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HEALTH STATUS TRANSITIONS
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Extracting the Policy Implications from
HEALTH STATUS TRANSITIONS
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(AGEING, HEALTH STATUS & DETERMINANTS OF HEALTH EXPENDITURE)

ENEPRI Policy Briefs present the policy implications of research carried out by member institutes of the European Network of Economic Policy Research Institutes. Initiated by CEPS in 1999, ENEPRI conducts research on welfare and employment issues with the aim of diffusing existing research, coordinating research plans and increasing the awareness of the European dimension in national problems. The research presented in this Policy Brief was conducted under the AHEAD project (Ageing, Health Status and the Determinants of Health Expenditure), which was funded for a three-year period by the European Commission under the 6th Research Framework Programme (contract no. SP21-CT-2003-502641). The research, carried out by a CEPS-led consortium of 18 partner institutes, was organised into nine Work Packages, the results of which have been published in the ENEPRI Research Report series and are available for free downloading on the CEPS online bookshop (<http://shop.ceps.eu>) and from the ENEPRI website (<http://www.enepri.org>).

A brief description of the AHEAD project and a list of its partner institutes and publications can be found on the last pages of this Policy Brief.

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The Goals of WP IV

The purpose of this work package was to build up a picture of the movements in health status of the whole population of each country by age. In WP III of the AHEAD project, transition probabilities were calculated for the migration between the different states of health, and for selected countries, migration into residential care and death. We use these probabilities together with demographic data from various sources to produce demographic accounts and then use these once again to produce transition probabilities. This circular process is necessary to assess the probabilities calculated in WP III and to produce transition probabilities for categories which were not explored in WP III, for instance death rates in residential care. Furthermore we then use transition matrices to calculate healthy life expectancies.

Methods used

The idea for this work package was to produce a demographic accounting matrix for each age/sex group. The assumption was that a health distribution of the population could be calculated from European Community Household Panel (ECHP) data. The number of deaths and the number of residents in institutional care were assumed to be known from sources like death registrations or census. A source for the number of deaths in residential care, however, was less obvious. The number of deaths in residential care could be derived, assuming sufficient availability of ECHP data, as well as data on residents in institutional care and overall deaths. The intention was to use transitions calculated from ECHP data not only for transitions between health states in households, but also for transitions into residential care and into death. Those estimates then should have been calibrated using the Stone-algorithm.¹

Unfortunately, for quite a number of countries it was not feasible to estimate the number of deaths or transitions into residential care from ECHP data, as those transitions were severely underreported. Furthermore, there is insufficient data on residential care and deaths in residential care in most European countries. The quality of the data provided on residential care and deaths in residential care varies widely between countries. In addition to differences in data quality (i.e. underreporting), different definitions of residential care in member countries pose an issue concerning data comparability. Good data on residential care (Netherlands, Finland) coincides with lack of transition rates calculated from ECHP in WP III.

Therefore, the choice of countries for which calculations have been made is severely limited by the availability of the necessary data. We thus selected Belgium, Germany, and the UK, as for

¹ The Stone-algorithm is a method to construct and to balance socio-demographic matrices. In contrast to the more frequently applied RAS method, the algorithm published by Richard Stone in 1982 is a least-square-estimation which allows differentiation between more and less reliable data using a variance matrix.

all three countries we have transition probabilities from WP III as well as age and sex specific information on residents in residential care institutions. Given the afore-mentioned limitations concerning data availability, the calculation of an EU-wide benchmark seemed not to be reasonable. But we were thinking of the *theoretical* possibility of an EU-wide benchmark.

In addition, we calculated a panel-regression analysis to detect age-, gender- and country-specific differences in the transition probabilities.

Results

We calculated transition probabilities for three countries (Belgium, Germany, the UK) for the age group 65-86, separately for both sexes. We thereby showed the technical feasibility of the Stone-algorithm. Nevertheless, due to the data issues described above, results should be viewed with caution.

