the deceased (code of municipality),
5. dwelling number within municipality.

In Austrian census records, the residential address of the respondent is coded in form of the *municipality code* and the *dwelling number* within the municipality where the variable *dwelling number* is based on the Austrian dwelling register. The database containing information from death certificates routinely records the residential address merely in form of the municipality code. It is only during the one-year-periods following the 1981 and 1991 censuses that dwelling numbers were processed in the database, too. Thus, these are the only two time periods for which information on the socioeconomic characteristics of the deceased is available in Austria.

In order to link the death certificates and census records, a scoring-algorithm has been developed in SAS that merges the 89,304 death records for 1981/82 and 83,324 deaths for 1991/92 with roughly 8 million census records from the 1981 and 1991 census, respectively, and according to the following rules:

1. Death and census records are merged only, if the municipality code as well as the dwelling number and at least three of four variables *year of birth*, *month of birth*, *day of birth* and *sex* are matching. Additionally, the *family status* and *year of marriage (if married)* are checked and also whether the information provided by the two variables in the death records and census records match. However, the family status is given low priority compared to other variables as it can change between the date the census was taken and the date of death.

2. If only two of the variables (year, month, and day of birth as well as the sex) are matching, a search in the political district of the municipality is started. Two are merged only if all of the variables (birth date, family status and date of marriage) are matching.

The remaining death records that could not be matched with census records are assigned to a rest group and excluded from the analysis of differential mortality. Also, the death records that can only be linked with more than one census record are assigned to the rest-group and excluded from the analysis.

Merging results

In the one year period after the 1981 census, 90,693 death certificates were submitted to the Central Bureau of Statistics. Correct dwelling numbers were assigned to 89,304 certificates. The remaining 1,389 death certificates (1.53%) were coded wrongly (with dwelling numbers that did not exist) and had to be excluded before merging. Based on the above merging procedure, 91.62% of the correctly coded death certificates could be linked to the census records. All variables - municipality code, dwelling number, birth date, sex, family status and year of marriage - are matching in 78 per cent of the cases; the municipality code and dwelling number are matching in 12 per cent of the cases, but one of the four variables (year of birth, month of birth, day of birth, or sex) is mismatching. Of the linked records, 4.6 per cent are merged within the same municipality but with a different dwelling number, while 2.4 per cent are merged with another municipality within the same political district. In the last two cases, all other variables used in the merging algorithm were matching. The proportions of the linked death records differ between the political districts but are homogeneous within the districts. The lowest and highest merging-rate is achieved in Vienna (88.35%) and in Burgenland (94.16%), respectively.

Slightly lower results were obtained for the 1991 census: The overall merging rate was 90.09 percent. The score for Vienna was lower than in any other state (84.86%). With the exception of Salzburg (88.80%), all other regions have merging rates of more than 90 percent.

The reason behind the lower values for the second wave probably can be attributed to a modified version of the merging algorithm: For the period 1991/92, two variables were not included: *family status* and *year of marriage*.

Generally, the ‘success’ of the merging algorithms depends on mobility of people before death, i.e., if a person moved to a new residential address after the census took place but before the occurrence of death, the area code and the dwelling number on the census records and death certificates are different. This happens most frequently when elderly people have moved to nursing homes or relatives shortly before death and it may explain why the merging-rate is lowest in Vienna: Compared with other provinces, Vienna has a comparably old population, of which the majority lives in separate households, i.e., locationally apart from their relatives. If they become sick, they have to be admitted to nursing homes, and this often occurs shortly before their death. In the Burgenland, by contrast, a rural district that has the highest merge-rate, the elderly tend to live with their relatives. The residential addresses given on their death certificates and in the census thus are more likely to match.

As to the 1981 merger, the age distribution of the deceased is almost identical in the linked data set to the deceased age distribution in the un-matched death records [3]. However, the older age groups have slightly more death records that can not be matched to census records than the younger age groups. There are also differences in the age distribution of the matched and un-matched death records, and these are larger among women than men. A plausible explanation for these differences may be that women are more likely to nurse their partners in

case of sickness as they tend to enjoy greater longevity than their male counterparts. Thus, it is less likely for the last residential address of men to change shortly before their death, as they do not have to be admitted to nursing homes. Among young men, the age distributions also slightly differ between the two data sets. This can be attributed to deaths from accidents, especially car accidents. In the latter case, the last residential address at death registered in the death record may differ from that recorded in the census. Although the merging was performed for all ages, we restricted our analysis to an age-range between 35 and 89 years. Tables 1 and 2 give information for the years 1981/82 and 1991/92 on the number of survivors and the number of deaths by sex, age, and education (Table 1) and by sex, age, and occupation (Table 2).

