

Society of Actuaries Mortality Research: Implications for Insurers and Pensions

R. Dale Hall, FSA, MAAA, CERA, CFA
Managing Director of Research
Society of Actuaries

Longevity 13

September 2017



Transition from Research to Application

- Actuarial Mortality / Longevity Research
 - Population Studies
 - Specific Subpopulation Analysis
 - Insured Life Studies: Individual Life Insurance, Individual Annuities
- Table / Scale / Model Creation
- Industry & Regulator Review
- Adoption & Application
- Industry Use / Opportunity

Society of Actuaries Population Mortality Research

- Increased focus on mortality and longevity analysis
 - Human Mortality Database project sponsorship
 - Internal research focus on CDC databases
 - Coordination with US Social Security Administration on population mortality updates
- Strategic Research Program Initiative
 - Board level initiative to increase further focus on key actuarial research program

Research Highlights

- <https://www.soa.org/research-reports/2017/2017-hmd-cause-of-death/>

CA



☰ Search SC

Future Actuaries Education & Exams Professional Development Research Publications Professional

Expanding the Human Mortality Database to include Cause-of-Death Information

February 2017

The Human Mortality Database is a unique open-access collection of detailed mortality and population data for 38 countries with complete and reliable vital registration and census data. The HMD currently covers the United States, almost all of Europe, including countries of the former U.S.S.R., Japan, Australia and other mostly high-income countries with rapidly aging populations. The Human Mortality Database (HMD) contains calculations of death rates and life tables for national populations (countries or areas), as well as the original input data used to construct these tables and an extensive documentation. This report overviews the development and completion of the HMD data series down to a cause of death level for an initial set of eight populations: Canada, Czech Republic, England and Wales, France, Japan, Norway, Sweden, and the United States.

Research Highlights

- <https://www.soa.org/research-reports/2017/2017-hmd-cause-of-death/>

Figure 5.

EXTRACT (FIRST 42 LINES) OF THE UNITED STATES HMD CAUSE-OF-DEATH SERIES

The United States of America, Deaths by HMD Cause-of-Death (5x5) 91 HMD causes Last modified:
Wed Sep 21 13:24:19 2016

Year	Age	COD.cat	COD.Frac.F	COD.Frac.M	COD.Frac.T	Deaths.F	Deaths.M	Deaths.T	Rates.F	Rates.M	Rates.T
1959	0	01	0.000355	0.000512	0.000445	17	33.04	50.04	0.8429	1.5829	1.2192
1959	0	02	0.000188	0.000186	0.000187	9	12.02	21.02	0.4462	0.5759	0.5121
1959	0	03	0.028146	0.025601	0.026685	1348.27	1652.96	3001.22	66.8339	79.1966	73.1204
1959	0	04	0.001754	0.001363	0.00153	84.02	88.02	172.03	4.1647	4.2171	4.1914
1959	0	05	0.001927	0.001755	0.001828	92.31	113.32	205.63	4.5759	5.4292	5.0098
1959	0	06	0.003905	0.003691	0.003782	187.04	238.29	425.33	9.2715	11.4169	10.3624
1959	0	07	0.000167	0.000263	0.000222	8.02	17	25.02	0.3975	0.8147	0.6096
1959	0	08	0	0	0	0	0	0	0	0	0
1959	0	09	0.007496	0.005685	0.006456	359.07	367.07	726.14	17.7992	17.5872	17.6914
1959	0	10	0.000021	0.000031	0.000027	1	2	3	0.0496	0.0959	0.0731

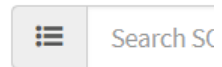
- Session later today on using COD information to decompose attribution of changing life expectancies and other population statistics

Research Highlights

- <https://www.soa.org/research-reports/2017/2017-us-pop-mort-age-cod-region/>



CA



Future Actuaries Education & Exams Professional Development Research Publications Professional