- Estimated transition probabilities evolve less smoothly with increasing age than transition probabilities from Work Package III. This result was to be expected as WP III used a probit function approach and parameterised age. In contrast, Work Package IV estimates probabilities separately for each age. By using the probit function approach with age being the only explanatory variable, estimated transitions are forced into a smooth form and can evolve with increasing age only in a certain way, i.e. rapid changes between steeper and less steep sections cannot result from this functional form.
- Transition probabilities are not consistently lower than estimated in WP III. The direction of deviations varies e.g. with age. Examples are probabilities for staying in poor health, especially for women. As WP III for all three countries estimated probabilities conditional on no transition into residential care, on average lower probabilities had to be expected: starting from one state of health, transition probabilities into all health states considered, plus death have to sum up to unity. A direct comparison between WP III and WP IV results on transitions into institutions is hampered by differing states of origin: In WP III, all origins are collapsed, while WP IV estimates transitions from all possible four states of health, ‘Very good’, ‘Good’, ‘Fair; or ‘Bad’ separately. Thus, transitions from ‘Bad’ are likely to be higher; other transitions into residential care are likely to be lower than estimated in WP III, as can be seen in the UK and Belgium.
- Discrepancies between WP III results and WP IV results are higher in the higher age-groups. As WP III estimates transitions that are conditional on staying out of residential care, and in reality transitions into residential care are more likely in old age, this result is plausible.
- Discrepancies between WP III results and WP IV results are higher for women. We have not yet found an interpretation for this result.
- Life expectancies (at the age of 65) derived from WP IV transitions tend to be lower than WP V. Differences between WP V and WP IV results can be seen for both sexes, but more pronounced for women. We have to note, though, that the calculation procedures are not completely comparable, as life expectancies in WP IV were calculated starting at the age of 16 and assume a life expectancy of 100, while our calculations are confined to elderly people assuming a life expectancy of 90 due to lack of observations for older persons (the comparison refers to ‘adjusted’ (healthy) life expectancies in WP IV).
- Comparing healthy life expectancies (again at the age of 65) derived from WP IV transitions to those derived from WP V, we find large sex- and country specific differences.

- As the estimation approach allows a considerable degree of freedom, the results have to be considered with caution. In order to achieve results that are compatible with the logic of health transitions, the applied method (Stone-algorithm) had to be implemented in a way that allows a high degree of freedom, i.e. we had to allow the sums of columns and rows to be variable rather than fixed. Using the original version of the Stone-method resulted in some implausible results, like increasing probabilities to move to better health states with increasing age in Germany. We assume that better data quality would allow us to reduce this degree of variability, which in turn would allow more reliable results.
- In order to achieve a reduction in time spent in residential care we compared two policy scenarios. One is primarily targeted at reducing the transition probability of directly entering residential care, while the other focuses on a general improvement of health by increasing an individual's chance of transition to more favourable health states. Our results show that in order to achieve the same reduction in time spent in residential care; the second approach seems more realistic as the magnitude of the necessary changes in transition probabilities is significantly smaller. Moreover, the more all-encompassing approach proves to be more successful in enhancing quality of life as represented by healthy life expectancy and life expectancy in general.
- A possible approach in developing a benchmarking tool for comparing health state transition probabilities between EU countries could be applying Data Envelopment Analysis (DEA).
- A result of the regression analysis is a significant gender effect as well as a significant age effect. Germany has a lower and Belgium a higher transition probability compared to the UK. It is worthwhile mentioning that such a difference can be the result of different definitions of residential care. It need not necessarily be a result of the healthcare systems.
- The probability of *death* while in *residential care* is lowest in Germany and highest in Belgium. The probability of *death* while in all other health states is lowest in the UK.

Conclusions/Recommendations

WP IV proves that it is technically feasible to calculate transition matrices and healthy life expectancies from various data sources, using the Stone algorithm as a means of calibration.

With the theoretical problems solved, data availability and quality appeared to be the real issue.

The results once again hint at the scarcity of data regarding residential care. In most member states it turned out to be impossible to obtain information as basic as mortality in residential care. This problem is aggravated by the well-known problem that the definition of 'residential care' varies considerably between countries, last but not least due to differences in historical development of the national social systems. Therefore, one has to be cautious when applying results derived for one country to other countries.

It seems worthwhile to put more effort into the collection of data on residential care, at least for some 'representative' countries, which could then be used to simulate countries with a deficient data situation. The problems encountered during this project lead us to believe that the task of data collection/generation would constitute a project on its own.

Panel attrition in the European Community Household Panel turned out to be another issue. In order to increase the utility of future panel studies concerning the research in the field of care/residential care, we highly recommend a re-think on tracking rules and more emphasis on tracking people outside of households.

The comparison of two policy scenarios aimed at reducing the expected time spent in *residential care* indicates that a more general and comprehensive policy approach to improving health is more realistic. Moreover it proves more successful in enhancing life expectancy as well as healthy life expectancy.

AHEAD Studies Published in the ENEPRI Research Reports Series
(available for free downloading from www.enepri.org or <http://shop.ceps.be>)

