Pensioner Mortality in the New York State Public Retirement Systems

## Summary

New York State has mortality data going back to 1921. When we looked at that data, and graphed the mortality experience, with particular attention paid to the recent data after 1986 we noticed a smooth asymptotic trend in the curve of the mortality rates by age over the years, as well as a smooth asymptotic trend in the curve of the mortality rates by years for each age. This led us to examine a recursive method of forecasting as well as an exponential method. Based on a recursive method, we forecasted future mortality rates and then calculated the effects on the liabilities and the funding of the New York State Retirement System. The results showed, that based on patterns from the past continuing into the future, mortality rates thirty years from now for pensioners over age 80 would be approximately $67 \%$ of our current assumptions. This would translate in the life expectancy of a sixty-two year old pensioner changing from approximately 22 years to approximately 26 years, and an increase in the current new entrant rate of approximately $7.9 \%$. These changes, although not insignificant, would be realized gradually over the next thirty years and would not represent an immediate burden. Again, this assumes that medical and social breakthroughs in the future will have no more of an impact on mortality than the changes which we have experienced over the last eighty years.

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Introduction
The New York State and Local Employees' Retirement System has been providing retirement benefits to municipal employees since 1921. There have been more than 550,000 pensioners and beneficiaries paid in that time, with the current number of pensioners and beneficiaries in excess of 290,000 . This collection of data shows a trend in mortality during a period of many medical breakthroughs and social improvements. The last fifteen years begin to show longevity reaching into ages beyond ninety. The question remains, however, what trends does the future hold, and can any information be gleaned from the past.

## The Last Fifteen Years

Attached are tables and graphs of our experience by allowance over the last fifteen years, broken down by gender. For our own purposes, we would also sort this data by job type (i.e. clerical, laborer, police officer, firefighter or beneficiary) and retirement type (i.e. service or disability). For this study, however, since we're interested in mortality at advanced ages where such distinctions lose their significance, we combined retirement types and job types.

## Male Mortality Experience by Allowance



Female Mortality Experience by Allowance


Female versus Male Mortality Experience 1987-2001 by Allowance


## Possible Trends

Attached are two graphs of the data, by number, that has been accumulated over the past eighty years. The first graph shows a laying down trend in the curve of age versus mortality rate as we look at selected five year data since 1921. This is what we would expect as an effect of societal and medical changes. The second graph, of each centralized age of mortality rate versus the years the data was accumulated, seems to show a regressive relationship in the mortality at each age as the years have passed. For instance, the mortality rate for the age 77 group in the period 1937 to 1941 is about the same as the mortality rate for the age group 82 in the period 1972 to 1976 . Also shown here is how wild the age 87 and 92 rates were, from 1921 through 1966 and how nicely they settled into a pattern after that. Now you can notice how wild the age 97 and above rates are, but you can also see the beginning of a pattern being set there as well.

The graphs appear to have an exponential quality. We looked at fitting them into the Lee-Carter Method for Forecasting Mortality (North American Actuarial Journal, January 2000), but couldn't get it to forecast trends that were as palatable as the regression method. The thought of an exponential mortality curve is enticing, however, we were not able to isolate all of the variables that were necessary to create viable forecasts.

## Total Mortality Experience by Number



## Mortality Experience by Number



Impact on the liabilities and the funding for the New York State and Local Employees' Retirement System.

Using the recursive relationship noticed earlier, and shifting our current mortality rates at each five year centralized age to be that of age minus five, we can crudely estimate what the mortality rate at each age will be in about the year 2036. These projected rates end up being approximately $67 \%$ of our current expected mortality rates. The life expectancy for a current retiree age 62 on our current assumptions is approximately 22 years, whereas a retiree age 62 on the projected rates would have a life expectancy of approximately 26 years. In calculating liabilities based on these mortality rates, the concern is that our current demographics do not reflect this improved mortality and that actual liabilities in 2036 will be based on far more pensioners and beneficiaries being over age 90 and even over age 100. However, as a starting point, I valued our currently active members on the new projected pensioner mortality rates. As a result, the present value of benefits for current members increased by 4.2 billion. This represents a percent change of approximately $6.1 \%$ and a change in future normal rate of approximately $2.5 \%$ of salary. In addition, I valued our current pensioners on the new projected pensioner mortality rates. This generated an increase in present value of benefits of approximately 2.7 billion. This represents a percent change of approximately $9.1 \%$ and a change in future normal rate of approximately $1.6 \%$ of salary. The changes in mortality will be gradual and if we do see these changes, the effects will be phased in gradually in the future. Another way of looking at the effects of these changes is by looking at how the new entrant rate will be affected. By calculating the new entrant rate on the new projected pensioner mortality rates and then comparing that to the current new entrant rate there would be an increase in the new entrant rate of approximately $.8 \%$ of salary, this corresponds to a $7.9 \%$ increase in the current new entrant rate. These increases are not small, but since we would realize them gradually, we should be prepared for them through our current process of creating new mortality tables every five years from our most recent experience and using the $25 \%$ loading factor. These assumptions assume that the trends from the past will continue into the future and thereby, that medical and societal changes in the future will be no more significant than the changes over the past eighty years, until proven otherwise.

