Regulatory Analysis Form

(Completed by Promulgating Agency)

(All Comments submitted on this regulation will appear on IRRC's website)

INDEPENDENT REGULATORY REVIEW COMMISSION

(1) Agency

Insurance Department

(2) Agency Number:

Identification Number: 11-255

IRRC Number: 3130

(3) PA Code Cite:

31 Pa Code Chapter 84

(4) Short Title:

Tables Approved for Use in Determining Minimum Nonforfeiture Standards and Minimum Standards for Valuation

(5) Agency Contacts (List Telephone Number and Email Address):

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(6) Type of Rulemaking (check applicable box):

- ☐ Proposed Regulation
- ☒ Final Regulation
- ☐ Final Omitted Regulation
- ☐ Emergency Certification Regulation;
- ☐ Certification by the Governor
- ☐ Certification by the Attorney General

(7) Briefly explain the regulation in clear and nontechnical language. (100 words or less)

The amendments to Chapter 84 would adopt new mortality tables for use in determining the minimum reserves that insurers must maintain for annuities and pure endowment contracts ("annuities"). These new minimum standards would apply to annuities issued on or after the effective date of adoption of the proposed amendments. The proposed amendments are based upon changes to National Association of Insurance Commissioners (NAIC) Model Regulation 821, which were adopted by the NAIC in 2012.

The 2012 Individual Annuity Mortality Table was developed by the Society of Actuaries and the American Academy of Actuaries in cooperation with the Life Actuarial Task Force and reflects improved mortality experience resulting from increased life expectancies. The new table is a generational table that incorporates projections for future mortality improvements. In other words, because people are living longer, mortality tables must be updated in accordance therewith so that insurers can maintain accurate reserves. As such, increased reserving will increase insurer solvency and thereby protect consumers by ensuring reliable payment of benefits when due.

(8) State the statutory authority for the regulation. Include specific statutory citation.

Sections 206, 506, 1501 and 1502 of The Administrative Code of 1929 (71 P.S. §66, 186, 411 and 412), regarding the general rulemaking authority of the Pennsylvania Insurance Department ("Department"); sections 301 and 303 of The Insurance Department Act of 1921 (40 P.S. §71 and §73), regarding computation of reserve liability and minimum reserve requirements of companies charging less than net premiums computed on mortality tables; and section 401A of The Insurance Company Law of 1921 (40 P.S. §510.1) regarding standard nonforfeiture law for life insurance.

(9) Is the regulation mandated by any federal or state law or court order, or federal regulation? Are there any relevant state or federal court decisions? If yes, cite the specific law, case or regulation as well as, any deadlines for action.

These amendments are not mandated by any federal or state law or court order or federal regulation. There are no relevant state or federal court decisions.

(10) State why the regulation is needed. Explain the compelling public interest that justifies the regulation. Describe who will benefit from the regulation. Quantify the benefits as completely as possible and approximate the number of people who will benefit.

The Department's adoption of the mortality tables will help to ensure the solvency of insurance companies by requiring adequate and accurate reserves based on the most recent mortality tables. Since the rulemaking concerns the solvency requirements applied to insurers, the public will benefit to the extent the rulemaking promotes a financially sound insurance industry that has the ability to fulfill its contractual obligations under insurance policies. Additionally, the adoption of the amendments will promote consistency with other states, at least 36 of which have adopted substantially similar amendments to their corresponding regulations.

(11) Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulations.

There are no federal standards applicable to the substance of these amendments.

(12) How does this regulation compare with those of the other states? How will this affect Pennsylvania's ability to compete with other states?

At least 36 other states have adopted amendments substantially similar to those in this final-form rulemaking. Pennsylvania domestic insurers issuing annuities may suffer adverse tax consequences if the proposed amendments are not adopted in Pennsylvania. Once at least 26 states adopted the amendments, federal tax law recognized the new mortality tables for tax reserves. If Pennsylvania does not adopt the new mortality tables, Pennsylvania domestic insurers may experience unfavorable tax treatment as compared to insurers domiciled in other jurisdictions that have adopted the new tables.

(13) Will the regulation affect any other regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.

These proposed amendments will not affect other regulations of the Department or other state agencies.

(14) Describe the communications with and solicitation of input from the public, any advisory council/group, small businesses and groups representing small businesses in the development and drafting of the regulation. List the specific persons and/or groups who were involved. ("Small business" is defined in Section 3 of the Regulatory Review Act, Act 76 of 2012.)

The Department circulated exposure drafts of the regulations to the Insurance Federation of Pennsylvania, Inc., the American Fraternal Alliance and the Pennsylvania Fraternal Alliance. Comments received were carefully considered and incorporated into the proposed rulemaking.

(15) Identify the types and number of persons, businesses, small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012) and organizations which will be affected by the regulation. How are they affected?

The rulemaking would apply to life insurance companies, including fraternal benefit societies, issuing annuities in this Commonwealth. As further explained below, some of these insurers would be considered Pennsylvania "small businesses."

(16) List the persons, groups or entities, including small businesses that will be required to comply with the regulation. Approximate the number that will be required to comply.

All life insurance companies and fraternal benefit societies issuing annuities in the Commonwealth will be required to comply with the regulation. There are 467 life insurance companies and 56 fraternal benefit societies that are authorized to issue annuities in Pennsylvania.

(17) Identify the financial, economic and social impact of the regulation on individuals, small businesses, businesses and labor communities and other public and private organizations. Evaluate the benefits expected as a result of the regulation.

Although it is not possible to quantify the exact cost that would be incurred by an insurer implementing the new mortality tables, the rulemaking may have some adverse fiscal impact on insurance companies marketing annuity contracts. Specifically, insurers may be required to expend the time necessary to determine if their current annuity reserve standards meet the new requirements. To the extent that the standards do not comply with the new requirements, an insurance company would need to increase the reserves for contracts issued on or after the effective date of adoption of the proposed amendments to Chapter 84. Finally, insurers may incur costs to upgrade their technological and actuarial services. Costs of compliance with the proposed amendments will vary by insurer.

The amendments will strengthen insurer solvency by providing for more accurate reserves. Specifically, the proposed rulemaking will benefit consumers by ensuring that insurers will be financially able to pay benefits on annuities. Consumers are living longer, and insurers must be prepared to pay benefits for a longer period of time. Additionally, because the new table is a generational table, it contains factors that will adjust the mortality rates *annually* based on expected mortality improvements. This will improve the long-term accuracy of the new table in lieu of a static table, which can become dated more quickly than a generational table.

(18) Explain how the benefits of the regulation outweigh any cost and adverse effects.

Any costs incurred by insurers in complying with this rulemaking would be outweighed by the benefit to consumers of holding policies from a more financially solvent insurer. Additionally, any negative fiscal impact would be minimized by requiring the new table be used only for contracts issued after the effective date of the regulation.

(19) Provide a specific estimate of the costs and/or savings to the **regulated community** associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

Because costs of compliance with the rulemaking will vary from insurer to insurer, it is not feasible for the Department to quantify the exact cost that would be incurred by an insurer implementing the new mortality tables. Costs will vary based upon the insurer's existing reserving practices, as well as the insurer's necessity to update current systems to accommodate the application of the new tables.

(20) Provide a specific estimate of the costs and/or savings to the **local governments** associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

This rulemaking will not impose any costs and/or savings to local governments.

(21) Provide a specific estimate of the costs and/or savings to the **state government** associated with the implementation of the regulation, including any legal, accounting, or consulting procedures which may be required. Explain how the dollar estimates were derived.

This rulemaking will not impose any costs and/or savings to state government.

(22) For each of the groups and entities identified in items (19)-(21) above, submit a statement of legal, accounting or consulting procedures and additional reporting, recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.

The rulemaking does not impose any additional reporting, recordkeeping or paperwork upon the regulated community. It is possible that actuarial services may be required for the implementation of the new mortality tables, but it is not possible to quantify the extent to which required. These requirements have been minimized by requiring application of the new tables for contracts issued only after the effective date of the amendments.

(23) In the table below, provide an estimate of the fiscal savings and costs associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years. **N/A**

	Current FY Year	**FY +1 Year**	**FY +2 Year**	**FY +3 Year**	**FY +4 Year**	**FY +5 Year**
SAVINGS:	**$**	**$**	**$**	**$**	**$**	**$**
Regulated Community						
Local Government						
State Government						
Total Savings						
COSTS:						
Regulated Community						
Local Government						
State Government						
Total Costs						
REVENUE LOSSES:						
Regulated Community						
Local Government						
State Government						
Total Revenue Losses						

(23a) Provide the past three year expenditure history for programs affected by the regulation. **N/A**

Program	FY -3	FY -2	FY -1	Current FY

(24) For any regulation that may have an adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), provide an economic impact statement that includes the following:

(a) An identification and estimate of the number of small businesses subject to the regulation.
(b) The projected reporting, recordkeeping and other administrative costs required for compliance with the proposed regulation, including the type of professional skills necessary for preparation of the report or record.
(c) A statement of probable effect on impacted small businesses.
(d) A description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed regulation.

Small businesses subject to the regulation

As stated above, there are 467 life insurance companies and 56 fraternal benefit societies that are authorized to issue annuities in Pennsylvania.

The Department reviewed the standards set forth by 13 CFR § 121.201 and the U.S. Small Business Administration Table of Small Business Size Standards Matched to North American Industry Classification System (NAICS) Codes to determine the applicability of this rulemaking to Pennsylvania small businesses. The standards for small business classification vary by type of business written as follows:

Subsector 524 – Insurance Carriers and Related Activities		
524113	Direct Life Insurance Carriers	$7.0 million annual receipts
524114	Direct Health and Medical Insurance Carriers	$7.0
524126	Direct Property and Casualty Insurance Carriers	1,500 employees

524127	Direct Title Insurance Carriers	$7.0
524128	Other Direct Insurance (except Life, Health and Medical) Carriers	$7.0
524130	Reinsurance Carriers	$7.0
524210	Insurance Agencies and Brokerages	$7.0
524291	Claims Adjusting	$7.0
524292	Third Party Administration of Insurance and Pension Funds	$7.0
524298	All Other Insurance Related Activities	$7.0

As per these standards, "Direct Life Insurance Carriers" with less than $7 million in annual receipts qualify as "small businesses." There are 26 "Direct Life Insurance Carriers" domesticated in Pennsylvania that will be subject to this regulation. According to publicly available annual statement data, there are two domestic Direct Life Insurance Carriers with less than $7 million in annual receipts that would meet the definition of "small business."

Additionally, there are 20 fraternal benefit societies domesticated in Pennsylvania, 13 of which would meet the definition of "small business."

Projected costs of compliance and probable effect on impacted small businesses

The rulemaking does not impose any reporting or recordkeeping requirements on the regulated community. An insurer may incur administrative cost in attaining compliance with the proposed rulemaking, and may need to employ actuarial services as necessary to determine to what extent reserves need to be increased. However, because insurers utilize actuarial services in the normal course of business, it is not possible to quantify the extent of additional services required, if any.

Alternative methods

The Department is unaware of any less intrusive or less costly alternative methods for achieving the purpose of the amendments, which is to provide requirements for more accurate annuity reserves based upon decreased mortality of individuals.

(25) List any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, the elderly, small businesses, and farmers.

No provisions were developed to meet the particular needs of minorities, the elderly, small businesses, or farmers.

(26) Include a description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

No alternative regulatory provisions were considered. There is no less burdensome acceptable alternative to the adoption of new mortality tables for use in determining the minimum reserves that insurers must maintain for annuities.

(27) In conducting a regulatory flexibility analysis, explain whether regulatory methods were considered that will minimize any adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), including:

a) The establishment of less stringent compliance or reporting requirements for small businesses;
b) The establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses;
c) The consolidation or simplification of compliance or reporting requirements for small businesses;
d) The establishment of performing standards for small businesses to replace design or operational standards required in the regulation; and
e) The exemption of small businesses from all or any part of the requirements contained in the regulation.

The Department did not consider regulatory methods to minimize adverse impact on small businesses. The increase in reserves required by the new tables is necessary to ensure financial solvency regardless of the size of the insurer issuing the annuity. Consumers that purchase annuities from smaller insurers should be provided the same assurances that their benefits be paid as those who contract with larger insurers. Also, it should be noted that the Department does not have the statutory authority to grant an exemption of small businesses from all or any part of the requirements of the proposed amendments.

(28) If data is the basis for this regulation, please provide a description of the data, explain <u>in detail</u> how the data was obtained, and how it meets the acceptability standard for empirical, replicable and testable data that is supported by documentation, statistics, reports, studies or research. Please submit data or supporting materials with the regulatory package. If the material exceeds 50 pages, please provide it in a searchable electronic format or provide a list of citations and internet links that, where possible, can be accessed in a searchable format in lieu of the actual material. If other data was considered but not used, please explain why that data was determined not to be acceptable.

This proposed rulemaking is based upon a model regulation developed by the NAIC. The changes developed by the NAIC to the mortality tables are based upon a 2011 report, requested by the NAIC's Life Actuarial Task Force (LATF), from the joint American Academy of Actuaries/Society of Actuaries Payout Annuity Table Team. The report documents the data, assumptions and process the Team used to develop the 2012 Individual Annuity Reserve Table (2012 IAR Table). The attached report explains how the data meets relevant acceptability standards in the actuarial community and documents the data, assumptions and process used to develop the new tables.

(29) Include a schedule for review of the regulation including:

A. The date by which the agency must receive public comments: 2/24/2016

B. The date or dates on which public meetings or hearings will be held: NONE

C. The expected date of promulgation of the proposed regulation as a final-form regulation: 8/1/2016

D. The expected effective date of the final-form regulation: 11/1/2016

E. The date by which compliance with the final-form regulation will be required: 11/1/2016

F. The date by which required permits, licenses or other approvals must be obtained: NONE

(30) Describe the plan developed for evaluating the continuing effectiveness of the regulations after its implementation.

The Department reviews each of its regulations for continued effectiveness on a triennial basis.

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Copy below is hereby approved as to form and legality. Attorney General	Copy below is here by certified to be a true and correct copy of a document issued, prescribed or promulgated by:	Copy below is hereby approved as to form and legality. Executive or Independent Agencies.
BY: _____ (DEPUTY ATTORNEY GENERAL)	Insurance Department (AGENCY)	BY: Marisa H. Z. Lehr
	DOCUMENT/FISCAL NOTE NO. 11-255	
_____ DATE OF APPROVAL	DATE OF ADOPTION: _____	05-03-16 DATE OF APPROVAL
	BY: Teresa D. Miller	Deputy General Counsel ~~(Chief Counsel, Independent Agency)~~ (Strike inapplicable title)
☐ Check if applicable Copy not approved. Objections attached.	Teresa D. Miller Insurance Commissioner TITLE _____ (EXECUTIVE OFFICER, CHAIRMAN OR SECRETARY)	☐ Check if applicable. No Attorney General approval or objection within 30 days after submission.

NOTICE OF FINAL RULEMAKING
INSURANCE DEPARTMENT

31 Pa. Code Chapter 84

TABLES APPROVED FOR USE IN DETERMINING MINIMUM NONFORFEITURE STANDARDS AND MINIMUM STANDARDS FOR VALUATION

FINAL-FORM RULEMAKING

INSURANCE DEPARTMENT

31 PA. CODE Ch. 84

Tables Approved for Use in Determining Minimum Nonforfeiture Standards and Minimum Standards for Valuation

[__ Pa.B. ____]
[Saturday, _____, 201_]

The Commonwealth of Pennsylvania Insurance Department (Department) amends Chapter 84 of the Department's regulations (31 Pa. Code Ch.84) (relating to tables approved for use in determining minimum nonforfeiture standards and minimum standards for valuation) to read as set forth in Annex A. This final-form rulemaking is made under the authority of: sections 206, 506, 1501 and 1502 of The Administrative Code of 1929 (71 P.S. §§ 66, 186, 411 and 412), regarding the general rulemaking authority of the Department; sections 301 and 303 of The Insurance Department Act of 1921 (40 P.S. §§ 71 and 73), regarding computation of reserve liability and minimum reserve requirements of companies charging less than net premiums computed on mortality tables; and section 410A of The Insurance Company Law of 1921 (40 P.S. §510.1), regarding standard nonforfeiture law for life insurance.

Purpose

The purpose of this final-form rulemaking is to adopt new mortality tables for use in determining the minimum reserves that insurers must maintain for annuities. These new minimum standards would apply to annuities issued on or after the effective date of adoption of the proposed amendments. The amendments are based upon changes to National Association of Insurance Commissioners (NAIC) Model Regulation 821, which were adopted by the NAIC in 2012. The 2012 Individual Annuity Mortality Table was developed by the Society of Actuaries and the American Academy of Actuaries in cooperation with the Life Actuarial (A) Task Force and reflects improved mortality experience resulting from increased life expectancies. The new table is a generational table that incorporates projections for future mortality improvements. In other words, because people are living longer, mortality tables must be updated in accordance therewith so that insurers can maintain accurate reserves. As such, increased reserving will strengthen insurer solvency and thereby protect consumers by ensuring reliable payment of benefits when due.

The Department's adoption of the proposed mortality tables will help to assure the solvency of insurance companies by requiring adequate and accurate reserves based on the most recent

mortality tables. Additionally, the adoption of the amendments will promote consistency with other states.

Comments and Responses

Notice of the proposed rulemaking was published at 46 Pa. B. 460 (January 23, 2016) with a thirty-day comment period. A comment was received from the Insurance Federation of Pennsylvania in support of the regulation and recommending an immediate effective date.

The Independent Regulatory Review Commission did not have objections, comments, or recommendations regarding the regulation.

Affected Parties

The final-form rulemaking would apply to life insurance companies and fraternal benefit societies issuing annuity and pure endowment contracts in this Commonwealth.

Fiscal Impact

State Government

There will be no increase in cost to the Department due to the adoption of new annuity tables since the proposed rulemaking does not impose additional requirements on the insurance industry.

General Public

It is unlikely that there will be any adverse fiscal impact on the consumers who purchase annuity contracts. The general public will be purchasing annuity contracts from more financially stable insurers.

Political Subdivisions

The final-form rulemaking will not impose additional costs on political subdivisions.

Private Sector

The final-form rulemaking may have some fiscal impact on insurance companies marketing annuity contracts. Insurers will be required to expend the time necessary to determine if their current annuity reserve standards meet the new requirements. To the extent that the standards do not comply with the new requirements, an insurance company must increase the reserves for contracts issued on or after the effective date of adoption of the proposed amendments to Chapter 84. However, any negative fiscal impact would be minimized by requiring the new tables be used only for contracts issued after the effective date of the regulation.

Paperwork

The final-form rulemaking will not impose additional paperwork on the Department. The regulation will not change an insurer's existing reporting, record keeping, or other paperwork requirements.

Effectiveness/Sunset Date

The final-form rulemaking will become effective 30 days after final adoption and publication in the *Pennsylvania Bulletin* as final rulemaking. The Department continues to monitor the effectiveness of regulations on a triennial basis. Therefore, a sunset date has not been assigned.

Contact Person

Questions or comments concerning this final-form rulemaking may be addressed in writing to Bridget E. Burke, Regulatory Coordinator, 1341 Strawberry Square, Harrisburg, PA 17120. Questions and comments may also be e-mailed to *briburke@pa.gov* or faxed to (717) 772-1969.

Regulatory Review

Under section 5(a) of the Regulatory Review Act (71 P.S. § 745.5(a)), on January 11, 2016, the Department submitted a copy of this rulemaking to the Independent Regulatory Review Commission (IRRC) and to the Chairpersons of the House Insurance Committee and the Senate Banking and Insurance Committee for review and comment.

Under section 5(c) of the Regulatory Review Act (71 P.S. § 745.5(c)), IRRC and the Chairpersons of the Senate and House Committees were provided with copies of the comments received during the public comment period. In preparing the final-form rulemaking, the Department considered all comments from IRRC, the House and Senate Committees and the public.

Under section 5.1(j.2) of the Regulatory Review Act (71 P.S. § 745.5a(j.2)), on _____, 2016, the final rulemaking was deemed approved by the House and Senate Committees. Under section 5.1(e) of the Regulatory Review Act (71 P.S. §745.5a(e)), IRRC met on _____ and approved the final-form rulemaking.

Findings

The Commissioner finds that:

(1) Public notice of intention to adopt this final-form rulemaking was given under sections 201 and 202 of the act of July 31, 1968 (P.L. 769, No. 240) (45 P.S. §§ 1201 and 1202) and the regulations thereunder, 1 Pa. Code §§ 7.1 and 7.2.