The model

We have chosen a logistic regression model to analyze socioeconomic differences in mortality in Austria. The model is usually denoted in the following form [20]:

$$\log\left(\frac{P_i}{1-P_i}\right) = \alpha + \beta_1 x_{i1} + \dots + \beta_k x_{ik}.$$

The logarithm of the probability for event (=death) P for individual i , divided by the probability that individual i does not die, is related to an intercept α and a set of k covariates and their respective regression coefficients β_1, \dots, β_k . We include the covariates *age* (defined in 5-year age groups), *education*, and *occupation*. The variable *education* is divided into five groups: tertiary education (more than 13 years), upper secondary (13 years), lower secondary (10 - 12 years: full time schooling), apprenticeship (9 years plus part time schooling), and basic education (9 years or less). The variable *occupation* distinguishes between six groups: non-manual workers and civil servants, skilled manual workers, unskilled manual workers, farmers, entrepreneurs, and others. For Figure 1, tertiary education was coded as “High”, upper and lower secondary school have been combined into “Medium”; people with basic

education or who went for an apprenticeship were labeled “Basic”. Unskilled and skilled manual workers were put into one category, as were farmers and entrepreneurs for Figure 2. People not classified by occupation have been excluded in Figure 2 but included in any other analysis.

In order to estimate the age specific odds-ratios of dying, we estimate separate models for education and occupation, and introduce an interaction effect between age and education, and age and occupational status. These odds-ratios can be interpreted as relative mortality risks since the event of interest is relatively rare. In this case, the odds-ratios and relative risks are approximately equal [21].

Results

Education

Males:

The age-specific relative mortality risks for five-year age groups are presented in Figure 1c) and 1d). We observe large mortality differentials by educational group. In 1981, three broad age groups showed distinct patterns of excess mortality in the lower educational groups. The first age range consists of ages 35 to 49 and is characterized by large mortality differentials, particularly among the two highest educational groups and among men with basic education and apprenticeship. The relative mortality risk of those with an intermediate level of education is about 40 per cent lower than that of men with basic education only. The mortality of men with tertiary education can be down to 20 percent of the mortality of men with basic education.

The second age range consists of the age groups 50 to 64 and has a relative mortality advantage that is lower for people with medium or high education than for younger men. One can also detect a strong decrease in mortality differentials with age.

The third age range is formed by men aged 65 to 89 years. At these ages, only two major educational groups can be distinguished: The first group is formed by men with either tertiary or medium education, while the second group consists of men with basic education. Contrary to younger men, mortality differentials remain stable with age.

In 1991 the three broad age groups were reduced to two groups. The first group now has extremely high survival advantages and includes all ages up to 64 years. The second age group ranges from 65 to 89 years. In other words, over the 10-year period from 1981 to 1991, the large inequalities in relative mortality have been extended to include a range from middle ages to the young elderly.

Two different trends can be observed, however, at ages 35 to 49 and 50 to 74. Among the younger age group, relative mortality differentials have slightly narrowed. This is in contrast to the mortality differentials at ages 50 to 74: They have increased over the ten-year period. It is only after age 75 that mortality differentials did reach similar or slightly lower levels than in 1981.

Females

On the basis of age-specific mortality risks, the most striking result is that differences by education are much smaller for females than for males (Figures 1a) and 1b). This is particularly true for the younger age groups whereas mortality differentials at older ages are comparable. Contrary to males, a distinction between several broad age ranges can not be

made and there is no distinct trend over time. In 1981 mortality differentials tended to be erratic, mainly because of fluctuations in the mortality of women with tertiary education. Over time, these fluctuations disappeared and in 1991 we observe more consistent mortality differentials by educational groups. Still, the year 1991 sees a cross-over in the mortality rates of educational groups at ages 50-54. This sudden increase can be attributed to breast cancer, the only cause of death that leads to an increase in mortality differentials with education. This is the only age group in which women of tertiary education experience the highest mortality risk. All other age groups have a lower risk. Over time, educational differentials in mortality remained unchanged.

Occupation

Males

Mortality differentials in occupation (Figure 2c) and 2d) resemble the patterns found for educational groups. In 1981, young manual workers aged 35-44 years had a relative mortality risk of about 2 as compared to non-manual workers and civil servants. Excess mortality decreases with age, but less so as to manual workers at all ages because of the high relative mortality risks when compared to other occupational groups. The relative mortality risks are considerably lower for farmers and entrepreneurs than for skilled and unskilled manual workers. In 1991, the pattern has changed insofar as between ages 54 and 69 manual workers are lagging behind in terms of relative mortality risks. The other occupational groups have similar relative mortality risks. This changes from ages 75 onwards where the group of non manual workers and civil servants clearly has the lowest mortality risk; the upward trend in the group of entrepreneurs and farmers at the highest ages is driven by the farmers, while the other occupational groups are intermediary.

