



Mortality Patterns: Impact of Education and Medical Cause in the Czech Republic 2001–2005



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Background

Educational level can be considered as a proxy for the socio-economic position/class. Higher education usually results in better working conditions and also influences the lifestyle. Educational inequalities in mortality from all causes of death are large in the Central and Eastern Europe, more particularly in the Czech Republic (Plug et al 2012). In spite of low social differentiation in former socialist societies and universal access to free health services, significant differences in mortality according to education were observed (Rychtaříková 2004, 2006).

The purpose of the study is to examine mortality differentials by four education levels and eighteen groups of causes of deaths in the Czech Republic in the post-census period 2001–2005. Both sexes were analyzed separately. It was confirmed that there are not only significant differences in the overall mortality according to education, but that there are also differences according to groups of causes of death. The inequalities according to education related to mortality were also observed in the health conditions.

Data

- Data used come from two unlinked datasets of deaths and census population. The first data set (deaths) contained 449 968 cases and the second one (Census) 6 065 663 records. Counts of numbers of deaths are related to men and women aged 30–84 years old on January 1, 2001 and followed over the period 2001–2005 by five year birth cohorts.
- The death data have been cross-classified according to sex, five year birth cohorts (except the first one of 1961–1970, i.e. age of 30–39), education, and causes of deaths (see the data description in Table 1 and 2 and Figure 1).

Table 1: Groups of causes of deaths used in the analysis; the abbreviations and ICD 10 codes

Causes of death	Variable name	ICD 10 codes
Ischaemic heart disease	ISCHAE	I20-I25
Cerebrovascular disease	CERVAS	I60-I69
Other circulatory diseases	OTHCV	Rest (I00-I99)
Cancer of trachea, bronchus and lung	CALUNG	C33-C34
Cancer of colon-rectum	CACORE	C18-C21
Cancer of stomach	CASTOM	C16
Sex-specific neoplasms: Cancer of breast, uterus corpus and cervix uteri (females). Cancer of prostate and testis (males)	CASEXD	C50,C53-C55, C61-C62
Cancer of bladder, kidney, and other urinary organs	CABKOT	C64-C68
Other neoplasms	OTHCAN	Rest (C00-D48)
Diabetes mellitus	DIABET	E10-E14
Pneumonia and Influenza	PNEUMO	J10-J18
Road and other traffic accidents	ROTHAC	V01-V99,Y85
Suicide	SUICID	X60-X84
Accidental fall	ACCFAL	W00-W19
Other external	OTHEXT	Rest (V01-Y98)
Alcohol related	ALCREL	C00-C15, C22, C32, F10, I42.6, K70, X45
Chronic lower respiratory diseases	CHRORE	J40-J44, J47
All other	ALLOTH	Rest (A00-Y98)

Note: Adapted from Eikemo T. A. Mackenbach J.P. (eds) (2012) EURO GBD SE: The potential for reduction of health inequalities in Europe : Final Report. Department of Public Health, Erasmus MC, University Medical Center Rotterdam, The Netherlands

Table 2: Levels of education used in the analysis; the abbreviations and ISCED codes

Level of education	Educational attainment (ISCED 97)	Educational attainment (ISCED 2011)
Basic	ISCED 2	ISCED 2 and lower
Vocational	ISCED 3C	ISCED 35
Secondary	ISCED 3A	ISCED 34
University	ISCED 5A and higher	ISCED 64 and higher

Methods

Mortality analysis

- Standardized risk at age 30–84 (using the European Standard Population 2013) by sex and education.
- Multinomial logistic regression
 - Dependent variable has 19 categories (18 medical causes of deaths and last category is represented by survivors). The effect of education (exposure variable) on mortality by cause is examined when controlling for age. The regression model is computed for each sex separately.