(2) The adoption of this final-form rulemaking in the manner provided in this order is necessary and appropriate for the administration and enforcement of the authorizing statutes.

Order

The Commissioner, acting under the authorizing statutes, orders that:

(a) The regulations of the Department, 31 Pa. Code Chapter 84, are amended by adopting new mortality tables as set forth in 46 Pa. B. 460.

(b) The Department shall submit this order, 46 Pa. B. 460, and Annex A and deposit them with the Legislative Reference Bureau as required by law.

(c) The final-form regulation adopted by this order shall take effect 30 days following publication in the Pennsylvania Bulletin.

Teresa D. Miller
Insurance Commissioner

Annex A

TITLE 31. INSURANCE

PART IV. LIFE INSURANCE

CHAPTER 84. TABLES APPROVED FOR USE IN DETERMINING MINIMUM NONFORFEITURE STANDARDS AND MINIMUM STANDARDS FOR VALUATION

§ 84.2. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

Act—The Insurance Department Act of 1921 (40 P. S. §§ 1—321).

Annuity 2000 Mortality Table—The mortality table developed by the Society of Actuaries Committee on Life Insurance Research and shown on page 240 of Volume XLVII of the *Transactions of the Society of Actuaries* (1995) and adopted as a recognized mortality table for annuities in December 1996 by the NAIC.

Commissioner—The Insurance Commissioner of the Commonwealth.

Department—The Insurance Department of the Commonwealth.

***Generational mortality table*—A mortality table containing a set of mortality rates that decrease for a given age from one year to the next based on a combination of a period table and a projection scale containing rates of mortality improvement.**

Law—The Insurance Company Law of 1921 (40 P. S. §§ 341—991).

NAIC—The National Association of Insurance Commissioners.

***Period table*—A table of mortality rates applicable to a given calendar year.**

***Projection Scale G2*—The table, as shown in Appendices III and IV, of annual rates, $G2_x$, of mortality improvement by age for projecting future mortality rates beyond calendar year 2012 developed by the Society of Actuaries Committee on Life Insurance Research.**

1983 Table "a"—The mortality table developed by the Society of Actuaries Committee to Recommend a New Mortality Basis for Individual Annuity Valuation and adopted as a recognized mortality table for annuities in June 1982 by the NAIC.

1983 GAM Table—The mortality table developed by the Society of Actuaries Committee on Annuities and adopted as a recognized mortality table for annuities in December 1983 by the NAIC.

1994 GAR Table—The mortality table developed by the Society of Actuaries Group Annuity Valuation Table Task Force and shown on pages 866—867 of volume XLVII of the *Transactions of the Society of Actuaries* (1995) and adopted as a recognized mortality table for annuities in December 1996 by the NAIC.

***2012 IAR Table*—The generational mortality table developed by the Society of Actuaries Committee on Life Insurance Research containing rates, q_x^{2012+n}, derived from a combination of the 2012 IAM Period Table and Projection Scale G2, using the methodology in § 84.3a (relating to application of the 2012 IAR Mortality Table).**

***2012 IAM Period Table*—The period table, as shown in Appendices I and II, containing loaded mortality rates for calendar year 2012, q_x^{2012}, developed by the Society of Actuaries Committee on Life Insurance Research.**

§ 84.3. 1983 Table "a," Annuity 2000 Mortality Table, 1983 GAM Table **[and],** 1994 GAR Table **and 2012 IAR Mortality Table**.

(a) The 1983 Table "a," the Annuity 2000 Mortality Table excluding mortality rates independent of sex, the 1983 GAM Table **[and],** the 1994 GAR Table **and the 2012 IAR Mortality Table** are approved by the Commissioner as annuity mortality tables for valuation.

(b) At the option of the company, the 1983 Table "a" may be used in determining the minimum standard of valuation for an individual annuity or pure endowment contract issued prior to January 1, 1986, and for an annuity or pure endowment purchased prior to January 1, 1986, under a group annuity or pure endowment contract.

(c) The 1983 Table "a," or the Annuity 2000 Mortality Table excluding mortality rates independent of sex shall be used in determining the minimum standard of valuation for an individual annuity or pure endowment contract issued on or after January 1, 1986, and prior to June 26, 1999.

(d) The Annuity 2000 Mortality Table excluding mortality rates independent of sex shall be used, except as provided by **[subsection (e)] subsections (e) and (f)**, in determining the minimum standard of valuation for an individual annuity or pure endowment contract issued on or after June 26, 1999.

(e) Except as provided in subsection (f), the 2012 IAR Mortality Table shall be used for determining the minimum standard of valuation for any individual annuity or pure endowment contract issued on or after _____ (*Editor's Note*: The blank refers to the effective date of adoption of this proposed rulemaking.).

[(e)] (f) The 1983 Table "a" shall be used in determining the minimum standard of valuation for an individual annuity or pure endowment contract issued on or after June 26, 1999**[.],** when the contract is based on life contingencies and is issued to fund periodic benefits arising from:

(1) Settlements of claims pertaining to court settlements or out of court settlements from tort actions.

(2) Settlements of claims, such as worker's compensation claims.

(3) Settlements of long term disability claims when a temporary or life annuity has been used in lieu of continuing disability payments.

[(f)] (g) At the option of the company, the 1983 GAM Table or the 1994 GAR Table may be used in determining the minimum standard of valuation for an annuity or pure endowment purchased prior to January 1, 1986, under a group annuity or pure endowment contract.

[(g)] (h) The 1983 GAM Table or the 1994 GAR Table shall be used in determining the minimum standard of valuation for an annuity or pure endowment purchased on or after January 1, 1986, and prior to June 26, 1999, under a group annuity or pure endowment contract.

[(h)] (i) 1994 GAR Table.

(1) The 1994 GAR Table shall be used in determining the minimum standard of valuation for an annuity or pure endowment purchased on or after June 26, 1999, under a group annuity or pure endowment contract.

(2) In using the 1994 GAR Table, the mortality rate for a person age x in year (1994 + n) shall be calculated as follows:

$$q_x^{1994+n} = q_x^{1994} (1-AA_x)^n$$

where the values of q_x^{1994} and AA_x are as specified in the 1994 GAR Table.

(*Editor's Note*: Section 84.3a and Appendices I—IV are new and printed in regular type to enhance readability.)

§ 84.3a. Application of the 2012 IAR Mortality Table.

(a) In using the 2012 IAR Mortality Table, the mortality rate for a person age x in year (2012 + n) is calculated as follows: $q_x^{2012+n} = q_x^{2012} (1-G2_x)^n$.

(b) The resulting q_x^{2012+n} shall be rounded to three decimal places per 1,000, for example, 0.741 deaths per 1,000. This rounding shall occur according to the formula in subsection (a), starting at the 2012 period table rate.

(1) For example, for a male age 30, $q_x^{2012} = 0.741$.

$q_x^{2013} = 0.741 * (1-0.010) \hat{} 1 = 0.73359$, which is rounded to 0.734.

$q_x^{2014} = 0.741 * (1-0.010) \hat{} 2 = 0.7262541$, which is rounded to 0.726.

(2) A method leading to incorrect rounding would be to calculate q_x^{2014} as q_x^{2013} * (1−0.010), or 0.734 * 0.99 = 0.727. It is incorrect to use the already rounded q_x^{2013} to calculate q_x^{2014}.

APPENDIX I
2012 IAM Period Table
Female, Age Nearest Birthday

AGE	1000 · q_x^{2012}	AGE	1000 · q_x^{2012}	AGE	1000 · q_x^{2012}	AGE	1000 · q_x^{2012}
0	1.621	30	0.300	60	3.460	90	88.377
1	0.405	31	0.321	61	3.916	91	97.491
2	0.259	32	0.338	62	4.409	92	107.269
3	0.179	33	0.351	63	4.933	93	118.201
4	0.137	34	0.365	64	5.507	94	130.969
5	0.125	35	0.381	65	6.146	95	146.449
6	0.117	36	0.402	66	6.551	96	163.908
7	0.110	37	0.429	67	7.039	97	179.695
8	0.095	38	0.463	68	7.628	98	196.151
9	0.088	39	0.504	69	8.311	99	213.150
10	0.085	40	0.552	70	9.074	100	230.722
11	0.086	41	0.600	71	9.910	101	251.505
12	0.094	42	0.650	72	10.827	102	273.007
13	0.108	43	0.697	73	11.839	103	295.086
14	0.131	44	0.740	74	12.974	104	317.591
15	0.156	45	0.780	75	14.282	105	340.362
16	0.179	46	0.825	76	15.799	106	362.371
17	0.198	47	0.885	77	17.550	107	384.113
18	0.211	48	0.964	78	19.582	108	400.000
19	0.221	49	1.051	79	21.970	109	400.000
20	0.228	50	1.161	80	24.821	110	400.000
21	0.234	51	1.308	81	28.351	111	400.000
22	0.240	52	1.460	82	32.509	112	400.000
23	0.245	53	1.613	83	37.329	113	400.000
24	0.247	54	1.774	84	42.830	114	400.000
25	0.250	55	1.950	85	48.997	115	400.000
26	0.256	56	2.154	86	55.774	116	400.000
27	0.261	57	2.399	87	63.140	117	400.000
28	0.270	58	2.700	88	71.066	118	400.000
29	0.281	59	3.054	89	79.502	119	400.000
						120	1000.000

APPENDIX II
2012 IAM Period Table
Male, Age Nearest Birthday

AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$
0	1.605	30	0.741	60	5.096	90	109.993
1	0.401	31	0.751	61	5.614	91	123.119
2	0.275	32	0.754	62	6.169	92	137.168
3	0.229	33	0.756	63	6.759	93	152.171
4	0.174	34	0.756	64	7.398	94	168.194
5	0.168	35	0.756	65	8.106	95	185.260
6	0.165	36	0.756	66	8.548	96	197.322
7	0.159	37	0.756	67	9.076	97	214.751
8	0.143	38	0.756	68	9.708	98	232.507
9	0.129	39	0.800	69	10.463	99	250.397
10	0.113	40	0.859	70	11.357	100	268.607
11	0.111	41	0.926	71	12.418	101	290.016
12	0.132	42	0.999	72	13.675	102	311.849
13	0.169	43	1.069	73	15.150	103	333.962
14	0.213	44	1.142	74	16.860	104	356.207
15	0.254	45	1.219	75	18.815	105	380.000
16	0.293	46	1.318	76	21.031	106	400.000
17	0.328	47	1.454	77	23.540	107	400.000
18	0.359	48	1.627	78	26.375	108	400.000
19	0.387	49	1.829	79	29.572	109	400.000
20	0.414	50	2.057	80	33.234	110	400.000
21	0.443	51	2.302	81	37.533	111	400.000
22	0.473	52	2.545	82	42.261	112	400.000
23	0.513	53	2.779	83	47.441	113	400.000
24	0.554	54	3.011	84	53.233	114	400.000
25	0.602	55	3.254	85	59.855	115	400.000
26	0.655	56	3.529	86	67.514	116	400.000
27	0.688	57	3.845	87	76.340	117	400.000
28	0.710	58	4.213	88	86.388	118	400.000
29	0.727	59	4.631	89	97.634	119	400.000
						120	1000.000

APPENDIX III
Projection Scale G2
Female, Age Nearest Birthday

AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$
0	0.010	30	0.010	60	0.013	90	0.006
1	0.010	31	0.010	61	0.013	91	0.006
2	0.010	32	0.010	62	0.013	92	0.005
3	0.010	33	0.010	63	0.013	93	0.005
4	0.010	34	0.010	64	0.013	94	0.004
5	0.010	35	0.010	65	0.013	95	0.004
6	0.010	36	0.010	66	0.013	96	0.004
7	0.010	37	0.010	67	0.013	97	0.003
8	0.010	38	0.010	68	0.013	98	0.003
9	0.010	39	0.010	69	0.013	99	0.002
10	0.010	40	0.010	70	0.013	100	0.002
11	0.010	41	0.010	71	0.013	101	0.002
12	0.010	42	0.010	72	0.013	102	0.001
13	0.010	43	0.010	73	0.013	103	0.001
14	0.010	44	0.010	74	0.013	104	0.000
15	0.010	45	0.010	75	0.013	105	0.000
16	0.010	46	0.010	76	0.013	106	0.000
17	0.010	47	0.010	77	0.013	107	0.000
18	0.010	48	0.010	78	0.013	108	0.000
19	0.010	49	0.010	79	0.013	109	0.000
20	0.010	50	0.010	80	0.013	110	0.000
21	0.010	51	0.010	81	0.012	111	0.000
22	0.010	52	0.011	82	0.012	112	0.000
23	0.010	53	0.011	83	0.011	113	0.000
24	0.010	54	0.011	84	0.010	114	0.000
25	0.010	55	0.012	85	0.010	115	0.000
26	0.010	56	0.012	86	0.009	116	0.000
27	0.010	57	0.012	87	0.008	117	0.000
28	0.010	58	0.012	88	0.007	118	0.000
29	0.010	59	0.013	89	0.007	119	0.000
						120	0.000

APPENDIX IV
Projection Scale G2
Male, Age Nearest Birthday

AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$
0	0.010	30	0.010	60	0.015	90	0.007
1	0.010	31	0.010	61	0.015	91	0.007
2	0.010	32	0.010	62	0.015	92	0.006

3	0.010	33	0.010	63	0.015	93	0.005
4	0.010	34	0.010	64	0.015	94	0.005
5	0.010	35	0.010	65	0.015	95	0.004
6	0.010	36	0.010	66	0.015	96	0.004
7	0.010	37	0.010	67	0.015	97	0.003
8	0.010	38	0.010	68	0.015	98	0.003
9	0.010	39	0.010	69	0.015	99	0.002
10	0.010	40	0.010	70	0.015	100	0.002
11	0.010	41	0.010	71	0.015	101	0.002
12	0.010	42	0.010	72	0.015	102	0.001
13	0.010	43	0.010	73	0.015	103	0.001
14	0.010	44	0.010	74	0.015	104	0.000
15	0.010	45	0.010	75	0.015	105	0.000
16	0.010	46	0.010	76	0.015	106	0.000
17	0.010	47	0.010	77	0.015	107	0.000
18	0.010	48	0.010	78	0.015	108	0.000
19	0.010	49	0.010	79	0.015	109	0.000
20	0.010	50	0.010	80	0.015	110	0.000
21	0.010	51	0.011	81	0.014	111	0.000
22	0.010	52	0.011	82	0.013	112	0.000
23	0.010	53	0.012	83	0.013	113	0.000
24	0.010	54	0.012	84	0.012	114	0.000
25	0.010	55	0.013	85	0.011	115	0.000
26	0.010	56	0.013	86	0.010	116	0.000
27	0.010	57	0.014	87	0.009	117	0.000
28	0.010	58	0.014	88	0.009	118	0.000
29	0.010	59	0.015	89	0.008	119	0.000
						120	0.000

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NAIC MODEL RULE (REGULATION) FOR RECOGNIZING A NEW ANNUITY MORTALITY TABLE FOR USE IN DETERMINING RESERVE LIABILITIES FOR ANNUITIES

Table of Contents

Section 1. Authority

This rule is promulgated by the Commissioner of Insurance pursuant to Section [insert applicable reference to the Standard Valuation Law] of the [insert state] Insurance Statute.

Section 2. Purpose

The purpose of this rule is to recognize the following mortality tables for use in determining the minimum standard of valuation for annuity and pure endowment contracts: the 1983 Table "a," the 1983 Group Annuity Mortality (1983 GAM) Table, the Annuity 2000 Mortality Table, the 2012 Individual Annuity Reserving (2012 IAR) Mortality Table, and the 1994 Group Annuity Reserving (1994 GAR) Table.

Section 3. Definitions

A. As used in this rule "1983 Table 'a'" means that mortality table developed by the Society of Actuaries Committee to Recommend a New Mortality Basis for Individual Annuity Valuation and adopted as a recognized mortality table for annuities in June 1982 by the National Association of Insurance Commissioners. [See *1982 Proceedings of the NAIC II*, page 454.]

B. As used in this rule "1983 GAM Table" means that mortality table developed by the Society of Actuaries Committee on Annuities and adopted as a recognized mortality table for annuities in December 1983 by the National Association of Insurance Commissioners. [See *1984 Proceedings of the NAIC I*, pages 414 to 415.]

C. As used in this rule "1994 GAR Table" means that mortality table developed by the Society of Actuaries Group Annuity Valuation Table Task Force and shown on pages 866-867 of Volume XLVII of the *Transactions of the Society of Actuaries* (1995).

D. As used in this rule "Annuity 2000 Mortality Table" means that mortality table developed by the Society of Actuaries Committee on Life Insurance Research and shown on page 240 of Volume XLVII of the *Transactions of the Society of Actuaries* (1995).

E. As used in this rule, "Period table" means a table of mortality rates applicable to a given calendar year (the Period).

F. As used in this rule, "Generational mortality table" means a mortality table containing a set of mortality rates that decrease for a given age from one year to the next based on a combination of a Period table and a projection scale containing rates of mortality improvement.

G. As used in this rule "2012 IAR Mortality Table" means that Generational mortality table developed by the Society of Actuaries Committee on Life Insurance Research and containing rates, q_x^{2012+n}, derived from a combination of the 2012 IAM Period Table and Projection Scale G2, using the methodology stated in Section 5.

H. As used in this rule, "2012 Individual Annuity Mortality Period Life (2012 IAM Period) Table" means the Period table containing loaded mortality rates for calendar year 2012. This table contains rates, q_x^{2012}, developed by the Society of Actuaries Committee on Life Insurance Research and is shown in Appendices 1-2.

I. As used in this rule, "Projection Scale G2 (Scale G2)" is a table of annual rates, $G2_x$, of mortality improvement by age for projecting future mortality rates beyond calendar year 2012. This table was developed by the Society of Actuaries Committee on Life Insurance Research and is shown in Appendices 3-4.

Section 4. Individual Annuity or Pure Endowment Contracts

A. Except as provided in Subsections B and C of this section, the 1983 Table "a" is recognized and approved as an individual annuity mortality table for valuation and, at the option of the company, may be used for purposes of determining the minimum standard of valuation for any individual annuity or pure endowment contract issued on or after [insert effective date of 1976 amendments to the Standard Valuation Law].

B. Except as provided in Subsection C of this section, either the 1983 Table "a" or the Annuity 2000 Mortality Table shall be used for determining the minimum standard of valuation for any individual annuity or pure endowment contract issued on or after [insert date on or after the effective date of original adoption of this regulation].

C. Except as provided in Subsection D of this section, the Annuity 2000 Mortality Table shall be used for determining the minimum standard of valuation for any individual annuity or pure endowment contract issued on or after [insert date on or after effective date of this amended regulation].

D. Except as provided in Subsection E of this section, the 2012 IAR Mortality Table shall be used for determining the minimum standard of valuation for any individual annuity or pure endowment contract issued on or after [insert date on or after effective date of this amended regulation].

E. The 1983 Table "a" without projection is to be used for determining the minimum standards of valuation for an individual annuity or pure endowment contract issued on or after [insert appropriate date on or after the effective date of this amended regulation], solely when the contract is based on life contingencies and is issued to fund periodic benefits arising from:

(1) Settlements of various forms of claims pertaining to court settlements or out of court settlements from tort actions;

(2) Settlements involving similar actions such as worker's compensation claims; or

(3) Settlements of long term disability claims where a temporary or life annuity has been used in lieu of continuing disability payments.

Section 5. Application of the 2012 IAR Mortality Table

In using the 2012 IAR Mortality Table, the mortality rate for a person age x in year (2012 + n) is calculated as follows:

$$q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n$$

The resulting q_x^{2012+n} shall be rounded to three decimal places per 1,000, e.g., 0.741 deaths per 1,000. Also, the rounding shall occur according to the formula above, starting at the 2012 period table rate.

For example, for a male age 30, $q_x^{2012} = 0.741$.
$q_x^{2013} = 0.741 * (1 - 0.010) \wedge 1 = 0.73359$, which is rounded to 0.734.
$q_x^{2014} = 0.741 * (1 - 0.010) \wedge 2 = 0.7262541$, which is rounded to 0.726.
A method leading to incorrect rounding would be to calculate q_x^{2014} as $q_x^{2013} * (1 - 0.010)$, or $0.734 * 0.99 = 0.727$.
It is incorrect to use the already rounded q_x^{2013} to calculate q_x^{2014}.