Possible factors that have had an effect on the mortality experience of the New York State and Local Employees' Retirement System.

New York State has historically been a progressive, industrialized state with good health care and an above average standard of living. So it would not be surprising if Mortality rates in New York State were lower than the national rates and Global rates. However, the New York State Retirement System mortality rates are higher than the national rates in the UP83, GAM83, UP94, and GAM94 tables. Perhaps this may be accounted for by the differences in the way the tables are created and the differences in the characteristics of the individuals. In particular, that we grouped service retirees and disability retirees together even though disability retirees have significantly higher mortality rates at the lower ages.

We also looked at pensioners since 1987 broken down into two groups. The first group consists of pensioners who are receiving annual benefits which are less than twice the minimum wage of the year that they started receiving benefits. The second group consists of pensioners who are receiving annual benefits which are more than twice the minimum wage of the year that they started receiving benefits. The level of twice minimum wage was chosen because about half of the exposures fell into the under and into the over group. The attached graphs of that data shows no significant differences. This is not what one might expect, until you consider that a pension benefit should not be their sole means of support and that the majority of these pensioners have had health insurance. The results do lend some credibility to the consistency of the data over these years as a homogeneous group.

Lastly, New York State may be a reasonable model, because it has been a progressive state for this eighty year period. There has been a smooth transition in mortality rates over these years, not a cliff scenario where they would be catching up with medical and social advances.

Compare Mortality Experience by Allowance for pensions under and over twice minimum wage