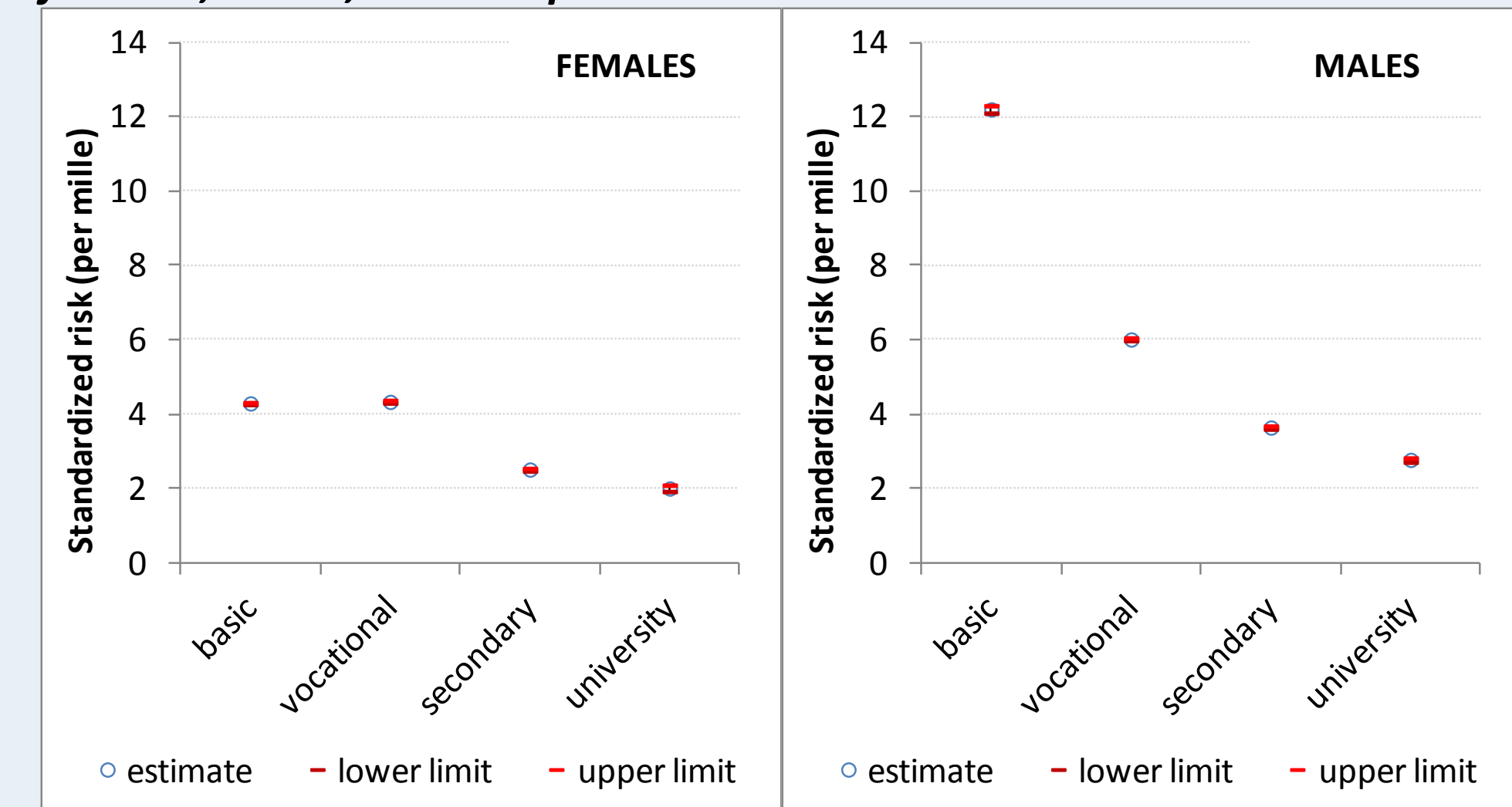
Health analysis

Multinomial and binary logistic regression based on data from the Generations and Gender Survey (2005) about the health status according to education.