Section 6. Group Annuity or Pure Endowment Contracts

A. Except as provided in Subsections B and C of this section, the 1983 GAM Table, the 1983 Table "a" and the 1994 GAR Table are recognized and approved as group annuity mortality tables for valuation and, at the option of the company, any one of these tables may be used for purposes of valuation for an annuity or pure endowment purchased on or after [insert effective date of 1976 amendments to the Standard Valuation Law] under a group annuity or pure endowment contract.

B. Except as provided in Subsection C of this section, either the 1983 GAM Table or the 1994 GAR Table shall be used for determining the minimum standard of valuation for any annuity or pure endowment purchased on or after [insert date on or after effective date of original adoption of this regulation] under a group annuity or pure endowment contract.

C. The 1994 GAR Table shall be used for determining the minimum standard of valuation for any annuity or pure endowment purchased on or after [insert appropriate date on or after effective date of this amended regulation] under a group annuity or pure endowment contract.

Section 7. Application of the 1994 GAR Table

In using the 1994 GAR Table, the mortality rate for a person age x in year (1994 + n) is calculated as follows:

$$q_x^{1994+n} = q_x^{1994}(1 - AA_x)^n$$

where the q_x^{1994} and AA_x are as specified in the 1994 GAR Table.

Section 8. Separability

If any provision of this rule or its application to any person or circumstances is for any reason held to be invalid, the remainder of the regulation and the application of its provisions to other persons or circumstances shall not be affected.

Section 9. Effective Date

The effective date of this rule is [it is recommended that the amended regulation be effective 1/1/2014].

Chronological Summary of Actions (all references are to the Proceedings of the NAIC).

1983 Proc. 1 12, 35, 448-449, 459, 520
1984 Proc. 1 6, 31, 376, 392, 471-472 (adopted).
1996 Proc. 3rd Quarter 9, 40, 908, 1202, 1236-1237 (amended and reprinted).
2012 Fall National Meeting, Amendments adopted at Executive/Plenary Session
December 2014 – technical correction

APPENDIX I

2012 IAM Period Table
Female, Age Nearest Birthday

AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$
0	1.621	30	0.300	60	3.460	90	88.377
1	0.405	31	0.321	61	3.916	91	97.491
2	0.259	32	0.338	62	4.409	92	107.269
3	0.179	33	0.351	63	4.933	93	118.201
4	0.137	34	0.365	64	5.507	94	130.969
5	0.125	35	0.381	65	6.146	95	146.449
6	0.117	36	0.402	66	6.551	96	163.908
7	0.110	37	0.429	67	7.039	97	179.695
8	0.095	38	0.463	68	7.628	98	196.151
9	0.088	39	0.504	69	8.311	99	213.150
10	0.085	40	0.552	70	9.074	100	230.722
11	0.086	41	0.600	71	9.910	101	251.505
12	0.094	42	0.650	72	10.827	102	273.007
13	0.108	43	0.697	73	11.839	103	295.086
14	0.131	44	0.740	74	12.974	104	317.591
15	0.156	45	0.780	75	14.282	105	340.362
16	0.179	46	0.825	76	15.799	106	362.371
17	0.198	47	0.885	77	17.550	107	384.113
18	0.211	48	0.964	78	19.582	108	400.000
19	0.221	49	1.051	79	21.970	109	400.000
20	0.228	50	1.161	80	24.821	110	400.000
21	0.234	51	1.308	81	28.351	111	400.000
22	0.240	52	1.460	82	32.509	112	400.000
23	0.245	53	1.613	83	37.329	113	400.000
24	0.247	54	1.774	84	42.830	114	400.000
25	0.250	55	1.950	85	48.997	115	400.000
26	0.256	56	2.154	86	55.774	116	400.000
27	0.261	57	2.399	87	63.140	117	400.000
28	0.270	58	2.700	88	71.066	118	400.000
29	0.281	59	3.054	89	79.502	119	400.000
						120	1000.000

APPENDIX II

2012 IAM Period Table
Male, Age Nearest Birthday

AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$	AGE	$1000 \cdot q_x^{2012}$
0	1.605	30	0.741	60	5.096	90	109.993
1	0.401	31	0.751	61	5.614	91	123.119
2	0.275	32	0.754	62	6.169	92	137.168
3	0.229	33	0.756	63	6.759	93	152.171
4	0.174	34	0.756	64	7.398	94	168.194
5	0.168	35	0.756	65	8.106	95	185.260
6	0.165	36	0.756	66	8.548	96	197.322
7	0.159	37	0.756	67	9.076	97	214.751
8	0.143	38	0.756	68	9.708	98	232.507
9	0.129	39	0.800	69	10.463	99	250.397
10	0.113	40	0.859	70	11.357	100	268.607
11	0.111	41	0.926	71	12.418	101	290.016
12	0.132	42	0.999	72	13.675	102	311.849
13	0.169	43	1.069	73	15.150	103	333.962
14	0.213	44	1.142	74	16.860	104	356.207
15	0.254	45	1.219	75	18.815	105	380.000
16	0.293	46	1.318	76	21.031	106	400.000
17	0.328	47	1.454	77	23.540	107	400.000
18	0.359	48	1.627	78	26.375	108	400.000
19	0.387	49	1.829	79	29.572	109	400.000
20	0.414	50	2.057	80	33.234	110	400.000
21	0.443	51	2.302	81	37.533	111	400.000
22	0.473	52	2.545	82	42.261	112	400.000
23	0.513	53	2.779	83	47.441	113	400.000
24	0.554	54	3.011	84	53.233	114	400.000
25	0.602	55	3.254	85	59.855	115	400.000
26	0.655	56	3.529	86	67.514	116	400.000
27	0.688	57	3.845	87	76.340	117	400.000
28	0.710	58	4.213	88	86.388	118	400.000
29	0.727	59	4.631	89	97.634	119	400.000
						120	1000.000

APPENDIX III

Projection Scale G2
Female, Age Nearest Birthday

AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$
0	0.010	30	0.010	60	0.013	90	0.006
1	0.010	31	0.010	61	0.013	91	0.006
2	0.010	32	0.010	62	0.013	92	0.005
3	0.010	33	0.010	63	0.013	93	0.005
4	0.010	34	0.010	64	0.013	94	0.004
5	0.010	35	0.010	65	0.013	95	0.004
6	0.010	36	0.010	66	0.013	96	0.004
7	0.010	37	0.010	67	0.013	97	0.003
8	0.010	38	0.010	68	0.013	98	0.003
9	0.010	39	0.010	69	0.013	99	0.002
10	0.010	40	0.010	70	0.013	100	0.002
11	0.010	41	0.010	71	0.013	101	0.002
12	0.010	42	0.010	72	0.013	102	0.001
13	0.010	43	0.010	73	0.013	103	0.001
14	0.010	44	0.010	74	0.013	104	0.000
15	0.010	45	0.010	75	0.013	105	0.000
16	0.010	46	0.010	76	0.013	106	0.000
17	0.010	47	0.010	77	0.013	107	0.000
18	0.010	48	0.010	78	0.013	108	0.000
19	0.010	49	0.010	79	0.013	109	0.000
20	0.010	50	0.010	80	0.013	110	0.000
21	0.010	51	0.010	81	0.012	111	0.000
22	0.010	52	0.011	82	0.012	112	0.000
23	0.010	53	0.011	83	0.011	113	0.000
24	0.010	54	0.011	84	0.010	114	0.000
25	0.010	55	0.012	85	0.010	115	0.000
26	0.010	56	0.012	86	0.009	116	0.000
27	0.010	57	0.012	87	0.008	117	0.000
28	0.010	58	0.012	88	0.007	118	0.000
29	0.010	59	0.013	89	0.007	119	0.000
						120	0.000

APPENDIX IV

Projection Scale G2
Male, Age Nearest Birthday

AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$	AGE	$G2_x$
0	0.010	30	0.010	60	0.015	90	0.007
1	0.010	31	0.010	61	0.015	91	0.007
2	0.010	32	0.010	62	0.015	92	0.006
3	0.010	33	0.010	63	0.015	93	0.005
4	0.010	34	0.010	64	0.015	94	0.005
5	0.010	35	0.010	65	0.015	95	0.004
6	0.010	36	0.010	66	0.015	96	0.004
7	0.010	37	0.010	67	0.015	97	0.003
8	0.010	38	0.010	68	0.015	98	0.003
9	0.010	39	0.010	69	0.015	99	0.002
10	0.010	40	0.010	70	0.015	100	0.002
11	0.010	41	0.010	71	0.015	101	0.002
12	0.010	42	0.010	72	0.015	102	0.001
13	0.010	43	0.010	73	0.015	103	0.001
14	0.010	44	0.010	74	0.015	104	0.000
15	0.010	45	0.010	75	0.015	105	0.000
16	0.010	46	0.010	76	0.015	106	0.000
17	0.010	47	0.010	77	0.015	107	0.000
18	0.010	48	0.010	78	0.015	108	0.000
19	0.010	49	0.010	79	0.015	109	0.000
20	0.010	50	0.010	80	0.015	110	0.000
21	0.010	51	0.011	81	0.014	111	0.000
22	0.010	52	0.011	82	0.013	112	0.000
23	0.010	53	0.012	83	0.013	113	0.000
24	0.010	54	0.012	84	0.012	114	0.000
25	0.010	55	0.013	85	0.011	115	0.000
26	0.010	56	0.013	86	0.010	116	0.000
27	0.010	57	0.014	87	0.009	117	0.000
28	0.010	58	0.014	88	0.009	118	0.000
29	0.010	59	0.015	89	0.008	119	0.000
						120	0.000

NAIC MODEL RULE (REGULATION) FOR RECOGNIZING A NEW ANNUITY MORTALITY TABLE FOR USE IN DETERMINING RESERVE LIABILITIES FOR ANNUITIES

These charts are intended to provide the readers with additional information to more easily access state statutes, regulations, bulletins or administrative rulings which are related to the NAIC model. Such guidance provides the reader with a starting point from which they may review how each state has addressed the model and the topic being covered. The NAIC Legal Division has reviewed each state's activity in this area and has made an interpretation of adoption or related state activity based on the definitions listed below. The NAIC's interpretation may or may not be shared by the individual states or by interested readers.

This state page does not constitute a formal legal opinion by the NAIC staff on the provisions of state law and should not be relied upon as such. Nor does this state page reflect a determination as to whether a state meets any applicable accreditation standards. Every effort has been made to provide correct and accurate summaries to assist the reader in targeting useful information. For further details, the laws cited should be consulted. The NAIC attempts to provide current information; however, due to the timing of our publication production, the information provided may not reflect the most up to date status. Therefore, readers should consult state law for additional adoptions and subsequent bill status.

NAIC MODEL RULE (REGULATION) FOR RECOGNIZING A NEW ANNUITY MORTALITY TABLE FOR USE IN DETERMINING RESERVE LIABILITIES FOR ANNUITIES

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NAIC MODEL RULE (REGULATION) FOR RECOGNIZING A NEW ANNUITY MORTALITY TABLE FOR USE IN DETERMINING RESERVE LIABILITIES FOR ANNUITIES

KEY:

MODEL ADOPTION: States that have citations identified in this column adopted the most recent version of the NAIC model in a substantially similar manner. This requires states to adopt the model in its entirety but does allow for variations in style and format. States that have adopted portions of the current NAIC model will be included in this column with an explanatory note.

RELATED STATE ACTIVITY: States that have citations identified in this column have not adopted the most recent version of the NAIC model in a substantially similar manner. Examples of Related State Activity include but are not limited to: An older version of the NAIC model, legislation or regulation derived from other sources such as Bulletins and Administrative Rulings.

NO CURRENT ACTIVITY: No state activity on the topic as of the date of the most recent update. This includes states that have repealed legislation as well as states that have never adopted legislation.

NAIC MEMBER	MODEL ADOPTION	RELATED STATE ACTIVITY
Alabama	ALA. ADMIN. CODE r. 482-1-076.01 to 482-1-076.09; Apps. I to IV (1985/2014).	
Alaska	ALASKA ADMIN. CODE tit. 3, §§ 28.600 to 28.690 (1985/2014).	
American Samoa	NO CURRENT ACTIVITY	
Arizona	BULLETIN 2014-6 (2014) (portions of model).	ARIZ. INS. ORDER, DOCKET NO. 5876 (1985).
Arkansas	054 ARK. CODE. R. §38 (2014).	
California	BULLETIN 2014-5 (2014) (portions of model).	BULLETIN 85-14 (1985) (Adopted by reference); BULLETIN 98-1 (1998).
Colorado		COLO. CODE REGS. § 4-1-7 (1985/2010).
Connecticut	CONN. AGENCIES REGS. §§ 38a-78-21 to 38a-78-25 (1992/2014); CONN. AGENCIES REGS. § 38a-78, App. 1 to 4 (2014).	
Delaware		18 DEL. CODE REGS. § 1208 (1985/2003).

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NAIC MEMBER	MODEL ADOPTION	RELATED STATE ACTIVITY
District of Columbia		D.C. MUN. REGS. tit. 26, §§ 1100 to 1199 (2000).
Florida		FLA. ADMIN. CODE ANN. r. 69O-162.101 to 69O-162.108 (1998); FLA. STAT. § 625.121 (1959/2000).
Georgia	GA. COMP. R. & REGS. 120-2-39-.01 to 120-2-39-.09 (1987/2015).	
Guam	NO CURRENT ACTIVITY	
Hawaii	NO CURRENT ACTIVITY	
Idaho	IDAHO ADMIN. CODE r. 18.01.46.000 to 18.01.46.015; Apps. 1 to 4 (1985/2014).	
Illinois	ILL. ADMIN. CODE tit. 50, §§ 935.10 to 935.55 (1985/2014).	BULLETIN 2014-11 (2014); BULLETIN 2014-12 (2014).
Indiana		760 IND. ADMIN. CODE 1-35 (1985/2013).
Iowa	IOWA ADMIN. CODE r. 191-43.1 to 191-43.7; Apps. I to IV (1985/2015).	
Kansas		KAN. ADMIN. REGS. § 40-2-18 (1986) (Adopted by reference).
Kentucky	806 KY. ADMIN. REGS. 6:070 (1985/2015).	
Louisiana	LA. ADMIN. CODE tit. 37, §§ XI.2101 to XI.2113 (Rule 8) (1985/2014).	
Maine	02-031-340 ME. CODE R. Art. V (1984/2014).	

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NAIC MEMBER	MODEL ADOPTION	RELATED STATE ACTIVITY
Maryland	MD. CODE REGS. 31.05.04.01 to 31.05.04.08 (1985/2014) (Individual); 31.05.05.01 to 31.05.05.06 (2004) (Group).	
Massachusetts		211 MASS. CODE REGS. 39.01 to 39.08 (2000/2009).
Michigan		MICH. ADMIN. CODE r. 500.1241 (1984) (Adopted by reference).
Minnesota	MINN. R. 2752.0010 to 2752.0040 (1999/2014).	
Mississippi		84 MISS. CODE REG. § 105 (1985).
Missouri		MO. CODE REGS. ANN. tit. 20, § 400-1.130 (1986/2001).
Montana	NO CURRENT ACTIVITY	
Nebraska	210 NEB. ADMIN. CODE § 42 (1985/2014).	
Nevada		NEV. ADMIN. CODE §§ 681B.162 to 681B.164 (1998).
New Hampshire		N.H. CODE ADMIN. R. ANN. INS. 307.01 to 307.05 (1985/2001).
New Jersey	N.J. ADMIN. CODE §§ 11:4-26.1 to 11:4-26.7 (1985/2015).	
New Mexico		N.M. CODE R. §§ 13.9.11.1 to 13.9.11.10 (1985/1997).
New York	N.Y. COMP. CODES R. & REGS. tit. 11, §§ 99.1 to 99.11 (Regulation 151) (2001/2014).	
North Carolina	11 N.C. ADMIN. CODE 11F.0505 (2014).	11 N.C. ADMIN. CODE 11F.0007 to 11F.0010 (1985).

NAIC MODEL RULE (REGULATION) FOR RECOGNIZING A NEW ANNUITY MORTALITY TABLE FOR USE IN DETERMINING RESERVE LIABILITIES FOR ANNUITIES

NAIC MEMBER	MODEL ADOPTION	RELATED STATE ACTIVITY
North Dakota		N.D. ADMIN. CODE §§ 45-04-08-01 to 45-04-08-04 (1986/1999).
Northern Marianas	NO CURRENT ACTIVITY	
Ohio		OHIO ADMIN. CODE 3901:3-17 (1998).
Oklahoma		OKLA. ADMIN. CODE §§ 365:10-9-1 to 365:10-9-6 (1998).
Oregon	OR. ADMIN. R. 836-051-0200 to 836-051-0250 (1997/2015).	
Pennsylvania		31 PA. CODE §§ 84.1 to 84.3 (1986/1999).
Puerto Rico	NO CURRENT ACTIVITY	
Rhode Island		27-94 R.I. CODE R. 001 to 007 (2000). R.I. GEN. LAWS § 27-4.5-4 (1994/2013).
South Carolina	S.C. CODE ANN. REGS. 69-37 (1984/2014).	
South Dakota	S.D. ADMIN. R. 20:06:43:01 to 20:06:43:04; Apps. A to D (1999/2014).	
Tennessee		TENN. COMP. R. & REGS. 0780-1-52-.01 (1985/2004); TENN. CODE ANN. § 56-7-108 (2007).
Texas	TEX. ADMIN. CODE §§ 3.1501 to 3.1505 (1985/2014).	
Utah	UTAH ADMIN. CODE r. 590-96 (1985/2014).	
Vermont	4-3-14 VT. CODE R. § A 1 to A 6 (Regulation 88-4 Part A) (1989/2015).	
Virgin Islands	NO CURRENT ACTIVITY	

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NAIC MEMBER	MODEL ADOPTION	RELATED STATE ACTIVITY
Virginia	14 VA. ADMIN. CODE §§ 5-50-10 to 5-50-50 (1985/2014).	
Washington	WASH. ADMIN. CODE 284-74-010 to 284-74-020 (1987/2014).	
West Virginia		W. VA. CODE R. §§ 114-45-1 to 114-45-5 (1996/1999).
Wisconsin	WIS. ADMIN. CODE INS. § 2.30 (1985/2015) (emergency rule).	
Wyoming	17 WYO. CODE R. (1985/2015).	

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AMERICAN ACADEMY *of* ACTUARIES

Report from the joint American Academy of Actuaries/Society of Actuaries Payout Annuity Table Team, a joint subgroup of the Life Experience Subcommittee

2012 Individual Annuity Reserving Table

Presented to the National Association of Insurance Commissioners' Life Actuarial Task Force

September 2011

The American Academy of Actuaries is a 17,000-member professional association whose mission is to serve the public and the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

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Table of Contents

I - Background and Scope

The objective of the Payout Annuity Table Team (Team), as requested by the NAIC's Life Actuarial Task Force (LATF), was to produce a new annuity valuation mortality table, including projection scales and margins necessary to make the table suitable for standard valuation purposes for individual annuities. This report documents the data, assumptions and process the Team used to develop the 2012 Individual Annuity Reserve Table (2012 IAR Table). The Team began with data and information from the mortality experience analysis, as described in the Society of Actuaries 2000-2004 Individual Payout Annuity Experience Report, dated April 2009. From this, the Team developed a basic table (2012 IAM Table), projection scale (Scale G2). Lastly, the Team explored various approaches and levels of margin which were discussed and ultimately recommended by LATF. The IAR Table is comprised of these three components, which are discussed throughout this report. In addition, the Team recommended and LATF concluded it made sense to develop a generational mortality table through the use of projection factors. While this represents a departure from previous individual annuitant mortality tables, it overcomes the disadvantage of using a static table that can become dated more quickly than a generational table.

II - Table Development and Approach

The 2000-2004 Payout Annuity Mortality Experience Study includes experience for immediate annuities, annuitizations and life settlement options of individual life insurance and annuity death claims. The experience analyzed excluded substandard annuities, structured settlement annuities and variable payout annuities. The experience represented 16 companies over the exposure period. The aggregated annuitant data (male, female) provided for the periods 2000-2004 included death, exposure (initial exposed to risk) and amount of annual income for ages 50 to 113. The data presented some evidence of selection in the form of lower Actual-to-Expected ratios for non-refund (i.e., life only with no certain period) immediate annuities at higher annual income levels. However, the Team decided that due to the limited data at these higher income levels and the narrow scope of this finding (unique to immediate annuities), it would avoid unnecessary complexity and not seek to differentiate mortality by annual income level.