| Age | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 80 | 6,208,965 | 7,805,715 | 8,979,489 | 9,681,860 | 10,053,836 | 10,528,668 | 12,143,497 | 12,012,653 | 14,112,159 | 15,466,150 | 15,547,288 | 17,375,965 | 20,085,032 | 20,162,117 | 25,407,80 |
| 81 | 5,745,270 | 5,685,031 | 7,057,135 | 8,205,193 | 9,063,249 | 9,276,662 | 9,799,449 | 11,197,697 | 10,965,245 | 13,247,003 | 14,161,919 | 14,504,484 | 16,052,427 | 18,697,753 | 18,915,54! |
| 82 | 4,304,245 | 5,246,288 | 5,130,431 | 6,325,469 | 7,433,327 | 8,313,994 | 8,490,421 | 9,014,282 | 10,395,173 | 10,132,455 | 12,260,927 | 13,089,457 | 13,547,940 | 14,840,361 | 17,316,50 |
| 83 | 3,525,378 | 3,905,414 | 4,701,776 | 4,696,154 | 5,715,493 | 6,727,545 | 7,680,250 | 7,729,640 | 8,194,619 | 9,532,895 | 9,295,396 | 11,233,648 | 11,947,052 | 12,357,480 | 13,585,86! |
| 84 | 2,842,212 | 3,204,129 | 3,481,553 | 4,175,072 | 4,243,826 | 5,147,107 | 5,941,942 | 6,834,900 | 6,986,435 | 7,295,440 | 8,524,165 | 8,579,365 | 10,260,710 | 10,736,080 | 11,487,91! |
| 85 | 1,837,344 | 2,549,109 | 2,803,246 | 3,088,088 | 3,671,492 | 3,687,567 | 4,547,216 | 5,292,070 | 6,060,613 | 6,176,218 | 6,367,071 | 7,580,067 | 7,743,055 | 9,149,780 | 9,510,05؛ |
| 86 | 1,432,107 | 1,533,614 | 2,230,127 | 2,511,240 | 2,693,905 | 3,250,610 | 3,192,794 | 4,065,392 | 4,673,548 | 5,344,767 | 5,501,239 | 5,523,688 | 6,631,416 | 6,787,123 | 7,994,23: |
| 87 | 1,134,132 | 1,207,109 | 1,347,393 | 1,886,394 | 2,169,171 | 2,329,879 | 2,857,149 | 2,633,714 | 3,547,750 | 4,026,550 | 4,784,494 | 4,955,914 | 4,867,182 | 5,628,514 | 5,668,46\} |
| 88 | 729,063 | 1,012,324 | 947,862 | 1,122,486 | 1,649,538 | 1,883,327 | 1,986,597 | 2,325,607 | 2,217,297 | 2,992,659 | 3,467,966 | 4,027,883 | 4,289,744 | 4,171,240 | 4,769,89( |
| 89 | 533,155 | 618,136 | 865,201 | 823,904 | 919,513 | 1,425,593 | 1,578,861 | 1,607,058 | 1,987,976 | 1,824,890 | 2,429,481 | 2,956,444 | 3,287,516 | 3,647,264 | 3,407,10؛ |
| 90 | 408,314 | 426,961 | 479,642 | 676,326 | 630,259 | 774,157 | 1,172,506 | 1,268,400 | 1,312,645 | 1,616,745 | 1,518,613 | 1,948,306 | 2,515,522 | 2,728,049 | 2,956,18 |
| 91 | 266,632 | 316,519 | 357,179 | 344,886 | 591,280 | 515,152 | 584,945 | 968,112 | 1,026,689 | 1,070,155 | 1,274,411 | 1,200,901 | 1,377,405 | 2,134,545 | 2,148,78 |
| 92 | 158,896 | 222,884 | 232,003 | 285,081 | 276,718 | 475,426 | 409,746 | 451,742 | 812,528 | 835,638 | 839,772 | 1,025,480 | 888,594 | 1,073,467 | 1,610,286 |
