Emerging strategies for determining pension plan member life expectancies may promise a more precise assessment of pension liabilities than traditional mortality tables. Multifactor modeling, which incorporates multiple variables that influence mortality, is one such approach.

Old Tables, New Realities:

The Changing Face of Pension Plan Mortality

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Mortality assumptions play a pivotal role in defined benefit (DB) pension plan valuations, influencing everything from funding strategies to long-term financial stability. For decades, the Society of Actuaries (SOA) has provided the industry standard mortality tables that pension plans use to estimate the life expectancy of their participants. While these tables have evolved over the years to reflect changing trends, they still present challenges that may not account for the rich diversity across the United States.

Life expectancy varies considerably across the country, influenced by factors such as income, lifestyle and socioeconomic conditions. The U.S. is home to hundreds of millions of people living vastly different lives. Should pension plans rely solely on average life expectancies reflected in traditional mortality tables, or is it time to adopt a more tailored approach? This article delves into the complexities of mortality in the U.S., examines the limitations of traditional mortality models and explores emerging strategies that may promise a more precise assessment of pension liabilities. Embracing a more nuanced view of mortality could not only be beneficial but may be necessary for the future of pension valuation.

takeaways

- Mortality assumptions play a pivotal role in defined benefit (DB) pension plan valuations. Most plans use average life expectancies provided by industry standard mortality tables, but these tables may not take the diversity of plan populations into full account.
- External factors such as lifestyle and environment have a larger impact on longevity than genetics. Variances in life expectancy across different states in the United States reflect this.
- Most single employer, multiemployer and public pension plans use standard mortality tables to value participant mortality, but these tables overlook critical elements that impact longevity such as lifestyle and geographic location.
- Actuaries can use a method called multifactor modeling to measure the impact of factors, such as ZIP code, collar type, gender and pension amount, on each plan participant to create individualized mortality tables.
- Benefits of multifactor modeling include tailored mortality assumptions, improved cash flow and head count projections, the ability to quantify intra- and intergenerational equity within the pension system, and enhanced understanding of longevity risk. Challenges include ensuring that the plan has access to high-quality data.

Taking the Pulse of Mortality in the U.S.

The mortality assumption is a critical component of DB pension plan valuation because it directly impacts funding, investment strategy, risk management and the financial stability of the plan. Traditionally, these assumptions are based on mortality tables developed by the SOA, which have served as a foundation for pension valuations for several decades and are utilized across the broader landscape of U.S. pensions, including single employer, public sector and multiemployer plans. Table I below illustrates the SOA base mortality tables used in the top 50 multiemployer plans (by total participant count) in the U.S. Plan sponsors and their actuaries have historically relied on these tables to estimate the life expectancy of retirees, helping to project the duration and total cost of benefit payouts accurately.

The SOA mortality tables have been updated over time to reflect changes in U.S. life expectancy and to incorporate some differentiating factors such as age, gender, collar type (i.e., blue collar or white collar) and retirement health. The Pri-2012 table is the latest iteration of SOA mortality tables produced for private sector pension plans. For example, using the Pri-2012 table, a 65-year-old male has a current life expectancy of 84.7 years, while a female of the same age is expected to live until 86.6 years.[1] These figures differ from national averages provided by the Centers for Disease Control and Prevention (CDC),[2] which estimate life expectancy for 65-year-old males and females at 82 and 84.7 years, respectively.

TABLE I

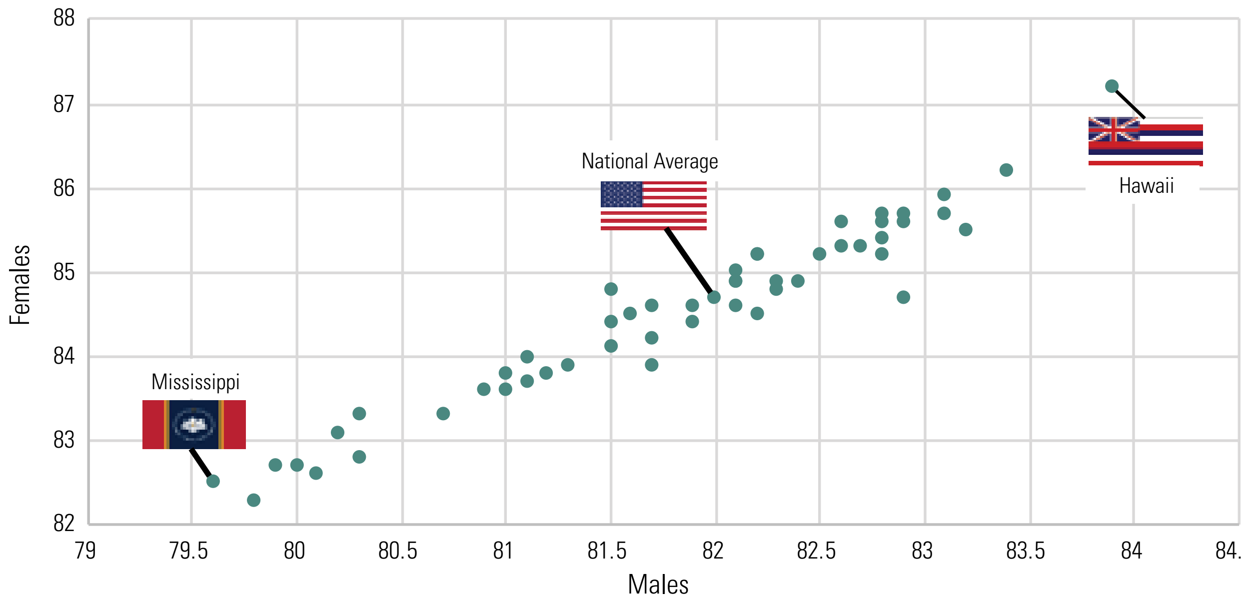
Base Mortality Tables Used (50 Largest Multiemployer Plans)