For the purpose of developing the 2002 experience table, the age range was subsequently limited to ages 50 to 99 due to lack of credible experience at younger and older ages. To account for differences in data (extract) periods by the contributing companies, the death, exposure and amount of annual income data were summed across the 2000-2004 period. This data was then smoothed using a graduation approach which is described in detail in this report. Mortality rates were then developed for ages younger than 50 and older than 95, and further adjustments were made to grade the rates for ages 50 to 65 up to the experience-based rates at age 65. The methods used to develop or extrapolate the mortality rates for ages under 50 and above 95, as well as other refinements and adjustments, are described within this report. See Section IV, Younger and Older Age Adjustments. The result of these efforts was a 2002 experience table.

The next step was to project this table with improvement factors to 2012 to create the 2012 Individual Annuity Mortality Basic Table (2012 IAM Basic Table). Once the decision was reached on the merits of creating a generational mortality table, the Team then proceeded with the development of an improvement scale to be used for years 2013 and beyond. Following the development of this scale, labelled projection Scale G2, a methodology to reflect mortality improvement between 2002 and 2012 was determined. Margin levels were then established and added to the 2012 IAM Basic Table to derive the 2012 IAM Period Table. The 2012 IAR Table consists of this 2012 IAM Period Table along with the use of Scale G2 to project future mortality improvements beyond 2012.

III - Graduation

The Team analyzed various graduation approaches to create a preliminary table and ultimately decided to create a preliminary table using confidence intervals by applying the P-Spline methodology. The Team chose the P-Spline method as it was a practical statistical package designed and used by actuaries for mortality data, the output of the package is a statistically robust fitted life ("best estimate") table and the output provides a measure of uncertainty of the fitted table in the form of confidence intervals.

The P-Spline method was used to fit the dataset and provide a graduated life table with the mortality rates (q_x) weighted by amount of annual income. Initially described by Eilers and Marx[1], P-Splines comprise a subset of a class

of (piecewise) polynomial functions. They combine the use of P-Splines and difference penalties (e.g., on the estimated coefficients of a generalized linear regression model) to smooth and provide projections of the data.

The P-Spline application used was made available through a spreadsheet-based modeling tool (CMI Mortality Projection Spreadsheet version 3.0) provided by the Continuous Mortality Investigation Bureau or CMIB (http://www.actuaries.org.uk/research-and-resources/pages/continuous-mortality-investigation).[2] Using the tool, values for q_x (males or females) weighted by amount of annual income were fitted for each age x of the dataset.[3] The surface fit was determined by a combination of the data and the penalty applied. Data smoothing was provided by means of the penalized splines and the log mean values of q_x within the fitted region generated.[4] Ninety-five percent confidence intervals (95% CI) were also calculated for q_x based upon the standard deviations (adjusted for increased uncertainty due to analysis by amount of annual income) of the log mean values of q_x generated by the tool.

This graduation approach resulted in mortality rates generally ranging between 99% and 101% of the best estimate mortality rates for key ages. However, the confidence intervals at the oldest and younger ages were wider, suggesting greater uncertainty. In addition, the resulting mortality rates at the older ages were higher than the Annuity 2000 Basic Table. The P-Spline application breaks down as data becomes limited and less credible, which was the case with the underlying younger and older age experience. Therefore, the Team explored additional methods to derive the mortally rates for the younger and older ages, as discussed in Section IV - Younger and Older Age Adjustments.

A comparison of the actual and smoothed mortality (q_x) values for males and females is provided in Figures 1 and 2, respectively.

Figure 1. Graduated Male Mortality Adjusted by Amount of Annual Income

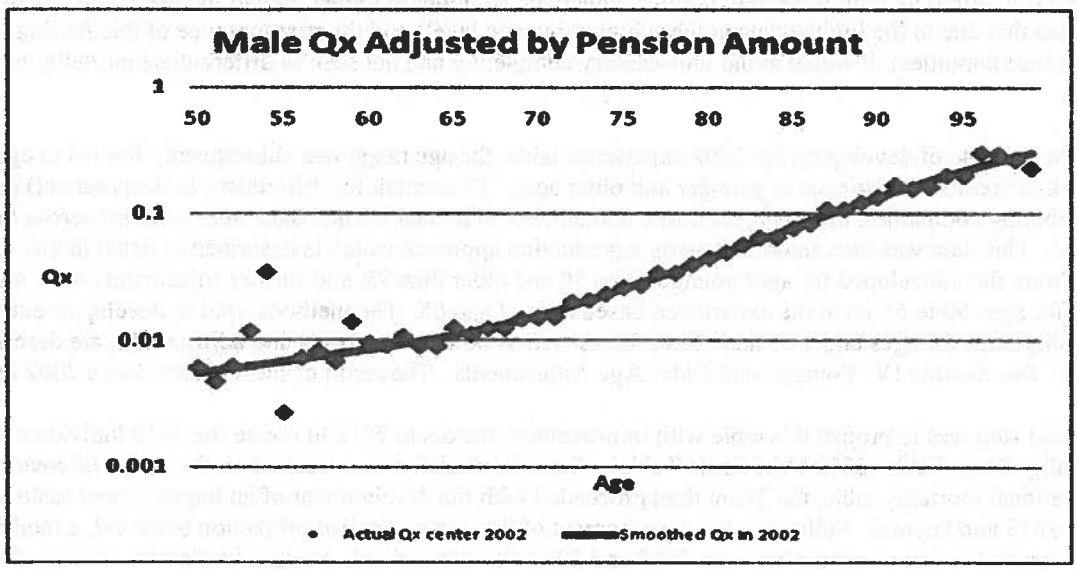
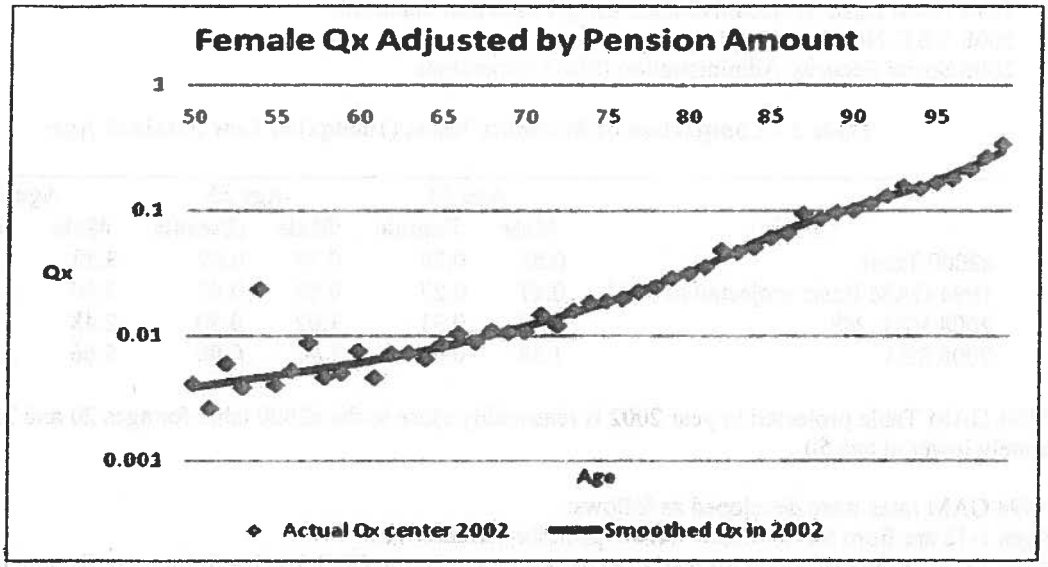


Figure 2. Graduated Female Mortality Adjusted by Amount of Annual Income



IV - Younger and Older Age Adjustments

The mortality experience at both the younger and older ages was limited. In analyzing the experience, the Team identified that the mortality rates at these ages had little impact on the final reserve. Therefore, the Team compared the results at specific ages to several existing industry tables, including: the 1994 Group Annuity Mortality Basic Table (GAM) projected with Scale AA to 2002 (the mid-point of the payout annuity experience period), the 2008 Valuation Basic RR100 Table (2008 VBT), the Annuity 2000 Basic Table (a2000 Table) and the 2006 U.S. Life Tables. Both the 1994 GAM and the a2000 Table had a reasonable fit for ages 20 and 35; however, the tables exhibited significant divergence from the underlying experience by age 50. In addition, the 1994 GAM was lower than the population mortality (2006 U.S. Life Tables) and the a2000 rates were significantly lower than both the population mortality rates and the more recent life experience table at the highest ages for the male risks.

IV.A - Younger Ages

The Team researched the development of the a2000 Table and predecessor tables and found that the a2000 Table rates, at the younger ages, could reasonably be described as being based on group annuity active life experience from 1939-1947, projected with various mortality improvement scales for almost 60 years.

For attained ages 50-59, the 2000-2004 experience shows ratios to the a2000 Table of 191% for males (245 deaths), and 231% for females (201 deaths). The Team considered that these high ratios might be caused by early retirements due to poor health. Past committees were not concerned about the actual experience for ages 50-59 being significantly higher than the valuation table. The Team attributed this lack of concern to the fact that there was not much payout annuity business at these ages, and the lack of material impact of mortality rates at these ages on the reserves. The lack of material impact at younger ages stems from the fact that annuity reserves are a function of probability of survival, which is near 1 at younger ages. For instance, using the a2000 table, using two times a mortality rate at age 20 (1.10 per 1,000 instead of 0.55 per 1,000) means the probability of survival (or receiving the next payment) would only decrease from 0.99945 to 0.99890, or a 0.055% reduction in actuarial value. In addition, there probably was a desire that the annuity valuation mortality appear consistent with other tables, e.g., life insurance and population life tables. Based on the report for the 1983 IAM Table, the a1983 Committee seemed to desire having the annuity mortality rates generally be lower than ultimate life insurance table mortality.

Table 1 below compares the mortality rates for ages 20, 35 and 50, for the following tables:

1. a2000 Table
2. 1994 GAM Basic projected to 2002 using Projection Scale AA
3. 2008 VBT, Nonsmoker, Ultimate
4. 2006 Social Security Administration (SSA) Experience

Table 1 - Comparison of Mortality Rates (1000qx) at Low Attained Ages

	Age 20		Age 35		Age 50	
Table	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
a2000 Table	0.55	0.28	0.79	0.52	3.33	1.71
1994 GAM Basic projected to 2002	0.47	0.27	0.88	0.47	2.40	1.34
2008 VBT, NS	0.88	0.31	1.02	0.50	2.48	1.77
2006 SSA	1.34	0.46	1.67	0.90	5.66	3.28

The 1994 GAM Table projected to year 2002 is reasonably close to the a2000 table for ages 20 and 35, and moderately lower at age 50.

The 1994 GAM rates were developed as follows:

- Ages 1-12 are from the 1990 Life Tables published in SSA 107.
- Ages 13-24 are graded up to the age 25 experience rate for the Civil Service Retirement System (CSRS) active life experience.
- Ages 25-50 are the CSRS active life experience.
- Ages 51-65 are weighted averages between CSRS active and retired life experience, with the weights for active lives grading down from age 51 to 65.
- Ages 66+ used group annuity actual experience. There was not a large disconnect between age 65 and 66, and later graduation smoothed the resulting table.
- All the experience rates were projected to 1994 prior to graduation.

After reviewing the various tables, the Team decided to use the 1994 GAM table, projected to 2002 using projection Scale AA for ages 1 through 45, and graded to the graduated (experience-based) rates at age 65. The grading was done such that the mortality rates have a constant percentage increase from age 50 to age 65. Age 0 was set equal to four times the age 1 rate, which was consistent with the approach taken for developing the age 0 mortality for the 2008 VBT.

Tables 2 and 3 below illustrate the development of the 2012 IAM Basic Table rates at younger ages for quinquennial ages for male and female risks, respectively.

Table 2 - Development of Mortality Rates for 2012 IAM Basic Table Male Risks - Select Younger Ages

Male Age	1994 GAM Basic 1000 Q_x	Projection Scale AA	1994 GAM Projected to 2002	Graduated Data	Graded Mortality
5	0.255	2.00%	0.217		0.217
10	0.212	2.00%	0.180		0.180
15	0.371	1.90%	0.318		0.318
20	0.545	1.90%	0.467		0.467
25	0.711	1.00%	0.656		0.656
30	0.862	0.50%	0.828		0.828
35	0.915	0.50%	0.879		0.879
40	1.153	0.80%	1.081		1.081
45	1.697	1.30%	1.528	3.445	1.528
50	2.773	1.80%	2.398	5.520	2.501
55	4.758	1.90%	4.081	6.836	4.092
60	8.576	1.60%	7.538	8.533	6.695
65	15.629	1.40%	13.962	10.955	10.955

Table 3 - Development of Mortality Rates for 2012 IAM Basic Table Female Risks - Select Younger Ages

Female Age	1994 GAM Basic 1000 Q_x	Projection Scale AA	GAM Projected to 2002	Graduated Data	Graded Mortality
5	0.188	2.00%	0.160		0.160
10	0.141	2.00%	0.120		0.120
15	0.233	1.60%	0.205		0.205
20	0.305	1.60%	0.268		0.268
25	0.313	1.40%	0.280		0.280
30	0.377	1.00%	0.348		0.348
35	0.514	1.10%	0.470		0.470
40	0.763	1.50%	0.676		0.676
45	1.046	1.60%	0.919	2.303	0.919
50	1.536	1.70%	1.339	3.899	1.588
55	2.466	0.80%	2.313	4.808	2.743
60	4.773	0.50%	4.585	6.007	4.738
65	9.286	0.50%	8.921	8.185	8.185

IV.B - Older Ages

Similar to the analysis for the younger ages, the Team researched the development of the a2000 Table and predecessor tables at the higher ages.

The a2000 Table mortality rates for the higher attained ages were developed as follows:

- As with the rates for the younger ages, the a2000 Table rates are the rates from the 1983 IAM Table projected 17 years using projection Scale G (100% for males and 50% for females). A cubic curve was fitted at the high ages, and rates were graded to 1.0 at age 115.
- The a1983 Table was based on the 1973 Experience Table, which was developed from the Society of Actuaries' 1971-76 experience study. At the older ages, the experience table was graduated with a formula that included a

cubic equation to grade to 1.0 by age 115. These rates were then projected 9.5 years to 1983, using 1.5% annual improvement. These rates were then re-graduated.

The level of improvement assumed in projecting the 1973 Experience Table to the a2000 Table was much higher than the observed mortality improvement in the US population over similar time periods. Table 4 below compares the assumed improvement used in the a1983 and a2000 Tables for select higher ages to the actual population improvement for similar periods of time.

Table 4 - Comparison of Annualized Improvement Rates in U.S Population, the a1983 and a2000 Tables for Select Higher Ages

	Male Age				Female Age			
Basis/Time Period	**82**	**87**	**92**	**97**	**82**	**87**	**92**	**97**
U.S. Life 1970-80	1.1%	1.0%	0.9%	0.5%	2.0%	1.8%	1.4%	0.9%
U.S. Life 1980-00	1.0%	0.7%	0.4%	0.2%	0.5%	0.4%	0.3%	0.2%
1973-1983 for a1983	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
1983-2000 for a2000	1.3%	1.3%	1.0%	1.0%	0.8%	0.8%	0.6%	0.6%

The Team noted that the actual to expected (A/E) ratios in the 2000-2004 experience study, where the expected basis was the a2000 Table, were relatively high. To understand why this might be, the Team analyzed the population improvement over the same time period versus that assumed in the a2000 Table. At the highest ages, the population improvement appears to have been less than assumed for the a2000 Table and the experience from the 2000-2004 experience study exhibited a similar relationship. For example, for attained ages 95-99, the 2000-2004 experience shows an A/E of 128% for males (1,477 deaths) and 108% for females (3,505 deaths). The Team did not have any other explanation for why the experience data mortality rates would be so much greater than the a2000 Table mortality rates. The Team did review preliminary experience data from 2005 through 2008 and noted a similar relationship to the a2000 Table. Therefore, the Team decided to continue this relationship in the final table.

For the higher ages in the 2012 IAM Table, the Team graduated the underlying experience data using individual age data up to age 99. The results of the graduation, compared to the a2000 Table, ranges from 120% to 130% for males (consistent with data), and 99% to 133% for females (consistent with data overall, but a very steep slope within the age range).

Table 5 below compares the graduated rates at ages 90, 95 and 99 to other predecessor mortality tables.

Table 5 - Comparison of Mortality Rates (1000qx) At High Attained Ages

	Age 90		Age 95		Age 99	
Table	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
2012 IAM Graduated Data	135.89	107.00	216.65	171.92	304.13	296.03
a2000 Table	124.61	112.76	180.24	174.49	233.37	233.03
1994 GAM Basic projected to 2002	159.25	122.05	247.20	197.05	321.39	273.83
2008 VBT, NS	139.33	104.24	227.67	159.48	306.99	240.15
2006 SSA	177.64	138.94	277.94	226.89	354.02	299.72

Table 6 below examines more closely the female A/E experience for ages 95 to 99. Upon further examination, it appeared that the female A/E ratios might have been skewed upward at and near age 99 by large amount claims. The Team decided the amount-based experience at these highest ages lacked sufficient credibility and did not make further adjustment to the underlying experience.

Table 6 - 2000-04 Experience for Ages 95 to 99

	Male			Female		
Age	A/E by Amount	A/E by Count	# of Deaths	A/E by Amount	A/E by Count	# of Deaths
95	110%	138%	511	95%	118%	1,036
96	156%	142%	385	95%	125%	886
97	144%	143%	268	107%	135%	733
98	121%	156%	203	128%	124%	487
99	99%	130%	112	152%	125%	363

The Team also desired to utilize a method that appropriately extrapolated the mortality for ages above age 99 and decided upon using Kannisto's formula. This formula is similar to the Gompertz formula (where the force of mortality increases by the same percentage amount at all ages), but Kannisto's formula is of the form X/(1+X), so that when mortality is low, the percentage increase in mortality by age is fairly constant, but as mortality becomes large, the increases get smaller. Kannisto's formula has been described as providing the best fit for data from ages 80-95 for a number of countries.[5]

Kannisto's formula was parameterized against the data for ages 80-95 and the rates for ages 96+ were used for the 2002 Experience Table. Table 7 below shows the results of the formula.

Table 7 - Results of Kannisto Extrapolation at Older Ages

	Male				Female				
Age	Qx Actual	Qx Kannisto	Ratio: Kannisto/ Actual	Increase Kannisto Qx	Qx Actual	Qx Kannisto	Ratio: Kannisto/ Actual	Increase Kannisto Qx	Ratio: Female/ Male
80	0.04471	0.04487	100.4%	12.3%	0.03134	0.03357	107.1%	12.9%	74.8%
81	0.04932	0.05036	102.1%	12.2%	0.03514	0.03785	107.7%	12.8%	75.2%
82	0.05708	0.05646	98.9%	12.1%	0.04844	0.04265	88.1%	12.7%	75.5%
83	0.06524	0.06322	96.9%	12.0%	0.04645	0.04802	103.4%	12.6%	76.0%
84	0.06517	0.07069	108.5%	11.8%	0.05071	0.05399	106.5%	12.4%	76.4%
85	0.07673	0.07893	102.9%	11.7%	0.06059	0.06064	100.1%	12.3%	76.8%
86	0.08303	0.08799	106.0%	11.5%	0.06577	0.06801	103.4%	12.2%	77.3%
87	0.10939	0.09790	89.5%	11.3%	0.09433	0.07617	80.7%	12.0%	77.8%
88	0.10827	0.10872	100.4%	11.1%	0.08610	0.08516	98.9%	11.8%	78.3%
89	0.12294	0.12048	98.0%	10.8%	0.09739	0.09503	97.6%	11.6%	78.9%
90	0.13537	0.13320	98.4%	10.6%	0.10077	0.10584	105.0%	11.4%	79.5%
91	0.16907	0.14688	86.9%	10.3%	0.11384	0.11763	103.3%	11.1%	80.1%
92	0.15740	0.16153	102.6%	10.0%	0.13135	0.13040	99.3%	10.9%	80.7%
93	0.16175	0.17712	109.5%	9.7%	0.15632	0.14419	92.2%	10.6%	81.4%
94	0.20105	0.19362	96.3%	9.3%	0.14984	0.15900	106.1%	10.3%	82.1%
95	0.19895	0.21096	106.0%	9.0%	0.16614	0.17479	105.2%	9.9%	82.9%
96		0.22905		8.6%		0.19153		9.6%	83.6%
97		0.24781		8.2%		0.20916		9.2%	84.4%
98		0.26709		7.8%		0.22760		8.8%	85.2%
99		0.28678		7.4%		0.24673		8.4%	86.0%
100		0.30671		7.0%		0.26642		8.0%	86.9%
101		0.32673		6.5%		0.28654		7.6%	87.7%
102		0.34668		6.1%		0.30692		7.1%	88.5%
103		0.36639		5.7%		0.32739		6.7%	89.4%
104		0.38571		5.3%		0.34777		6.2%	90.2%
105		0.40450		4.9%		0.36790		5.8%	91.0%

Table 8 below compares the resulting graduated rates to the mortality rates for other predecessor tables for select ages 90, 95 and 99.