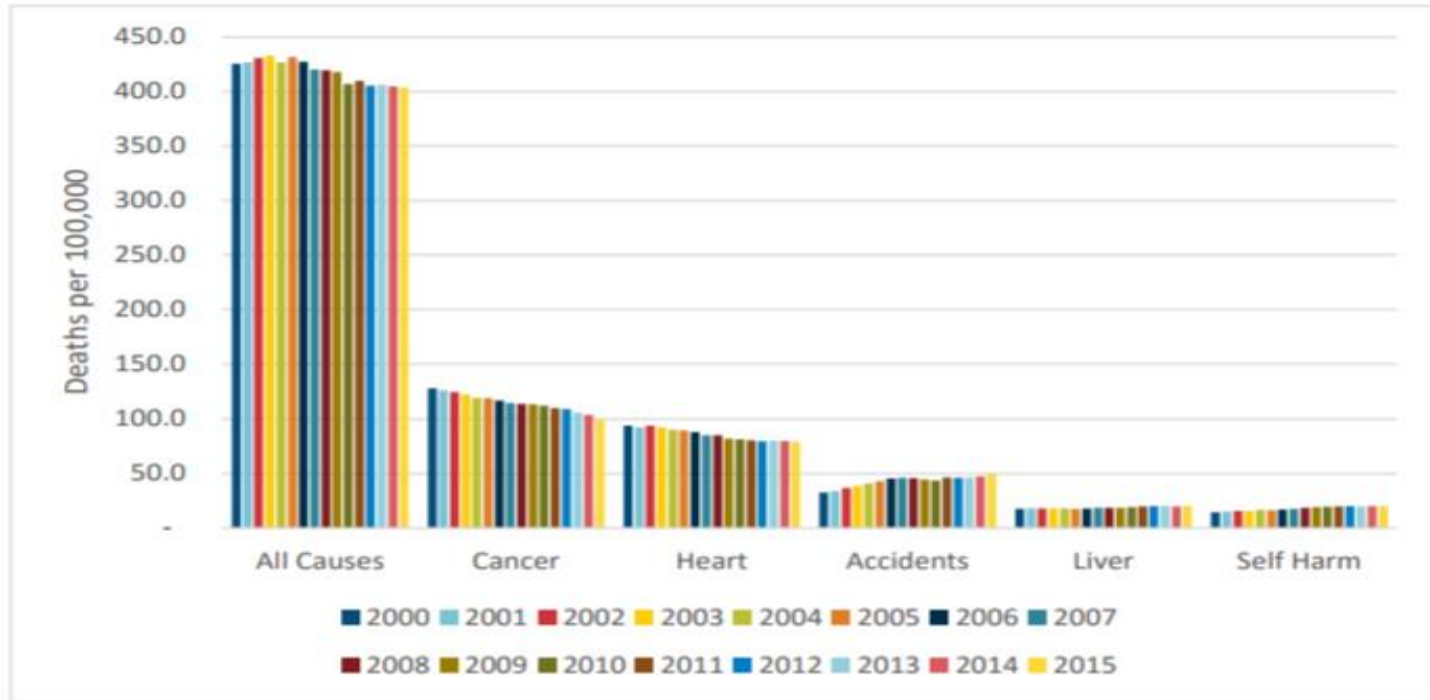
US Population Mortality Rate Study - Variation by Age Group, Cause of Death and Region from 2000-2015

May 2017

This report covers US regional population mortality experience during the period 2000-2015. The Society of Actuaries pursued the research as part its ongoing longevity and mortality research initiatives. The purpose of the research is to produce an overview of the differences and similarities in mortality by age group, time, cause of death and region (geographic and urban-rural) to better aid in the understanding of future expected mortality rates and the management of public programs and policy.

Research Highlights

Figure 2
AGES 45-54 ALL CAUSES OF DEATH AND TOP FIVE COD 2000-2015



COD	Deaths per 100,000		Total Change	Avg Annual Improvement*
	2000	2015		
All Causes	425.6	404.0	-5.1%	0.3%
Cancer	127.5	99.7	-21.8%	1.6%
Heart	94.2	79.3	-15.8%	1.1%
Accidents	32.6	49.8	52.8%	-2.9%
Liver	17.7	20.5	16.3%	-1.0%
Self-Harm	14.4	20.3	40.4%	-2.3%

*Annual improvement is the geometric average rate of change between 2000 and 2015.

