# THE
# COMMONWEALTH OF THE
# BAHAMAS

## LIFE TABLE
## REPORT
## 2009 - 2011

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# PREFACE

This Life Table Report is the fifth edition to be prepared and published for the Bahamas. The tables therein are based on the mortality events, which occurred during the calendar years 2009, 2010 and 2011 along with population data compiled during the 2010 Census of Population.

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# HIGHLIGHTS OF LIFE TABLES REPORT: 2009 - 2011

Data from the most recent Census of Population and Housing (2010) have been utilized in the production of a new set of Life Tables for The Bahamas, which covers the years 2009 - 2011. The most important piece of information derived from these tables is the life expectancy at birth, which is a major socio-economic indicator. The findings of the life tables indicate that the average life expectancy for males and females increased, but at a slower pace than in the previous years (see pg. iii). Females are expected to live 76.8 years, a gain of about one third of a year longer than in 2000. Bahamian males, whose life expectancy is lower than that of the females, are expected to live 70.6 years or six months longer than a decade ago.

# INTRODUCTION

Demography is the science of a population defined as the natural and social history of the human species, of their general changes and of their physical, civil, intellectual and moral conditions.

Death is a principal “vital event” of demography. Death statistics is one of the tools that have afforded demographers and actuaries access into the study of mortality. For most of human history, the fate of a population whether it grew, stagnated or failed to survive depended more on mortality than on fertility or migration.

The construction of a life table requires reliable data on a population’s mortality rates, by age and sex. The most reliable source of such data is a functioning vital registration system where all deaths are registered. Deaths at each age are related to the size of the population censuses. The resulting age/sex-specific death rates are then used to calculate a life table.

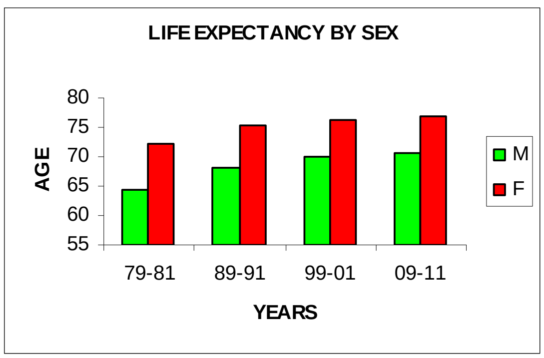
A life table is designed essentially to measure mortality. The rates and ratios in the life table, when combined with other demographic data, provide a useful set of measures for answering questions about the level of mortality and projecting changes in a population size.

## Historical Overview

Recorded life tables for The Bahamas date back to the 1979 -1981 period, when the average life expectancy for Bahamian males was 64.3 years and for females, 72.1 years. The life span of both sexes increased noticeably by the next decade (1989 -1991) when males added four years to their lives and females three. As seen in the table below, by the 1999 -2001 period, life expectancy slowed as both sexes were expected to live only one additional year over the previous period. A decade later the life expectancy slowed even further as both sexes added less than one year to their life span.

**AVERAGE LIFE EXPECTANCY AT BIRTH**

| | 1979-1981 | 1989-1991 | 1999-2001 | 2009-2011 |
|---|---|---|---|---|
| Male | 64.3 | 68.2 | 69.9 | 70.6 |
| Female | 72.1 | 75.3 | 76.4 | 76.8 |



# THE LIFE TABLE

## DEFINITION

A life table is designed essentially to measure the level of mortality of a population. George Barclay defines it as a life history of a hypothetical group, or cohort of people, as it is diminished gradually by deaths. This process he says is governed by a number of assumptions, namely:-

(a) That the cohort is “closed” against migration in or out. Hence there are no changes in membership except the losses due to death.

(b) People die at each age according to a schedule that is fixed in advance and does not change.

(c) The cohort originates from some standard number of births (always set at a round figure like 1,000, 10,000, or 100,000) called the “radix” of the life table.

(d) At each age (except the first few years of life) deaths are evenly distributed between one birthday and the next. That is to say, half the deaths expected between age 10 and age 15 occur by the time everyone reached age 12 ½.

(e) The cohort normally contains members of only one sex because of the difference between male and female morality.

The life tables then represent very clearly the effects of mortality by age on the size of a cohort, without interference by the complicating factors of the actual world. The cumulative effect of mortality is to reduce the original cohort; a large number is removed by death immediately after birth, and others die at each age until eventually the last person has died.

