Four decades of mortality by cause of death in three European countries.

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BACKGROUND AND OBJECTIVES

Czech Republic, West Germany, and France entered the 20th century with very different levels of life expectancy at birth. Compared to France, Czech Republic entered the 20th century with a remarkable disadvatage of 4.5 years in male and 5.3 years of female life expectancy (Rychtarikova (1989) (Table 1). These differences between the two countries became negligible in the early 1950s, and until the mid-1960s, the male life expectancy at birth in the three countries evolved in a parallel way (Figure 1), following a general pattern of convergence as observed in most of the developed world (Vallin and Meslé 2005).

Table 1 Life expectancy at birth – 20th century

Year	Country	Males	Females	Gain in e(0) : Males	Gain in e(0): Females
1900	CZ*	38,90	41,70	23,07	25,15
	Germany**	40,57	43,97	23,99	24,51
	FR	43,40	47,00	20,03	22,19
1950	CZ	61,97	66,85	11,49	13,02
	WG***	64,56	68,48	12,66	13,79
	FR	63,43	69,19	13,79	14,96
2006	CZ	73,46	79,87	.	.
	WG	77,22	82,27	.	.
	FR	77,22	84,15	.	.

* Rychtarikova et al (1989)
** This figure has only orientation value. It was estimated for years 1891-1900 for the territory of Germany at the time being, i.e. including West Germany, Alsace-Lorraine, East Germany and some parts of Poland (Silesia, West Prussia, Posnania and Ostpreussen) (Haines and Kintner 2000)
*** The data come from the Human Life Table Database, they are for years 1949-1951

Source : Human mortality database, Rychtarikova et al. (1989), Haines and Kintner (2000), Human life table database

In 1965, the gap in male life expectancy at birth between France and Czech Republic was still only 0.5 years. During the second half of the 1960s, the Czech male life expectancy at birth suddenly started to decrease reaching its minimal post-war value in 1969. As of the early 1970s, this decline was followed by the two decades of stagnation.

French females have had a constant advantage in life expectancy over West Germany for the whole period of observation. The Czech female life expectancy at birth kept abreast with West Germany only until the mid-1960s. Between the second half of the 1960s and the end of the 1980s, the life expectancy of Czech females has increased slowly, while remarkable rates of improvement came by the end of the 1990s. Despite this remarkable progress of survival in Czech Republic during the 1990s and 2000s, the mortality disadvantage of the Czech males and females against their German and French counterparts remains very significant - life expectancy gap in 2006 is only about 1 year smaller than the corresponding value for 1900 (see Table 1).

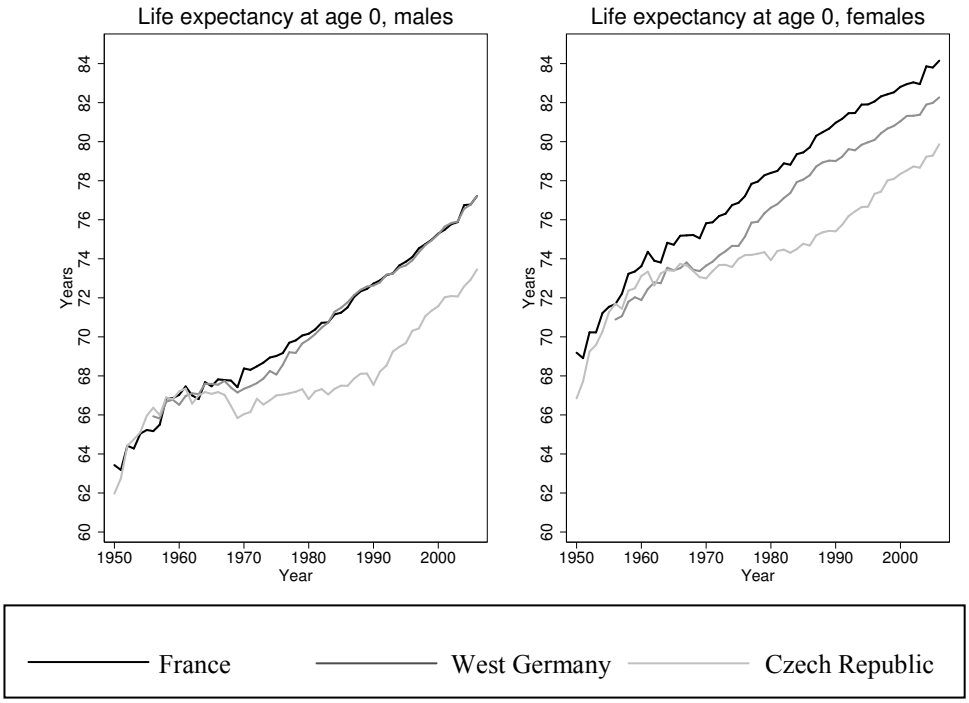

Figure 1 Life expectancy at birth in Czech Republic, West Germany and France in 1950-2006