Research Highlights

- <https://www.soa.org/research-reports/2017/us-historical-population-2000-2015/>



Future Actuaries Education & Exams Professional Development Research Publications Professional

U.S. Historical Population Mortality Rates 2000-2015

July 2017

The Society of Actuaries (SOA) is pleased to present historical U.S. population mortality rates by gender and single year of age for calendar years 2000-2015. To develop these rates, the SOA relied upon data furnished by the Centers for Disease Control and Prevention, Centers for Medicare and Medicaid Services, and the Social Security Administration. A document summarizing key observations and the process used to develop the rates, along with a table of the rates themselves, can be found below.

Research Highlights

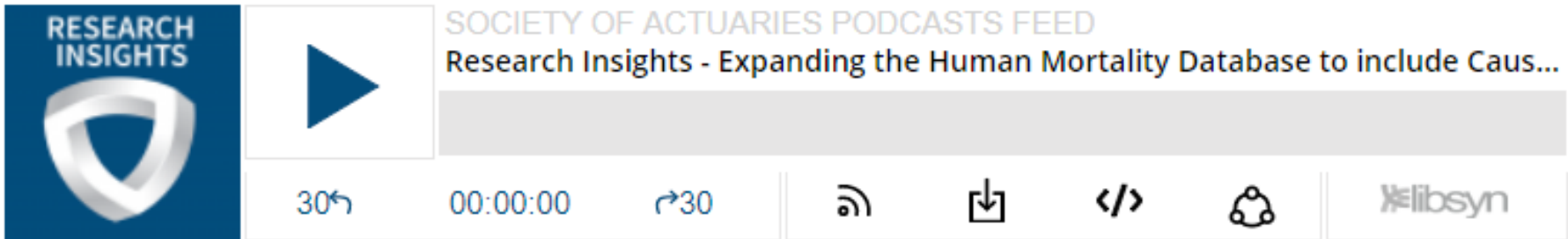
- <https://www.soa.org/research-reports/2017/us-historical-population-2000-2015/>

Male Mortality Improvement - Broad Age Groups			
Age Band	2012 -> 2013	2013 -> 2014	2014 -> 2015
20-to-44	-0.1%	-1.7%	-6.3%
45-to-64	-0.4%	-0.3%	-0.4%
65-to-84	0.3%	0.8%	-0.1%
85-to-100	0.1%	1.8%	-1.1%
All Ages	0.0%	0.6%	-0.9%

Male Mortality Improvement - Under/Over 65			
Age Band	2012 -> 2013	2013 -> 2014	2014 -> 2015
Under 65	-0.4%	-0.6%	-1.7%
65 and Over	0.2%	1.2%	-0.5%
All Ages	0.0%	0.6%	-0.9%

Read / Listen / Watch

Podcast



<https://player.fm/series/society-of-actuaries-podcasts-feed>

Search “Society of Actuaries” on iTunes

Impact on actuarial practice activity

- The road to proposed Internal Revenue Service mortality tables
- RP-2014 Mortality Tables released Oct 2014
 - Aggregate; Income Quartiles; Collars
 - 10 Million+ life years of exposure
 - 2006 central study year
- MP-2014 Mortality Improvement Scale / Model
 - Attained Age / Calendar Year / Gender model developed from US Population mortality 2006 central study year

Impact on actuarial practice activity

- Dec 2016: Proposed new tables for Jan 2018
- RP-2014 back to central year of study; brought forward with observed mortality improvement
- Minimum funding
- PBGC variable premiums
- Lump Sum distributions
- Credibility calculations to use plan-specific mortality