The pattern of depletion is determined by the schedule of proportions dying. At the ages where these proportions are high, they take away a large share of the cohort’s survivors; where they are low, the cohort is diminished less rapidly.

The typical pattern then is that a life table cohort loses many of its original members at a very early period of life when deaths among infants are relatively high. The loss of life is least during the years of later childhood and young adulthood, but increases again at advanced ages.

## POPULATION

This set of Life-Tables for The Bahamas is based on the mortality experience during the calendar years 2009, 2010 and 2011. The population data used relate to the middle of this period, the 2010 Census. These data do not represent the mortality experience of the actual cohorts, but assume hypothetical cohorts subject to the age-specific death rates observed during the period.

These Life-Tables are 'Abridged'; that means, that the tables contain data intervals of (5) years of age, [e.g. age between exact age 5 and exact 10 (5-10)], with the exception of under one year (0) and one to four (1-4), which are presented separately.

The 'not stated' ages recorded during the 2010 census were distributed among the 20 and over age groups proportionately, using a 'factor r' method. (Table 1).

## DEATHS

Mortality rates are produced from the annual data compiled for the calendar years (2009-2011). Late registrations of all deaths for these years were included in the revised totals.

## USES OF A LIFE TABLE

The life table is principally used to measure the level of mortality of the population involved. Other users of a life table include a variety of specialists such as demographers, and actuaries. It is employed in the studies of public health and educational services, longevity, fertility, migration and population. The life table is also a necessary tool for the studies of vital events and population projections; widowhood, orphan hood, length of married and working life.

A life table provides answers to questions for planners and decision makers, in the projections of future population needs such as the number of schools or hospitals required. Mortality statistics play a major part in determining administrative and research needs of public health agencies, as they relate to the development, operation, and evaluation of public health programs. Life insurance companies need accurate answers to questions about average life expectancy, to enable the construction of actuarial tables. Life table indicators help public and private administrators to strategically, and effectively administer programs of economic and social development, in either developed or under-developed areas.

## FUNCTIONS AND INTERPRETATION OF THE LIFE TABLE

**The Life Tables are presented in Tables 4 & 5. The columns with their functions are explained below:**

**Column 1. Exact Age (*x*) and Age Interval (*x* to *x* + *n*)**

The first column of the life table is the "age" Column. Each of the life table functions refers to a specific age or age interval. The first column of the life table specifies the age to which the later columns refer. In the life table the word "age" is used very precisely, and the precision is emphasized by the addition of the modifier "exact". When a person is said to be exact age 0, that means that he/she was just born. When a person is exact age 5, he/she has lived exactly five full years. (In contrast to say that someone is "5 years old" means that the person is between exact age 5 and exact age 6 i.e., age 5 on the last birthday).

*x* to *x* + n The interval between two exact ages. For example, "30-35" refers to the 5-year period between the $30^{th}$ and $35^{th}$ birthdays.

**Column 2. $_nq_x$ The proportion of persons in the cohort alive at the beginning of the age interval dying during interval.**

The second column of the life table $_nq_x$ represents the portion of persons in the cohort alive at the beginning of an indicated age interval (*x*) that will die before reaching the end of the age interval (*x* + *n*). Expressed in terms of probability, that is the proportion of persons who reach exact age *x*, who will die before their next birthday (*x* + *n*).

**Column 3. $l_x$ The number of survivors to exact Age *x***

The third column of the life table $1_x$ represents the number of persons who have survived from birth to exact age *x* out of an initial cohort, assumed as the radix (100,000 newborn babies) of the life table.

**Column 4. $_nd_x$ The number of deaths between age interval *x* to *x* + *n***

The fourth column of the life table symbolizes the $_nd_x$, or that function which refers to the number of persons out of an original cohort of 100,000 newborn babies who will die in the age interval *x* to *x* + *n*.

**Column 5. $_nL_x$ Represents persons-years that will be lived within the age interval**

The fifth column of the life table $_nL_x$ represent the number of person -years that will be lived or the stationary population during an age interval *x* to *x* + *n*.

**Column 6. $T_x$ Total number of person-years lived at beginning of age interval**

The sixth column of the life table gives the exact number of person – years that would be lived by the cohort after reaching exact age x (i.e. the beginning of the age interval).