Table 8 - Comparison of Mortality Rates (1000qx) At High Attained Ages

	Age 90		Age 95		Age 99	
Table	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
2002 Experience Graduated Table	135.89	107.00	216.65	171.92	304.13	296.03
Kannisto Extrapolation	133.20	105.84	210.96	174.79	286.78	246.73
a2000	124.61	112.76	180.24	174.49	233.37	233.03
1994 GAM Basic projected to 2002	159.25	122.05	247.20	197.05	321.39	273.83
2008 VBT, NS	139.33	104.24	227.67	159.48	306.99	240.15
2006 SSA	177.64	138.94	277.94	226.89	354.02	299.72

The Team decided to use the graduated experience data rates up to age 95 and the Kannisto extrapolated rates for ages 96 and above.

Similar to the 2008 VBT Table, the Team decided to cap the mortality at the oldest ages, but decided upon a rate of 0.400 rather than the 0.450 used in the 2008 VBT. The decision to use 0.400 rather than 0.450 was based on information presented at the Society of Actuaries 2011 Living to 100 Symposium, which suggested there was some evidence that mortality did not end at 0.450 or 0.400 but that the process of aging could be slowed down, which would either increase a person's life span or reduce the impact of disease. Given that the difference in the ultimate mortality rate as these extreme ages has little bearing on the resulting reserve levels, the Team went with the lower level.

V - The 2012 Individual Annuity Mortality Basic Table

The previous sections within this report describe the development of the 2002 experience table. The next step was to project this with improvement factors to 2012 to create the 2012 Individual Annuity Mortality Basic Table (2012 IAM Basic Table). The Team also developed a set of improvement or projection factors to improve mortality beyond 2012.

The improvement factors for 2013 and beyond were developed first. The Team looked at population improvement rates over a number of historical periods. Different sources were considered (Social Security Administration, U.S. Life Tables developed by the Centers for Disease Control and Prevention, and data published by the Human Mortality Database), all of which showed similar results. In addition, the Team compared the historical improvement rates to existing improvement assumptions including Scale AA, Scale G and the recently published improvement rates from the Canadian Institute of Actuaries.[6] Historical improvement in annuity experience would have been preferred, but homogeneous data was not available. Tables 9 and 10 below show a comparison of the various improvement factors for male and female risks, respectively.

Table 9 - Comparison of Mortality Improvement for Various Sources - Male Risks

Male Age	Social Security Improvement Rates - 2010 Trustees Report Actual 1990-2000	Actual 2000-2006	Actual 1990-2006	Forecast 2010-2030	Average SSA 2002-2006	Scale AA	Scale G	CIA Proposal
25	2.9%	-2.0%	1.0%	0.9%	-2.0%			
30	4.2%	-1.3%	2.1%	1.1%	-1.1%			
35	3.8%	0.8%	2.7%	1.1%	1.4%			
40	1.8%	1.3%	1.6%	1.0%	2.0%			
45	0.6%	1.1%	0.8%	0.9%	1.6%			
50	1.3%	-0.6%	0.6%	1.0%	-0.1%	1.8%	1.8%	1.5%
55	1.9%	0.5%	1.4%	1.2%	0.5%	1.6%	1.6%	1.2%
60	2.2%	1.5%	1.9%	1.5%	1.7%	1.6%	1.5%	1.0%
65	1.9%	2.4%	2.1%	1.2%	2.6%	1.4%	1.5%	1.0%
70	1.5%	3.0%	2.0%	1.1%	3.2%	1.5%	1.4%	1.0%
75	1.4%	2.6%	1.9%	1.0%	2.9%	1.0%	1.2%	1.0%
80	1.1%	2.3%	1.5%	1.1%	2.5%	1.0%	1.2%	1.0%
85	0.2%	2.2%	1.0%	0.7%	2.6%	0.7%	1.2%	1.0%
90	-0.4%	1.4%	0.3%	0.5%	2.0%	0.4%	1.1%	1.0%
95	-0.8%	0.4%	-0.3%	0.4%	1.1%	0.3%	1.1%	0.5%

Table 10 - Comparison of Mortality Improvement for Various Sources - Female Risks

Female Age	Social Security Improvement Rates - 2010 Trustees Report Actual 1990-2000	Actual 2000-2006	Actual 1990-2006	Forecast 2010-2030	Average SSA 2002-2006	Scale AA	50% Scale G	CIA Proposal
25	1.6%	- 1.5%	0.5%	0.8%	- 1.8%			
30	1.8%	- 0.4%	1.0%	0.9%	- 0.5%			
35	0.6%	0.7%	0.7%	0.8%	1.4%			
40	- 0.6%	0.4%	- 0.2%	0.7%	1.4%			
45	0.1%	- 0.6%	- 0.1%	0.8%	0.4%			
50	1.2%	- 0.6%	0.5%	1.0%	- 0.4%	1.7%	1.0%	1.5%
55	1.2%	1.2%	1.2%	1.2%	1.3%	0.8%	0.9%	1.2%
60	1.1%	1.7%	1.3%	1.3%	1.7%	0.5%	0.9%	1.0%
65	0.5%	2.4%	1.2%	1.0%	2.5%	0.5%	0.9%	1.0%
70	0.3%	1.9%	0.9%	0.8%	2.2%	0.5%	0.9%	1.0%
75	0.2%	1.6%	0.7%	0.8%	2.0%	0.8%	0.8%	1.0%
80	- 0.1%	1.6%	0.6%	0.9%	2.1%	0.7%	0.8%	1.0%
85	- 0.4%	1.4%	0.3%	0.5%	1.9%	0.6%	0.8%	1.0%
90	- 0.7%	1.0%	- 0.1%	0.4%	1.5%	0.3%	0.7%	1.0%
95	- 0.9%	0.7%	- 0.3%	0.4%	1.1%	0.2%	0.6%	0.5%

In looking more closely at the historical SSA improvement for the 2000 to 2006 years, the Team identified there was both improvement and dis-improvement from year-to-year. Years 2004 and 2006 showed high improvement for most ages whereas the year 2003 showed dis-improvement. In determining the average mortality improvement, the improvement was not floored at zero, allowing for the dis-improvement to be considered. In addition, the Team discussed whether some of the recent improvement in mortality in the actual SSA data could be explained by cohorts of smokers and ex-smokers being replaced by cohorts of non-smokers. This theory raised several questions such as:

1. Whether the higher level of improvement should be used to adjust the base table to 2012?
2. The point at which to assume a steady state is reached?
3. Whether these higher improvement trends were applicable to annuitants, given that they have a lower starting level of mortality than the population? Also, should the fact that smokers are under-represented in annuity populations be considered in our adjustments?

An additional consideration of the Team was that recent group annuity experience from 1993 – 2002 exhibited mortality improvement in line with scale AA. The Team believed that group annuity mortality would be lower than population but would not have the same level of anti-selection as individual annuity mortality.

The Team determined to use the SSA data as its primary source. The SSA had three separate forecasts which represented a low-cost set (Alternative I), an intermediate set (Alternative II) and a high-cost set (Alternative III). The SSA figures reflected in Tables 9 and 10 above are from their intermediate forecast (Alternative II).

The Team considered the actual SSA improvement rates for the period 1990-2006, as well as the average improvement rates assumed by the SSA in their 2010 Trustees report for years 2012-2022, and developed a set of improvement factors that are equal to or slightly (0.1% to 0.4%) higher than the SSA 2012-2022 improvement factors for ages 50-95. (Note: Based upon clarification of approach from discussions with SSA actuaries and supported by various research and emerging experience, the Team determined the SSA improvement for ages 65+ to be too conservative (i.e., low) for an annuity valuation table.) Therefore, an additional improvement level of 0.4% for ages 65 to 82 and 0.2% for ages 87+ was added. The adjustment to the improvement was graded from 0.4% to 0.2% between ages 82 and 87. This adjustment was the same for males and females. For younger ages, a simple 1% assumption was made. For older ages, the improvement rates grade to zero at age 105. The Team has named the improvement Scale G2, as it replaces Scale G as the scale used for individual annuity valuation. Scale G2 is shown in Table 11, below. Table 12 compares the annualized improvement in Scale G2 to that of the U.S. Life Tables over various time periods.

Table 11 - Scale G2

	G2 Improvement	
Age	**Male**	**Female**
<50	1.0%	1.0%
50	1.0%	1.0%
60	1.5%	1.3%
80	1.5%	1.3%
90	0.7%	0.6%
100	0.2%	0.2%
105	0.0%	0.0%

Table 12 - Annualized Annual Improvement
Scale G2 Compared to U.S. Life Tables

	Male				Female			
Year	**62**	**72**	**82**	**92**	**62**	**72**	**82**	**92**
1960-70	0.1%	-0.1%	0.6%	1.3%	1.1%	1.1%	1.6%	2.6%
1970-80	2.2%	1.5%	1.1%	0.9%	1.4%	1.9%	2.1%	1.5%
1980-90	1.6%	1.4%	0.8%	0.0%	0.7%	0.6%	1.1%	0.3%
1990-00	1.9%	1.7%	1.3%	0.8%	0.8%	0.5%	0.0%	0.3%
2000-06	1.7%	2.7%	1.9%	1.1%	1.6%	1.9%	1.4%	0.8%
Scale G2	1.5%	1.5%	1.3%	0.6%	1.3%	1.3%	1.2%	0.5%

To create the 2012 IAM Basic Table, the Team projected the 2002 experience table for four years using actual SSA improvement from 2002 to 2006 (where 2002 is the mid-point of the underlying 2000-04 experience data, consistent with the experience study used to create the 2002 experience table). The Team looked at limited population data that indicated that population improvement rates from 2006 to 2009 were not inconsistent with Scale G2; therefore, the Team projected the rates from 2006-2012 (six years) using Scale G2. Tables 13 and 14 below show the actual SSA improvement rates for 1990 through 2006 and 2002 through 2006, and the SSA assumed improvement rates for 2012 through 2022, Scale G2, the 2002 experience table rates and the 2012 IAM Basic Table rates for male and female risks, respectively. Also, please see Exhibit I for the 2012 IAM Basic Table rates.

Table 13 - Scale G2 versus Population Improvement and Resulting IAM 2012 Basic Table, Male

Male													
Age	SSA 1990 -2006	SSA 2002 -2006	SSA 2012 -2022	Scale G2	2002 Exp. Table	2012 IAM Table	Age	SSA 1990 -2006	SSA 2002 -2006	SSA 2012 -2022	Scale G2	2002 Exp. Table	2012 IAM Table
0	2.1%	0.7%	1.9%	1.0%	2.168	1.783	61	2.0%	1.7%	1.5%	1.5%	7.306	6.237
1	3.2%	3.3%	1.9%	1.0%	0.542	0.446	62	2.0%	1.8%	1.5%	1.5%	8.084	6.954
2	3.1%	2.9%	1.8%	1.0%	0.366	0.306	63	2.0%	2.1%	1.4%	1.5%	8.946	7.810
3	3.1%	2.9%	1.8%	1.0%	0.304	0.254	64	2.1%	2.4%	1.3%	1.5%	9.900	8.220
4	3.5%	3.5%	1.9%	1.0%	0.237	0.193	65	2.1%	2.6%	1.2%	1.5%	10.955	9.007
5	3.2%	2.3%	1.8%	1.0%	0.217	0.166	66	2.1%	2.8%	1.2%	1.5%	11.639	9.497
6	3.1%	1.5%	1.7%	1.0%	0.208	0.164	67	2.1%	2.9%	1.1%	1.5%	12.428	10.085
7	3.1%	1.5%	1.7%	1.0%	0.199	0.177	68	2.1%	3.0%	1.1%	1.5%	13.344	10.787
8	3.2%	2.1%	1.9%	1.0%	0.184	0.159	69	2.1%	3.1%	1.1%	1.5%	14.411	11.625
9	3.5%	3.8%	2.2%	1.0%	0.178	0.143	70	2.0%	3.1%	1.1%	1.5%	15.661	12.619
10	4.1%	7.2%	2.6%	1.0%	0.180	0.128	71	2.0%	3.1%	1.1%	1.5%	17.128	13.796
11	4.2%	8.9%	2.7%	1.0%	0.190	0.123	72	2.0%	3.1%	1.1%	1.5%	18.837	15.195
12	3.6%	6.8%	2.1%	1.0%	0.207	0.147	73	1.9%	3.0%	1.1%	1.5%	20.814	16.834
13	3.0%	3.9%	1.6%	1.0%	0.234	0.185	74	1.9%	2.9%	1.1%	1.5%	23.081	18.733
14	2.7%	2.2%	1.3%	1.0%	0.274	0.236	75	1.9%	2.8%	1.1%	1.5%	25.664	20.905
15	2.6%	1.5%	1.2%	1.0%	0.318	0.282	76	1.8%	2.7%	1.0%	1.5%	28.586	23.367
16	2.5%	1.1%	1.1%	1.0%	0.361	0.325	77	1.7%	2.6%	1.0%	1.5%	31.886	26.155
17	2.3%	0.6%	1.1%	1.0%	0.397	0.364	78	1.7%	2.6%	1.0%	1.5%	35.607	29.306
18	1.9%	0.0%	1.0%	1.0%	0.425	0.399	79	1.6%	2.5%	1.1%	1.5%	39.796	32.858
19	1.4%	-0.6%	0.9%	1.0%	0.447	0.430	80	1.5%	2.4%	1.1%	1.5%	44.505	36.927
20	0.9%	-1.1%	0.9%	1.0%	0.467	0.459	81	1.4%	2.3%	1.1%	1.4%	49.790	41.703
21	0.6%	-1.5%	0.8%	1.0%	0.493	0.492	82	1.3%	2.2%	1.0%	1.3%	55.722	46.957
22	0.5%	-1.7%	0.8%	1.0%	0.521	0.526	83	1.2%	2.3%	0.9%	1.3%	62.382	52.713
23	0.6%	-1.9%	0.8%	1.0%	0.561	0.569	84	1.1%	2.4%	0.8%	1.2%	69.863	59.148
24	0.8%	-2.0%	0.9%	1.0%	0.604	0.616	85	1.0%	2.4%	0.7%	1.1%	78.269	66.505
25	1.0%	-2.0%	0.9%	1.0%	0.656	0.669	86	0.8%	2.3%	0.6%	1.0%	87.702	75.016
26	1.3%	-2.0%	1.0%	1.0%	0.714	0.728	87	0.7%	2.2%	0.5%	0.9%	98.206	84.623
27	1.5%	-2.0%	1.0%	1.0%	0.751	0.764	88	0.5%	2.0%	0.5%	0.9%	109.777	95.967
28	1.8%	-1.8%	1.1%	1.0%	0.779	0.789	89	0.4%	1.8%	0.5%	0.8%	122.371	108.482
29	2.0%	-1.6%	1.1%	1.0%	0.805	0.808	90	0.3%	1.6%	0.5%	0.7%	135.888	122.214
30	2.1%	-1.4%	1.1%	1.0%	0.828	0.824	91	0.1%	1.4%	0.5%	0.7%	150.209	136.799
31	2.3%	-1.1%	1.1%	1.0%	0.848	0.834	92	0.0%	1.1%	0.5%	0.6%	165.349	152.409
32	2.4%	-0.7%	1.2%	1.0%	0.867	0.838	93	-0.1%	0.9%	0.4%	0.5%	181.387	169.078
33	2.6%	-0.1%	1.2%	1.0%	0.876	0.838	94	-0.2%	0.7%	0.4%	0.5%	198.436	186.882
34	2.6%	0.5%	1.2%	1.0%	0.877	0.808	95	-0.3%	0.6%	0.4%	0.4%	216.648	205.844
35	2.7%	1.2%	1.2%	1.0%	0.879	0.789	96	-0.4%	0.5%	0.4%	0.4%	229.053	219.247
36	2.7%	1.7%	1.2%	1.0%	0.891	0.783	97	-0.4%	0.4%	0.4%	0.3%	247.806	238.612
37	2.6%	2.0%	1.1%	1.0%	0.920	0.800	98	-0.5%	0.4%	0.4%	0.3%	267.095	258.341
38	2.3%	2.0%	1.1%	1.0%	0.963	0.837	99	-0.5%	0.4%	0.4%	0.2%	286.781	278.219
39	2.0%	1.8%	1.0%	1.0%	1.016	0.889	100	-0.5%	0.4%	0.4%	0.2%	306.714	298.482
40	1.6%	1.6%	1.0%	1.0%	1.081	0.956	101				0.2%	326.734	323.610
41	1.3%	1.4%	1.0%	1.0%	1.156	1.029	102				0.1%	346.679	344.191
42	1.1%	1.3%	1.0%	1.0%	1.242	1.110	103				0.1%	366.388	364.633
43	1.0%	1.3%	0.9%	1.0%	1.331	1.188	104				0.0%	385.708	384.783
44	0.9%	1.4%	0.9%	1.0%	1.424	1.269	105				0.0%	400.000	400.000
45	0.8%	1.5%	0.9%	1.0%	1.528	1.355	106					400.000	400.000
46	0.8%	1.5%	0.9%	1.0%	1.654	1.464	107					400.000	400.000
47	0.8%	1.3%	0.9%	1.0%	1.809	1.615	108					400.000	400.000
48	0.7%	0.8%	0.9%	1.0%	1.986	1.808	109					400.000	400.000
49	0.7%	0.3%	1.0%	1.0%	2.180	2.032	110					400.000	400.000
50	0.6%	-0.3%	1.0%	1.0%	2.398	2.288	111					400.000	400.000
51	0.6%	-0.7%	1.1%	1.1%	2.654	2.557	112					400.000	400.000
52	0.7%	-0.7%	1.1%	1.1%	2.936	2.828	113					400.000	400.000
53	0.9%	-0.5%	1.2%	1.2%	3.249	3.088	114					400.000	400.000
54	1.2%	0.0%	1.2%	1.2%	3.596	3.348	115					400.000	400.000
55	1.4%	0.5%	1.3%	1.3%	3.979	3.616	116					400.000	400.000
56	1.6%	0.9%	1.3%	1.3%	4.403	3.922	117					400.000	400.000
57	1.7%	1.2%	1.3%	1.4%	4.872	4.272	118					400.000	400.000
58	1.8%	1.4%	1.4%	1.4%	5.392	4.681	119					400.000	400.000
59	1.9%	1.5%	1.4%	1.5%	5.966	5.146	120					400.000	400.000
60	1.9%	1.6%	1.5%	1.5%	6.602	5.662							

Table 14 - Scale G2 versus Population Improvement and Resulting IAM 2012 Basic Table, Female Risks

