WP11 : Population data and disability weights
Report on data collection for population data and disability weights

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Introduction

In addition to data related to specific diseases, risk factors and relative risks, DYNAMO-HIA includes data on:

- the baseline population
- age- and sex specific all-cause mortality rates
- projected new born
- overall disability weights
- disease-specific disability weights

The baseline population

Dynamo-HIA includes data on the population size per January 1st by single-year of age and sex for all 27 EU Member States for the year 2005. For most counties population data by January 1st were obtained from the Human Mortality Database available at www.mortality.org or www.humanmortality.de. Only for Malta, the Czech Republic, Greece and Romania, which were not included in the Human Mortality database, population data were extracted from the EHEMU database, available at: http://www.ehemu.eu/.

Dynamo-HIA needs population data by single year of age for all ages ranging from 0 to 95 years of age. Generally, population data by single-year of age are available in the mentioned databases. Only for Malta data on the population size by single-year of age above 90 was not available for some years, including the year 2005. Because data by single-year of age were available for the years 2002 and 2003, we used the proportional distribution based on these years to split the age group 90+ in 2005 into single-years of age.

It is noteworthy that we had pragmatic reasons to choose for the Human Mortality Database as the primary data source. We preferred to use both mortality rates and population numbers from the same source. The main reason to choose for the Human Mortality Database was that this database provided (pooled) mortality rates, whereas the EHEMU data base provides the data needed to calculate mortality rates, but not ready-to-use mortality rates.

Mortality rates

Dynamo-HIA includes data on the mortality rates of all 27 EU Member States by single-year of age and sex. For most counties these data were obtained from the Human Mortality

Database available at www.mortality.org or www.humanmortality.de (see also prior paragraph on the baseline population). Only for Malta, the Czech Republic, Greece and Romania, which were not included in the Human Mortality database, population data were extracted from the EHEMU database, available at: http://www.ehemu.eu/.

Dynamo-HIA needs mortality rates by single year of age for all ages ranging from 0 to 95. To avoid erratic rates, we used pooled mortality rates by single-year of age from a few calendar years. Such pooled mortality rates are available from the Human Mortality Database for all member states except Malta, the Czech Republic, Greece and Romania. We used the most recent pooled years available from the Human Mortality Database, i.e., 2005-2006 (Hungary, Ireland, Italy, the Netherlands, Poland, Spain and the United Kingdom), 2005-2007 (Portugal, Bulgaria, Belgium, Denmark, Estonia, France, Latvia, Lithuania, and Sweden) or 2005-2008 (Austria, the Czech Republic, Finland, Germany and Slovakia). The exceptions are two small countries, Luxembourg and Slovenia, for which we used pooled rates for the calendar years for 2000-2006 (based on data for 2000-2004 and 2005-2006), to avoid erratic mortality rates or zero mortality rates for some ages.

For Malta, the Czech Republic, Greece and Romania, not included in the Human Mortality Database, mortality rates were calculated based on the number of deaths and population per January 1st from the EHEMU database (http://www.ehemu.eu/). We first calculated the mid-year population by age and sex. These mid-year populations were used to obtain mortality rates by single-age and sex. We pooled rates for the years 2005-2007. Only for Malta we used pooled rates of a longer period (2000-2007) because the small population size (hence few deaths) would otherwise have yielded erratic mortality rates. As explained in the paragraph on the baseline population, for Malta, the population by single-year of age above 90 was not available for all years. We used the proportional distribution for the years 2002 and 2003, for which individual ages were available, to derive population estimates by single year of age for years 2000, 2001, 2004-2008.

Projected new born

Projected births were obtained from Eurostat for the period 2009-2025, based on population projections up to 2050, baseline variant (EUROPOP2004).
[http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database?_piref458_12 09540_458_211810_211810.node_code=proj_tbp_eve](http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database?_piref458_1209540_458_211810_211810.node_code=proj_tbp_eve)

Overall disability weights

Overall disability weights by country, age group and sex were obtained from the World Health Organization (WHO) (personal communication Collin Mathers). These overall disability weights are better known as "health state evaluations" and were originally used for the calculation of WHO HALE2007.

The WHO calculated the average health state valuations (on a scale where 0 = full health and 1 = equivalent to death) from the Global Burden of Disease (GBD 2004 update), using in addition World Health Survey results. The health state valuations were calculated for broader age ranges used in GBD, and were then applied to each 5 year interval within each range.

Before entering the overall disability weights in Dynamo-HIA they were smoothed, using logistic regression. The influence of age was modeled by means of a natural spline function (restricted cubic spline) in order to account for the non-linearity of the age variable (Harrell 2001, Carstensen et al. 2008). We did not apply linear interpolation within the 5-year age groups in Excel as this leads to "steps" in the age pattern.

DYNAMO-HIA includes overall disability weights in percentages (hence overall disability weight multiplied with 100).

Disease-specific disability weights

Disability weights for diseases range from 0 to 1, where 0 means no impact on health and 1 means severe impact on health.

Internationally there are two sets of disability weights for diseases:
1. WHO disability weights: 1999 and revision 2004
2. Dutch disability weights:[1]

We used disability weights for diseases based on the Dutch Burden of Disease study. These weighting factors by disease stage were originally derived from the study of Stouthart and colleagues [1]. Based on these disease weights by stage and the stage distribution in the Netherlands, RIVM calculated average weights for each disease. [2] to be used in the "Kompas Volksgezondheid" (http://www.nationaalkompas.nl/gezondheid-en-ziekte/sterfte-

levensverwachting-en-daly-s/ziektelast-in-daly-s/wat-zijn-wegingsfactoren-en-hoe-zijn-ze-bepaald/), and VTV 2010 [3]. More information on calculation and interpretation of disability weights based on the Dutch Burden of Disease study is given on http://www.nationaalkompas.nl/gezondheid-en-ziekte/sterfte-levensverwachting-en-daly-s/ziektelast-in-daly-s/wat-zijn-wegingsfactoren-en-hoe-zijn-ze-bepaald/ . More information on disability weights in general is given on: http://www.who.int/healthinfo/global_burden_disease/daly_disability_weight/en/index.html

In DYNAMO-HIA we used as disability weights for each disease the Dutch average disability weights. Only for oral cancer we used the weights for oesophagus cancer, as no separate weight was available for oral cancer. The assumption that the weights for oral cancer and oesophagus cancer were similar, was also used in the Australian Burden of Disease Study [5]. By using the average Dutch disability weights, we ignored cross-country differences in the distribution of diseases severity stages and in the disability weights per disease within Europe. It is noteworthy that disability weights for diseases are not available by country or region.

DYNAMO-HIA includes disability weights in percentages (hence disability weight multiplied with 100):

Disease	Disability weight (in %)
Ischemic Heart Disease	28.80
Stroke	60.9
Diabetes Mellitus	
COPD	
Breast cancer	25.57
Lung cancer	58.4
Oesophagus Cancer	52.67
Colorectal cancer	29.97
Oral Cancer	52.67

References:

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5. Begg S, Vos T, Barker B, Stevenson. C, Stanley L, A. L: The burden of disease and injury in Australia 2003. Canberra, Australia: AIHW; 2007.