**Column 7. $e^0$ Expectation of life or average number of years lived after exact age x**

The last column in the life table is the one most commonly used. The symbol $e^0$ is a life table function used to indicate the expected average number of years to be lived by a newborn baby. This value of $e^0$ shows the average remaining life time (in years) for a person who survives to exact age x (column 1 ). This is called the complete expectation of life or life expectancy or the average length of life.

## CONSTRUCTION OF THE LIFE TABLE

The fundamental step in life table construction is one of converting observed age-specific death rates $M_x$ into their corresponding mortality rate or probabilities of dying. The method used for this short cut procedure is that illustrated by Reed Merrell (The Methods and Materials of Demography). In this method rates are read off from a set of standard conversion tables showing the mortality rates associated with various observed central death rates $M_x$.

The standard table for $3m_2$, $5m_x$ and $10m_x$ have been prepared on assumption that following exponential equation holds: $_nq_x = 1 - e^{-n.}\ {}_nm_x - an^3\ {}_nm^{2/}{}_x$
Where n is size of age interval

$_nM_x$ is the central death rate
a is a constant
e is the base of the system of natural logarithms.

Reed and Merrell found that a value of a = 0.008 would produce acceptable results.

Conversion of $_nM_x$ to $_nq_x$ by use of the Reed-Merrell tables was applied to the 5-year data and for the special age-group under 1 and 1-4. (Appendix A).

Once the life table mortality rates ($_nq_x$) had been calculated, the construction of the life table continues with the computation of each entry in the survivor's column ($l_x$) and the death column $_nd_x$. The $l_x$ column contains the numbers that survive (to an exact age) from an initial cohort of 100,000 births according to the mortality rates at each exact age.

Example: (Males)

(a) Multiply $q_0$ (.008580) by the radix $l_0$ (100,000) to get $d_0$ (858)
(b) Subtract $d_0$ from $l_0$ to get $l_1$ (99,142)
(c) Continue multiplying the successive value of $l_x$ to corresponding $_nq_x$ value to get $_nd_x$, and subtracting the successive value of $_nd_x$ from $l_x$ to get $l_x$ + n.

In the Reed-Merrell method, $T_x$ for ages 10 years and over is calculated first. This was done directly from the $l_x$'s by application of the following equation:

$$T_x = -.20833*l_x-5 + 2.5*l_x + .20833*l_x+5$$

For calculation it was convenient to include a column. $l_x$+5 a (sum of the values of $l_x$ from the end of the life to age x). (Table 4).

In calculating the $l_x$ column, Reed-Merrell's linear equation was applied for ages under 10 years. These equations used standard separation factors appropriate for each situation. The values were suitably applicable to generate this portion of the abridged tables.

$L_0 = .276\ l_0 + .724\ l_1.$

${}_4L_1 = .034\ l_0 + 1.184\ l_1 + 2.782\ l_5$

${}_5L_5 = -.003\ l_0 + 2.242\ l_5 + 2.761\ l_{10}$

${}_nL_x$ for ages 10 and over may be derived by differencing the $T_x$'s i.e. ${}_5L_{20} = T_{20} - T_{25}$.

The final column of the life table, $e^0x$, is computed as the ratio $T_x$ to $L_x$. (Table 4).

## 2010 CENSUS POPULATION BY AGE-GROUP AND SEX

**Table 1**

| AGE GROUP | MALES | | FEMALES | |
|---|---|---|---|---|
| | 2010 CENSUS POPULATION | ADJUSTED 2010 CENSUS POPULATION | 2010 CENSUS POPULATION | ADJUSTED 2010 CENSUS POPULATION |
| **0** | 3171 | 3171 | 3002 | 3002 |
| **1-4** | 12205 | 12205 | 12352 | 12352 |
| **5-9** | 15704 | 15704 | 15827 | 15827 |
| **10-14** | 15942 | 15942 | 15916 | 15916 |
| **15-19** | 15686 | 15686 | 15496 | 15496 |
| **20-24** | 13140 | 13203 | 13359 | 13411 |
| **25-29** | 12627 | 12687 | 13839 | 13893 |
| **30-34** | 13102 | 13165 | 14081 | 14135 |
| **35-39** | 13935 | 14002 | 15120 | 15178 |
| **40-44** | 12629 | 12689 | 13609 | 13662 |
| **45-49** | 12038 | 12096 | 12950 | 13000 |
| **50-54** | 9025 | 9068 | 10241 | 10281 |
| **55-59** | 6502 | 6533 | 7226 | 7254 |
| **60-64** | 4747 | 4770 | 5392 | 5413 |
| **65-69** | 3702 | 3720 | 4472 | 4489 |
| **70-74** | 2610 | 2622 | 3279 | 3292 |
| **75-79** | 1545 | 1552 | 2110 | 2118 |
| **80-84** | 885 | 889 | 1324 | 1329 |
| **85-89** | 367 | 369 | 661 | 664 |
| **90+** | 183 | 184 | 491 | 493 |
| **SUB - TOTAL** | **169745** | | **180747** | |
| **NOT - STATED** | **512** | | **457** | |
| **TOTAL** | **170257** | **170257** | **181204** | **181204** |