Female													
Age	SSA 1990 -2006	SSA 2002 -2006	SSA 2012 -2022	Scale G2	2002 Exp. Table	2012 IAM Table	Age	SSA 1990 -2006	SSA 2002 -2006	SSA 2012 -2022	Scale G2	2002 Exp. Table	2012 IAM Table
0	1.9%	0.4%	1.8%	1.0%	1.943	1.801	61	1.3%	1.7%	1.3%	1.3%	5.051	4.352
1	2.6%	0.4%	1.9%	1.0%	0.486	0.450	62	1.3%	1.8%	1.2%	1.3%	5.699	4.899
2	2.0%	0.9%	1.9%	1.0%	0.316	0.287	63	1.2%	2.0%	1.2%	1.3%	6.430	5.462
3	3.1%	2.8%	1.9%	1.0%	0.237	0.199	64	1.2%	2.3%	1.1%	1.3%	7.254	6.118
4	2.8%	2.3%	1.9%	1.0%	0.177	0.152	65	1.2%	2.5%	1.0%	1.3%	8.185	6.929
5	2.6%	2.0%	1.8%	1.0%	0.160	0.139	66	1.2%	2.7%	0.9%	1.3%	8.780	7.279
6	2.5%	1.9%	1.7%	1.0%	0.150	0.130	67	1.1%	2.7%	0.9%	1.3%	9.438	7.821
7	2.5%	2.0%	1.7%	1.0%	0.140	0.122	68	1.1%	2.8%	0.9%	1.3%	10.168	8.476
8	2.6%	2.8%	1.7%	1.0%	0.125	0.105	69	1.0%	2.3%	0.8%	1.3%	10.979	9.234
9	2.8%	3.4%	1.6%	1.0%	0.119	0.098	70	0.9%	2.1%	0.8%	1.3%	11.882	10.063
10	3.1%	4.5%	1.9%	1.0%	0.120	0.094	71	0.8%	2.0%	0.8%	1.3%	12.892	11.011
11	3.2%	5.1%	1.9%	1.0%	0.126	0.096	72	0.8%	1.9%	0.8%	1.3%	14.028	12.030
12	3.0%	4.7%	1.8%	1.0%	0.135	0.106	73	0.7%	1.8%	0.8%	1.3%	15.315	13.154
13	2.6%	4.0%	1.4%	1.0%	0.151	0.120	74	0.7%	1.8%	0.8%	1.3%	16.782	14.416
14	2.1%	3.1%	1.1%	1.0%	0.176	0.146	75	0.7%	1.8%	0.8%	1.3%	18.466	15.869
15	1.9%	2.6%	1.0%	1.0%	0.205	0.174	76	0.7%	1.8%	0.8%	1.3%	20.413	17.565
16	1.7%	2.2%	0.9%	1.0%	0.231	0.199	77	0.7%	1.8%	0.8%	1.3%	22.676	19.500
17	1.5%	1.8%	0.9%	1.0%	0.251	0.220	78	0.6%	1.8%	0.8%	1.3%	25.324	21.758
18	1.2%	1.2%	0.9%	1.0%	0.262	0.234	79	0.6%	1.8%	0.8%	1.3%	28.440	24.412
19	0.9%	0.6%	0.8%	1.0%	0.267	0.245	80	0.6%	1.8%	0.9%	1.2%	32.131	27.579
20	0.5%	-0.1%	0.7%	1.0%	0.268	0.253	81	0.5%	1.8%	0.9%	1.2%	36.514	31.501
21	0.2%	-0.7%	0.7%	1.0%	0.269	0.260	82	0.5%	1.8%	0.8%	1.2%	41.665	36.122
22	0.1%	-1.1%	0.7%	1.0%	0.271	0.266	83	0.4%	1.8%	0.7%	1.1%	47.583	41.477
23	0.1%	-1.2%	0.7%	1.0%	0.275	0.272	84	0.3%	1.7%	0.6%	1.0%	54.293	47.669
24	0.3%	-1.3%	0.8%	1.0%	0.277	0.276	85	0.3%	1.7%	0.5%	1.0%	61.725	54.441
25	0.5%	-1.3%	0.8%	1.0%	0.280	0.277	86	0.2%	1.6%	0.5%	0.9%	69.775	61.972
26	0.6%	-1.3%	0.9%	1.0%	0.287	0.284	87	0.1%	1.5%	0.4%	0.8%	78.388	70.156
27	0.7%	-1.2%	0.9%	1.0%	0.294	0.290	88	0.1%	1.4%	0.4%	0.7%	87.512	78.963
28	0.8%	-1.0%	0.9%	1.0%	0.307	0.300	89	0.0%	1.3%	0.4%	0.7%	97.080	88.336
29	0.9%	-0.7%	0.9%	1.0%	0.323	0.313	90	-0.1%	1.2%	0.4%	0.6%	107.003	98.187
30	1.0%	-0.4%	0.9%	1.0%	0.348	0.333	91	-0.1%	1.1%	0.4%	0.6%	117.256	108.323
31	1.0%	-0.2%	0.9%	1.0%	0.376	0.357	92	-0.2%	1.0%	0.4%	0.5%	128.179	119.188
32	1.0%	0.1%	0.9%	1.0%	0.400	0.375	93	-0.3%	0.9%	0.4%	0.5%	140.355	131.334
33	0.9%	0.5%	0.9%	1.0%	0.422	0.390	94	-0.3%	0.8%	0.4%	0.4%	154.575	145.621
34	0.8%	0.8%	0.9%	1.0%	0.445	0.405	95	-0.3%	0.8%	0.4%	0.4%	171.923	162.722
35	0.7%	1.1%	0.8%	1.0%	0.470	0.424	96		0.7%	0.4%	0.4%	191.530	182.120
36	0.5%	1.3%	0.8%	1.0%	0.499	0.447	97		0.7%	0.4%	0.3%	209.161	199.601
37	0.4%	1.3%	0.8%	1.0%	0.534	0.476	98		0.7%	0.4%	0.3%	227.595	217.946
38	0.2%	1.3%	0.7%	1.0%	0.574	0.514	99		0.7%	0.4%	0.2%	246.726	236.934
39	0.0%	1.1%	0.7%	1.0%	0.621	0.560	100		0.7%	0.4%	0.2%	266.423	256.347
40	-0.2%	0.9%	0.7%	1.0%	0.676	0.613	101				0.2%	286.541	275.602
41	-0.4%	0.8%	0.7%	1.0%	0.732	0.667	102				0.1%	306.919	294.716
42	-0.4%	0.6%	0.7%	1.0%	0.787	0.723	103				0.1%	327.387	315.010
43	-0.4%	0.4%	0.7%	1.0%	0.836	0.774	104				0.0%	347.770	340.936
44	-0.3%	0.2%	0.7%	1.0%	0.879	0.822	105				0.0%	367.898	367.888
45	-0.1%	0.0%	0.8%	1.0%	0.919	0.866	106					387.607	387.607
46	0.0%	-0.1%	0.8%	1.0%	0.969	0.917	107					400.000	400.000
47	0.1%	-0.2%	0.8%	1.0%	1.034	0.983	108					400.000	400.000
48	0.2%	-0.4%	0.9%	1.0%	1.122	1.072	109					400.000	400.000
49	0.4%	-0.5%	0.9%	1.0%	1.218	1.168	110					400.000	400.000
50	0.5%	-0.6%	1.0%	1.0%	1.339	1.280	111					400.000	400.000
51	0.6%	-0.6%	1.1%	1.0%	1.511	1.453	112					400.000	400.000
52	0.8%	-0.4%	1.1%	1.1%	1.705	1.622	113					400.000	400.000
53	0.9%	0.1%	1.1%	1.1%	1.923	1.792	114					400.000	400.000
54	1.1%	0.7%	1.2%	1.1%	2.170	1.972	115					400.000	400.000
55	1.2%	1.3%	1.2%	1.2%	2.448	2.166	116					400.000	400.000
56	1.3%	1.8%	1.2%	1.2%	2.762	2.383	117					400.000	400.000
57	1.4%	2.1%	1.2%	1.2%	3.117	2.668	118					400.000	400.000
58	1.4%	2.1%	1.2%	1.2%	3.517	3.000	119					400.000	400.000
59	1.4%	2.0%	1.2%	1.3%	3.968	3.393	120					400.000	400.000
60	1.3%	1.8%	1.3%	1.3%	4.477	3.844							

Table 15 below contains the analysis for the 2012 IAM Table and the impact of the projection scale 40 years out, to 2052. The 2012 table results in mortality rates, which, at key ages, are significantly lower than those in the a2000 Table, even without future improvement. For example, male rates are 33% lower at age 75 and 18% lower at age 85.

Table 15 - Relationship of 2012 IAM Table with and without Projection to a2000 Table and Female to Male

	Projected Basic 1000qx as of:				Ratio to a2000 Table				Ratio: Female to Male	
	2012		2052		2012		2052			
Age	Male	Female	Male	Female	Male	Female	Male	Female	2012	2052
0	1.78	1.80	1.19	1.20	77.2%	100.4%	51.6%	67.2%	101.0%	101.0%
5	0.19	0.14	0.12	0.09	57.5%	73.6%	38.5%	49.3%	74.7%	74.7%
10	0.13	0.09	0.08	0.06	32.3%	67.2%	21.6%	44.9%	74.6%	74.6%
15	0.28	0.17	0.19	0.12	60.1%	88.1%	40.2%	58.9%	61.5%	61.5%
20	0.46	0.25	0.31	0.17	83.7%	91.5%	56.0%	61.2%	55.1%	55.1%
25	0.67	0.28	0.45	0.19	97.5%	75.6%	65.3%	50.6%	41.5%	41.5%
30	0.82	0.33	0.55	0.22	105.1%	74.0%	70.3%	49.5%	40.4%	40.4%
35	0.79	0.42	0.53	0.28	99.6%	82.3%	66.7%	55.1%	53.7%	53.7%
40	0.95	0.61	0.64	0.41	91.5%	90.5%	61.2%	60.6%	64.2%	64.2%
45	1.35	0.87	0.91	0.58	69.5%	83.1%	46.5%	55.6%	64.0%	64.0%
50	2.29	1.29	1.53	0.86	68.6%	75.4%	45.9%	50.5%	56.4%	56.4%
55	3.62	2.17	2.19	1.36	71.2%	78.9%	43.1%	49.7%	59.9%	62.4%
60	5.66	3.84	3.09	2.28	79.0%	89.9%	43.1%	53.3%	67.9%	73.6%
65	9.01	6.83	4.92	4.05	81.9%	97.3%	44.8%	57.7%	75.8%	82.2%
70	12.62	10.08	6.89	5.97	66.7%	90.3%	36.4%	53.5%	79.9%	86.7%
75	20.91	15.87	11.42	9.40	66.4%	81.2%	36.3%	48.1%	75.9%	82.3%
80	36.93	27.58	20.17	16.34	72.2%	77.5%	39.5%	45.9%	74.7%	81.0%
85	66.51	54.44	42.73	37.16	81.8%	85.2%	52.5%	58.2%	81.9%	87.0%
90	122.21	98.20	92.28	77.19	98.1%	87.1%	74.1%	68.5%	80.3%	83.6%
95	205.84	162.72	171.87	138.62	114.2%	93.3%	95.4%	79.4%	79.1%	80.7%
100	298.45	256.36	275.48	236.63	119.5%	108.1%	110.3%	99.8%	85.9%	85.9%
105	400.00	367.90	400.00	367.90	107.4%	105.9%	107.4%	105.9%	92.0%	92.0%

VI - The 2012 Individual Annuity Mortality Period Table

The 2012 IAM Period Table is the 2012 IAM Basic Table with the margins as determined by LATF, but without future projection. To develop the margins, the Team reviewed the approach taken for developing the margins used in the a2000 Table and discussed with LATF whether there was a need to vary the approach to determining the margin or the actual level of margin from that used in developing the a2000 Table, with a recommendation that the Team did not see a compelling reason to vary. LATF agreed no changes in the approach or level of margin were required. Thus, the resulting margin recommended by LATF is 10% for all ages up to and including 100. The margin then grades down 1% per year for ages 100 until the ultimate mortality cap of 0.40000 is invoked. This results in a margin of zero beginning at age 106 for males and 108 for females. The table omega is 120 where the mortality rate is set to 1.00000. The Team determined there was no need to smoothly grade from 0.40000 to 1.00000 as there was little difference on the impact of reserves. See Exhibit II for the 2012 IAM Period Table.

VII - The 2012 Individual Annuity Reserve Table and Projection Factors

To develop the 2012 Individual Annuity Reserve Table (2012 IAR Table), the Team concluded it made sense to create a generational mortality table through the use of projection factors. These projection factors are applied to the table each valuation year, rather than using a static table which can become dated more quickly. The Team used the same approach as for the improvement factors described in Section VI of this report. For future projection, the Team decided to use Scale G2, without further modification. An example of the development of a generational mortality table through application of projection factors is shown in Exhibit IV.

VIII - Validation of 2012 IAM Table

In order to test the overall fit of the resulting table to the underlying 2000-2004 experience, the Team back-tested the table by recalculating the A/E ratio where the expected basis was the 2012 IAM Table (i.e., without margin) adjusted to 2002, the mid-point of the underlying experience. The purpose of this test was to ensure that the resulting table, after the various adjustments, graduation and smoothing compared to the underlying experience as the Team intended. The Team observed the overall fit to be quite good at the core ages (i.e., 65 through 95) and somewhat less at other ages, where different data was used. The Team concluded this was appropriate and the results of the back-testing did not warrant additional modification to the table. Table 16 below shows the results of the back-testing.

Table 16 - Comparison of 2012 IAM Basic Table (Adjusted to 2002) to 2000-2004 Experience

Attained Age Group	Male A/E Ratio	Female A/E Ratio
60 - 64	111%	112%
65 - 69	100%	103%
70 - 74	100%	102%
75 - 79	100%	99%
80 - 84	100%	100%
85 - 89	100%	102%
90 - 94	101%	100%
95 - 99	107%	105%

In addition, the Team tested the 2012 IAM Table to the preliminary 2005-2008 experience data. The Team determined there was no evidence to suggest withholding the introduction of the 2012 Table in order to obtain more data. Table 17 shows the results of the testing against the 2005-2008 preliminary experience data. The Expected basis is the 2012 IAM table (i.e., without margin) adjusted to January 1, 2007, the mid-point of the underlying experience.

Table 17 - Comparison of 2012 IAM Basic Table (Adjusted to January 1, 2007) to Preliminary 2005 - 2008 Experience

Attained Age Group	Male A/E Ratio	Female A/E Ratio
60 - 64	110%	129%
65 - 69	94%	99%
70 - 74	105%	99%
75 - 79	102%	103%
80 - 84	104%	98%
85 - 89	102%	96%
90 - 94	107%	105%
95 - 99	99%	107%

IX - Impact to Reserves

The Team analyzed the impact of the 2012 Individual Annuity Reserve (2012 IAR) Table, which includes both the projection factors and margin, to the current a2000 Table, as well as to annuity reserves. Figures 3, 4, 5 and 6 below compare the mortality rates per 1,000 of the 2012 IAM Table, the 2012 IAR Table to the a2000 Table and a2000 Valuation Table.

Figure 3
Mortality Rate per 1,000 Comparison
Proposed 2012 Table to a2000 Table
Male Risks, Ages 0-64

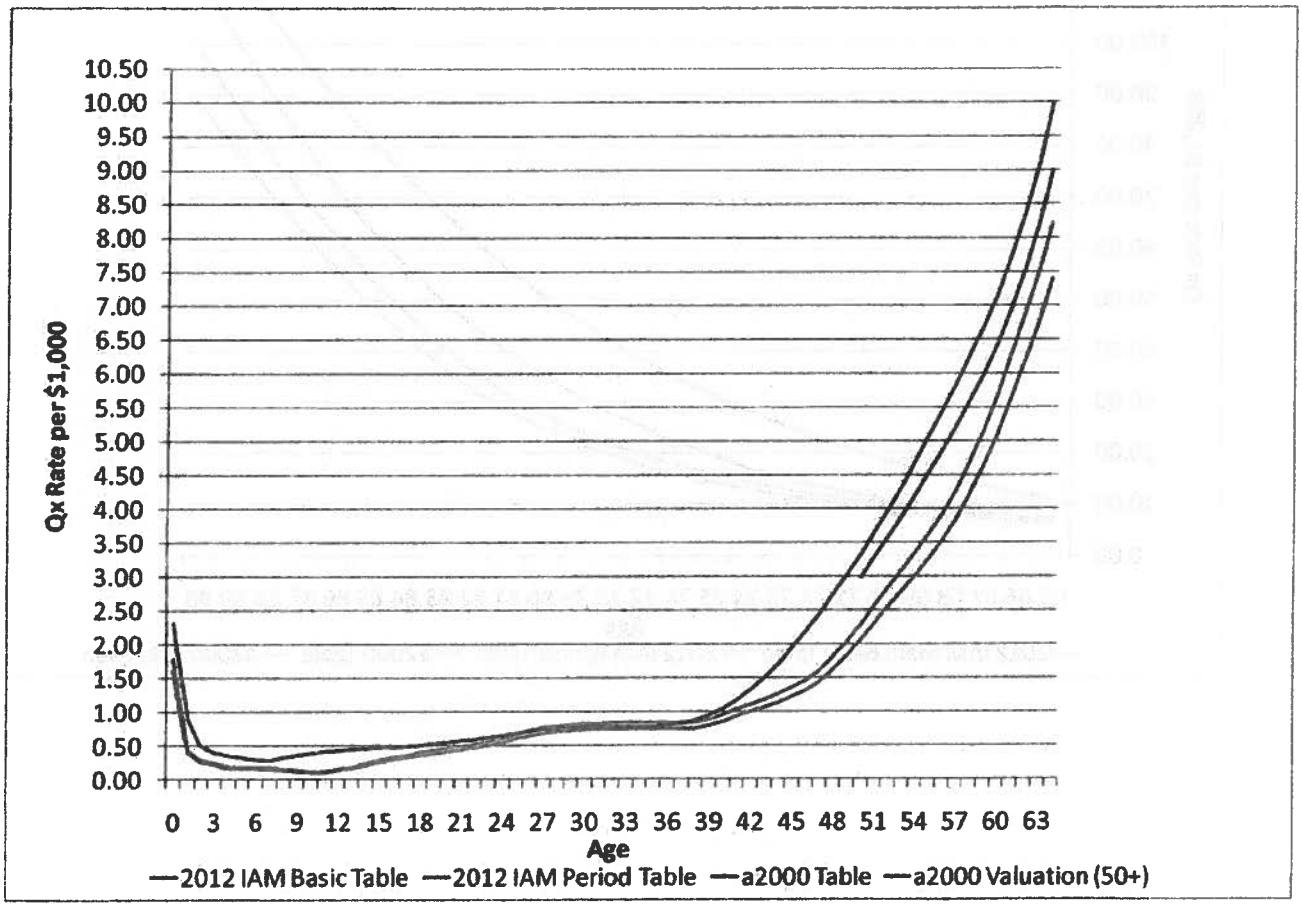


Figure 4
Mortality Rate per 1,000 Comparison
Proposed 2012 Table to a2000 Table
Male Risks, Ages 65-90

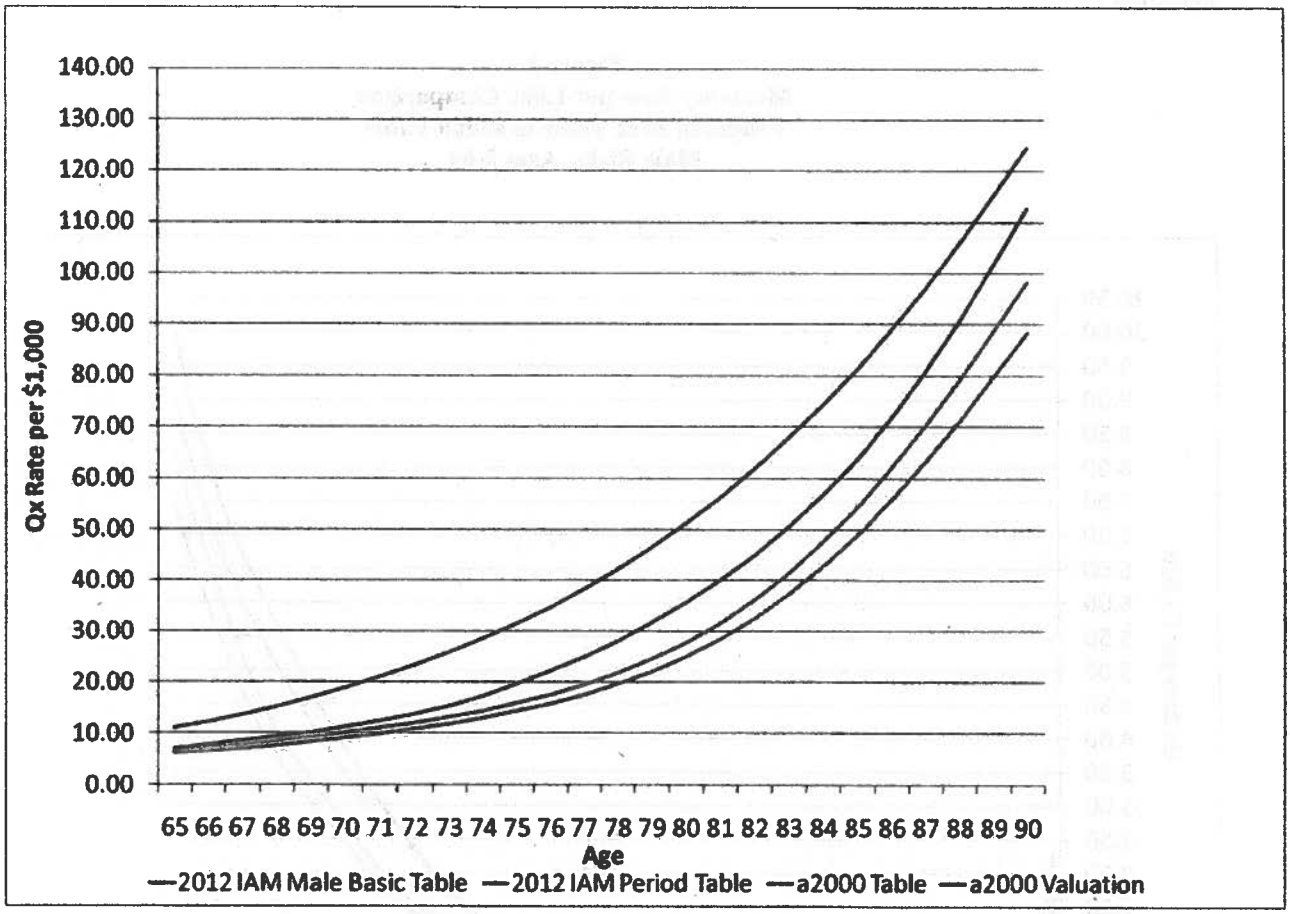


Figure 5
Mortality Rate per 1,000 Comparison
Proposed 2012 Table to a2000 Table
Male Risks, Ages 91-115