A single breakdown of these divergent mortality trends by age reveals their nature only partially. The most of the early post-war improvements were driven by infant mortality, regardless of the political orientation. The absence of 1950s health progress in age group 60-69 and sustained mortality deterioration at ages 60-74 in 1960s, observed in all the three countries (not shown here), testifies of a sudden emergence of „new" diseases, revealed by saving lives at younger ages and reinforced by spreading adoption of unhealthy habits (namely smoking). The contemporary health care systems were taken by surprise: 1) they were pre-occupied by fight against infections, and 2) at the time, relatively little was known about risk factors, prevention and treatment of chronic diseases. The potentials of health care systems to prevent or treat these new health threats became one of the decisive factors for the demographic division of Europe into East and West.

Figure 2 and Figure 3 show how the emergence of the old-age diseases disadvantaged both the populations of West Germany and Czech Republic. The end of the 1960s brought significant relative worsening of old-age survival for both countries, which lasts until present. The only way to fully understand the reasons of the observed disparities is the use of reliable data on mortality by cause of death – the main objective of this contribution.

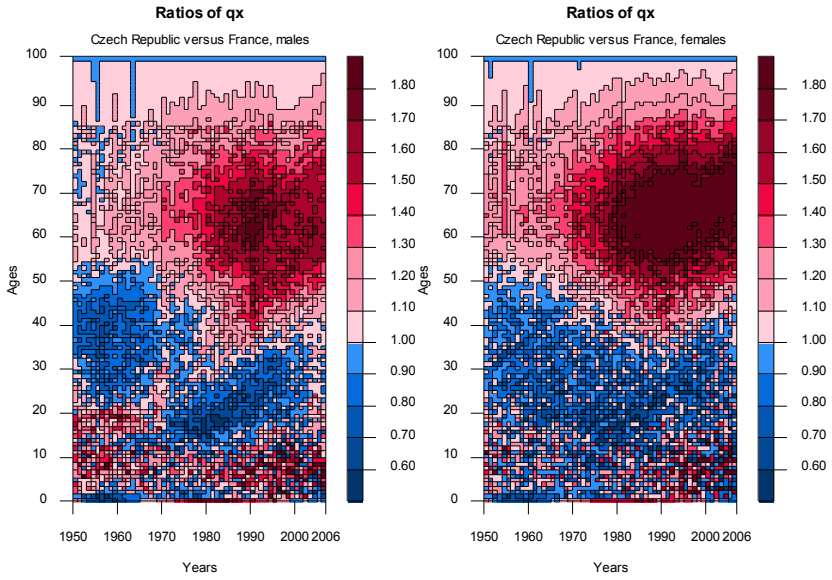

Figure 2 Ratios of death probabilities : Czech Republic divided by France

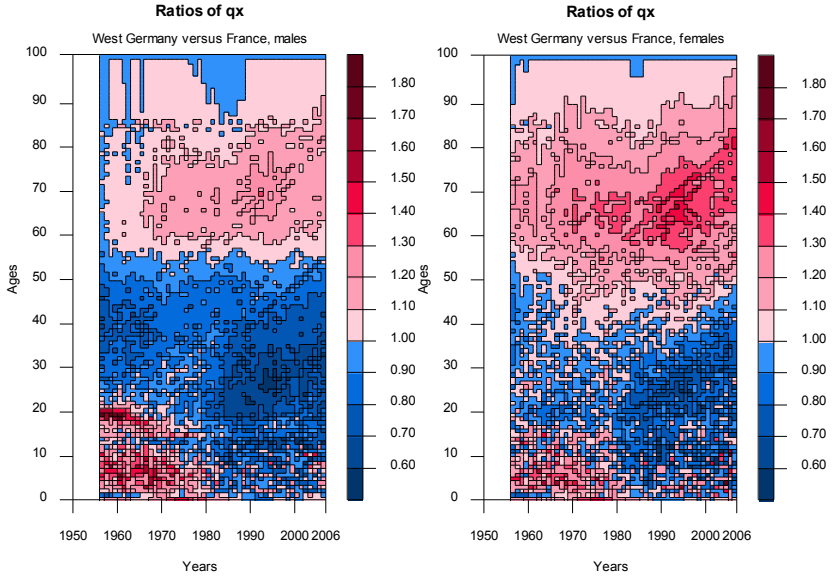

Figure 3 Ratios of death probabilities : West Germany divided by France

DATA AND METHODS

Reliability and applicability of detailed cause-of-death data is often questioned. The main objections concern: 1) their regular interruptions by the updates of the International Classification of Diseases (ICD), 2) their varying precision (the percentage of deaths with poorly defined cause), and 3) cross-national differences in the medical habits, reporting systems and coding manners in general. Therefore, most demographic studies focusing on causes of death limit their analyses either to the duration of one ICD revision or reduce their lists to large groups of diseases.