**Note: Totals maybe off due to rounding.**

**MALE FACTOR = 107549/107037**
**= 1.004783**

**FEMALE FACTOR = 118611/118154**
**= 1.003868**

****Factor "R" is applied to 20+years only.**

**AGE-SPECIFIC DEATH RATES BY AGE-GROUP: MALES**
**2009 - 2011**

**Table 2**

| MALES | | | | | | |
|---|---|---|---|---|---|---|
| **AGE GROUP** | **DEATHS** | | | **AVERAGE ANNUAL DEATHS 2009 - 2011** | **ADJUSTED 2010 CENSUS POPULATION** | **AGE SPECIFIC DEATH RATE MX** |
| | **2009** | **2010** | **2011** | | | |
| **0** | 32 | 39 | 26 | 32 | 3171 | **0.010197** |
| **1-4** | 5 | 5 | 9 | 6 | 12205 | **0.000519** |
| **5-9** | 2 | 4 | 2 | 3 | 15704 | **0.000170** |
| **10-14** | 8 | 4 | 5 | 6 | 15942 | **0.000355** |
| **15-19** | 24 | 18 | 12 | 18 | 15686 | **0.001148** |
| **20-24** | 41 | 39 | 41 | 40 | 13203 | **0.003055** |
| **25-29** | 38 | 34 | 55 | 42 | 12687 | **0.003337** |
| **30-34** | 40 | 39 | 58 | 46 | 13165 | **0.003469** |
| **35-39** | 67 | 71 | 57 | 65 | 14002 | **0.004642** |
| **40-44** | 76 | 69 | 68 | 71 | 12689 | **0.005595** |
| **45-49** | 91 | 77 | 87 | 85 | 12096 | **0.007027** |
| **50-54** | 89 | 74 | 95 | 86 | 9068 | **0.009484** |
| **55-59** | 71 | 92 | 86 | 83 | 6533 | **0.012705** |
| **60-64** | 79 | 89 | 92 | 87 | 4770 | **0.018169** |
| **65-69** | 99 | 92 | 102 | 98 | 3720 | **0.026254** |
| **70-74** | 100 | 103 | 101 | 101 | 2622 | **0.038647** |
| **75-79** | 91 | 94 | 100 | 95 | 1552 | **0.061211** |
| **80-84** | 65 | 68 | 73 | 69 | 889 | **0.077240** |
| **85-89** | 63 | 41 | 61 | 55 | 369 | **0.149051** |
| **90-94** | 23 | 39 | 30 | 31 | 143 | **0.214452** |
| **95-99** | 8 | 14 | 17 | 13 | 35 | **0.371429** |
| **100+** | 1 | 3 | 3 | 2 | 6 | **0.388889** |
| **NOT-STATED** | 0 | 0 | 0 | 0 | | |
| **TOTAL** | **1113** | **1108** | **1180** | **1134** | **170257** | |