| 93 | 145,592 | 120,879 | 180,641 | 197,095 | 236,932 | 244,539 | 351,847 | 305,829 | 359,014 | 586,313 | 684,929 | 677,992 | 725,768 | 681,288 | 798,34! |
| 94 | 117,395 | 110,023 | 90,752 | 148,217 | 128,295 | 185,457 | 171,276 | 261,686 | 232,771 | 289,839 | 436,395 | 518,670 | 520,357 | 516,423 | 538,13. |
| 95 | 61,088 | 102,150 | 69,863 | 76,216 | 119,674 | 107,190 | 138,350 | 155,258 | 157,814 | 166,308 | 199,275 | 322,680 | 427,002 | 389,175 | 356,78! |
| 96 | 25,954 | 47,612 | 59,489 | 55,517 | 55,261 | 104,150 | 65,128 | 90,952 | 120,230 | 131,320 | 120,170 | 119,867 | 211,012 | 296,513 | 241,98( |
| 97 | 32,552 | 16,567 | 30,367 | 29,863 | 19,731 | 38,714 | 86,420 | 41,530 | 61,786 | 106,086 | 108,543 | 94,995 | 68,654 | 160,272 | 236,61< |
| 98 | 16,470 | 29,624 | 10,130 | 17,183 | 22,731 | 18,114 | 27,610 | 71,061 | 19,195 | 53,925 | 66,938 | 93,541 | 60,835 | 35,226 | 111,786 |
| 99 | 5,896 | 13,208 | 11,506 | 6,765 | 13,921 | 20,653 | 6,071 | 15,970 | 55,497 | 14,218 | 36,380 | 31,880 | 53,826 | 30,271 | 21,22: |
| 100 | 2,592 | 2,982 | 12,129 | 10,366 | 4,046 | 8,623 | 13,905 | 3,243 | 9,728 | 33,368 | 12,433 | 16,147 | 15,743 | 34,756 | 17,82 |
| 101 | 2,438 | 2,592 | 1,207 | 10,617 | 8,162 | 3,353 | 6,890 | 10,191 | 1,273 | 4,012 | 32,876 | 12,433 | 3,310 | 12,062 | 29,69 |
| 102 | 0 | 1,833 | 0 | 974 | 10,034 | 1,247 | 2,917 | 5,675 | 10,191 | 1,273 | 554 | 1,420 | 11,431 | 2,598 | 10,00 |
| 103 | 0 | 0 | 0 | 0 | 974 | 10,034 | 1,247 | 2,474 | 1,963 | 4,387 | 0 | 401 | 1,420 | 735 | 2,59 |
| 104 | 0 | 0 | 0 | 0 | 0 | 0 | 783 | 1,247 | 1,977 | 1,963 | 4,116 | 0 | 401 | 1,420 | 73! |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 783 | 0 | 1,977 | 1,963 | 2,002 | 0 | 0 | 1,421 |
| 106 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 640 | 819 | 0 | 0 | 1 |
| 107 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 640 | 0 | 0 | 1 |
| 108 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 640 | 0 | 1 |
| 109 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 640 | 1 |
| 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 641 |
| 111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 112 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| 113 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| 114 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 116 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 118 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 119 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |


| Total A | uals by Al | wance for | Males |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Age | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
| 80 | 533,694 | 755,613 | 786,581 | 678,991 | 834,681 | 792,312 | 956,337 | 1,088,153 | 916,457 | 1,338,933 | 1,095,255 | 1,388,311 | 1,422,861 | 1,308,587 | 659,769 |
| 81 | 504,060 | 611,236 | 737,923 | 814,530 | 782,694 | 807,703 | 830,668 | 837,343 | 915,860 | 1,077,275 | 1,092,467 | 1,016,239 | 1,258,531 | 1,395,956 | 557,926 |
| 82 | 399,271 | 546,485 | 436,033 | 626,011 | 771,480 | 671,010 | 785,657 | 866,753 | 933,129 | 890,955 | 1,066,783 | 1,158,938 | 1,225,138 | 1,305,865 | 677,068 |
| 83 | 325,370 | 427,153 | 529,884 | 454,139 | 583,267 | 814,978 | 856,962 | 752,511 | 918,351 | 1,044,591 | 725,717 | 987,186 | 1,218,403 | 890,206 | 638,977 |
| 84 | 293,327 | 406,278 | 396,318 | 505,101 | 557,498 | 619,962 | 653,538 | 775,087 | 820,683 | 939,968 | 944,920 | 852,188 | 1,123,009 | 1,224,406 | 479,038 |
| 85 | 310,758 | 322,214 | 296,121 | 396,710 | 422,180 | 497,553 | 503,088 | 619,305 | 730,526 | 675,691 | 858,327 | 949,688 | 960,243 | 1,159,140 | 536,678 |
| 86 | 224,998 | 187,395 | 347,156 | 342,069 | 366,106 | 400,279 | 561,392 | 518,835 | 646,998 | 588,434 | 606,987 | 657,837 | 1,037,854 | 1,121,841 | 430,804 |
| 87 | 125,153 | 259,247 | 226,081 | 237,271 | 286,074 | 344,431 | 533,367 | 418,186 | 555,091 | 572,908 | 767,581 | 680,730 | 695,942 | 875,231 | 350,713 |
| 88 | 110,927 | 150,023 | 126,022 | 204,080 | 223,945 | 304,695 | 380,687 | 339,406 | 394,175 | 587,581 | 527,837 | 740,367 | 654,956 | 778,830 | 315,202 |
| 89 | 106,436 | 138,494 | 190,495 | 197,888 | 146,462 | 253,087 | 310,461 | 298,773 | 371,901 | 308,485 | 481,790 | 443,185 | 559,467 | 691,083 | 285,192 |
| 90 | 91,795 | 70,023 | 135,594 | 85,046 | 117,540 | 189,212 | 206,457 | 241,711 | 243,237 | 342,775 | 320,463 | 571,516 | 380,977 | 579,268 | 240,731 |
| 91 | 43,748 | 84,516 | 72,098 | 69,005 | 115,854 | 105,658 | 133,203 | 157,646 | 191,051 | 230,383 | 250,978 | 312,850 | 303,938 | 524,259 | 198,380 |
| 92 | 38,017 | 42,243 | 34,908 | 48,244 | 32,645 | 123,579 | 103,917 | 96,519 | 226,215 | 150,709 | 162,066 | 299,712 | 207,306 | 275,125 | 164,328 |
| 93 | 35,569 | 30,888 | 32,424 | 68,800 | 51,569 | 73,263 | 90,161 | 73,058 | 69,175 | 149,918 | 166,259 | 157,635 | 209,345 | 143,157 | 49,896 |
| 94 | 15,245 | 40,160 | 15,297 | 28,543 | 21,105 | 47,107 | 16,018 | 103,872 | 66,463 | 90,564 | 113,715 | 91,668 | 131,182 | 159,638 | 102,815 |
| 95 | 13,476 | 42,661 | 14,346 | 20,955 | 15,524 | 42,062 | 47,398 | 35,028 | 26,494 | 44,075 | 79,408 | 111,668 | 130,489 | 147,195 | 28,684 |
| 96 | 9,387 | 17,245 | 29,626 | 35,786 | 16,547 | 17,730 | 23,598 | 29,166 | 14,144 | 22,777 | 23,111 | 51,213 | 50,740 | 59,899 | 72,931 |
| 97 | 2,928 | 6,437 | 13,184 | 7,132 | 1,617 | 11,104 | 15,359 | 22,335 | 8,654 | 39,148 | 15,002 | 34,160 | 33,428 | 48,486 | 19,703 |
| 98 | 3,262 | 18,118 | 3,365 | 3,262 | 2,078 | 12,043 | 11,640 | 9,645 | 4,977 | 18,337 | 35,058 | 39,715 | 30,564 | 14,003 | 27,238 |
| 99 | 2,914 | 1,079 | 1,140 | 2,719 | 5,298 | 6,748 | 2,828 | 6,242 | 16,210 | 1,785 | 20,233 | 16,137 | 19,070 | 12,450 | 4,381 |
| 100 | 0 | 1,775 | 1,512 | 2,204 | 693 | 1,733 | 3,714 | 1,970 | 5,716 | 492 | 0 | 12,837 | 3,681 | 5,065 | 283 |
| 101 | 605 | 2,592 | 233 | 583 | 6,915 | 436 | 1,215 | 0 | 0 | 3,458 | 31,456 | 1,002 | 712 | 2,061 | 9,203 |
| 102 | 0 | 1,833 | 0 | 0 | 0 | 0 | 443 | 3,712 | 5,804 | 1,273 | 153 | 0 | 10,696 | 0 | 0 |
| 103 | 0 | 0 | 0 | 0 | 974 | 9,251 | 0 | 497 | 0 | 271 | 0 | 0 | 0 | 0 | 2,598 |
| 104 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,247 | 0 | 0 | 2,114 | 0 | 401 | 0 | 0 |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 783 | 0 | 1,337 | 1,144 | 2,002 | 0 | 0 | 0 |
| 106 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 819 | 0 | 0 | 0 |
| 107 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 109 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 112 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 114 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 116 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 118 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 119 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |


|  | posures by | Allowance | Females |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Age | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
| 80 | 5,232,250 | 6,016,564 | 6,694,315 | 7,130,948 | 7,585,551 | 8,951,917 | 8,508,692 | 10,059,788 | 11,033,043 | 13,090,381 | 13,271,5181 | 14,928,140 | 17,104,286 | 16,223,981 | 20,127,29 |
| 81 | 4,151,612 | 5,057,405 | 5,722,636 | 6,327,991 | 6,726,511 | 7,245,946 | 8,672,209 | 8,048,768 | 9,468,153 | 10,557,181 | 12,423,6301 | 12,706,100 | 14,103,048 | 16,280,752 | 15,189,74 |
| 82 | 3,444,799 | 3,986,261 | 4,718,224 | 5,417,429 | 6,032,432 | 6,326,913 | 6,839,937 | 8,112,819 | 7,642,560 | 8,834,403 | 10,023,7331 | 11,572,661 | 12,025,033 | 13,358,306 | 15,369,511 |
| 83 | 2,798,581 | 3,272,044 | 3,775,444 | 4,449,910 | 5,101,649 | 5,589,525 | 5,998,165 | 6,416,137 | 7,637,515 | 7,168,114 | 8,315,142 | 9,290,415 | 10,699,939 | 11,126,504 | 12,374,67، |
| 84 | 2,123,042 | 2,588,018 | 3,013,590 | 3,518,293 | 4,081,826 | 4,706,703 | 5,285,566 | 5,640,678 | 5,964,994 | 7,082,519 | 6,709,457 | 7,644,434 | 8,667,249 | 9,824,341 | 10,310,16: |
| 85 | 1,984,651 | 1,976,035 | 2,384,071 | 2,791,225 | 3,260,103 | 3,769,170 | 4,368,568 | 4,872,808 | 5,141,707 | 5,359,036 | 6,567,944 | 6,145,304 | 6,928,583 | 8,001,088 | 8,960,80 |
| 86 | 1,444,075 | 1,868,383 | 1,846,849 | 2,160,181 | 2,562,049 | 3,009,434 | 3,511,690 | 3,925,344 | 4,534,885 | 4,559,598 | 4,893,794 | 5,874,685 | 5,519,383 | 6,205,482 | 7,096,196 |
| 87 | 1,070,766 | 1,360,527 | 1,658,297 | 1,697,233 | 2,031,568 | 2,360,490 | 2,713,364 | 3,203,295 | 3,568,600 | 4,213,721 | 4,119,202 | 4,434,226 | 5,259,024 | 4,953,480 | 5,488,92 |
| 88 | 848,487 | 930,277 | 1,238,845 | 1,468,241 | 1,572,106 | 1,757,076 | 2,098,096 | 2,395,507 | 2,803,942 | 3,131,720 | 3,797,144 | 3,629,791 | 3,845,584 | 4,576,049 | 4,201,58i |
| 89 | 691,747 | 755,716 | 790,412 | 1,065,016 | 1,326,522 | 1,353,577 | 1,557,482 | 1,799,631 | 2,076,760 | 2,457,911 | 2,730,135 | 3,328,140 | 3,216,273 | 3,321,046 | 3,997,94i |
| 90 | 531,469 | 594,336 | 669,121 | 684,953 | 936,294 | 1,107,210 | 1,154,489 | 1,324,231 | 1,555,684 | 1,795,009 | 2,030,652 | 2,317,266 | 2,777,024 | 2,790,842 | 2,715,62 |
| 91 | 397,291 | 439,619 | 492,391 | 573,471 | 613,394 | 821,406 | 962,972 | 969,889 | 1,112,712 | 1,261,363 | 1,474,057 | 1,732,173 | 1,977,712 | 2,255,635 | 2,251,05: |
| 92 | 284,118 | 344,047 | 379,906 | 416,476 | 487,324 | 531,534 | 634,233 | 809,920 | 794,770 | 922,260 | 1,013,409 | 1,177,218 | 1,446,637 | 1,582,780 | 1,738,786 |
| 93 | 221,999 | 236,060 | 292,422 | 289,213 | 328,991 | 378,046 | 422,427 | 496,262 | 645,745 | 649,837 | 762,000 | 804,117 | 974,294 | 1,154,966 | 1,250,59: |