Females

There is little variation in the relative mortality risks over age and time for females (Figures 2a) and 2b)). Non-manual and civil servants have the lowest mortality risks, (unskilled and skilled) manual workers face the highest risks at young ages. Neither the pattern of excess mortality nor the extent of the relative mortality risks changed over time.

Multivariate Analysis

Comparing the results of the multivariate analysis for the years 1981/82 and 1991/92, we find little change in the relative mortality risks of old males (ages 65-89) and increasing educational differentials among young males, independent of correcting for occupational status (Table 3). Educational differentials among females remained unchanged at all ages, while occupational differentials among younger females tended to decline (Table 4).

The Absolute Level of Mortality

The change in the absolute levels of mortality over time has been analyzed using age-adjusted death rates. The results for education are shown in Table 5 and in Table 6 for occupation.

Education

The previous results are mirrored in the death rates. These have been adjusted for age: The higher the level of education is, the lower are the death rates. This finding holds for women as well as for men and for both age ranges (35–64 years, 65–89 years). Compared to basic education, we can detect a widening gap in the death rates between 1981/82 and 1991/92 for the younger age-group. For example, the age-adjusted death rate (per 1000 person years) with

basic education was 9.17 in 1981/82 and 8.64 in 1991/92, with the corresponding rates for men with tertiary education having been 4.37 (1981/82) and 3.07 (1991/92). Absolute differences to basic education increased, therefore, from 4.80 to 5.39. The same trend can be observed for women, albeit on a smaller scale. Between the ages 65–89, the absolute differences between the levels of education remained relatively stable for both sexes.

Occupation

The changes in the absolute levels of mortality, displayed in Table 6, are less clear for occupation than for education. For women, the differences relative to non-manual employees and civil servants appear to become smaller among the younger age-group and widen among the elderly. While manual workers, both skilled and unskilled, are increasingly disadvantaged among men at working age, other occupational groups remain relatively stable or even show a decrease in the absolute difference in mortality. At ages 65–89, the absolute differences in mortality among the occupation groups analyzed tend to converge.

Discussion

In the ten-year period between 1981/82 and 1991/92, death rates decreased for all educational and occupational groups as well as for both sexes and for all ages. At the same time, we observe a stagnation or widening of educational and occupational inequalities with the exception of occupational inequalities among young females, which tend to become smaller. The general trend, however, is only significant among males. A closer look at their age-specific odds ratios reveals that the widening is constrained to age groups 50 to 70, while at older and younger ages, mortality differentials remain almost unchanged. The mortality of young males with basic education lags behind the mortality of all other educational groups,

however the difference is only significant for males with tertiary education. The widening in male educational differentials is also reflected in the increasing excess mortality of manual workers as compared to non-manual workers and civil servants; this increase, however, is not significant. The multivariate model shows that occupation and education measure different dimensions of inequality and that their effects do not cancel out. The univariate trends remain virtually unchanged in the multivariate model.

In most populations, mortality differentials decline with age [22]. This study shows that in both periods, Austrian females are an exception: The odds ratios among the elderly are as large as among the young. Age specific trends among males follow the general international pattern. In 1991/92 the decline in mortality differentials with age is among the steepest observed in eleven European countries [22]. Ten years earlier this decline was even steeper. In other words: over time the age-specific pattern in Austrian male mortality differentials approaches that of other European countries, although it is still outstanding.

At this point in time, we do not have information about the causes of death for the period 1991/92. A large series of studies, however, reports that the widening gap in the mortality of educational groups results to a large extent from cardiovascular disease. This is consistent with the increase in the age-specific mortality risks that we observe in our study. Circulatory disease becomes by far the leading major group of death cause in Austrian male mortality from ages 50 onwards. Exactly from this age group onwards, mortality differentials started to widen between 1981/82 and 1991/92. In 1981/82 and among the circulatory diseases, cardiovascular disease revealed one of the highest mortality differentials among males aged 50-64, with an excess mortality of 79 % among those with basic education compared to those with upper secondary and tertiary education [3].