## AGE-SPECIFIC DEATH RATES BY AGE-GROUP: FEMALES
## 2009 - 2011

**Table 3**

| FEMALES | | | | | | |
|---|---|---|---|---|---|---|
| **AGE GROUP** | **DEATHS** | | | **AVERAGE ANNUAL DEATHS 2009 - 2011** | **ADJUSTED 2010 CENSUS POPULATION** | **AGE SPECIFIC DEATH RATE Mx** |
| | **2009** | **2010** | **2011** | | | |
| **0** | 39 | 28 | 22 | 30 | 3002 | **0.009882** |
| **1-4** | 6 | 9 | 6 | 7 | 12352 | **0.000567** |
| **5-9** | 2 | 2 | 7 | 4 | 15827 | **0.000232** |
| **10-14** | 0 | 1 | 9 | 3 | 15916 | **0.000209** |
| **15-19** | 7 | 7 | 17 | 10 | 15496 | **0.000667** |
| **20-24** | 10 | 11 | 14 | 12 | 13411 | **0.000870** |
| **25-29** | 19 | 7 | 25 | 17 | 13893 | **0.001224** |
| **30-34** | 30 | 30 | 23 | 28 | 14135 | **0.001957** |
| **35-39** | 31 | 37 | 25 | 31 | 15178 | **0.002042** |
| **40-44** | 37 | 48 | 45 | 43 | 13662 | **0.003172** |
| **45-49** | 47 | 50 | 54 | 50 | 13000 | **0.003872** |
| **50-54** | 54 | 58 | 70 | 61 | 10281 | **0.005901** |
| **55-59** | 43 | 65 | 57 | 55 | 7254 | **0.007582** |
| **60-64** | 63 | 59 | 71 | 64 | 5413 | **0.011885** |
| **65-69** | 73 | 72 | 78 | 74 | 4489 | **0.016559** |
| **70-74** | 79 | 73 | 68 | 73 | 3292 | **0.022276** |
| **75-79** | 105 | 91 | 93 | 96 | 2118 | **0.045483** |
| **80-84** | 88 | 93 | 101 | 94 | 1329 | **0.070730** |
| **85-89** | 81 | 72 | 81 | 78 | 664 | **0.117470** |
| **90-94** | 53 | 74 | 42 | 56 | 377 | **0.149425** |
| **95-99** | 36 | 19 | 23 | 26 | 94 | **0.276596** |
| **100+** | 5 | 9 | 6 | 7 | 21 | **0.317460** |
| **NOT STATED** | 0 | 0 | 0 | 0 | 0 | |
| **TOTAL** | **908** | **915** | **937** | **920** | **181204** | |

## ABRIDGED LIFE TABLES FOR BAHAMAS - MALES: 2009 - 2011

**Table 4**

| Age Interval | Proportion Dying | of 100,000 Born Alive | | Stationary Population | | Average Remaining Lifetime |
|---|---|---|---|---|---|---|
| Period of Life Between Two Exact Ages Stated in Year | Proportion of Persons Alive At Beginning of Age Interval Dying During Interval | Number Living at Beginning of Age Interval | Number Dying During Age Interval | In The Age intreval | In This And All Subsequent Age Intervals | Average Number of Years Of Life Remaining At Beginning of Age Interval |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| x - x + n | $_nq_x$ | $l_x$ | $_nd_x$ | $_nL_x$ | $T_x$ | $e^o$ |
| 0-1 | 0.009623 | 100,000 | 962 | 99303 | 7057193 | 70.57 |
| 1-5 | 0.002031 | 99,038 | 201 | 395624 | 6957889 | 70.25 |
| 5-10 | 0.000850 | 98,837 | 84 | 493947 | 6562266 | 66.40 |
| 10-15 | 0.001774 | 98,753 | 175 | 493425 | 6068318 | 61.45 |
| 15-20 | 0.005725 | 98,577 | 564 | 491749 | 5574894 | 56.55 |
| 20-25 | 0.015168 | 98,013 | 1487 | 486564 | 5083144 | 51.86 |
| 25-30 | 0.016558 | 96,526 | 1598 | 478667 | 4596580 | 47.62 |
| 30-35 | 0.017207 | 94,928 | 1633 | 470670 | 4117913 | 43.38 |
| 35-40 | 0.022964 | 93,295 | 2142 | 461302 | 3647243 | 39.09 |
| 40-45 | 0.027618 | 91,152 | 2517 | 449660 | 3185941 | 34.95 |
| 45-50 | 0.034573 | 88,635 | 3064 | 435816 | 2736282 | 30.87 |
| 50-55 | 0.046399 | 85,571 | 3970 | 418337 | 2300465 | 26.88 |
| 55-60 | 0.061701 | 81,600 | 5035 | 395977 | 1882128 | 23.07 |
| 60-65 | 0.087142 | 76,565 | 6672 | 366898 | 1486152 | 19.41 |
| 65-70 | 0.123623 | 69,893 | 8640 | 328733 | 1119254 | 16.01 |
| 70-75 | 0.176942 | 61,253 | 10838 | 280167 | 790521 | 12.91 |
| 75-80 | 0.266408 | 50,415 | 13431 | 218738 | 510354 | 10.12 |
| 80-85 | 0.324408 | 36,984 | 11998 | 154915 | 291617 | 7.88 |
| 85-90 | 0.535815 | 24,986 | 13388 | 90587 | 136701 | 5.47 |
| 90-95 | 0.673149 | 11,598 | 7807 | 36366 | 46114 | 3.98 |
| 95-100 | 0.864001 | 3,791 | 3275 | 9249 | 9748 | 2.57 |
| 100+ | 1.000000 | 516 | 516 | 499 | 499 | 0.97 |

