IAA Mortality Working Group

Insights about the level of mortality rates around the world, and the trends of future mortality rates, have never been more important. Whilst mortality rates are declining in most countries, in other countries they are stable and in some instances are even increasing. Mortality rates affect many aspects of society, including:

- The costs of old age income support in Social Security systems;
- The proportion of resources absorbed by government sponsored and private health arrangements;
- The financial position of defined benefit pension funds;
- The probability that assets will be sufficient for retirement needs for members of defined contribution funds;
- The solvency requirements of life insurers;
- Pricing of long term mortality related financial products;
- Work place practices relating to the employment of older workers;
- The growth of certain industries (such as aged care services) and the need for infrastructure (such as accessibility to transport).

Planning in all these areas requires knowledge and understanding about present and projected future rates of mortality, and accordingly in January 2008, the International Actuarial Association (IAA) set up the IAA Mortality Task Force which transformed into the IAA Mortality Working Group in November 2009.

This brochure provides basic information about the Working Group.

Vision

The vision of the IAA Mortality Working Group is

The Mortality Working Group will be a preeminent international actuarial body to provide insights and knowledge with respect to mortality and trends in mortality.

Membership

Members of the MWG are selected based on interest, expertise and the need for additional specific representation within the MWG.

Purpose

To serve as a working group within the IAA devoted to the worldwide study of mortality, particularly mortality impacts on insurance (including life, pension and living benefits) products or on government or world organisation (such as WHO and the UN) sponsored programs. Studies of the mortality experience of general populations, insured life and other population subsets are within the scope of the MWG.

The International Actuarial Association

Founded in 1985, the International Actuarial Association (IAA) is the worldwide association of local professional actuarial associations and their individual actuaries. The IAA exists to encourage the development of a global profession, acknowledged as technically competent and professionally reliable, which will ensure that the public interest is served.

Disclaimer

The opinions put forward by the IAA Mortality Working Group are not necessarily the opinions of the International Actuarial Association or of the associations to which the individual members of the Working Group might belong, or of the companies or organisations where the individual members of the Working Group might be employed.
Terms of Reference

- To monitor selected activities focusing on mortality research, and to assist in ensuring that the results of this research are available to insurance professionals and other interested persons in increasing their understanding of the drivers of mortality outcomes
- To selectively monitor data collection efforts internationally and to facilitate continuous improvement in the quality and extent of data collection.
- To facilitate the sharing of mortality knowledge across the various regions served by the IAA.
- To ensure that the work done by the various Sections and Committees of the IAA in the area of mortality is coordinated, including when this involves cooperation with other international bodies.
- To encourage the extension of the body of knowledge of the international actuarial community in respect of mortality through:
  - the global encouragement of actuarial research;
  - making research accessible to actuaries globally;
  - leveraging national actuarial research organisations efforts to help actuaries in other countries conduct and publish experience studies;
  - assisting countries with less developed actuarial resources;
  - collecting and disseminating research from both actuarial and non-actuarial sources;
  - encouraging attendance and providing presentations and papers at professional seminars, colloquia, conferences etc.;
  - encouraging and coordinating with other actuaries the production of presentations and papers at professional seminars, colloquia, conferences etc.;
  - organising sessions related to mortality at professional seminars, colloquia, conferences; and
  - conducting research on mortality.

Information Base on International Mortality

The MWG has developed an online Information Base which contains information on the studies made to date by the MWG, and reference to other papers and website that are of particular interest.

This information base is located at www.actuaries.org/mortality. This resource base is not meant to be exhaustive, but the MWG expects that it will be of particular interest to non-specialist actuaries and non-actuaries looking for information on a variety of topics on international mortality.

The Information Base website is developed and maintained by a sub-committee of the MWG.

Areas of Investigation

The areas under active study by the IAA Mortality Working Group are:

- **Collection of global mortality tables**
  
  Mortality tables exist by country and by type (population, life insurance or pension). There exist a few comprehensive aggregations of such tables, each with its strengths and weaknesses. We aim to provide a central point of reference to enable simple web-based access to these websites or tables.

- **Mortality trends**
  
  Past mortality rates changes are documented in many parts of the world. In most countries, mortality has been improving most of the time. We provide references to the documentation of such changes, and to projection methodologies, to help answer the following questions. What are the most likely future mortality trends? What could be said about the uncertainty around mortality forecasts?
• **Healthy longevity**

The trend of decreasing mortality rates in many countries and increasing life expectancy is a wonderfully positive outcome for humanity. However it is of vital importance to know how these extra years of life are being spent: in good or poor health? How the proportion of old age which is free from disability and disease is evolving and the implications of this evolution for individuals, organisations and society are the focus of some studies made by the MWG. The implications of the extension of life being healthy or frail are profound for Social Security and workforce participation.

• **Pandemics**

A pandemic is an outbreak of infectious disease on an international, regional or global scale. Pandemics can have a significant effect on mortality rates and hence may impact financial services organisations and indeed all aspects of the community. What is the likely future frequency and severity of future pandemics? What evidence have we on the short- and long-term effects of past pandemics on population mortality? How is the impact of a possible future pandemic taken into account in financial calculations?

• **Social and demographic stratification**

Mortality rates vary according to a person's social and demographic profile. Understanding this aspect of mortality can assist pricing and valuation decisions by financial institutions, and can influence future social policy. How are financial institutions dealing with questions relating to social difference in mortality rates? What support could the actuarial profession give?