Impact on actuarial practice activity

- Current questions surrounding final regulations and applicable date
 - “Economically significant” discussion
- *“...change is likely to increase (traditional or annuity-formula based) plan liabilities for funding requirements and Pension Benefit Guaranty Corporation (PBGC) premium calculations by 2% to 5%. ”*
- <https://www.towerswatson.com/en/Insights/Newsletters/Americas/Insider/2017/02/irs-proposes-regulations-for-pension-mortality-tables>

Impact on actuarial practice activity

- Pension Risk Transfer opportunities continuing with strong consideration in US market
- Corporate analysis of contribution strategy in light of PBGC premiums, current tax environment, future tax reform
 - Limitation of Interest Expense Deduction (?)
 - Overseas earnings
 - Lower Corporate Tax Rate
 - Prudential:
 - http://conferences.pionline.com/uploads/conference_admin/PRTALRE9_Accelerate_Pension_Funding_and_De-risking_Ahead_of_Tax_Reform.pdf

Impact on actuarial practice activity

- Updated Private Plan study underway – potential exposure 2019
- “Mortality Table (Transition) Risk”
- GAAP Financials vs. Regulatory Funding

- Public Plan study underway - likely exposure 2018
 - Multi-variate analysis to select distinguishing variables
 - Age / Gender
 - Occupation / Income / Geography

Impact on actuarial practice activity

- Individual Life Insurance Mortality
- US Statutory valuation transition to principles-based reserves in 2017 – 2019
- All companies under new valuation law starting 1/1/2020

Impact on actuarial practice activity

- <https://www.soa.org/Files/Research/Exp-Study/research-2017-cso-report.pdf>



Report on the 2017 CSO and 2017 CSO Preferred Structure Table Development

**Joint American Academy of Actuaries' Life Experience Committee and
Society of Actuaries Preferred Mortality Oversight Group
CSO Development Subgroup**

October 2015

Impact on actuarial practice activity

- <http://www.circ.gov.cn/web/site0/tab5216/info4054990.htm>



中国保险监督管理委员会
China Insurance Regulatory Commission

为民监管 依法公正
科学审慎

首页 保监会简介 发布与解读 工作动态 政策法规 行政许可 行政处罚 统计数据 派出机构 消费者保护 互动交流 办事服务

您现在的位置: 首页 > 工作动态 > 公告通知 > 通知

中国保监会关于发布《中国人身保险业经验生命表（2010—2013）》的通知

发布时间: 2016-12-28

分享到:

【字体: 大 中 小】

保监发〔2016〕107号

各人身保险公司:

现发布《中国人身保险业经验生命表（2010—2013）》，并将有关事项通知如下:

中国第三张人身保险业经验生命表命名为《中国人身保险业经验生命表（2010—2013）》，英文名称为“China Life Insurance Mortality Table（2010—2013）”，简称：CL（2010—2013）。其中：非养老类业务一表两张，非养老类业务二表两张，养老类业务表两张，分别是：

1. CL1（2010—2013）：非养老类业务一表（男）；

阅读排行 周排行 | 月排行

1. 保险业服务实体经济工作取...
2. 保监会弥补监管短板 构建严...
3. 中国保监会发布实施偿二代...
4. 保险市场乱象整治工作取得...
5. 保险行业风险防控工作取得...
6. 黄洪副主席在2017金融街论...
7. 第十一届保险公司董秘联席...
8. 中国保监会召开党委中心组...
9. 中国保监会和国务院扶贫办...
10. 中国保监会印发《关于加强...