**NOTE:** The $_nq_x$ in the Life-Table may differ from the $_nq_x$ in Appendix A due to computer rounding.

## ABRIDGED LIFE TABLES FOR BAHAMAS - FEMALES: 2009 – 2011

Table 5

| Age Interval | Proportion Dying | of 100,000 Born Alive | | Stationary Population | | Average Remaining Lifetime |
|---|---|---|---|---|---|---|
| Period of Life Between Two Exact Ages Stated in Year | Proportion of Persons Alive At Beginning of Age Interval Dying During Interval | Number Living at Beginning of Age Interval | Number Dying During Age Interval | In The Age intreval | In This And All Subsequent Age Intervals | Average Number of Years Of Life Remaining At Beginning of Age Interval |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| x - x + n | $_nq_x$ | $l_x$ | $_nd_x$ | $_nL_x$ | $T_x$ | $e^o$ |
| **0-1** | 0.009329 | 100,000 | 933 | 99325 | 7682801 | 76.83 |
| **1-5** | 0.002219 | 99,067 | 220 | 395689 | 7583477 | 76.55 |
| **5-10** | 0.001159 | 98,847 | 115 | 493917 | 7187788 | 72.72 |
| **10-15** | 0.001044 | 98,733 | 103 | 493450 | 6693872 | 67.80 |
| **15-20** | 0.003330 | 98,630 | 328 | 492394 | 6200421 | 62.87 |
| **20-25** | 0.004341 | 98,301 | 427 | 490495 | 5708027 | 58.07 |
| **25-30** | 0.006103 | 97,874 | 597 | 487987 | 5217532 | 53.31 |
| **30-35** | 0.009741 | 97,277 | 948 | 484096 | 4729545 | 48.62 |
| **35-40** | 0.010162 | 96,329 | 979 | 479316 | 4245449 | 44.07 |
| **40-45** | 0.015745 | 95,351 | 1501 | 473171 | 3766134 | 39.50 |
| **45-50** | 0.019189 | 93,849 | 1801 | 464990 | 3292963 | 35.09 |
| **50-55** | 0.029108 | 92,048 | 2679 | 453863 | 2827973 | 30.72 |
| **55-60** | 0.037256 | 89,369 | 3330 | 439000 | 2374110 | 26.57 |
| **60-65** | 0.057827 | 86,040 | 4975 | 418412 | 1935110 | 22.49 |
| **65-70** | 0.079713 | 81,064 | 6462 | 389775 | 1516698 | 18.71 |
| **70-75** | 0.105845 | 74,602 | 7896 | 354775 | 1126923 | 15.11 |
| **75-80** | 0.205056 | 66,706 | 13678 | 301019 | 772148 | 11.58 |
| **80-85** | 0.301383 | 53,028 | 15982 | 225821 | 471129 | 8.88 |
| **85-90** | 0.451819 | 37,046 | 16738 | 142326 | 245308 | 6.62 |
| **90-95** | 0.536734 | 20,308 | 10900 | 72307 | 102982 | 5.07 |
| **95-100** | 0.767644 | 9,408 | 7222 | 27170 | 30675 | 3.26 |
| **100+** | 1.000000 | 2,186 | 2186 | 3505 | 3505 | 1.60 |