Results

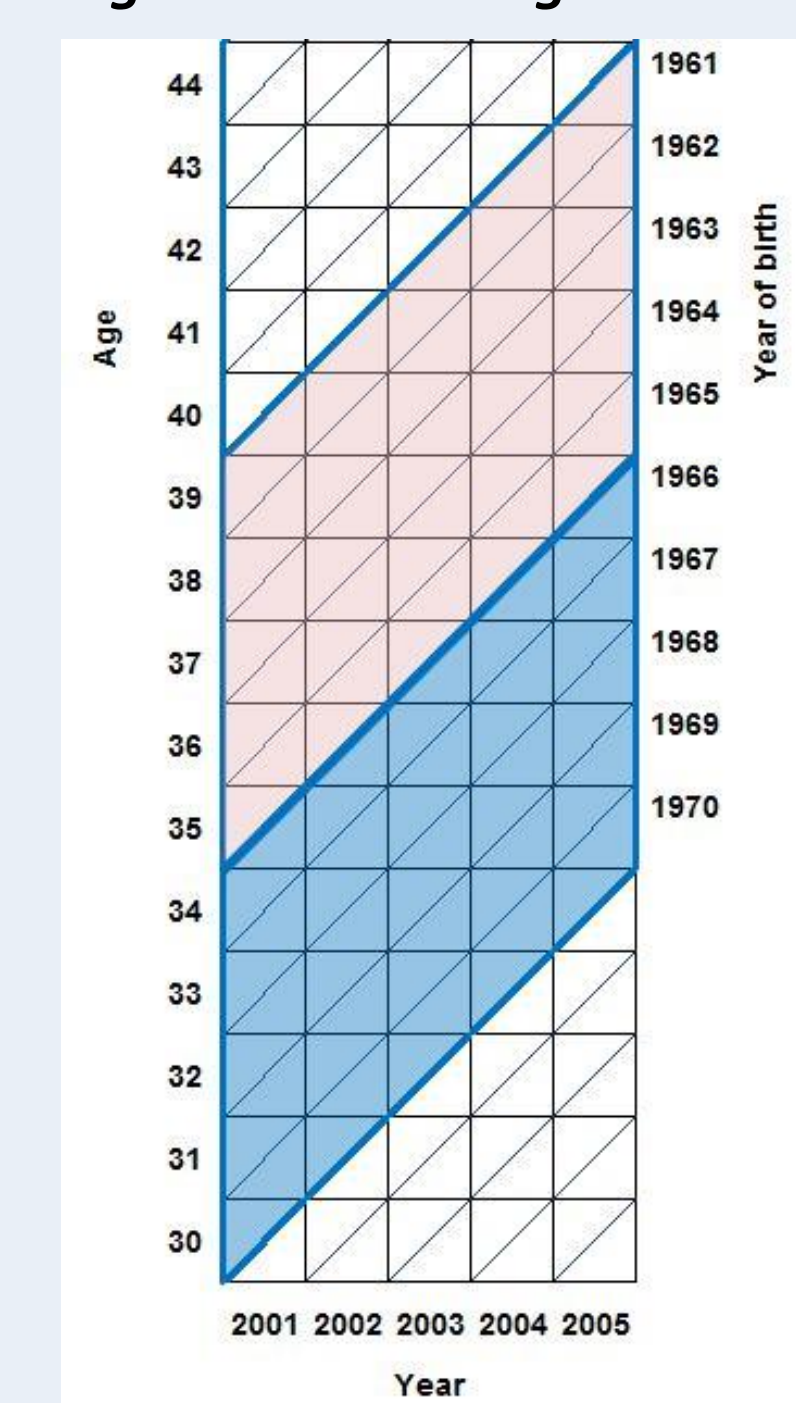
- Male inequality in mortality by educational attainment exceeds female inequality.
- The results show a consistency in the effects of education on male mortality – males with basic education experienced very poor health conditions due to hard work (mines, construction) and due to unfavorable life style (alcohol, smoking).
- The particular anomaly in the mortality gradient is observed when comparing basic and vocational education among women – women with basic education show lower mortality level compared to their vocational counterparts.
- It can be hypothesized that these women with vocational education worked during socialist era mostly in factories with detrimental working conditions. Less demanding work (agriculture, cleaning, house wife) was practiced by the least educated women.

Figure 2: Standardized risks according to levels of education, age 30–84, females, males, Czech Rep. 2001–2005



Data structure

Figure 1: Lexis diagram with the illustration of data structure



- The age was defined as the age at the beginning of the studied period (January 1, 2001).
- Five year age groups were defined by the years of birth.
- Two youngest age groups (30–34 and 35–39, shown in the diagram – Figure 1) were collapsed (as the age group 30–39).
- The death data have been cross-classified according to sex, five year birth cohorts (except the first one of 1961–1970, i.e. age of 30–39), education, and causes of deaths.

Figure 3: Probability of death according to levels of education and age, males, females, Czech Rep. 2001–2005