A series of studies have been conducted in Austria about the risk factors of cardiovascular disease. The time trends and social patterns observed in these studies are generally consistent with our results of increasing or stagnating mortality differentials over time. A recent study on changes in the socio-demographic distribution of cardiovascular risk factors [23], such as obesity, hypertension, hypercholesterolemia, highly elevated cholesterol, and hypertriglyceridemia shows that both in 1991 and 1999 people with a relatively low education had significantly higher risk factor levels. A comparative study of obesity in Austria, Germany, and Switzerland reveals an increase between 10 to 40 per cent over variable periods [24]. Kirchengast et al. [25] find a marked increase in the prevalence of the overweight and obese among 18-year old military conscripts as to the time period 1985 to 2000. In addition to a large educational gradient in the Body Mass Index (BMI), they also show regional differences in BMI, with a higher prevalence of the overweight and obese in the cartographically flat Eastern part of Austria compared to the mountainous Western part. Haidinger et al. [26] show that smoking prevalence increased in Austria between 1986 and 1995 by 34% among females and by 10 per cent among males and that the patterns of smoking among females approached that of males. A questionnaire on the attitudes on and knowledge of the Austrian population about hypertension [27] found a decrease of awareness between 1984 and 1993. Although to respondents there has been an increase in the importance of overweight, alcohol, mental stress, and cigarette smoking as risk factors for hypertension in the ten-year period, knowledge about the level of their own blood pressure has decreased.

The observed widening of inequality in educational mortality is not caused by problems in the study design or data, for three reasons: First, this study is based on the total population; therefore there are no differences in the sample design or the response rates. Second, we were

able to link 92 per cent of the death records with the respective census for both periods. Third, we used a similar classification of education for both periods, and the classification procedure used in the censuses has not changed. The results by occupational status have to be interpreted more cautiously, however, as the classification rule for the residual category *all others* has changed over time. In both periods, this category is supposed to consist of students, retirees, and the unemployed people; housewives and pensioners should be categorized according to their husband's occupation and by their last occupation, respectively. A closer look at the age-specific numbers reveals, however, that in 1981/82 there is an unexpected increase from age 60 onwards in the absolute numbers falling under the category *all others*; this rise did not exist in 1991/92. It seems that the classification procedure was not as strictly adhered to in the first period as in the second period. This may also be an explanation as to why the results for occupation are less clear than the results for education.

The widening of the gap in the relative mortality of educational groups among Austrian men is in line with the trends in education and social class differentials observed in other European countries [6, 10, 11]. Several explanations have been offered: Increasing income inequality has been suggested to be a cause of growing disparities in mortality [16]. Others have argued that income, diet, smoking, or medical care are critical determinants of mortality [6, 22]. For Austria, we indeed find evidence that these factors are of importance. Although country specific mechanisms may play an important role, the general trend in Western countries suggests that recent developments in mortality improvements have particularly favored the better educated. This study has shown that this is also true for Austrian males.

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Table 1: Absolute number of survivors and deaths by sex, age, and education; Austria 1981/82 and 1991/92

Education	Males				Females			
	1981/82		1991/92		1981/82		1991/92	
	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths
Basic								
35-39	67277	196	60301	143	109429	153	96469	101
40-44	88266	397	63695	239	142241	252	104225	208
45-49	83933	586	57717	358	136368	385	101047	260
50-54	86466	933	73730	668	148095	630	132213	499
55-59	79144	1258	68192	933	182277	1174	127980	718
60-64	54168	1237	67017	1456	131451	1337	136712	1159
65-69	60210	2206	58704	1874	158528	2809	161618	2408
70-74	56328	3442	36269	1724	158659	4976	110160	2746
75-79	42433	4165	32201	2506	122099	7464	114638	5353
80-84	20157	3081	20239	2674	70721	7655	84967	7485
85-89	6062	1448	7487	1476	28074	5182	34408	5310
Total	644444	18949	545552	14051	1387942	32017	1204437	26247
Apprenticeship								
35-39	117550	275	129901	236	61353	56	71598	70
40-44	113492	373	135904	428	48089	60	80150	127
45-49	82846	474	118548	537	29158	74	65799	160
50-54	85906	810	113872	783	33371	117	52659	145
55-59	66392	877	80656	934	30503	171	31503	145
60-64	39911	862	77838	1407	19250	209	33931	279
65-69	46706	1668	55271	1563	20883	318	29836	396
70-74	42279	2401	29938	1252	22764	690	17672	385
75-79	23588	2133	27629	2148	12583	586	16907	733
80-84	8950	1418	17862	2094	6074	549	14082	1074
85-89	2740	624	5502	994	2297	399	4720	572
Total	630360	11915	792921	12376	286325	3229	418857	4086
Lower secondary								
35-39	19338	38	22222	27	44102	44	48370	42
40-44	19420	60	20809	45	39092	59	43401	60
45-49	12866	47	20157	82	22582	50	44296	95
50-54	13973	90	19659	90	25968	105	38787	103
55-59	12921	157	12564	101	34069	175	21809	103
60-64	8972	153	12901	181	20127	186	24311	196
65-69	10128	267	10986	250	19601	268	30900	332
70-74	9461	454	6767	251	17631	452	17264	337
75-79	6002	458	6079	349	13573	625	14301	519
80-84	2544	332	3779	379	7412	654	9626	606
85-89	795	145	1266	200	2500	348	3822	391
Total	116420	2201	137189	1955	246657	2966	296887	2784

continued

Table 1 continued: Absolute number of survivors and deaths by sex, age, and education;
Austria 1981/82 and 1991/92