**NOTE:** The $_nq_x$ in the Life-Table may differ from the $_nq_x$ in Appendix A due to computer rounding.

**APPENDIX A**

## CONVERSION OF $M_x$ TO $Q_X$ VALUES, MALES: 2010

| $M_0$ | $q_0$ | |
|---|---|---|
| | | .000921 x |
| .016188 | .015008 | .188 |
| | + .000173 | = .000173 |
| | .015181 | |

| $_4M_1$ | $_4q_1$ | |
|---|---|---|
| | | .003906 x |
| .000519 | .000000 | .519 |
| | + .002027 | = .002027 |
| | .002027 | |

| $_5M_5$ | $_5q_5$ | |
|---|---|---|
| | | .004989 x |
| .000170 | .000000 | .170 |
| | + .000848 | = .000848 |
| | .000848 | |

| $_5M_{10}$ | $_5q_{10}$ | |
|---|---|---|
| | | .004989 x |
| .000355 | .000000 | .355 |
| | + .001771 | = .001771 |
| | .001771 | |

| $_5M_{15}$ | $_5q_{15}$ | |
|---|---|---|
| | | .004965 x |
| .001148 | .004989 | .148 |
| | + .000735 | = .000735 |
| | .005724 | |

| $_5M_{20}$ | $_5q_{20}$ | |
|---|---|---|
| | | .004920 x |
| .003055 | .014897 | .055 |
| | + .000271 | = .000271 |
| | .015168 | |

## CONVERSION OF $M_X$ TO $Q_X$ VALUES, MALES: 2010

| $_5M_{25}$ | $_5q_{25}$ | |
|---|---|---|
| | | .004920 x |
| .003337 | .004989 | .337 |
| | + .001658 | = .001658 |
| | .016555 | |
| $_5M_{30}$ | $_5q_{30}$ | |
| | | .004920 x |
| .003469 | .014897 | .469 |
| | + .002307 | = .002307 |
| | .017204 | |
| $_5M_{35}$ | $_5q_{35}$ | |
| | | .004897 x |
| .004642 | .019817 | .642 |
| | + .003144 | = .003144 |
| | .022961 | |
| $_5M_{40}$ | $_5q_{40}$ | |
| | | .004876 x |
| .005595 | .024714 | .595 |
| | + .002901 | = .002901 |
| | .027615 | |
| $_5M_{45}$ | $_5q_{45}$ | |
| | | .004830 x |
| .007027 | .034442 | .027 |
| | + .000130 | = .000130 |
| | .034572 | |
| $_5M_{50}$ | $_5q_{50}$ | |
| | | .004786 x |
| .009484 | .044080 | .484 |
| | + .002316 | = .002316 |
| | .046396 | |

# CONVERSION OF $M_X$ TO $Q_X$ VALUES, MALES: 2010

| | | |
|---|---|---|
| ${}_5M_{55}$ | ${}_5q_{55}$ | |
| | | .004720 x |
| .012705 | .058371 | .705 |
| | + .003328 | = .003328 |
| | .061699 | |
| ${}_5M_{60}$ | ${}_5q_{60}$ | |
| | | .004590 x |
| .018169 | .086365 | .169 |
| | + .000776 | = .000776 |
| | .087141 | |
| ${}_5M_{65}$ | ${}_5q_{65}$ | |
| | | .004423 x |
| .026254 | .122498 | .254 |
| | + .001123 | = .001123 |
| | .123621 | |
| ${}_5M_{70}$ | ${}_5q_{70}$ | |
| | | .004182 x |
| .038647 | .174234 | .647 |
| | + .002706 | = .002706 |
| | .176940 | |
| ${}_5M_{75}$ | ${}_5q_{75}$ | |
| | | .003755 x |
| .061211 | .265614 | .211 |
| | + .000792 | = .000792 |
| | .266406 | |
| ${}_5M_{80}$ | ${}_5q_{80}$ | |
| | | .003478 x |
| .077240 | .323572 | .240 |
| | + .000835 | = .000835 |
| | .324407 | |

# CONVERSION OF MX TO QX VALUES, MALES: 2010

| $_5M_{85}$ | $_5q_{85}$ | |
|---|---|---|
| | | .002454 x |
| .149051 | .535689 | .051 |
| | + .000125 | = .000125 |
| | .535814 | |

| $_5M_{90}$ | $_5q_{90}$ | |
|---|---|---|
| | | .001774 x |
| .214452 | .672346 | .452 |
| | + .000802 | = .000802 |
| | .673148 | |

| $_5M_{95}$ | $_5q_{95}$ | |
|---|---|---|
| | | .000781 x |
| .371429 | .863665 | .429 |
| | + .000335 | = .000335 |
| | .864000 | |

