Dissertation thesis of Markéta Pechholdová

Four decades of cause-specific mortality in the Czech Republic, West Germany and France

Evaluation report
by Jacques Vallin

This dissertation summarizes an enormous work of reconstruction of coherent time series of deaths by cause for West Germany and the Czech Republic overcoming the statistical ruptures caused by the two last revisions of the International Classifications of Diseases (ICD-9 and ICD-10), and even more, since to compare with France it was necessary to solve the problem of ICD-10 for that country to update the data already reconstructed into ICD-9. In spite of two final chapters devoted to comparative analyses of reconstructed data, the main substance of this work is methodological. But far from a simple application of existing methods it is a very innovative exercise that results not only in the reconstructed data now available for many purposes, but also in technological refinements or novelties that will be very useful for those who will undertake similar work in other countries.

The issue is the following. Changes in the cause-of-death classification in use break the statistical series available for researchers or public health actors. In the countries where a bridge coding is produced for the transition year, it is possible to get correction coefficients to reconstruct continuous series. No bridge coding exist for West Germany nor the Czech Republic and the one done in France for ICD-10 gives a very insufficient level of detail. Furthermore, as it has been often shown, no bridge coding done for one country can ever serve for another one. The only way is to analyse in detail all the ICD changes, to make (and to check) precise hypotheses on the various exchanges between specific items caused by the revision, in order to produce correction coefficients ex-post. Knowing that ICD-9 includes about 5,000 items and ICD-10 more than 10,000, one can imagine years of works for dozen of people. Actually basic data are not always available in such a detail. For West Germany and the Czech Republic, only the three digit levels of ICD-8 and ICD-9 are available. And, for ICD-10, Markéta Pechholdová built her own 186-item special list. But even with such short cuts that is a tremendous task. Only the reconstruction for one country after one ICD revision would justify a doctoral study. Markéta Pechholdová did not hesitate to undertake twice the work for ICD-9 and even three times for ICD-10. And once again, this is not a repetition since each case brings its series of specific problems.

As a mark of a great modesty but also that of a deep knowledge in the matter, Markéta Pechholdová's dissertation does not stretch much over the amount of encountered difficulties. The author moves elegantly across emblematic problems without borrowing the reader with too many specific cases.

A short but efficient introduction discreetly places the topic in the general framework of the health transition the understanding of which obviously requires results as those exposed here. Then six chapters assemble very logically the most important pieces of the work. Chapter 1 gives a quite intelligent overview of the history of the international classification from its origins until its near future promised by the on-going 11th revision, as well as a clear explanation of the complex rules established by the WHO for the selection of the so called "underlying cause of death". Chapter 2 describes shortly but precisely the way each of the three countries collects information and produce cause-of-death statistics. Chapter 3 deals with the reconstruction over ICD-9 changes for West Germany, and then the Czech Republic,

without omitting to solve problems caused by unrecorded changes in national coding practices at any time, nor the question of ill-defined causes of death. Chapter 4 does the same, quite differently of course, with ICD-10, after rethinking the rare attempts already made without great success. Chapter 5 compares the changes in cause-of-death patterns observed between the three countries during the last 35 years. And finally Chapter 6 goes deeper by using various life-table methodologies to measure the role of causes of death in life expectancy levels and trends.

All is done in 183 pages only! Pertinently enriched with a CD-Rom including technical tables that will be of great help for further investigations. Done and well done. In spite of great effort to try to track any formal deficiency I was quite unsuccessful. To avoid appearing completely empty-handed, let us say that chapters are badly numbered in the Table of contents, starting with 2 instead of 1 in the chapter headings. In a first step, when reading a preliminary version printed in black and white on a low quality printer, I thought of charging the author with a lack of consideration for my ageing eyes when drawing her graphs, but I must admit that the official colour printed issue I then received is quite readable! Indeed I cannot be a good judge for Markéta Pechholdová's English but it seems to me excellent and I took a great pleasure to read it. Rarely did I read so well written a doctoral dissertation!

Elegant form is a pleasure, but the quality of content is more important, naturally.

On this side, I have no more relevant comments to do on chapter 1 to 4 that simply demonstrate that the author has a complete control of the cause-of-death classifications and statistics, as well as of all existing experiences of time series reconstruction. From the beginning to its end the work was accomplished with a great mastery. And plenty of the procedures or new technical tools she invented to solve difficult questions encountered will be of great help for future researches. This is crucial, since the main content of her doctoral work is there.

The last two chapters, that gives ideas on how results of the reconstruction work can serve a better knowledge of mortality trends, open the door room for more questions, naturally. Let us focus on two remarks.

First, to analyse respective roles of specific causes of death in life expectancy changes over time in the Czech Republic as compared to France and West Germany since 1950, the choice made by the author of a systematic examination of decennial periods is not the best one. In order to understand the dynamic of life expectancy it would be more appropriate to select periods according to years of change of life expectancy in the CR. Roughly, there are three major period of interest: 1950-1961, 1961-1990, and 1990-2006. Indeed 1961 is the year when divergence between the CR and the two western countries started while 1990 is the one where the CR started to catch up France and West Germany. If we want to refine more, three sub periods could be interesting to investigate between 1961 and 1990: 1961-1967 (pure stagnation in CR but also slowing down in France and West Germany), 1967-1970 (impact of the flue epidemics, that seems to have be aggravated in CR but not in the other two countries), and then 1970-1990 (very slow progress in CR as compared to western countries). Comments of pages 150-153 would have been much easier and efficient.

Second, the last method used to analyse interactions between cause, age and life expectancy (p. 169-174), especially the graphs of figures 93 and 94, is questionable. It combines for each cause mean age at death by the specific cause with the proportion of deaths due to the latter

and the results are shown by the mean of rectangles as if these two components are multiplicative. Interpreting such graphs is quite a challenge, since the two components impact life expectancy in opposite direction: the higher mean age at death, the higher is life expectancy, while the higher is the fraction of deaths, the lower is life expectancy. The only interesting thing here is to see what causes have a higher age at death than the general mean and in what order. Instead of that, graphs attract more reader's attention towards rectangles' surfaces that have no sense. And the things are even more complicated by the fact that causes are systematically put in the same order while they should be ranked according to their mean age at death. Consequently the correspondence between the comments and the graphs is not easy.

In spite of the latter reservation, the whole dissertation is a real benchmark in the advancement of knowledge on German and Czech mortality trends and patterns and a valuable addition to what was already known for France. Complete coherent time series of deaths by cause are now available for the two first countries over the whole period covered by ICD-8 and ICD-9 at the level of the three-digit items. In addition the ICD-10 cuts have been over passed for the three countries in an innovative way, through a shorter list of 186 items, that allows precise and fruitful comparative analysis for four decades. That is an outstanding contribution to the enrichment of the international patrimony of scientific information on causes of death. In addition, by applying various classical methods of analysis to her reconstructed series, the author made a clear demonstration of the promising usefulness of her reconstruction as well as of her research ability.

For all these reasons, Markéta Pechholdová's dissertation fully deserves to be defended and her author fulfils all the criteria necessary for obtaining the Ph D degree.