Education	Males				Females			
	1981/82		1991/92		1981/82		1991/92	
	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths
Upper secondary								
35-39	21861	26	26973	26	18263	28	19337	21
40-44	17399	25	22651	50	13300	17	17732	18
45-49	11210	37	21558	59	8884	20	18038	25
50-54	15740	119	17326	76	12603	41	13245	30
55-59	14992	144	10871	86	12146	64	8711	42
60-64	9779	159	14530	160	9334	57	12260	65
65-69	8185	205	12913	287	7240	88	11033	125
70-74	6373	294	7561	247	4690	109	7885	134
75-79	4643	324	5141	296	3614	165	5339	170
80-84	2491	304	2934	271	2388	192	2763	174
85-89	909	141	1087	150	1045	168	1219	132
Total	113582	1778	143545	1708	93507	949	117562	936
Tertiary								
35-39	18780	15	27718	27	7993	5	25535	15
40-44	14648	14	24257	28	5273	5	15327	18
45-49	8518	20	20612	41	2587	6	9346	20
50-54	9614	54	15541	52	3437	9	5992	21
55-59	10232	83	8831	30	4572	14	2936	12
60-64	7630	110	9496	93	2705	29	3818	18
65-69	7967	202	9288	156	2450	27	4612	43
70-74	5993	212	6033	158	1689	43	2599	43
75-79	3865	295	5305	273	1021	30	2108	60
80-84	1894	184	2932	287	515	38	1165	55
85-89	697	124	1015	140	195	23	424	44
Total	89838	1313	131028	1285	32437	229	73862	349

Table 2: Absolute number of survivors and deaths by sex, age, and occupation; Austria
1981/82 and 1991/92

Occupation	Males				Females			
	1981/82		1991/92		1981/82		1991/92	
	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths
Non manual/civil servant								
35-39	116287	176	117153	140	131329	113	140160	116
40-44	111603	258	117428	261	115753	159	135206	176
45-49	74877	283	114310	370	77778	168	125703	249
50-54	83685	613	108027	573	89392	286	108513	309
55-59	77506	847	70017	613	98844	473	68798	329
60-64	47098	839	73831	1083	55221	465	75128	548
65-69	44094	1257	63940	1572	45003	657	80159	924
70-74	33002	1572	37438	1390	34519	867	44241	892
75-79	20682	1712	30418	1995	22863	1121	31196	1139
80-84	9918	1362	17227	1816	12211	1125	18046	1259
85-89	3123	602	5740	916	4198	648	6674	786
Total	621875	9521	755529	10729	687111	6082	833824	6727
Farmer								
35-39	10125	30	10743	18	15374	21	13260	9
40-44	16598	72	11253	41	25160	23	15111	22
45-49	18301	96	9389	37	24869	57	13841	28
50-54	20687	154	15295	80	25580	91	21885	64
55-59	17373	224	16551	155	27914	158	21660	96
60-64	11817	213	17773	265	19177	170	21225	145
65-69	14673	486	14130	358	22460	374	20934	258
70-74	14585	806	8464	357	21312	682	12029	286
75-79	11295	1049	8282	647	15674	978	10248	496
80-84	5474	868	5600	737	8667	1019	6301	580
85-89	1776	459	1961	426	3078	616	2364	365
Total	142704	4457	119441	3121	209265	4189	158858	2349
Entrepreneur								
35-39	21935	42	21993	33	15859	18	13220	16
40-44	23451	72	24283	66	16377	34	15321	22
45-49	17929	81	23459	94	12999	38	15400	41
50-54	19518	161	22009	110	15588	59	14258	47
55-59	18827	249	15503	163	20832	111	11245	60
60-64	14171	278	16458	240	16131	161	13063	109
65-69	15848	542	14967	347	18360	273	15506	210
70-74	15703	829	9803	389	17371	453	9881	194
75-79	10130	880	8532	591	11741	619	8882	369
80-84	4341	630	5839	638	6333	582	5894	478
85-89	1525	294	1971	374	2513	428	2166	264
Total	163378	4058	164817	3045	154104	2776	124836	1810

continued

Table 2 continued: Absolute number of survivors and deaths by sex, age, and occupation;
Austria 1981/82 and 1991/92

