Changes in Disease Life Expectancy Over Time and Differences Between the Sexes in England: An Explanation Through the Contribution of the Underlying Causes

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BACKGROUND

At present, evaluation of health programs is based principally on changes in mortality based on their impact on life expectancy since mortality is more easily measured than morbidity. As morbidity and mortality are complementary aspects of a population's health, a good measure should comprise both. Measures of length of life both with and without disease are very useful for health planners because most health treatment is disease-based and major chronic diseases are treated pharmaceutically from the time of diagnosis to the time of death. A measure which contains both mortality and morbidity information is the disease life expectancy, which is number of the years expected to live with any kind of disease.

In order to monitor changes in mortality and morbidity over time for each sex and identify the factors which trigger differences in disease life expectancy between the sexes, a partition technique is required. This allows the contributions of mortality and morbidity to the disease life expectancy to be measured separately for each age.

Whilst there are several examples of studies providing decomposition tools to explore changes in life expectancy (Arriaga 1984, 1989; Pollard 1988), it is only recently that demographers have developed techniques to partition changes in health expectancies. In particular, the method described by Nusselder & Looman (2004) enables the contribution of morbidity and mortality (broken down by underlying cause) to be disentangled and explain any changes in the disease life expectancy over time, and differences between the sexes.

This study aims to explore changes in disease life expectancy in England for each sex over time and between the sexes at certain time points using the Nusselder and Looman method. The analysis is performed for the time period 1991-2005.

DATA

For the research, two types of information are required: the first consists of mortality rates by cause; the second consists of morbidity rates and causes of morbidity.

The number of deaths by cause and the corresponding population at risk are supplied by the Office for National Statistics. Single causes of death are provided instead of standard chapters in order to be able to match those causes whose code changed between 1991 and 2005 according to the International Classification of Diseases.

The morbidity rates are drawn from the Health Survey for England, which has run since 1991 and asks people whether they have diseases and which diseases they have. The Health Survey for England is preferred to the national survey (General Household Survey) for the purposes of the research since the former has no breaks over time in the set of questions about health.

In line with the Health Survey for England, whose sample does not include people younger than age 16 for most of the time period under investigation, mortality data are collected from age 16 upwards.

METHODS

Life expectancies and disease life expectancies at age 16 are computed for a period of three consecutive years (1991-93, 1992-94, 1993-95, 1994-96, 1995-97, 1996-98, 1997-99, 1998-2000, 2001-03, 2002-04, 2003-05) for males and females separately. The three consecutive years chosen for the analysis reflect the time period of official life tables.

With regard to cause of death, some effort is required to match the causes with different codes in the ICD9 and ICD10. In the UK, in 2001, there was a transition from the IX Revision of the International Classification of Diseases to the X Revision. Caution is also required for some causes such as HIV where the code and related chapter changed within the IX Revision.

The causes of mortality are aggregated in six groups: accidents and suicides, infectious diseases, cancer, circulatory diseases, respiratory diseases and other chronic diseases, other acute diseases.

The causes of disease are calculated using the Health Survey for England and are aggregated into infectious diseases, cancer, circulatory diseases, respiratory diseases and other chronic diseases, other acute diseases.

The mortality and morbidity rates by cause are computed consistently with the 11 time points of life and disease expectancy outlined above.

The availability of mortality and morbidity rates then enables the application of the Nusselder and Looman method (2004) to explore the changes in disease life expectancy over time, and differences in disease life expectancy between the sexes.

EXPECTED OUTCOMES

The decomposition method is able to show whether any changes in disease life expectancy over time for each sex is due to compression or expansion of morbidity. This improves the knowledge about the population's health in England which could not have been done without partition techniques.

Similarly, the decomposition method applied to analyse differences in disease life expectancy between the sexes at certain time points indicates whether the effect of some causes have changed over time in explaining gender differences. The research helps to push back the barriers of past research since it provides snapshot results in the context of a time series.

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