- No. 15 *Health and Morbidity by Age and Socio-Economic Characteristics*, Richard Layte, Anne Nolan, Brian Nolan and Tom Van Ourti, November 2005
- No. 16 *The Influence of Supply and Demand Factors on Aggregate Healthcare Expenditure with a Specific Focus on Age Composition*, Erika Schulz, November 2005
- No. 17 *The Impact of Death-Related Costs on Healthcare Expenditure: A Survey*, Michele Raitano, February 2006
- No. 18 *Demographic Factors and Health Expenditure Profiles by Age: The Case of Italy*, S. Gabriele, C. Cislighi, F. Costantini, F. Innocenti, V. Lepore, F. Tediosi, M. Valerio and C. Zocchetti, May 2006
- No. 26 *Health and Morbidity in the Accession Countries: Country Report – Bulgaria*, Rossitsa Rangelova, December 2006
- No. 27 *Health and Morbidity in the Accession Countries: Country Report – Estonia*, Liis Rooväli, December 2006
- No. 28 *Health and Morbidity in the Accession Countries: Country Report – Hungary*, Edit Remák, Róbert I. Gál and Renáta Németh, December 2006
- No. 29 *Health and Morbidity in the Accession Countries: Country Report – Poland*, Stanisława Golinowska and Agnieszka Sowa, December 2006
- No. 30 *Health and Morbidity in the Accession Countries: Country Report – Slovakia*, Vladimír Kvetan, Viliam Páleník, December 2006
- No. 31 *Health Status and Healthcare Systems in Central and East European Countries: Bulgaria, Estonia, Poland, Slovakia and Hungary*, December 2006
- No. 32 *Demographic Changes and Aggregate Health-Care Expenditure in Europe*, Terkel Christiansen, Mickael Bech, Jørgen Lauridsen and Pascal Nielsen, December 2006
- No. 33 *Healthy Life Expectancy in the European Union Member States*, Ehsan Khoman and Martin Weale, December 2006
- No.34 *Incidence of Poor Health and Long-Term Care: Health Transitions in Europe: Results from the European Community Household Panel Survey and Institutional Data*, Andrew Bebbington and Judith Shapiro, December 2006
- No. 35 *Health Status Transitions*, Maria M. Hofmarcher, Monika Riedel, Alexander Schnable and Gerald Sirlinger, June 2007

AHEAD Work Packages	
WPI	Health and Morbidity by Age and Socio-economic Circumstances
WP II	Health and Morbidity in the New Member States
WP III	Incidence of Poor Health and Long-term Care
WP IV	Health Status Transitions
WP V	Healthy Life Expectancy
WP VI	Determinants of Aggregate Healthcare Expenditure focusing on age composition
WP VII	Health Costs Prior to Death
WP VIII	Development of Scenarios for Health Expenditure in European Union Countries
WP IX	Development of Scenarios for Health Expenditure in the New Member States



About AHEAD

In February 2004, a CEPS-led consortium of research institutes launched the implementation of a three-year project called AHEAD (Ageing, Health Status and the Determinants of Health Expenditure). Most of the consortium's 18 partner institutes are members of the European Network of Economic Policy Research Institutes (ENEPRI – see <http://www.enepri.org> for details). As specified in the call for proposals, the main task of the project is to carry out an “Investigation into different key factors driving healthcare expenditures and in particular their interaction with particular reference to ageing” in the (enlarged) European Union.

The strategic objectives of AHEAD are to:

- assess pressures on health spending in the existing EU and in selected candidate countries, looking both at those arising directly from ageing and at those affected by changing incomes, social change and methods of expenditure control;
- develop models for projecting future health spending and
- estimate confidence limits for these projections.

Expenditure on medical treatment has tended to rise as a proportion of national income throughout the European Union. A particular concern is that an ageing population and therefore the presence of more old people will create further pressures for expenditure on healthcare. This issue is of concern both in its own terms and because of its fiscal implications. Rising health expenditures put pressure on the targets of the Stability and Growth Pact. They also raise the question whether budgetary targets should be tightened ahead of projected growth in public expenditures, so as to ‘save up’ for future spending and keep expected future tax rates reasonably constant.

This project has aimed to refine existing estimates of the links between reported states of health and use of medical services. As well as looking at the effects of ageing on healthcare, the research has taken account of the link between health expenditure and fertility rates and the demands on health services made by non-native populations. Particular attention is paid to the costs of care near death. One study examined factors other than demand (such as methods of financial control) that may influence health spending. An important aspect of this research is that the work is carried out so as to be able to provide not only the familiar projections and scenarios but also standard deviations and confidence limits for predictions of key variables, such as healthy life expectancy and demand-driven expenditure levels. These will allow policy-makers to judge not only possible outcomes but also the risks surrounding them and to assess their implications.

Participating Research Institutes

Centre for European Policy Studies, CEPS, Belgium
National Institute for Economic and Social Research, NIESR, UK
Netherlands Bureau for Economic Policy Research, CPB, The Netherlands
Deutsches Institut für Wirtschaftsforschung, DIW, Germany
Economic and Social Research Institute, ESRI, Ireland
Research Institute of the Finnish Economy, ETLA, Finland
Federal Planning Bureau, FPB, Belgium
Istituto di Studi e Analisi Economica, ISAE, Italy
Institute for Advanced Studies, HIS, Austria
Institute for Public Health, IPH, Denmark
Laboratoire d’Economie et de Gestion des Organisations de Santé, LEGOS, France
Personal Social Services Research Unit, PSSRU, UK
Fundación de Estudios de Economía Aplicada, FEDEA, Spain
Centre for Social and Economic Research, CASE, Poland
Institute of Slovak and World Economy, ISWE, Slovak Republic
Institute of Economics at the Bulgarian Academy of Sciences, IE-BAS, BG
Social Research Centre, TARKI, Hungary
Department of Public Health, University of Tartu, Estonia