Impact on actuarial practice activity

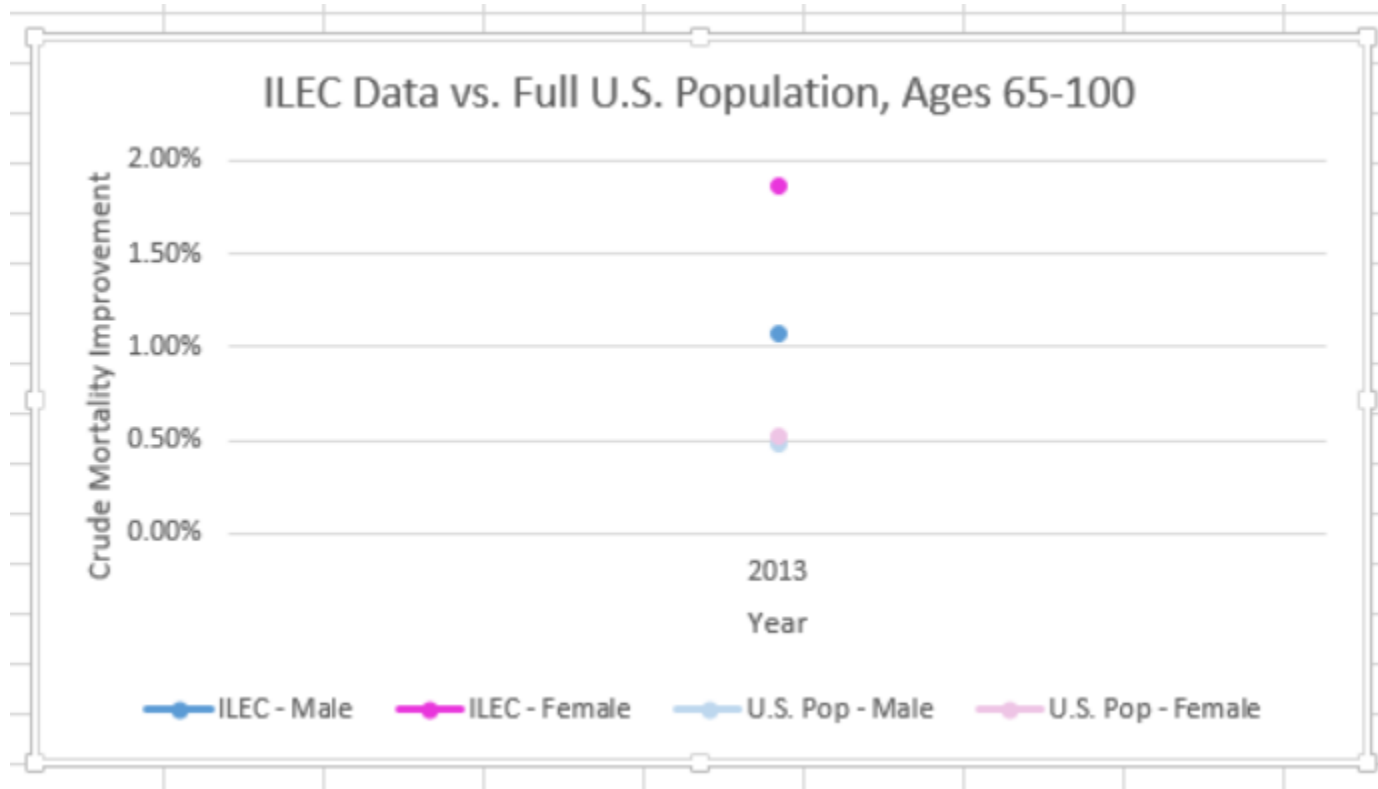
- *“The times they are a-changing...”* – Bob Dylan
- Additional individual life studies
 - Pre-need Mortality
 - Simplified Issue Mortality
 - Guaranteed Issue Mortality
 - Estimation of Automated / Accelerated Underwriting Mortality
- <https://www.soa.org/research/topics/indiv-mort-exp-study-list/>
- <https://www.soa.org/research-reports/2015/research-cso-impact-study/>

Impact on actuarial practice activity

- Potential evolution of population mortality analysis to individual life insurance
- What is improvement rates for individually insured lives? Different than general US population
- Demographics: Income level, education level, geography
- Items to consider --- multiple coverages for one insured; select vs ultimate mortality

Impact on actuarial practice activity

- Draft example: 2012 – 2013 Mortality Improvement



Final thoughts: SOA Research to bring research into practical application

- Increasing use of mortality data in multiple ways
 - Actual / Expected Analysis
 - Table development
 - Mortality Improvement Trends
- Predictive analytics focus on data
- Data set flat files for research use