Investigating social inequalities in HE by surveys with mortality follow-up: a feasibility study

Clare Gillies and Carol Jagger for the EHLEIS team
The EHEMU/EHLEIS team comprises:

Jean-Marie Robine, Health and Demography, University of Montpellier, France, robine@valdorel.fnclcc.fr
Carol Jagger, University of Leicester, United-Kingdom, cxj@le.ac.uk
Herman Van Oyen Scientific Institute of Public Health, Brussels, Belgium, Herman.VanOyen@wiv-isp.be
Emmanuelle Cambois, INED (Institut National d’Etudes Démographiques), Paris, France, Cambois@ined.fr
Gabriele Doblhammer, Rostock Center for Demographic Change, Germany, doblhammer@rostockerzentrum.de
Wilma J. Nusselder, Erasmus University, Rotterdam, w.nusselder@erasmusmc.nl
Jitka Rychtarikova, University Charles, Prague, Czech Republic, rychta@natur.cuni.cz
Bianca Cox, Scientific Institute of Public Health, Brussels, Belgium, Bianca.Cox@wiv-isp.be
Clare Gillies, University of Leicester, United-Kingdom, clg13@le.ac.uk
Claire Weston, University of Leicester, United-Kingdom, clw19@le.ac.uk
Anne Kruse, Rostock Center for Demographic Change, Germany, kruse@rostockerzentrum.de
Isabelle Beluche, Health and Demography, University of Montpellier, France, isabelle.beluche@valdorel.fnclcc.fr
Renaud Counienc, Health and Demography, University of Montpellier, France, renaud.counienc@valdorel.fnclcc.fr
Cedric Hassen-Khodja, Health and Demography, University of Montpellier, France, cedric.hassen-khodja@valdorel.fnclcc.fr
Isabelle Romieu, Health and Demography, University of Montpellier, France, iromieu@valdorel.fnclcc.fr
Christine Perrier, Health and Demography, University of Montpellier, France, robine@valdorel.fnclcc.fr

Contact EHEMU: Jean Marie ROBINE
Equipe Démographie et Santé, Centre Val d’Aurelle, Parc Euromédecine, 34298 Montpellier cedex 5, France.
Tel: +33 (0) 467 61 30 29
Fax: +33 (0) 467 61 37 87
Email: robine@valdorel.fnclcc.fr

EHLEIS project co-funded by DG SANCO (Agreement number 2006109)
Background

Since the development of health expectancy measures in the late 1960s, their use to identify health inequalities has flourished. Health expectancies add a quality dimension to the quantity of life by measuring whether increases in life expectancy are years of healthy life or are simply due to extending the lives of the frail. However answering this question requires not only regular monitoring of life expectancy but also health expectancies. Chronological series of health expectancies have been published for only eleven European countries: Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Lithuania, Netherlands, Spain, and the UK. Most of these are not comparable since they have been undertaken independently and are based on seven different health domains: self-perceived health, chronic morbidity or long-standing illness, impairment, functional limitation, activity limitation including basic and instrumental daily activities, happiness, and well-being.

Until recently, the only data with comparable health measures across different European countries was the European Household Panel Study (ECHP). A comparable series of health expectancies across 13 EU member states over the time period 1995 to 2001 using the ECHP has now been calculated. Consistent increases in life expectancy at ages 16 and 65 were found in all thirteen countries, but only two countries (Austria and Italy) had strong evidence of compression of disability. Three further countries (the Netherlands, Germany, and the United Kingdom) showed strong evidence of expansion of disability, though not of severe disability, thereby suggesting dynamic equilibrium.

Our European populations are, however, not homogeneous and an important question at the national and European level is whether all social groups are experiencing compression or expansion similarly. To understand the data needed to assess the relationship between life and health expectancy within social groups requires an understanding of how health expectancy is calculated. The simplest and most widely used method is Sullivan’s method which requires the age and sex specific prevalence of health (however measured) from a cross-sectional survey and a population life table of the same time period. To monitor specific subgroups of the population these quantities are needed for each subgroup. Whilst most surveys include relevant socio-economic measures so that the prevalence of health is easily obtained for these subgroups, most countries do not routinely produce life tables for subgroups of the population other than gender or region. Where health expectancies have been calculated for population subgroups, for example by level of education, deprivation or social class), these have generally used multi-state life tables from longitudinal data which provides both the mortality and health transitions. With regards to education, the most
readily available and comparable measure of socio-economic status, the consensus is that those in the lowest education group live shorter lives, have more years of ill-health, and enjoy fewer healthy years than those with the highest levels of education \(^{25-27}\).

For time series the optimum technique is Sullivan’s method \(^{24}\) since time series with longitudinal data are scarce and can be subject to bias through attrition. Two European countries have produced trends in health expectancies by education, a measure of social inequity from early in life. In the Netherlands, between 1989 and 2000 educational differentials in morbidity-free life expectancy decreased by 2.5 years for men and 0.7 years for women, perhaps because of earlier diagnosis of chronic diseases in the less educated \(^{16}\).

In contrast in Denmark, the gaps in healthy life expectancy (based on self-rated health) and disability-free life expectancy (DFLE) between the most and least educated increased between 1994 and 2005, despite the decrease in numbers of people with the lowest level of education \(^{28}\).