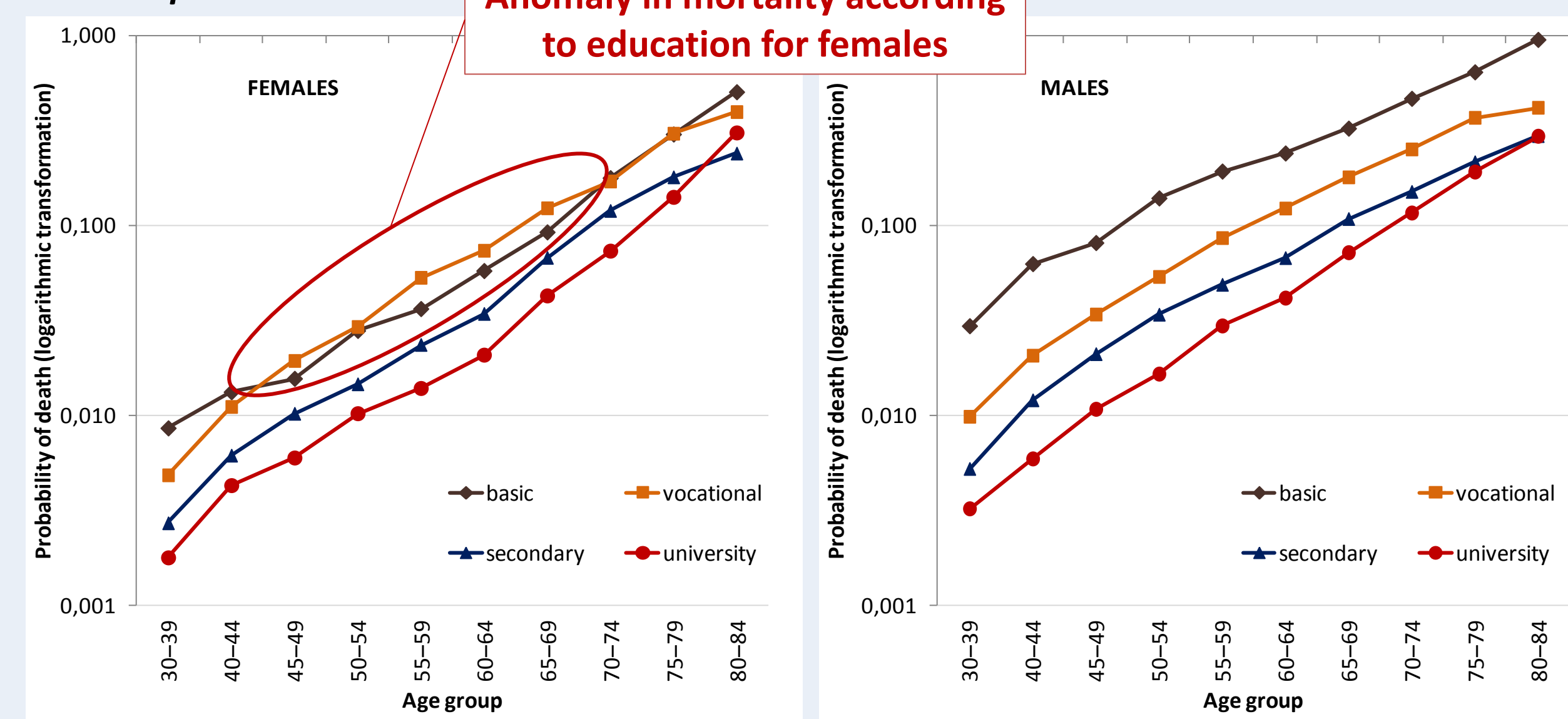
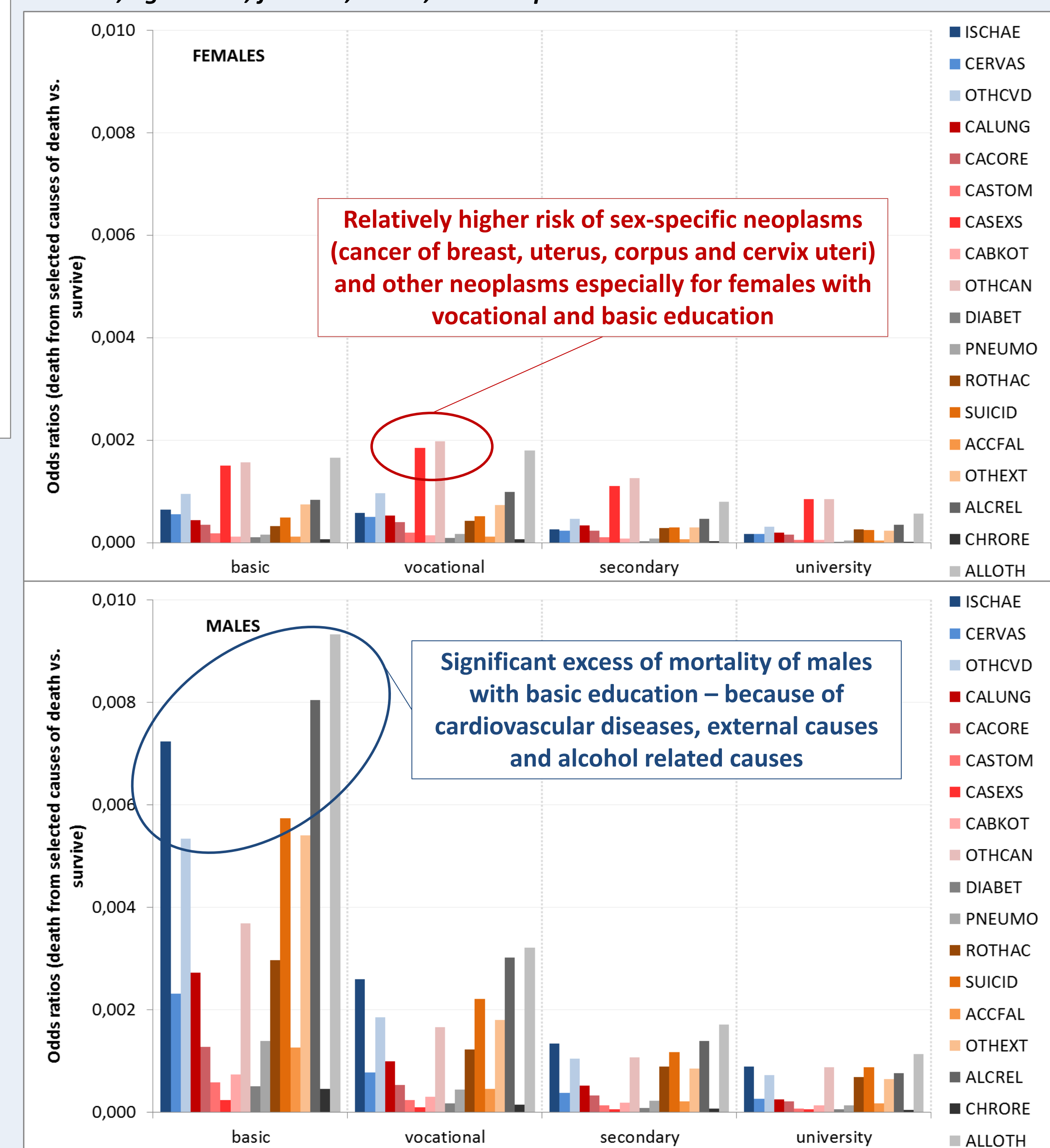