Occupation	Males				Females			
	1981/82		1991/92		1981/82		1991/92	
	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths	Survivors	Deaths
Skilled Manual								
35-39	43839	119	54684	98	21076	31	23946	18
40-44	42091	154	52584	179	21222	27	21994	34
45-49	33122	226	42123	228	17948	52	18506	66
50-54	34969	369	40091	329	18893	78	20467	61
55-59	26052	352	32130	434	17673	117	17889	96
60-64	14643	322	33537	684	10396	103	18115	155
65-69	17620	643	23963	770	11140	182	15689	218
70-74	17513	1072	12889	557	11099	334	8437	196
75-79	11282	1024	12035	973	6145	294	7011	332
80-84	4293	647	8279	1033	2495	250	4998	401
85-89	1200	314	2819	496	886	146	1587	205
Total	246624	5242	315134	5781	138973	1614	158639	1782
Unskilled manual								
35-39	50135	166	57607	141	52046	87	64010	73
40-44	57232	277	57879	205	63165	105	65792	139
45-49	52954	421	46270	298	58328	156	55978	123
50-54	49596	606	51773	528	60191	260	63254	245
55-59	38047	670	44063	673	63875	437	54897	311
60-64	21922	573	38559	953	39464	411	55611	474
65-69	25065	1043	28428	1025	43969	759	57759	921
70-74	23279	1533	16771	874	40456	1324	33517	854
75-79	15649	1569	15710	1272	26779	1566	31246	1486
80-84	6344	975	9722	1378	12664	1336	21351	1896
85-89	1645	408	3390	677	4338	816	7651	1178
Total	341868	8241	370172	8024	465275	7257	511066	7700
All other								
35-39	2485	17	4935	29	5456	16	6713	17
40-44	2250	36	3889	38	6318	45	7411	38
45-49	2190	57	3041	50	7657	64	9098	53
50-54	3244	103	2933	49	13830	128	14519	72
55-59	5876	177	2850	46	34429	302	18450	128
60-64	10809	296	1624	72	42478	508	27890	286
65-69	15896	577	1734	58	67770	1265	47952	773
70-74	16352	991	1203	65	80676	2610	47475	1223
75-79	11493	1141	1378	94	69688	4292	64710	3013
80-84	5666	837	1079	103	44740	4776	56013	4780
85-89	1934	405	476	71	19098	3466	24151	3651
Total	78195	4637	25142	675	392140	17472	324382	14034

Table 3: Relative mortality risks for males aged 35-65 and 65-89 by education and occupation; Austria 1981/82 and 1991/92.

		1981/82			1991/92		
		Odds ratios	95% CI		Odds ratios	95% CI	
			<i>lower</i>	<i>upper</i>		<i>lower</i>	<i>upper</i>
Ages 35-64							
Occupation	Non-manual/ civil servant	1.00			1.00		
	Farmer	1.07	<i>0.98</i>	<i>1.16</i>	0.94	<i>0.86</i>	<i>1.03</i>
	Entrepreneur	1.19	<i>1.10</i>	<i>1.28</i>	1.09	<i>1.01</i>	<i>1.19</i>
	Skilled manual	1.30	<i>1.22</i>	<i>1.39</i>	1.34	<i>1.27</i>	<i>1.43</i>
	Unskilled manual	1.52	<i>1.44</i>	<i>1.62</i>	1.49	<i>1.41</i>	<i>1.58</i>
	All other	2.31	<i>2.11</i>	<i>2.52</i>	2.77	<i>2.44</i>	<i>3.14</i>
Education	Basic	1.00			1.00		
	Apprenticeship	0.94	<i>0.89</i>	<i>0.98</i>	0.89	<i>0.84</i>	<i>0.93</i>
	Lower secondary	0.81	<i>0.74</i>	<i>0.89</i>	0.72	<i>0.66</i>	<i>0.80</i>
	Upper secondary	0.75	<i>0.68</i>	<i>0.82</i>	0.64	<i>0.57</i>	<i>0.71</i>
	Tertiary	<i>0.57</i>	<i>0.53</i>	<i>0.67</i>	<i>0.46</i>	<i>0.40</i>	<i>0.52</i>
Ages 65-89							
Occupation	Non-manual/ civil servant	1.00			1.00		
	Farmer	1.07	<i>1.03</i>	<i>1.12</i>	1.08	<i>1.02</i>	<i>1.13</i>
	Entrepreneur	1.08	<i>1.03</i>	<i>1.13</i>	1.05	<i>1.00</i>	<i>1.10</i>
	Skilled manual	1.12	<i>1.07</i>	<i>1.17</i>	1.13	<i>1.08</i>	<i>1.18</i>
	Unskilled manual	1.18	<i>1.13</i>	<i>1.23</i>	1.20	<i>1.15</i>	<i>1.25</i>
	All other	1.13	<i>1.08</i>	<i>1.18</i>	0.99	<i>0.89</i>	<i>1.10</i>
Education	Basic	1.00			1.00		
	Apprenticeship	0.97	<i>0.94</i>	<i>1.00</i>	0.94	<i>0.91</i>	<i>0.98</i>
	Lower secondary	0.82	<i>0.77</i>	<i>0.86</i>	0.80	<i>0.76</i>	<i>0.85</i>
	Upper secondary	0.78	<i>0.73</i>	<i>0.83</i>	0.77	<i>0.73</i>	<i>0.83</i>
	Tertiary	0.73	<i>0.68</i>	<i>0.78</i>	0.70	<i>0.65</i>	<i>0.75</i>

Estimates are controlled for age.