Occupation is often viewed as a measure of inequity in middle rather than early or late life. As for education, the consensus is that those with the lowest occupational status live shorter lives, with more years of disability and fewer years disability-free though these results are based on only one time point \(^{29-36}\).

The contrasting trends for the Netherlands and Denmark by level of education highlight the need for a more comparable analysis across European countries. The aim of this paper is to review potential data sources that comprise European surveys covering more than one country at ideally more than one time point and that include measures of health, socio-economic position and with mortality follow-up of participants. Two potential data sources were identified: European Prospective Investigation into Cancer and Nutrition (EPIC); and the Survey of Health and Retirement in Europe (SHARE). These are reviewed as to their suitability below.

**EPIC**

EPIC is an ongoing multi-centre, prospective cohort study investigating the role of biological, dietary, lifestyle and environmental factors in cancer and other chronic diseases \(^{37}\). Between 1992 and 2000, 519978 apparently healthy volunteers (366 521 women and 153 457 men) were recruited in 23 centres from 10 European countries. The study started with 7 core countries (France, Germany, Greece, Italy, the Netherlands, Spain, and the United Kingdom) which were later joined by Sweden, Denmark and Norway who were conducting broadly similar prospective studies. One of the clinics in Italy (Naples) also joined EPIC at a later stage. The age range at recruitment was broadly from 35 to 70 years, although this varied...
slightly between countries, as did source populations. At enrolment information was collected through a non-dietary questionnaire on lifestyle variables and through a dietary questionnaire addressing usual diet. Anthropometric measurements and blood samples were also taken. The main outcome measure for the study is incident of cancer and mortality with successful follow-up of the 521,000 subjects enrolled in the EPIC cohort, with little loss to follow-up during this time period, and the identification of over 26,000 incident cases and nearly 16,000 deaths.

For the seven core EPIC countries a common set of questions and possible answers was agreed upon and translated into national questionnaires. This included questions on education, socio-economic status, current and past occupations, medical history, alcohol consumption, smoking history, physical activity and use of exogenous hormones for fertility or menopause treatment. In Denmark, Sweden, Norway and Naples (all of whom joined EPIC late) questionnaires on non-dietary variables had already been developed independently. Nevertheless the questionnaires covered broadly similar questions and a comprehensive recoding system was developed to standardise these questionnaires to the core EPIC questions.

In terms of data on socio-economic status, all centres have information on highest school level achieved. The centres in Italy, Spain, Cambridge, Greece, Germany and Denmark have information on occupational history and the Norwegian centre has information on current occupation. These appear to be the only measure of socio-economic status recorded. To date only one publication has utilised socioeconomic status across all the involved countries and was based solely on educational level. Four categories were used in the analyses defined as (i) primary school or less, (ii) vocational secondary education, (iii) other secondary education and (iv) college or university. Subjects without school attendance were assigned to the lowest educational level. In addition, the RII26 was calculated, this measure is based on a hierarchical order of education and was developed to overcome the problem of large ratios of risk due to small group size at the extremes of the indicator.

The main advantage of the EPIC data set for calculating health expectancies by socio-economic status are the length of the follow-up for mortality. The major disadvantages are that not all European countries are covered, the relative age of the dataset (cohort inception 1992-2000) and that there is only a single time point for each country cohort. In addition the measures of socio-economic status which have been used throughout all countries appear to be only level of education. Since the main focus of the study is cancer, it is likely that there is a limited range of other health measures.
The Survey of Health, Ageing and Retirement in Europe (SHARE) is a multidisciplinary and cross-national panel database of micro data on health, socio-economic status and social and family networks of more than 45,000 individuals aged 50 or over. Based on probability samples in all participating countries, SHARE represents the non-institutionalized population aged 50 and older. SHARE is co-ordinated centrally at the Mannheim Research Institute for the Economics of Aging, under the leadership of Axel Börsch-Supan. The study was modelled on the U.S. Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). Eleven countries were included in the baseline wave of SHARE in 2004, these being a balanced representation of the various regions in Europe, ranging from Scandinavia (Denmark and Sweden) through Central Europe (Austria, France, Germany, Switzerland, Belgium, and the Netherlands) to the Mediterranean (Spain, Italy and Greece). Further data were collected in 2005-06 in Israel. Two of the newer EU member states - the Czech Republic and Poland - as well as Ireland joined SHARE in 2006 and participated in the second wave of data collection in 2006-07. Data collection in 2006-7 included follow-up of participants in 2004, providing a longitudinal dimension and potential mortality data.

Data collected include health variables (e.g. self-reported health, physical functioning, cognitive functioning, health behaviour, use of health care facilities), psychological variables (e.g. psychological health, well-being, life satisfaction), economic variables (e.g. current work activity, job characteristics, opportunities to work post retirement age, sources and composition of current income, wealth and consumption, housing, education), and social support variables (e.g. assistance within families, transfers of income and assets, social networks, volunteer activities).

Advantages of the SHARE survey for describing inequalities between social groups in health expectancies include the wide array of health measures and the harmonised socio-economic variables which have been extensively used already in publications. However to date no mortality data are available and observed deaths will be few given the age of the participants (50 years and over).

**Conclusion**

At present there is no readily available data set which provides harmonised health and socioeconomic measures across multiple European countries and which includes follow-up for mortality. The European Health Interview Survey (EHIS) may provide a means of doing this but at present the likely sample sizes per country are small and it is viewed as a repeated cross-section rather than including a follow-up for mortality.
References


