

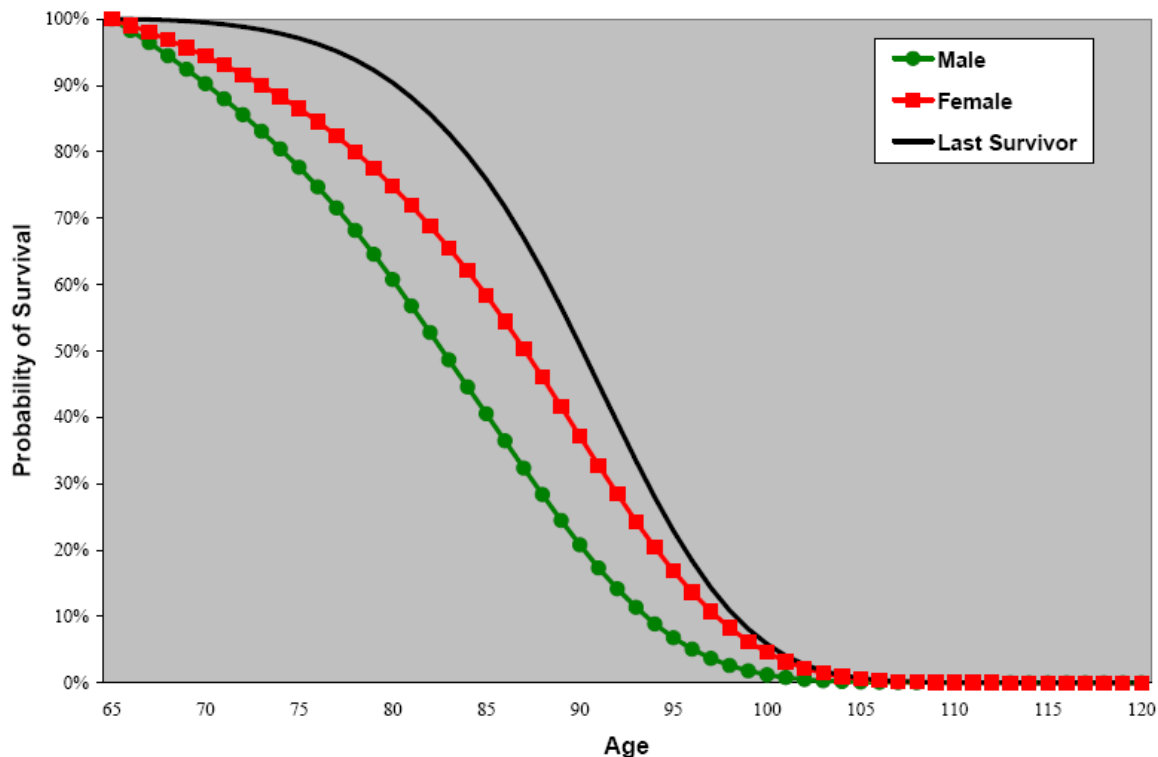
Longevity Risk

Longevity risk is the risk of a retiree outliving his or her retirement benefits. Defined benefit plans usually annuitize retirement funds for retirees, giving them annual income that will last their lifetime. Since traditional defined benefit plans place all employer\employee contributions into the same pool of assets, they pool longevity risk.¹ Under a traditional defined contribution plan, members hold separate accounts and usually receive a lump-sum payment upon retirement. They then have several options to spread their benefits over their lifetime, including following the “4% rule” or buying an annuity.

Longevity Risk	
Systematic Risk	Low
Non-Systematic Risk	High

Why Longevity Risk is a Concern

An individual should not plan only for the average life expectancy because one could easily live longer. The following chart shows the probability of an individual and at least one member of a couple (both age 65) living to certain ages, based on mortality observed for NC state and local government employees:



Following the 4% Rule

The 4% rule is a popular self-management strategy for retirement funds that is recommended by many financial advisors; it is often presented as a possible means for employees to manage non-systematic longevity risk. Under this rule, a retiree draws 4% of his or her retirement account value during the first year of retirement and then adjusts the withdrawal rate for inflation in subsequent years. For example, if a retiree’s 401(k) fund has \$100,000 at retirement, then he or she withdraws \$4,000 ($.04 \times 100,000$) from the fund during the first year of retirement. If inflation is 3% during the first year, then the retiree withdraws \$4,120 from the remaining balance in the second year.

¹ Note that the employer takes on systematic longevity risk if the average lifespan increases, although sharp unexpected improvements in life spans are unprecedented in history.

Buying a Lifetime Annuity

A lifetime, immediate annuity provides a fixed amount of annual income for the remainder of the retiree's life. The amount of annuity income depends on the purchase price of the annuity. Take for example an employee who retires with \$300,000 in 401(k) assets and wishes to purchase an annuity. If the price is \$16² for every \$1 of annual income then the initial annual payout of the annuity will be \$18,750.