| 94 | 155,216 | 198,797 | 213,264 | 230,222 | 225,787 | 291,632 | 301,843 | 352,687 | 362,386 | 517,470 | 487,592 | 565,158 | 635,426 | 783,755 | 895,796 |
| 95 | 105,149 | 126,251 | 159,065 | 191,435 | 185,577 | 179,182 | 229,209 | 234,684 | 277,381 | 268,074 | 407,448 | 372,400 | 427,736 | 512,201 | 591,46 |
| 96 | 61,521 | 87,367 | 106,568 | 115,172 | 133,996 | 157,847 | 123,906 | 169,470 | 168,866 | 217,808 | 236,295 | 341,061 | 301,456 | 278,881 | 368,15 |
| 97 | 43,038 | 47,845 | 52,569 | 78,942 | 88,056 | 121,451 | 126,728 | 88,760 | 133,569 | 126,872 | 137,978 | 147,364 | 231,495 | 219,378 | 171,99! |
| 98 | 46,587 | 30,898 | 34,849 | 35,482 | 61,855 | 74,335 | 103,235 | 82,671 | 72,308 | 97,882 | 88,752 | 106,305 | 96,531 | 158,309 | 154,55 |
| 99 | 14,975 | 29,123 | 18,925 | 21,669 | 26,728 | 38,338 | 48,370 | 27,362 | 61,326 | 41,840 | 72,469 | 56,032 | 64,499 | 53,470 | 109,77 |
| 100 | 5,628 | 9,092 | 17,859 | 10,179 | 12,332 | 24,792 | 31,977 | 40,892 | 22,701 | 38,020 | 32,551 | 49,275 | 44,203 | 51,837 | 35,011 |
| 101 | 9,985 | 5,628 | 5,121 | 12,979 | 9,031 | 10,164 | 19,425 | 16,617 | 22,267 | 20,647 | 24,871 | 27,124 | 41,548 | 27,911 | 36,441 |
| 102 | 2,429 | 6,686 | 4,563 | 2,379 | 9,817 | 6,997 | 4,650 | 16,240 | 12,231 | 5,657 | 19,156 | 11,266 | 10,049 | 19,010 | 17,63: |
| 103 | 834 | 2,429 | 6,078 | 4,563 | 1,836 | 3,041 | 5,927 | 4,650 | 13,595 | 9,601 | 1,625 | 11,431 | 1,535 | 7,122 | 7,174 |
| 104 | 0 | 0 | 2,429 | 6,078 | 3,026 | 648 | 3,041 | 2,445 | 4,650 | 7,060 | 3,146 | 788 | 11,431 | 1,535 | 3,60، |
| 105 | 0 | 0 | 0 | 2,429 | 3,007 | 852 | 648 | 3,041 | 592 | 3,798 | 824 | 0 | 0 | 3,868 | 98! |
| 106 | 425 | 0 | 0 | 0 | 2,429 | 2,303 | 0 | 0 | 1,356 | 592 | 3,798 | 824 | 0 | 0 | 1 |
| 107 | 695 | 0 | 0 | 0 | 0 | 1,829 | 2,303 | 0 | 0 | 1,356 | 592 | 1,698 | 0 | 0 |  |
| 108 | 162 | 695 | 0 | 0 | 0 | 0 | 252 | 2,303 | 0 | 0 | 0 | 592 | 1,698 | 0 |  |
| 109 | 0 | 162 | 695 | 0 | 0 | 0 | 0 | 252 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| 110 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 252 | 0 | 0 | 0 | 0 | 0 |  |
| 111 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 252 | 0 | 0 | 0 | 0 |  |
| 112 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 252 | 0 | 0 | 0 | 1 |
| 113 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 252 | 0 | 0 | 1 |
| 114 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 252 | 0 | 1 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 116 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 1 |
| 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 1 |
| 118 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 1 |
| 119 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 | 1 |
| 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 1 |