Table 4: Relative mortality risks for females aged 35-65 and 65-89 by education and occupation; Austria 1981/82 and 1991/92.

		1981/82			1991/92		
		Odds ratios	95% CI		Odds ratios	95% CI	
			lower	upper		lower	upper
Ages 35-64							
Occupation	Non-manual/ civil servant	1.00			1.00		
	Farmer	1.06	0.96	1.18	0.91	0.81	1.03
	Entrepreneur	1.23	1.10	1.36	1.18	1.04	1.33
	Skilled manual	1.25	1.12	1.40	1.14	1.02	1.27
	Unskilled manual	1.30	1.21	1.40	1.16	1.07	1.25
	All other	1.84	1.69	2.00	1.59	1.44	1.75
Education	Basic	1.00			1.00		
	Apprenticeship	0.94	0.86	1.02	0.91	0.84	0.99
	Lower secondary	0.96	0.88	1.05	0.89	0.81	0.98
	Upper secondary	0.87	0.76	1.00	0.71	0.61	0.83
	Tertiary	0.80	0.63	1.02	0.74	0.60	0.91
Ages 65-89							
Occupation	Non-manual/ civil servant	1.00			1.00		
	Farmer	1.16	1.11	1.22	1.13	1.07	1.19
	Entrepreneur	1.02	0.97	1.08	1.07	1.01	1.14
	Skilled manual	1.04	0.98	1.12	1.12	1.05	1.19
	Unskilled manual	1.12	1.07	1.16	1.17	1.12	1.22
	All other	1.15	1.11	1.19	1.16	1.12	1.20
Education	Basic	1.00			1.00		
	Apprenticeship	0.90	0.86	0.94	0.90	0.86	0.93
	Lower secondary	0.83	0.79	0.87	0.78	0.74	0.82
	Upper secondary	0.81	0.75	0.87	0.76	0.71	0.82
	Tertiary	0.69	0.59	0.81	0.67	0.58	0.76

Estimates are controlled for age.

Table 5: Age-adjusted death rates (per 1000 person years) for ages 35-65 and 65-89 by education; Austria 1981/82 and 1991/92.

Education	Year	Males				Females			
		Age adjusted death rates *		<i>Absolute difference to basic education</i>		Age adjusted death rates *		<i>Absolute difference to basic education</i>	
		Ages 35-64	Ages 65-89	<i>Ages 35-64</i>	<i>Ages 65-89</i>	Ages 35-64	Ages 65-89	<i>Ages 35-64</i>	<i>Ages 65-89</i>
Basic	1981/82	9.17	70.73			3.97	49.09		
	1991/92	8.46	62.04			3.68	42.94		
Apprenticeship	1981/82	7.84	67.83	<i>-1.33</i>	<i>-2.90</i>	3.88	42.47	<i>-0.09</i>	<i>-6.62</i>
	1991/92	6.82	57.09	<i>-1.64</i>	<i>-4.95</i>	3.22	37.44	<i>-0.46</i>	<i>-5.50</i>
Lower secondary	1981/82	6.27	55.89	<i>-2.90</i>	<i>-14.84</i>	3.67	38.82	<i>-0.30</i>	<i>-10.27</i>
	1991/92	5.05	47.25	<i>-3.41</i>	<i>-14.79</i>	3.09	31.57	<i>-0.59</i>	<i>-11.37</i>
Upper secondary	1981/82	5.44	52.21	<i>-3.73</i>	<i>-18.52</i>	2.98	37.59	<i>-0.99</i>	<i>-11.50</i>
	1991/92	4.34	44.41	<i>-4.12</i>	<i>-17.63</i>	2.47	30.63	<i>-1.21</i>	<i>-12.31</i>
Tertiary	1981/82	4.37	48.80	<i>-4.80</i>	<i>-21.93</i>	3.08	31.79	<i>-0.89</i>	<i>-17.30</i>
	1991/92	3.07	40.32	<i>-5.39</i>	<i>-21.72</i>	2.56	26.5	<i>-1.12</i>	<i>-16.44</i>

Table 6: Age-adjusted death rates (per 1000 person years) for ages 35-65 and 65-89 by occupation; Austria 1981/82 and 1991/92.

