

**Milliman Extension of 1975-80 Select & Ultimate Tables to Issue Age 87
and Ultimate Attained Age of 102**

DISCLAIMER - The Milliman Extension of the 75-80 S&U table developed by the SoA was performed as follows. The authors believe this is a reasonable way to extend the table, but make no representation that this is the only, or even the best, way to extend the table. Milliman offer this extension to further knowledge but do not intend to benefit any user thereof. If you plan to use this extension you must satisfy yourself it is appropriate for your purpose.

1. The basic source is the final draft of the Society of Actuaries report on the 1975-80 Basic Tables prepared by the Committee on Ordinary Insurance and Annuities.
2. The age-nearest-birthday ultimate tables are copies of the ultimate rates shown on page 2 of the draft. These rates have been extrapolated to attained age 102 by keeping second differences constant. This is consistent with the method used by the Committee.
3. To construct the age-nearest-birthday select tables for adults, we worked with the select-to-ultimate mortality ratios given in Table 8 of the draft on page 15. First, we assumed that the true central age of the issue age groups from age 15 through 64 was the fractional age exhibited on page 260 of TASA Volume XLVIII. The ratios in Table 8, therefore, represented the ratio of a select q at a fractional age to an ultimate q at an integral central age (for example, select age 12.2 versus ultimate age 12). We calculated ultimate mortality rates at the select fractional ages and obtained new select to ultimate ratios. These fractional age ratios were assumed to be applicable to the integral central ages. The Table 8 ratios given for age group 65-69 were used for issue age groups 65-69, 70-74, ...85-89. These ratios were then applied to the corresponding ultimate tables to derive select mortality rates for quinquennial issue ages 17, 22, ...87.
4. Without further modification, these results were accepted for the first eleven policy years. It was considered desirable to grade this table into the ultimate table by the end of the fifteenth year, and this was done on a gradual basis by setting our twelfth-year mortality rate equal to 80% of the figure derived from the select table after adjustment as described in point (3) above, plus 20% of the ultimate mortality rate. For the thirteenth year we used a mix of 60% and 40%; fourteenth year 40% and 60%; fifteenth year 20% and 80%; sixteenth year 100% of the ultimate table. The select mortality rates for ages 0, 1, 2, 7 and 12 were taken directly from the table of graduated select mortality rates in the report subject to the constraint that
$${}^q(x) + t - 1 < {}^q_{x+t-1}$$
5. This gave us a select 15-year table for issue ages 0 and 1 and every fifth age from 2 through 87. Intervening issue ages were interpolated by using a polynomial interpolation program.
6. The age-last-birthday tables were derived from the corresponding age-nearest-birthday tables by linear interpolation. However, the age zero rate was derived by adding two-thirds of the age zero age nearest birthday rate to one-third of the age one rate to allow for the skewed distribution of issues.