Annuity vs. 4% Rule

In general, purchasing an annuity with one's defined contribution assets is a less expensive option than following the 4% rule. If a retiree needs to replace 38% of his or her pre-retirement average income of \$50,000, then he or she can purchase an annuity for \$300,000 to provide a lifetime annual annuity payment of \$18,750. If applying the 4% rule to his or her 401(k) plan, the retiree would need a 401(k) balance of \$468,750 (\$18,750/.04) to get the same lifetime payment of \$18,750. Applying the 4% rule would cost \$168,750 more than purchasing an annuity. Further, there is still a 3.4%³ chance that the retiree will outlive his or her savings under the 4% rule, whereas purchasing an annuity effectively pools and mitigates the non-systematic risk of longevity. Additional self-management practices such as the interest rule (spending only dividends and interest, not the principal) and the life expectancy rule (withdrawing payments equal to the balance divided by the remaining years of expected life) also do not mitigate longevity risk.

Strategies to Increase Annuitization

Though annuity products have the potential to protect retirees from longevity risk, very few employees elect to convert their retirement funds into annuities (about 4% of DC accounts and 11% of IRAs).⁴ Possible explanations for under-annuitization include a lack of financial literacy vis-à-vis annuity products and an underdeveloped annuity market.⁵

Below are strategies proposed by scholars and policy-makers to provide inducements for annuitization and make annuity options more attractive for retirees:

- Automatic annuitization (retirement account assets defaulted into an annuity)
- Longevity insurance (a type of deferred annuity)
- Trial income in which all or a portion of a retiree's assets are annuitized for a period of 1-2 years
- Incrementally rolling a portion of member assets into deferred annuities before retirement
- Displaying annuity payout estimates on member statements (instead of just lump sum balances)

Systematic Longevity Risk

Systematic longevity risk is very low. Most actuaries expect life spans to continue to increase in the future and these projected increases are built into the valuations of the state and local retirement systems. Thus, the systematic risk is not that life spans will increase, but that they will increase even faster than predicted.⁶ For example, this might happen if a cure were suddenly discovered for all cancers, rather than the slow, steady progress against some cancers that would be built into the projections. Most experts (and non-experts) would estimate a low probability for finding a universal cure for cancer.

² \$16 is the estimated price on an inflation-protected annuity, assuming a 2% real interest rate and the mortality experience of state and local retirees.

³ Estimated using a stochastic model developed by the Retirement Systems Division that is based on historical returns and risk.

⁴ Johnson, Richard W., Leonard E. Burman and Deborah Kobes. 2004. "Annuitized Wealth at Older Ages: Evidence from the Health and Retirement Study." Washington, D.C.: Urban Institute. Retrieved from http://www.urban.org/UploadedPDF/411000_annuitized_wealth.pdf

⁵ Further discussion can be found in the article "Managing Longevity Risk in U.S. Retirement Plans through Mandatory Annuitization."

⁶ There is also a possibility they will increase slower than predicted. For example, researchers have cited the high incidence of obesity in younger people as a factor that may decrease the longevity of that generation.

There is little historical precedence for a serious systematic mortality risk event.⁷ The following table shows changes in US life expectancy in the 20th Century⁸:

Year	Life Expectancy at Birth	Life Expectancy at Age 65
1900-1902	49.24	11.86
1919-1921	56.40	12.47
1939-1941	63.62	12.80
1959-1961	69.89	14.39
1979-1981	73.88	16.51
2004	77.8	18.7

While life expectancy at birth increased by $77.8 - 49.24 = 29$ years, life expectancy at 65 increased by only $18.7 - 11.86 = 6.8$ years. Thus, most of the improvement occurred in mortality rates at younger ages, particularly among infants and children. While improvements in child mortality are commendable, they have no impact on retirement plans since children are usually neither working nor retired.

The 6.8 year increase in post-65 mortality does have an impact, but keep in mind that this occurred over 100 years and thus would have been fairly easy to gradually adjust for. Even in 1900, you could have predicted improvements in life spans in the 20th Century, as improvements had already occurred in the 19th Century. Based on the figures above, the rate of increase may have accelerated after World War II and thus estimates made in 1940 might have been too low, but this acceleration was still to a new rate slow enough to allow gradual adjustments. The reader should note that the data from the earlier years is based on a limited number of states, so the acceleration might also be a factor of the way the data was gathered, rather than a true change in the rate of improvement.

⁷ In the direction of longer lifespans. The Plague and smallpox are precedents in the other direction.

⁸ U.S. Centers for Disease Control, *United States Life Tables, 2004*, p. 30,
http://www.cdc.gov/nchs/data/nvsr/nvsr56/nvsr56_09.pdf