Figure 4: Odds ratios (multinomial regression) – death of selected causes of death vs. survival, age 30–84, females, males, Czech Rep. 2001–2005



Note: Multinomial logistic regression. Dependent variable has 19 categories (18 medical causes of death with the last category represented by survivors). The model is controlled for age and computed for each sex separately.

Self-Perceived Health, Chronic Morbidity, Activity Limitations

- Findings of health analysis confirmed the same gradient of educational inequalities observed in mortality analysis.
- However, the results do not sufficiently explain the mortality anomaly between women with basic and vocational education.

Table 3: Odds ratios: selected questions from the Generations and Gender Survey dealing with the health status, females, males, Czech Republic, 2005

FEMALES	Education attainment			
category	basic	vocational	secondary	university
How is your health in general? Reference category: Fair				
Bad	1,38 (*)	1	0,65 (**)	0,42 (**)
Good	0,80 (*)	1	1,29 (**)	1,64 (**)
Are you limited in your ability to carry out normal everyday activities, because of a physical or mental health problem or a disability? Probability modeled is yes				
Yes	1,03	1	0,75 (**)	0,50 (**)
Do you have any long-standing illness or chronic condition? Probability modeled is yes				
Yes	1,08	1	0,82(*)	0,80
MALES				
category	basic	vocational	secondary	university
How is your health in general? Reference category: Fair				
Bad	1,55 (**)	1	0,74	0,65 (*)
Good	0,87	1	1,44 (**)	2,00 (**)
Are you limited in your ability to carry out normal everyday activities, because of a physical or mental health problem or a disability? Probability modeled is yes				
Yes	1,12	1	0,56(**)	0,49 (**)
Do you have any long-standing illness or chronic condition? Probability modeled is yes				
Yes	1,18	1	0,81 (*)	0,79 (*)

- For each sex a separate model was computed.
- Age and partnership were the control variables.
- Education level impacts self-perceived health, chronic morbidity, as well as activity limitations.
- University graduates declare more often their self-perceived health as good, this is true especially for males.
- Similarly, the daily activities are limited mostly for people with lower levels of education. For females with basic and vocational education there is no significant difference.
- Moreover, chronic illnesses are more typical for people with lower education attainment, however, educational differences are the lowest among the analyzed questions.
- Being without a partner negatively affects men's health but does not impact women (not shown here).

Acknowledgments

This research was done with the support provided by the Grant Agency of the Czech Republic to the project no. P404/12/0883 'Cohort life tables for the Czech Republic: data, biometric functions, and trends/Generační úmrtnostní tabulky České republiky: data, biometrické funkce a trendy'.

Literature and sources

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