Total Actuals by Allowance for Females

| Age | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 80 | 255,259 | 331,959 | 419,139 | 451,827 | 385,072 | 374,979 | 501,336 | 613,274 | 552,425 | 726,269 | 687,045 | 907,450 | 940,947 | 1,124,679 | 403,608 |
| 81 | 217,096 | 359,955 | 374,611 | 355,861 | 443,810 | 488,411 | 611,358 | 455,362 | 655,543 | 631,094 | 891,139 | 758,394 | 791,627 | 1,011,895 | 381,556 |
| 82 | 207,856 | 263,801 | 299,803 | 398,806 | 499,530 | 378,579 | 510,364 | 527,642 | 518,109 | 565,303 | 764,519 | 906,151 | 945,998 | 1,004,548 | 354,166 |
| 83 | 239,918 | 282,869 | 288,758 | 391,547 | 424,469 | 352,161 | 398,753 | 498,583 | 607,791 | 514,034 | 702,887 | 625,789 | 920,318 | 841,475 | 330,842 |
| 84 | 178,767 | 237,783 | 243,043 | 299,630 | 339,916 | 365,466 | 466,288 | 523,121 | 662,970 | 562,546 | 638,256 | 731,107 | 686,355 | 880,596 | 315,580 |
| 85 | 152,264 | 146,316 | 248,088 | 255,798 | 283,303 | 293,459 | 466,520 | 386,251 | 612,379 | 507,296 | 702,117 | 670,146 | 735,508 | 911,789 | 422,385 |
| 86 | 116,575 | 214,955 | 166,349 | 167,991 | 216,575 | 302,700 | 344,599 | 380,836 | 371,657 | 469,989 | 503,918 | 647,990 | 586,474 | 717,062 | 312,870 |
| 87 | 153,929 | 142,535 | 198,078 | 153,624 | 287,543 | 268,108 | 330,292 | 413,532 | 453,435 | 470,886 | 523,475 | 629,572 | 686,410 | 752,880 | 257,585 |
| 88 | 98,859 | 141,935 | 186,469 | 146,891 | 237,020 | 204,557 | 308,287 | 325,218 | 367,506 | 417,136 | 492,925 | 425,102 | 529,159 | 578,106 | 240,839 |
| 89 | 98,569 | 95,334 | 106,427 | 135,181 | 220,159 | 200,033 | 242,361 | 248,888 | 292,459 | 445,442 | 435,306 | 557,849 | 453,800 | 608,233 | 257,147 |
| 90 | 94,469 | 103,477 | 103,887 | 75,859 | 117,063 | 145,065 | 185,545 | 221,882 | 296,164 | 333,601 | 300,235 | 355,312 | 526,788 | 546,829 | 269,794 |
| 91 | 56,428 | 60,575 | 76,739 | 89,021 | 86,188 | 191,018 | 157,818 | 179,394 | 193,081 | 250,305 | 302,158 | 286,426 | 396,073 | 516,849 | 163,310 |
| 92 | 49,441 | 52,982 | 93,880 | 87,918 | 109,677 | 109,982 | 137,971 | 176,144 | 145,250 | 164,496 | 209,672 | 205,903 | 295,358 | 333,327 | 153,447 |
| 93 | 23,202 | 48,305 | 62,200 | 69,057 | 39,951 | 76,203 | 76,323 | 133,876 | 134,172 | 162,561 | 199,710 | 168,691 | 190,539 | 259,170 | 135,218 |
| 94 | 31,304 | 39,732 | 45,954 | 44,645 | 49,048 | 67,054 | 68,191 | 82,374 | 95,215 | 110,912 | 115,192 | 145,609 | 123,225 | 192,291 | 93,555 |
| 95 | 17,782 | 19,683 | 43,893 | 57,439 | 27,730 | 55,276 | 61,778 | 67,896 | 60,058 | 47,864 | 67,276 | 70,944 | 148,855 | 144,050 | 108,940 |
| 96 | 14,975 | 34,798 | 28,144 | 27,116 | 12,545 | 31,119 | 35,146 | 35,901 | 41,994 | 82,260 | 88,931 | 109,849 | 82,078 | 106,886 | 51,223 |
| 97 | 12,140 | 13,865 | 17,087 | 18,034 | 13,721 | 18,216 | 44,057 | 16,452 | 35,687 | 38,120 | 31,673 | 50,833 | 73,186 | 64,828 | 29,056 |
| 98 | 17,464 | 11,973 | 14,049 | 11,438 | 23,946 | 25,965 | 75,873 | 21,345 | 30,468 | 25,413 | 32,720 | 41,806 | 43,061 | 48,538 | 43,015 |
| 99 | 5,883 | 11,264 | 8,746 | 9,337 | 4,619 | 6,361 | 7,478 | 4,661 | 23,306 | 9,289 | 23,194 | 11,829 | 12,662 | 18,460 | 17,147 |
| 100 | 0 | 3,971 | 4,880 | 1,148 | 2,168 | 5,367 | 15,360 | 18,625 | 2,054 | 13,149 | 5,427 | 7,727 | 16,292 | 15,391 | 13,195 |
| 101 | 3,299 | 1,065 | 2,742 | 3,162 | 2,034 | 5,514 | 3,185 | 4,386 | 16,610 | 1,491 | 13,605 | 17,075 | 22,538 | 10,278 | 10,189 |
| 102 | 0 | 608 | 0 | 543 | 6,776 | 1,070 | 0 | 2,645 | 2,630 | 4,032 | 7,725 | 9,731 | 2,927 | 11,834 | 2,666 |
| 103 | 834 | 0 | 0 | 1,537 | 1,188 | 0 | 3,482 | 0 | 3,852 | 6,455 | 837 | 0 | 0 | 3,520 | 0 |
| 104 | 0 | 0 | 0 | 3,071 | 2,174 | 0 | 0 | 1,853 | 852 | 3,552 | 3,146 | 788 | 7,563 | 546 | 2,701 |
| 105 | 0 | 0 | 0 | 0 | 704 | 852 | 648 | 1,685 | 0 | 0 | 0 | 0 | 0 | 3,868 | 299 |
| 106 | 425 | 0 | 0 | 0 | 600 | 0 | 0 | 0 | 0 | 0 | 2,100 | 824 | 0 | 0 | 0 |
| 107 | 0 | 0 | 0 | 0 | 0 | 1,577 | 0 | 0 | 0 | 1,356 | 0 | 0 | 0 | 0 | 0 |
| 108 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,303 | 0 | 0 | 0 | 592 | 1,698 | 0 | 0 |
| 109 | 0 | 0 | 695 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 112 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 114 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 252 | 0 | 0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 116 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 118 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 119 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