## CONVERSION OF $M_x$ TO $Q_x$ VALUES, FEMALES 2010

| | | |
|---|---|---|
| $M_0$ | $Q_0$ | |
| .015656 | .014085 | .000923 x .656 |
| | + | |
| | .000605 | = .000605 |
| | .014690 | |
| $_4M_1$ | $_4Q_1$ | |
| .000567 | .000000 | .003906 x .567 |
| | +.002215 | = .002215 |
| | .002215 | |
| $_5M_5$ | $_5Q_5$ | |
| .000232 | .000000 | .004989 x .232 |
| | +.001157 | = .001157 |
| | .001157 | |
| $_5M_{10}$ | $_5Q_{10}$ | |
| .000209 | .000000 | .004989 x .209 |
| | +.001043 | = .001043 |
| | .001043 | |
| $_5M_{15}$ | $_5Q_{15}$ | |
| .000667 | .000000 | .004989 x .667 |
| | +.003328 | = .003328 |
| | .003328 | |
| $_5M_{20}$ | $_5Q_{20}$ | |
| .000870 | .000000 | .004989 x .870 |
| | +.004340 | = .004340 |
| | .004340 | |

## CONVERSION OF $M_x$ TO $Q_x$ VALUES, FEMALES 2010

| $_5M_{25}$ | $_5Q_{25}$ | |
|---|---|---|
| .001224 | .014897 | .004965 x .224 |
| | +.001112 | = .001112 |
| | .006101 | |

| $_5M_{30}$ | $_5Q_{30}$ | |
|---|---|---|
| .001957 | .004989 | .004965 x .957 |
| | +.004752 | = .004752 |
| | .009741 | |

| $_5M_{35}$ | $_5Q_{35}$ | |
|---|---|---|
| .002042 | .009954 | .004943 x .042 |
| | +.000208 | = .000208 |
| | .010162 | |

| $_5M_{40}$ | $_5Q_{40}$ | |
|---|---|---|
| .003172 | .014897 | .004920 x .172 |
| | +.000846 | = .000846 |
| | .015743 | |

| $_5M_{45}$ | $_5Q_{45}$ | |
|---|---|---|
| .003872 | .014897 | .004920 x .872 |
| | +.004290 | = .004290 |
| | .019187 | |

## CONVERSION OF $M_x$ TO $Q_x$ VALUES, FEMALES 2010

| | | |
|---|---|---|
| $_5M_{50}$ | $_5Q_{50}$ | |
| .005901 | .024714 | .004876 x .901 |
| | +.004393 | = .004393 |
| | .029107 | |
| $_5M_{55}$ | $_5Q_{55}$ | |
| .007582 | .034442 | .004830 x .580 |
| | .002811 | = .002811 |
| | .037253 | |
| $_5M_{60}$ | $_5Q_{60}$ | |
| .011885 | .053629 | .004742 x .885 |
| | +.004197 | = .004197 |
| | .057826 | |
| $_5M_{65}$ | $_5Q_{65}$ | |
| .016559 | .077120 | .004633 x .559 |
| | +.002590 | = .002590 |
| | .079710 | |
| $_5M_{70}$ | $_5Q_{70}$ | |
| .022276 | .104599 | .004506 x .276 |
| | +.001244 | = .001244 |
| | .10584 | |

## CONVERSION OF $M_x$ TO $Q_x$ VALUES, FEMALES 2010

| $_5M_{75}$ | $_5Q_{75}$ | |
|---|---|---|
| .045483 | .203099 | .004047 x .483 |
| | +.001955 | = .001955 |
| | .205054 | |
| $_5M_{80}$ | $_5Q_{80}$ | |
| .070730 | .298756 | .003596 x .730 |
| | +.002625 | = .002625 |
| | .301381 | |
| $_5M_{85}$ | $_5Q_{85}$ | |
| .117470 | .450568 | .002870 x .470 |
| | +.001349 | = .001349 |
| | .451817 | |
| $_5M_{90}$ | $_5Q_{90}$ | |
| .149425 | .535689 | .002454 x .425 |
| | +.001043 | = .001043 |
| | .536732 | |
| $_5M_{95}$ | $_5Q_{95}$ | |
| .276596 | .766874 | .001291 x .596 |
| | +.000769 | = .000769 |
| | .767643 | |