The data used in our contribution overcome most of these inconveniences. For all the three countries we use the reconstructed detailed ICD9 series beginning with the year 1968 and covering 25 years for Czech Republic, 29 years for West Germany and 32 years for France. These series were created using a method developed at INED and applied in several countries, including France (Vallin and Meslé 1988), Russia (Meslé et al. 1996), Ukraine (Meslé and Vallin 2003), and the Baltic countries. Long-

term time series also exist for the Netherlands (Wolleswinkel-van Den Bosch, Van Poppel, and Mackenbach 1996).[1] The method consists of systematic comparison of two successive ICD revisions and connection of the same medical content via the ex-post double classification. The question of poorly defined causes was solved by their proportional redistribution into well-defined causes.

To update these existing series to the current 10th ICD revision, we developed a special shortlist of 185 ICD items.[2] The transition to ICD10 extended the series to the year 2008 for Czech Republic, 2006 for France and 2004 for West Germany.[3]

To address the issue of international comparability, we checked the data for differences in the coding manners, where it was possible. This was done empirically by studying the detailed ICD9 series with the focus at possible problems reported in the literature. Typical problematic diseases include social pathologies (suicides, drug and alcohol abuse, violence), stigmatizing conditions (HIV), mental diseases and the ill-defined causes of death.

RESULTS

The shortlist of 185 items was also developed as an analytical tool. It can be contracted to directly comply with the 113-list of causes of death used by the NCHS for the US mortality data or to the European list of 65 causes developed by EUROSTAT.

The shortlist also allows for division of causes into avoidable or not, and thus to study the role of health care in the observed mortality trends. Finally, the concepts of smoking and alcohol related mortality were taken under consideration too, and our shortlist allows for such type of study as well.[4] The interpretation of the results is the work in progress, but several interesting findings can be pointed out already :

- All three health care systems handled infectious mortality with similar success
- The mortality differences are driven by cardiovascular diseases, and cardiovascular diseases are also most sensitive to national coding manners
- The fight against cardiovascular mortality is more successful with acute than with chronic conditions
- The most dramatic gap emerged due to the rapid increase of cerebrovascular mortality in the Czech Republic in the 1970s
- Czech Republic failed to lower the mortality from avoidable conditions
- France has higher mortality from « new and re-emerging diseases » (typically in immunocompromised patients), and is probably a precursor for next health trends in the elderly population

LITERATURE

Haines, M. R., and H. J. Kintner (2000). The mortality transition in Germany, 1860–1935. Historical Methods 33: 83–104

Meslé, F., Shkolnikov, V., Hertrich, V. And Vallin, J. (1996). Tendances récentes de la mortalité par cause en Russie, 1965-1994 : la crise sanitaire dans les pays de l'ex-URSS : Epidemiologiceskij krizis v stranah byvsego SSSR. Paris: INED (Données statistiques).

Meslé, F. and Vallin, J. (2003). Mortalité et causes de décès en Ukraine au XXe siècle: la crise sanitaire dans les pays de l'ex-URSS. Paris: INED (Les Cahiers de l'INED; 152).

[1] The method used in Netherlands is based on the *ex-post* double classification, but works with nested classification consisting of three levels of refinement for different time periods (from 27 reconstructed causes in 1875-1992 to 92 causes for the 1931-1992 period.)

[2] A full-scale reconstruction of the series according to ICD10 has proved not to fit in the scope of the presented contribution.

[3] West Germany does not formally exist since 1990, and ceased to exist „statistically“ in 2004 : in that year a reform of districts in Berlin took place no longer allowing for backward statistical continuity of the West German territory

[4] Complementary information on smoking and drinking prevalence is required.

Rychtaříková, J., Vallin, J., Meslé, F. (1989) Comparative study of mortality trends in France and the Czech Republic since 1950. Population English Selection I, 44, September, p.291-321

Vallin, J. and Meslé, F. (1988). Les causes de décès en France de 1925 à 1978. Paris: PUF, INED (Travaux et documents; 115).

Vallin J., Meslé F. (2004). Convergences and divergences in mortality. A new approach of health transition, *Demographic Research*, Special Collection 2, Article 2, 2004.

Wolleswinkel-van Den Bosch, J. H., Van Poppel, F. W. and Mackenbach, J. P. (1996). Reclassifying causes of death to study the epidemiological transition in the Netherlands,1875-1992. *Eur J Popul* 12(4): 327-61.