Occupation		Males				Females			
		Age adjusted death rates *		<i>Absolute difference to basic education</i>	Age adjusted death rates *		<i>Absolute difference to basic education</i>		
		Ages 35-64	Ages 65-89	Ages 35-64	Ages 65-89	Ages 35-64	Ages 65-89	Ages 35-64	Ages 65-89
Non manual/civil servant	1981/82	6.08	58.60			3.30	40.7		
	1991/92	5.92	50.18			2.96	33.9		
Farmer	1981/82	7.37	67.7	1.29	9.1	3.61	50.9	0.31	10.2
	1991/92	6.58	59.06	0.66	8.88	2.87	42.8	-0.09	8.9
Entrepreneur	1981/82	7.12	63.51	-1.04	4.91	4.00	42.5	0.70	1.8
	1991/92	6.43	52.47	-0.51	2.29	3.48	37.5	0.52	3.6
Skilled manual	1981/82	8.45	69.64	2.37	11.04	4.2	43.8	0.9	3.1
	1991/92	8.85	60.14	2.93	9.96	3.55	39.4	0.59	5.5
Unskilled manual	1981/82	10.3	74.49	4.22	15.89	4.42	48.6	1.12	7.9
	1991/92	10.5	66.38	4.58	9.96	3.69	43.7	0.73	9.8
All other	1981/82	21.5	69.56	15.42	10.96	7.85	49.5	4.55	8.8
	1991/92	18.8	56.26	12.88	6.8	5.73	42.9	2.77	9.0

- Figure 1: Age specific relative mortality risks for educational groups, Austria 1981/82 and 1991/92

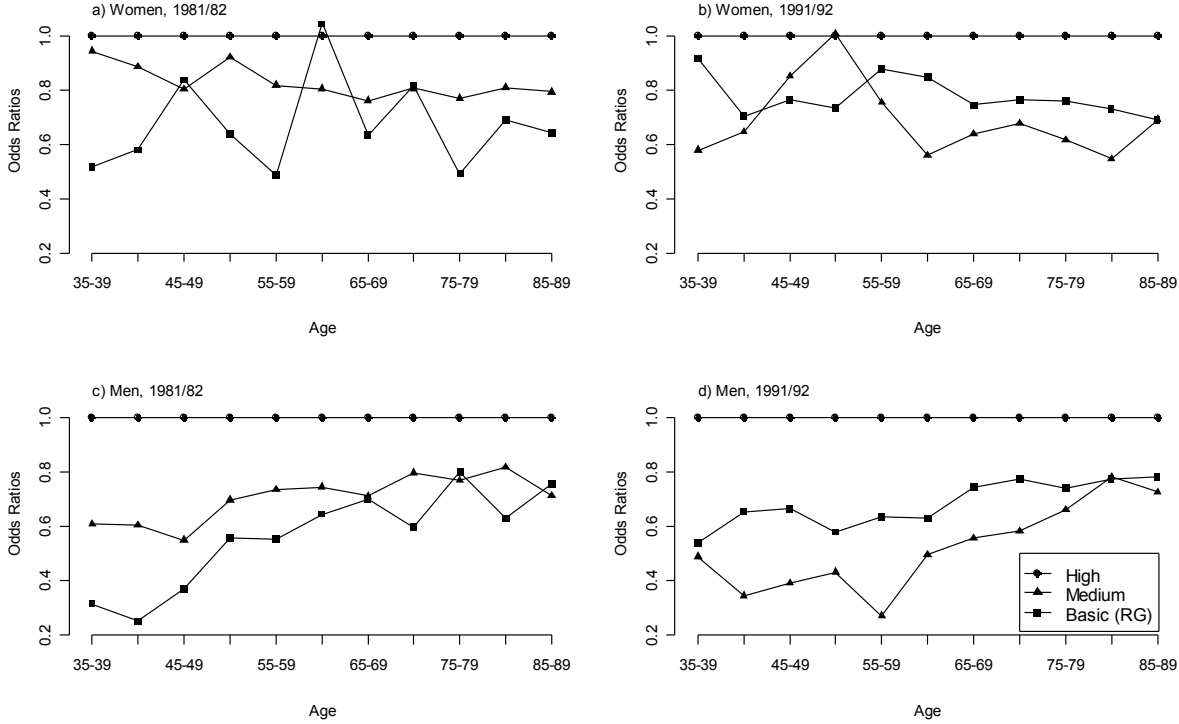


Figure 2: Age specific relative mortality risks for occupational groups, Austria 1981/82 and 1991/92