• **Analysis by cause of death**

Social changes, medical breakthroughs and increased awareness of basic healthy lifestyle behaviour have resulted in enormous shifts in the cause of death (for example, in the UK, death from infectious diseases has reduced to very low levels). Studies of causes of death can assist in the analysis of medical and treatment outcomes and can affect pricing and valuation decisions of financial institutions. Understanding the trends in causes of death can assist in forecasting mortality rates.

• **Graduation techniques**

The first step in the construction of mortality tables is to calculate the ‘raw’ rates of number of deaths divided by the size of the relevant population. These raw rates often form a disjointed series, and hence they are graduated or smoothed to produce the final version of the mortality tables. The challenge of graduation is to achieve a relatively smooth outcome without discarding too much of the original information. What techniques are being used at the present time? Are these helpful for countries?

• **Projection techniques**

Projection techniques refers to methods of forecasting future levels of mortality. There are three broad approaches: expectation, extrapolation and explanation.

Expectation or scenario-based methods utilise expert opinion to provide an assumed forecast; often accompanied by high and low scenarios. Extrapolation methods assume that future trends are based on statistical models and will often result in a continuation of the past, derived after analysing historical data. Explanatory methods are based on structured or causal epidemiological models of certain causes of death involving disease processes and known risk factors.

Also combinations of these methods are in use. What techniques are being used at the present time, and are these helpful for countries?

• **Data availability**

In a number of countries there are reliable databases for births, deaths and the size of the population. In these countries it is relatively straightforward to construct tables that are reliable estimators of the underlying mortality rates. However, in many countries, data is very scarce or of low quality, or the country is too small to yield reliable results. In these countries, special techniques must be used to construct mortality tables, sometimes using data from countries with similar characteristics. What insights can the actuarial profession offer, internationally?
• **Uncertainty**

The values in mortality rates, both present day and at future dates, are best estimates. However, there is uncertainty attached to these best estimates. The first reason for the uncertainty is that the best estimates may be based on incomplete data and random elements inevitably intervene. Secondly, even if the data is comprehensive, in many countries, the population is so small that the observed mortality pattern could be expected to show large random deviations from the underlying mortality rate. Thirdly, future levels of mortality will depend on changes yet to be seen. How can uncertainty be factored into the calculations made by actuaries and others?

• **Mortality related financial products**

Reinsurance solutions are traditionally used to hedge mortality and (more recently) longevity risks. However, there has also been a development of other types of mortality related financial solutions and products. One example is the development of mortality and longevity bonds. Another example is commercial entities purchasing life policies from current policyholders, where one of the determinants of the price of the transaction is the purchaser’s view of the mortality risk. What is being done at the present time, and where are these methodologies likely to lead?

• **Society of Actuaries (SoA) International Experience Study**

The SoA International Experience Study (IES) assists developing countries to produce more credible actuarial experience. Through the IES, the SoA and the country actuaries jointly share responsibilities to successfully complete a mortality and persistency study of insured life experience. The IES software toolkits are provided to each participating company in each country at no charge on the sole condition that permission is given to publish the combined results for the country of the study.

• **Mortality assumptions used in pensions and annuity reserving**

Mortality tables are used in the calculation of pensions liabilities for company balance sheets, but the assumptions made can vary considerably by country. Defined benefit pension liabilities can form a significant item in the balance sheet of many companies. If, for example, a company is the subject of a merger or acquisition and the jurisdiction of the regulations governing the pension liability changes, this can have a significant impact on the transaction.

The MWG commissioned a report from Cass Business School on mortality tables used throughout the EU and other selected countries, to compare them with the corresponding population tables.

An OECD project on “mortality and life expectancy assumptions: addressing longevity risk” is expected to be finished around June 2013.

• **Underwriting**

Underwriting is used both in risk selection and premium rating. It plays a major role in the resulting mortality on all life insurance and annuity products. The types of underwriting and resulting mortality vary around the world as a result of different ways of doing business and different legal and ethical constraints.

The increasing availability of online medical information, improved understanding of socio demographic information and development of “preferred” and “substandard” classes of business, have led to rapid change over recent years. Also, automated underwriting processes, introduced often for speed or convenience, have led to a variety of interesting new underwriting methodologies.

The MWG has formed an underwriting sub-group to study international approaches to the subject, to report back and to communicate its findings.
• **Mortality of disabled people**

Various types of insurance products require the understanding of the mortality of disabled people. In particular:

1. Income Protection (IP) policies, providing annuities with partial / total, temporary / permanent disability;
2. Long Terms Care (LTC) policies, providing lifelong annuities related to senescent disability needs, with benefit given either as a fixed amount, or as a (partial) expense reimbursement;

There are a number of different methods and assumptions that are used by actuaries in setting the mortality assumptions for these products, but the material is both scarce and highly variable. The MWG is researching the mortality of disabled people to provide a body of research to assist actuaries working in these areas.

• **Current issues**

The MWG monitors and reports on issues of current interest. For example a paper was written on the recent H1N1 flu pandemic. The MWG is also keeping up to date the outcomes of the recent judgement by the European Court of Justice (ECJ). Indeed the provision enabling EU insurers to use actuarial and statistical factors based on sex in their risk assessment is invalid from 21 December 2012.

At each meeting, the MWG receives reports on mortality related developments in the countries represented by its members.
Contact Us

The members of the IAA Mortality Working Group are listed on the IAA website www.actuaries.org/Mortality

Please feel free to contact any member of the Working Group with any requests for information.

Also, we would be particularly interested in receiving advice of any papers, research or studies that you consider worthy of inclusion in our material.