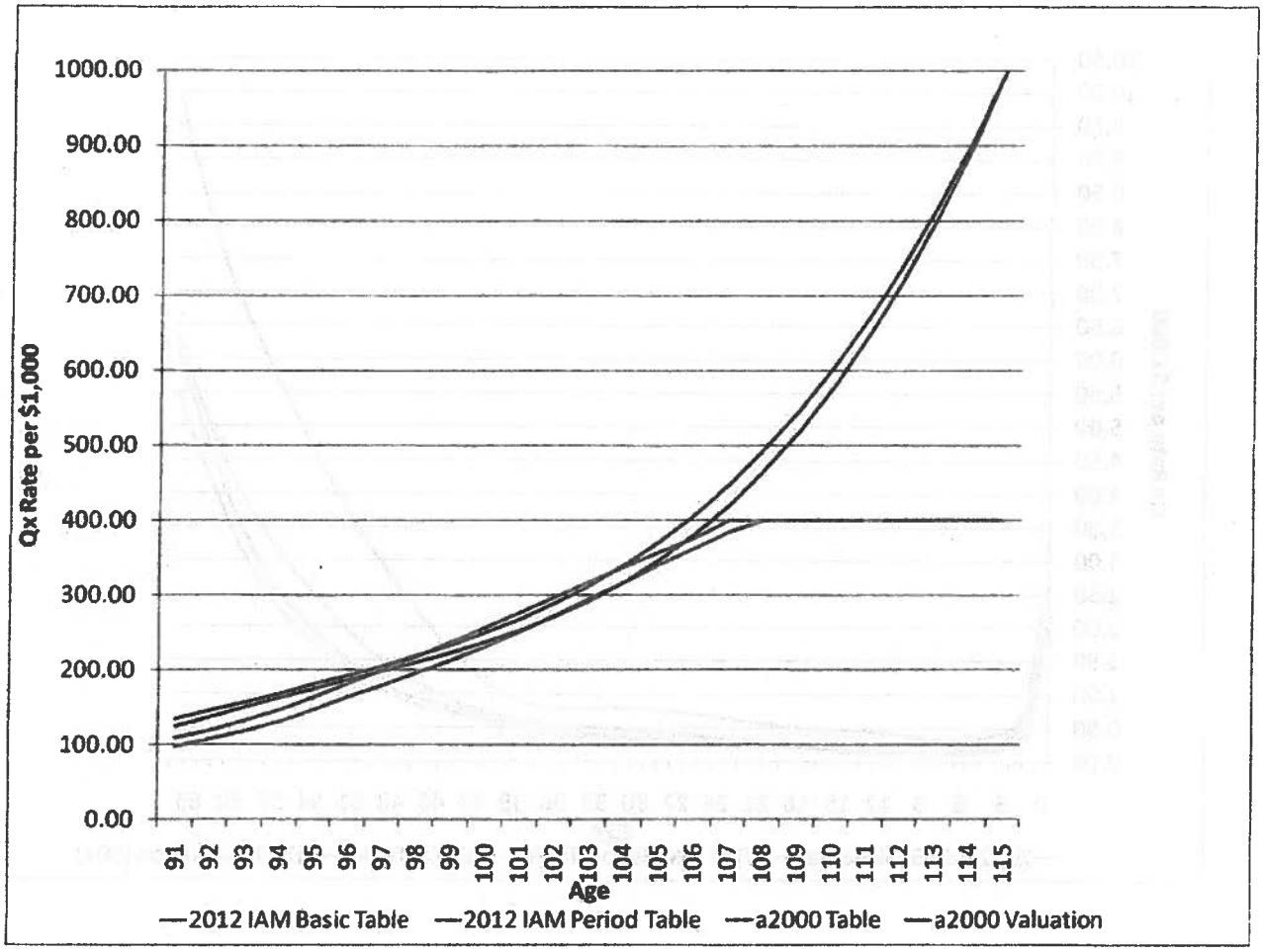


Figure 6
Mortality Rate per 1,000 Comparison
Proposed 2012 Table to a2000 Table
Female Risks, Ages 0-64

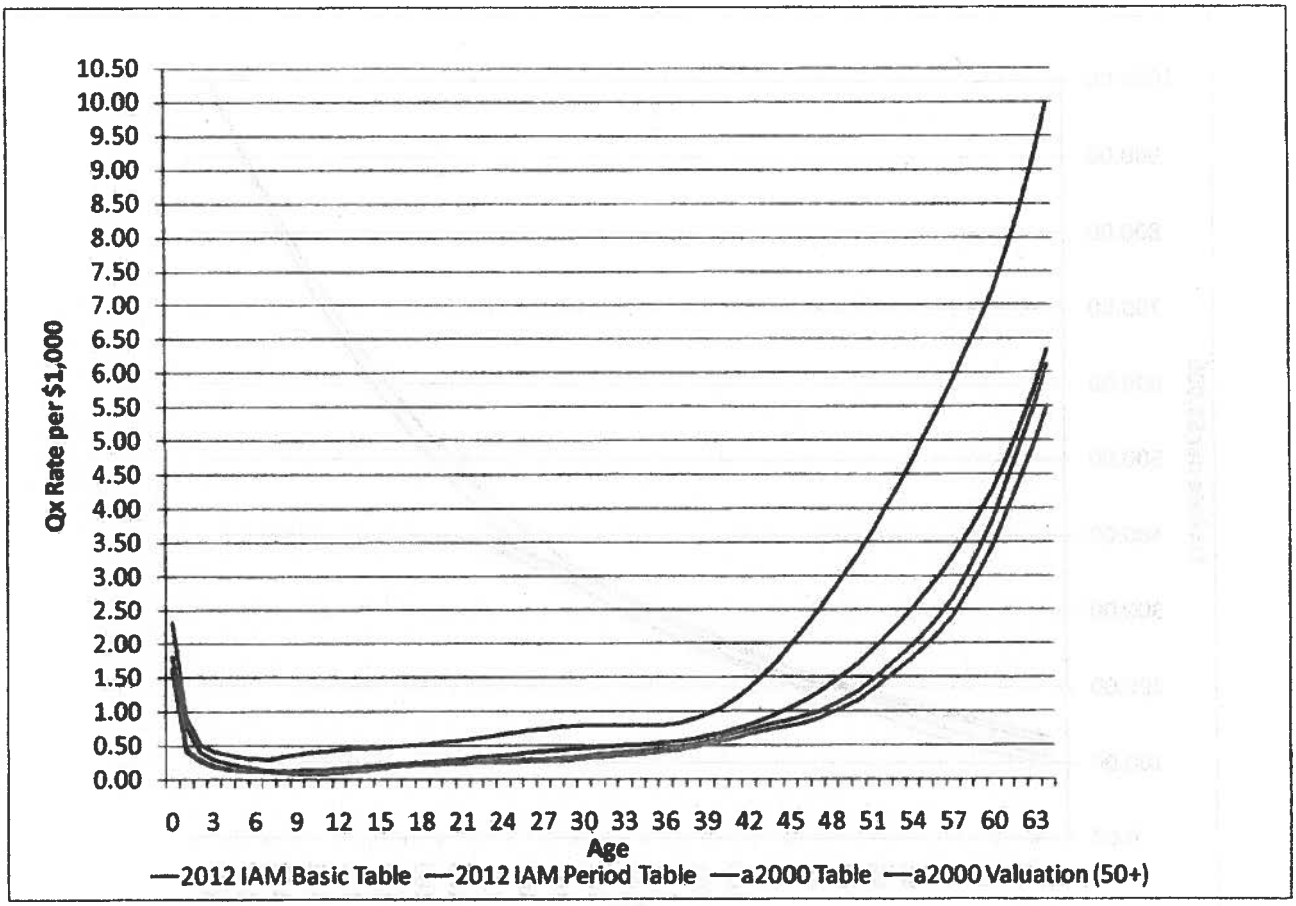


Figure 7
Mortality Rate per 1,000 Comparison
Proposed 2012 Table to a2000 Table
Female Risks, Ages 65-90

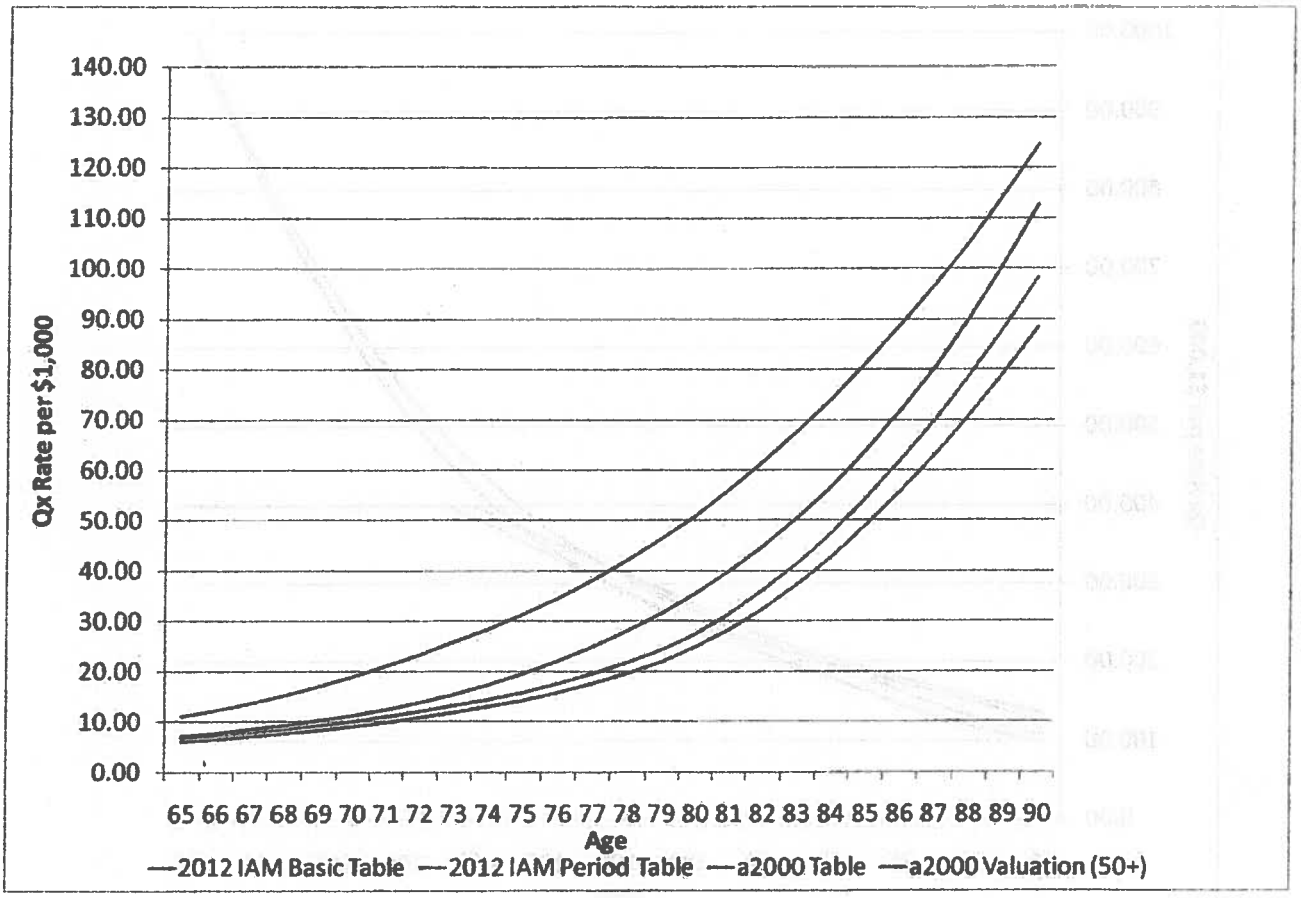
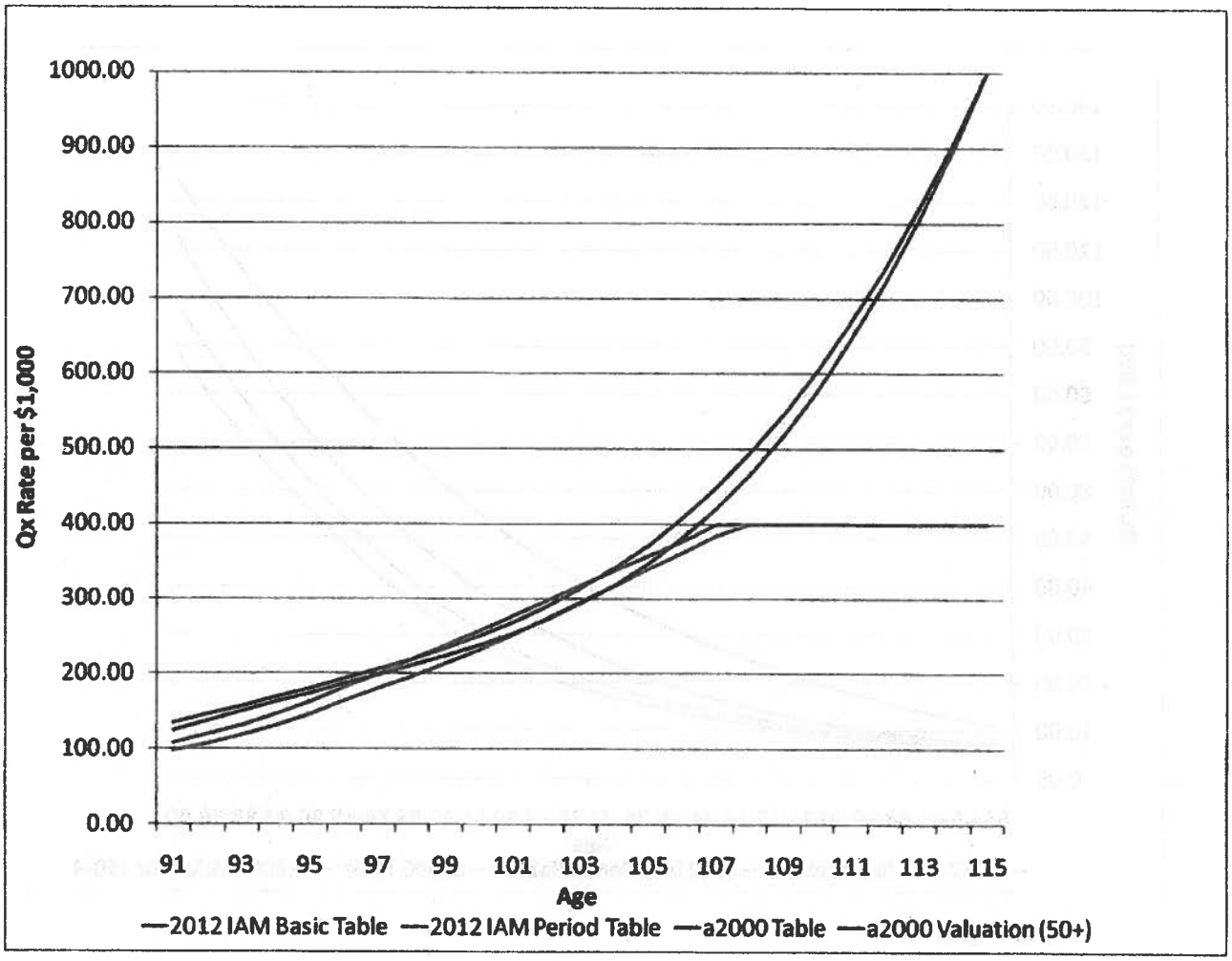


Figure 8
Mortality Rate per 1,000 Comparison
Proposed 2012 Table to a2000 Table
Female Risks, Ages 91-115



The Team also prepared sample reserve calculations using 5% interest and proposed mortality and compared them to reserves using a2000 table. In performing the review of the impact to reserves of the IAR Table, the Team compared initial reserves and reserves 10 years after issue for select ages as shown in Tables 18 and 19 below.

Table 18 - Comparison of Reserves at Issue

		Initial Reserves per $1,000 @ 5% Interest			Percentage Increase		
		a2000	2012 w/o Improvement	2012 with Improvement	2012 w/o Improvement	Adding Improvement	Total 2012
Life Annuity at Age 65	Male	11.69	12.37	12.76	6.6%	3.1%	9.9%
	Female	12.62	13.00	13.32	3.0%	2.4%	5.5%
Life Annuity at Age 75	Male	8.50	9.20	9.45	8.3%	2.7%	11.2%
	Female	9.41	9.95	10.16	5.7%	2.1%	8.0%
Life Annuity at Age 85	Male	5.50	5.63	5.72	2.3%	1.5%	3.9%
	Female	5.91	6.29	6.37	6.4%	1.3%	7.7%
20 Year C&L at Age 65	Male	14.54	14.58	14.79	0.3%	1.4%	1.7%
	Female	14.69	14.83	15.01	1.0%	1.2%	2.2%
20 Year C&L at Age 75	Male	13.67	13.53	13.59	- 1.1%	0.5%	- 0.6%
	Female	13.71	13.71	13.77	- 0.1%	0.5%	0.4%
Age 50 deferred to 80	Male	1.05	1.27	1.57	21.3%	23.3%	49.6%
	Female	1.36	1.51	1.76	11.0%	16.6%	29.4%
Age 60 deferred to 80	Male	1.78	2.14	2.46	19.8%	15.4%	38.2%
	Female	2.26	2.50	2.78	10.5%	11.1%	22.7%

Table 19 - Comparison of Reserves 10 Years after Issue

		Reserves per $1,000 10 Years After Issue @ 5% Interest			Percentage Increase		
		a2000	2012 w/o Improvement	2012 with Improvement	2012 w/o Improvement	Adding Improvement	Total 2012
Life Annuity at Age 65	Male	8.50	9.20	9.79	8.3%	6.3%	15.1%
	Female	9.41	9.95	10.43	5.7%	4.8%	10.8%
Life Annuity at Age 75	Male	5.50	5.63	5.95	2.3%	5.6%	8.1%
	Female	5.91	6.29	6.57	6.4%	4.5%	11.1%
Life Annuity at Age 85	Male	3.21	2.82	2.91	-12.1%	3.3%	- 9.2%
	Female	3.32	3.30	3.39	- 0.6%	2.8%	2.2%
20 Year C&L at Age 65	Male	11.10	11.18	11.51	0.7%	3.0%	3.7%
	Female	11.35	11.58	11.87	2.0%	2.5%	4.6%
20 Year C&L at Age 75	Male	9.69	9.45	9.56	- 2.5%	1.1%	- 1.4%
	Female	9.76	9.75	9.85	- 0.1%	1.1%	0.9%
Age 50 deferred to 80	Male	1.78	2.14	2.63	19.8%	23.1%	47.4%
	Female	2.26	2.50	2.91	10.5%	16.4%	28.6%
Age 60 deferred to 80	Male	3.21	3.76	4.31	17.0%	14.7%	34.2%
	Female	3.92	4.32	4.78	10.1%	10.7%	21.8%

EXHIBIT I

2012 Individual Annuity Mortality Table Basic Rates

EXHIBIT I

2012 IAM Basic Table
Male, Age Nearest Birthday

Age	$1000q_x$ 2012	Age	$1000q_x$ 2012	Age	$1000q_x$ 2012	Age	$1000q_x$ 2012
0	1.783	30	0.824	60	5.662	90	122.214
1	0.446	31	0.834	61	6.237	91	136.799
2	0.306	32	0.838	62	6.854	92	152.409
3	0.254	33	0.828	63	7.510	93	169.078
4	0.193	34	0.808	64	8.220	94	186.882
5	0.186	35	0.789	65	9.007	95	205.844
6	0.184	36	0.783	66	9.497	96	219.247
7	0.177	37	0.800	67	10.085	97	238.612
8	0.159	38	0.837	68	10.787	98	258.341
9	0.143	39	0.889	69	11.625	99	278.219
10	0.126	40	0.955	70	12.619	100	298.452
11	0.123	41	1.029	71	13.798	101	323.610
12	0.147	42	1.110	72	15.195	102	344.191
13	0.188	43	1.188	73	16.834	103	364.633
14	0.236	44	1.268	74	18.733	104	384.783
15	0.282	45	1.355	75	20.905	105	400.000
16	0.325	46	1.464	76	23.367	106	400.000
17	0.364	47	1.615	77	26.155	107	400.000
18	0.399	48	1.808	78	29.306	108	400.000
19	0.430	49	2.032	79	32.858	109	400.000
20	0.459	50	2.285	80	36.927	110	400.000
21	0.492	51	2.557	81	41.703	111	400.000
22	0.526	52	2.828	82	46.957	112	400.000
23	0.569	53	3.088	83	52.713	113	400.000
24	0.616	54	3.345	84	59.148	114	400.000
25	0.669	55	3.616	85	66.505	115	400.000
26	0.728	56	3.922	86	75.015	116	400.000
27	0.764	57	4.272	87	84.823	117	400.000
28	0.789	58	4.681	88	95.987	118	400.000
29	0.808	59	5.146	89	108.482	119	400.000
						120	400.000

EXHIBIT I

2012 IAM Basic Table
Female, Age Nearest Birthday

Age	$1000q_x 2012$	Age	$1000q_x 2012$	Age	$1000q_x 2012$	Age	$1000q_x 2012$
0	1.801	30	0.338	60	3.844	90	98.197
1	0.450	31	0.357	61	4.352	91	108.323
2	0.287	32	0.375	62	4.899	92	119.188
3	0.199	33	0.390	63	5.482	93	131.334
4	0.152	34	0.405	64	6.118	94	145.521
5	0.139	35	0.424	65	6.829	95	162.722
6	0.130	36	0.447	66	7.279	96	182.120
7	0.122	37	0.476	67	7.821	97	199.661
8	0.105	38	0.514	68	8.475	98	217.946
9	0.098	39	0.560	69	9.234	99	236.834
10	0.094	40	0.613	70	10.083	100	256.357
11	0.096	41	0.667	71	11.011	101	283.802
12	0.105	42	0.723	72	12.030	102	304.716
13	0.120	43	0.774	73	13.154	103	325.819
14	0.146	44	0.823	74	14.415	104	346.936
15	0.174	45	0.866	75	15.869	105	367.898
16	0.199	46	0.917	76	17.555	106	387.607
17	0.220	47	0.983	77	19.500	107	400.000
18	0.234	48	1.072	78	21.758	108	400.000
19	0.245	49	1.168	79	24.412	109	400.000
20	0.253	50	1.290	80	27.579	110	400.000
21	0.260	51	1.453	81	31.501	111	400.000
22	0.266	52	1.622	82	36.122	112	400.000
23	0.272	53	1.792	83	41.477	113	400.000
24	0.275	54	1.972	84	47.589	114	400.000
25	0.277	55	2.166	85	54.441	115	400.000
26	0.284	56	2.393	86	61.972	116	400.000
27	0.290	57	2.666	87	70.155	117	400.000
28	0.300	58	3.000	88	78.963	118	400.000
29	0.313	59	3.393	89	88.336	119	400.000
						120	400.000

EXHIBIT II

2012 Individual Annuity Mortality Period Table Rates

EXHIBIT II

2012 IAM Period Table
Male, Age Nearest Birthday

Age	$1000q_x$ 2012	Age	$1000q_x$ 2012	Age	$1000q_x$ 2012	Age	$1000q_x$ 2012
0	1.605	30	0.741	60	5.096	90	109.993
1	0.401	31	0.751	61	5.614	91	123.119
2	0.275	32	0.754	62	6.169	92	137.168
3	0.229	33	0.756	63	6.759	93	152.171
4	0.174	34	0.756	64	7.398	94	168.194
5	0.168	35	0.756	65	8.106	95	185.260
6	0.165	36	0.756	66	8.548	96	197.322
7	0.159	37	0.756	67	9.076	97	214.751
8	0.143	38	0.756	68	9.708	98	232.507
9	0.129	39	0.800	69	10.463	99	250.397
10	0.113	40	0.859	70	11.357	100	268.607
11	0.111	41	0.926	71	12.418	101	290.016
12	0.132	42	0.999	72	13.675	102	311.849
13	0.169	43	1.069	73	15.150	103	333.962
14	0.213	44	1.142	74	16.860	104	356.207
15	0.254	45	1.219	75	18.815	105	380.000
16	0.293	46	1.318	76	21.031	106	400.000
17	0.328	47	1.454	77	23.540	107	400.000
18	0.359	48	1.627	78	26.375	108	400.000
19	0.387	49	1.829	79	29.572	109	400.000
20	0.414	50	2.057	80	33.234	110	400.000
21	0.443	51	2.302	81	37.533	111	400.000
22	0.473	52	2.545	82	42.261	112	400.000
23	0.513	53	2.779	83	47.441	113	400.000
24	0.554	54	3.011	84	53.233	114	400.000
25	0.602	55	3.254	85	59.855	115	400.000
26	0.655	56	3.529	86	67.514	116	400.000
27	0.688	57	3.845	87	76.340	117	400.000
28	0.710	58	4.213	88	86.388	118	400.000
29	0.727	59	4.631	89	97.634	119	400.000
						120	1000.000

EXHIBIT II

2012 IAM Period Table
Female, Age Nearest Birthday

Age	$1000q_x$ 2012	Age	$1000q_x$ 2012	Age	$1000q_x$ 2012	Age	$1000q_x$ 2012
0	1.621	30	0.300	60	3.460	90	88.377
1	0.405	31	0.324	61	3.916	91	97.491
2	0.259	32	0.338	62	4.409	92	107.269
3	0.179	33	0.351	63	4.933	93	118.201
4	0.137	34	0.365	64	5.507	94	130.969
5	0.125	35	0.381	65	6.146	95	146.449
6	0.117	36	0.402	66	6.551	96	163.908
7	0.110	37	0.429	67	7.039	97	179.695
8	0.095	38	0.463	68	7.628	98	196.151
9	0.088	39	0.504	69	8.311	99	213.150
10	0.085	40	0.552	70	9.074	100	230.722
11	0.086	41	0.600	71	9.910	101	251.505
12	0.094	42	0.650	72	10.827	102	273.007
13	0.108	43	0.697	73	11.839	103	295.086
14	0.131	44	0.740	74	12.974	104	317.591
15	0.156	45	0.780	75	14.282	105	340.362
16	0.179	46	0.825	76	15.799	106	362.371
17	0.198	47	0.885	77	17.550	107	384.113
18	0.211	48	0.964	78	19.582	108	400.000
19	0.221	49	1.051	79	21.970	109	400.000
20	0.228	50	1.161	80	24.821	110	400.000
21	0.234	51	1.308	81	28.351	111	400.000
22	0.240	52	1.460	82	32.509	112	400.000
23	0.245	53	1.613	83	37.329	113	400.000
24	0.247	54	1.774	84	42.830	114	400.000
25	0.250	55	1.950	85	48.997	115	400.000
26	0.256	56	2.154	86	55.774	116	400.000
27	0.261	57	2.399	87	63.140	117	400.000
28	0.270	58	2.700	88	71.066	118	400.000
29	0.281	59	3.054	89	79.502	119	400.000
						120	1000.000

EXHIBIT III

Projection Scale G2

EXHIBIT III

Projection Scale G2
Male, Age Nearest Birthday

Age	$G2_x$	Age	$G2_x$	Age	$G2_x$	Age	$G2_x$
0	0.010	30	0.010	60	0.015	90	0.007
1	0.010	31	0.010	61	0.015	91	0.007
2	0.010	32	0.010	62	0.015	92	0.006
3	0.010	33	0.010	63	0.015	93	0.005
4	0.010	34	0.010	64	0.015	94	0.005
5	0.010	35	0.010	65	0.015	95	0.004
6	0.010	36	0.010	66	0.015	96	0.004
7	0.010	37	0.010	67	0.015	97	0.003
8	0.010	38	0.010	68	0.015	98	0.003
9	0.010	39	0.010	69	0.015	99	0.002
10	0.010	40	0.010	70	0.015	100	0.002
11	0.010	41	0.010	71	0.015	101	0.002
12	0.010	42	0.010	72	0.015	102	0.001
13	0.010	43	0.010	73	0.015	103	0.001
14	0.010	44	0.010	74	0.015	104	0.000
15	0.010	45	0.010	75	0.015	105	0.000
16	0.010	46	0.010	76	0.015	106	0.000
17	0.010	47	0.010	77	0.015	107	0.000
18	0.010	48	0.010	78	0.015	108	0.000
19	0.010	49	0.010	79	0.015	109	0.000
20	0.010	50	0.010	80	0.015	110	0.000
21	0.010	51	0.011	81	0.014	111	0.000
22	0.010	52	0.011	82	0.013	112	0.000
23	0.010	53	0.012	83	0.013	113	0.000
24	0.010	54	0.012	84	0.012	114	0.000
25	0.010	55	0.013	85	0.011	115	0.000
26	0.010	56	0.013	86	0.010	116	0.000
27	0.010	57	0.014	87	0.009	117	0.000
28	0.010	58	0.014	88	0.009	118	0.000
29	0.010	59	0.015	89	0.008	119	0.000
						120	0.000

EXHIBIT III

Projection Scale G2
Female, Age Nearest Birthday

Age	$G2_x$	Age	$G2_x$	Age	$G2_x$	Age	$G2_x$
0	0.010	30	0.010	60	0.013	90	0.006
1	0.010	31	0.010	61	0.013	91	0.006
2	0.010	32	0.010	62	0.013	92	0.005
3	0.010	33	0.010	63	0.013	93	0.005
4	0.010	34	0.010	64	0.013	94	0.004
5	0.010	35	0.010	65	0.013	95	0.004
6	0.010	36	0.010	66	0.013	96	0.004
7	0.010	37	0.010	67	0.013	97	0.003
8	0.010	38	0.010	68	0.013	98	0.003
9	0.010	39	0.010	69	0.013	99	0.002
10	0.010	40	0.010	70	0.013	100	0.002
11	0.010	41	0.010	71	0.013	101	0.002
12	0.010	42	0.010	72	0.013	102	0.001
13	0.010	43	0.010	73	0.013	103	0.001
14	0.010	44	0.010	74	0.013	104	0.000
15	0.010	45	0.010	75	0.013	105	0.000
16	0.010	46	0.010	76	0.013	106	0.000
17	0.010	47	0.010	77	0.013	107	0.000
18	0.010	48	0.010	78	0.013	108	0.000
19	0.010	49	0.010	79	0.013	109	0.000
20	0.010	50	0.010	80	0.013	110	0.000
21	0.010	51	0.010	81	0.012	111	0.000
22	0.010	52	0.011	82	0.012	112	0.000
23	0.010	53	0.011	83	0.011	113	0.000
24	0.010	54	0.011	84	0.010	114	0.000
25	0.010	55	0.012	85	0.010	115	0.000
26	0.010	56	0.012	86	0.009	116	0.000
27	0.010	57	0.012	87	0.008	117	0.000
28	0.010	58	0.012	88	0.007	118	0.000
29	0.010	59	0.013	89	0.007	119	0.000
						120	0.000

EXHIBIT IV

Generational Mortality Table Development

EXHIBIT IV

Example of Generational Mortality Table and Use of Projection Factors

In order to develop generational mortality table rates, the mortality rate for a person age x in year (2012 + n) determined as follows:

$$q_x^{2012+n} = q_x^{2012} * (1 - G2_x)^n$$

where,

- G2x is annual rate of mortality improvement for age x
- q_x is the mortality rate from 2012 Individual Annuity Mortality Period Table

The following table illustrates the development of the 2012 IAR Mortality Table from the 2012 IAM Period Table

Illustration of Development of 2012 IAR Mortality Table, which is a Generation Mortality Table from the 2012 IAM Period Table

	2012	2013						...	2070
65	q_{65}^{2012}	q_{65}^{2013}	q_{65}^{2014}	q_{65}^{2015}	q_{65}^{2016}	q_{65}^{2017}	q_{65}^{2018}	...	q_{65}^{2070}
66	q_{66}^{2012}	q_{66}^{2013}	q_{66}^{2014}	q_{66}^{2015}	q_{66}^{2016}	q_{66}^{2017}	q_{66}^{2018}	...	q_{66}^{2070}
67	q_{67}^{2012}	q_{67}^{2013}	q_{67}^{2014}	q_{67}^{2015}	q_{67}^{2016}	q_{67}^{2017}	q_{67}^{2018}	...	q_{67}^{2070}
68	q_{68}^{2012}	q_{68}^{2013}	q_{68}^{2014}	q_{68}^{2015}	q_{68}^{2016}	q_{68}^{2017}	q_{68}^{2018}	...	q_{68}^{2070}
69	q_{69}^{2012}	q_{69}^{2013}	q_{69}^{2014}	q_{69}^{2015}	q_{69}^{2016}	q_{69}^{2017}	q_{69}^{2018}	...	q_{69}^{2070}
...	...	...	...	...	...	...	...	...	...
120	q_{120}^{2012}	q_{120}^{2013}	q_{120}^{2014}	q_{120}^{2015}	q_{120}^{2016}	q_{120}^{2017}	q_{120}^{2018}	...	q_{120}^{2070}

The following is an example of the mortality table rates for years 2013 through 2018. The table is based on the 2012 IAM Period Table for Male risks, using Scale G2, for issue years 2013

			Values of 1000qx					
Age	**$1000q_x^{2012}$**	**$G2_x$**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
65	8.106	0.015	7.984	7.865	7.747	7.630	7.516	7.403
66	8.548	0.015	8.420	8.293	8.169	8.047	7.926	7.807
67	9.076	0.015	8.940	8.806	8.674	8.544	8.415	8.289
68	9.708	0.015	9.562	9.419	9.278	9.138	9.001	8.866
69	10.463	0.015	10.306	10.151	9.999	9.849	9.701	9.556

[1] Eilers, P.H.C., and Marx, B.D. 1996. "Flexible Smoothing with B-splines and Penalties." Statistical Science 11(2): 89-121.

[2] P-Spline formula denoted as $q(i)x,t = \exp\{\log(q(i)x,t) + Z \times \hat{S}x,t\}$ whereby $q(i)x,t$ is the force of mortality for each age x and for each year t. $\hat{S}x,t$ is the standard deviation of the log mean value of $q(i)x,t$. Z is a standard normal variable for use in generating scenarios. Further details on the P-Spline methodology and the Mortality Projection Spreadsheet v3.0 can be found in the Continuous Mortality Investigation Working Paper 15 (2005), pp. 12-15 and Revised Working Paper 20 produced by The Faculty of Actuaries and Institute of Actuaries.

[3] Continuous Mortality Investigation. 2005. "Working Paper 15. Projecting Future Mortality: Towards a Proposal for a Stochastic Methodology." and Continuous Mortality Investigation. 2007. "Revised Working Paper 20. Stochastic Projection Methodologies: further progress and P-Spline Model features, example results and implications." The Faculty of Actuaries and Institute of Actuaries.

[4] Currie, I.D., Durban, M., and Eilers, P.H.C. 2004. "Smoothing and Forecasting Mortality Rates." Statistical Modeling 4: 279-298

[5] Inference for Logistic-type Models for the Force of Mortality", Louis G. Doray, Living to 100 and Beyond Symposium, 2008

[6] Canadian Institute of Actuaries, "Mortality Improvement Research Paper," Committee of Life Insurance Financial Reporting, September 2010

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Insurance Department

Notice of Final Rulemaking

31 Pa. Code Chapter 84

TABLES APPROVED FOR USE IN DETERMINING MINIMUM NONFORFEITURE STANDARDS AND MINIMUM STANDARDS FOR VALUATION

Document/Fiscal Note No. 11-255

INSURANCE COMMISSIONER'S CERTIFICATION

I, Teresa D. Miller, hereby certify that I have reviewed this Final Form Regulation and determined that it is consistent with the principles outlined in Executive Order 1996-1.

Teresa D. Miller
Insurance Commissioner

The Insurance Federation of Pennsylvania, Inc.

1600 Market Street
Suite 1720
Philadelphia, PA 19103
Tel: (215) 665-0500 Fax: (215) 665-0540
E-mail: smarshall@ifpenn.org

Samuel R. Marshall
President & CEO

February 19, 2016

Bridget E. Burke
Regulatory Coordinator
Pennsylvania Insurance Department
1341 Strawberry Square
Harrisburg, PA 17120

Re: Insurance Department Proposed Regulation 11-255 – annuity mortality tables

Dear Bridget:

The Insurance Federation supports the Department's proposed regulation, with appreciation for the collaborative efforts that went into its drafting.

In fact, we support this regulation so strongly that we recommend it take effect immediately upon final-form publication in the Pennsylvania Bulletin. Annuity writers are ready for prompt implementation of this regulation, as is the Department – so this may be one where neither side needs a 30 day lead time.

Sincerely,

Samuel R. Marshall

C: Corinne R. Brandt, IRRC
Fiona E. Wilmarth, IRRC

GOVERNOR'S OFFICE OF GENERAL COUNSEL

May 5, 2016

Mr. David Sumner
Executive Director
Independent Regulatory Review Comm.
333 Market Street, 14th Floor
Harrisburg, PA 17101

Re: Insurance Department Final-form Regulation No. 11-255, Tables Approved for Use in Determining Minimum Nonforfeiture Standards and Minimum Standards for Valuation

Dear Mr. Sumner:

Pursuant to Section 5a(c) of the Regulatory Review Act, enclosed for your information and review is Final-form regulation 31 Pa. Code, Chapter 84, Tables Approved for Use in Determining Minimum Nonforfeiture Standards and Minimum Standards for Valuation.

The purpose of this rulemaking is to adopt new mortality tables for use in determining the minimum reserves that insurers must maintain for annuities. The amendments in this rulemaking are based upon changes to NAIC Model Regulation # 821 adopted by the NAIC in 2012.

If you have any questions regarding this matter, please contact me at (717) 787-2567.

Sincerely yours,

Bridget E. Burke

Bridget E. Burke
Regulatory Coordinator

1341 STRAWBERRY SQUARE | HARRISBURG, PA 17120
Ph: 717-787-2567 | Fx: 717-772-1969 | www.insurance.pa.gov

pennsylvania
INSURANCE DEPARTMENT

TRANSMITTAL SHEET FOR REGULATIONS SUBJECT TO THE REGULATORY REVIEW ACT

I.D. NUMBER: 11-255

SUBJECT: TABLES APPROVED FOR USE IN DETERMINING MINIMUM NONFORFEITURE STANDARDS AND MINIMUM STANDARDS FOR VALUATION

AGENCY: DEPARTMENT OF INSURANCE

TYPE OF REGULATION

Proposed Regulation

X Final Regulation

Final Regulation with Notice of Proposed Rulemaking Omitted

120-day Emergency Certification of the Attorney General

120-day Emergency Certification of the Governor

Delivery of Tolled Regulation
a. _____ With Revisions b. _____ Without Revisions

FILING OF REGULATION

DATE	SIGNATURE	DESIGNATION
		HOUSE COMMITTEE ON INSURANCE:
5-5		**MAJORITY CHAIR – REP. TINA PICKETT**
5-5		**MINORITY CHAIR – REP. ANTHONY DELUCA**
		SENATE COMMITTEE ON BANKING & INSURANCE:
5-5		**MAJORITY CHAIR: SEN. DONALD C. WHITE**
5-5		**MINORITY CHAIR: SEN. SEAN WILEY**
5/5/16	K Cooper	*INDEPENDENT REGULATORY REVIEW COMMISSION*
		ATTORNEY GENERAL (for Final Omitted Only)
		LEGISLATIVE REFERENCE BUREAU (for Proposed Only)

May 5, 2016