Table Name	Data Incorporated in Table	Number of Plans Using
Pri-2012	2010-2014	24
RP-2014	2004-2008	14
RP-2006	2004-2008	9
RP-2000	1990-1994	3
Total		**50**

Source: Analysis of base mortality tables used in the top 50 multiemployer plans by total participant count, based on the 2022 Form 5500 dataset downloaded October 2024. The counts do not include collar type or weighted adjustments incorporated into the tables. Adjustments were applied in 45 of the 50 plans.

FIGURE 1

U.S. Life Expectancy From Age 65 by State (2021) (Including Washington, D.C.)



Source: National Vital Statistics Reports; U.S. State Life Tables, 2021 (August 21, 2024); page 6.

The U.S Longevity Divide

The U.S. is home to a diverse population. This diversity becomes especially clear in looking at the life expectancies of each state. Figure 1 highlights the average life expectancy for men and women across each state. There is more than a four-year difference in life expectancy between the longest living state (Hawaii) and the shortest living state (Mississippi).

What is contributing to this diversity in longevity?

The Roots of Longevity Diversity

It is a common misconception that our parents' lifespans strongly predict our own. In reality, research indicates that genetics account for less than 20% of the differences in our longevity.[3] The remaining over 80% is influenced by external factors such as lifestyle and environment—the foods we consume, exercise habits, smoking status, education level and income. These factors are shaped by the everyday decisions we make and the habits we maintain.

The 337 million people who live in the U.S. represent diverse backgrounds, ethnicities, lifestyles and socioeconomic statuses.[4] Each state has a unique mix of characteristics that affect health and longevity, leading to noticeable differences in life expectancies across the country. For example, states with higher average incomes, better health care access and healthier lifestyles—such as Hawaii and California—generally see longer life expectancies. In contrast, states such as Mississippi and West Virginia, where residents may face higher poverty levels and limited access to quality health care, tend to have lower life expectancies.

Are the standard SOA tables sufficient to capture these differences?

Is Being Average Enough?

The SOA mortality tables have long been the industry standard, but they come with several challenges. These tables are created using a "top-down" approach, where data from pension plans across the U.S. are averaged into a few generalized tables. The issue with this method is that it results in a one-size-fits-all model. This approach is most suitable for a geographically diverse, nationwide pension plan with a mix of blue- and white-collar workers and average benefit amounts, which is rarely the case for individual plans.

As shown in Table I on page 16, many private multiemployer pension plans in the U.S. use these standard tables to value participant mortality. However, does it make sense for a plan concentrated in a state with a longer life expectancy to use the same mortality assumptions as a plan in a state with shorter life expectancy? A plan based in a state with higher longevity might experience fewer deaths than expected under a standard table, while one in a state with shorter life expectancies might face more.

Another limitation of the SOA tables is the narrow set of factors they consider to differentiate assumptions. While they account for gender, occupation and retirement health, they overlook many other critical elements that impact longevity, such as lifestyle and geographic location.

How can pension plans and administrators capture the diversity introduced by these external factors?

Ahead of the Longevity Curve

Pension plan administrators hold a wealth of data about their plans and participants, providing numerous factors that can be used to estimate longevity more accurately. As shown in Table II, various drivers of longevity can be derived from data fields routinely maintained by pension plan administrators, referred to in this article as *data proxies*.

While some of these data proxies are already incorporated in current standard approaches, there is still potential to extract further insights from additional data fields. As discussed, longevity varies significantly across the U.S., largely influenced by the differing lifestyles and socioeconomic conditions in each region. A key emerging approach to capture this variation is the use of ZIP codes as a data proxy. ZIP codes can capture a wealth of information, such as lifestyle information (education, prevalence of smoking, affluence, etc.), socioeconomic status and population density, serving as a highly useful indicator of differing longevity characteristics.

Research, such as the *2024 National Findings Report* by County Health Rankings & Roadmaps, indicates that individuals living in counties (ZIP codes) with higher "civic health" (higher socioeconomic lifestyle) live more than three years longer, on average, than those in counties with lower civic health.[5]

Traditionally, many pension plans have relied on experience studies to shape their mortality assumptions. These studies analyze the historical mortality data specific to a given plan or group of participants, helping actuaries adjust for plan-specific experience rather than relying solely on standard mortality tables. However, while experience studies provide a degree of customization, they often focus on just a few factors—primarily age and gender—and may not fully capture the broader and more complex range of variables influencing longevity. Experience studies also have a retrospective focus, analyzing past mortality patterns, which means they can lag behind in reflecting shifts in mortality trends

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TABLE II

Longevity Drivers and Pension Administration Proxies

Longevity Driver	Data Item Used as Proxy
Lifestyle (level of education, propensity to smoke, etc.)	ZIP code (five- or nine-digit)
Affluence	Ideally salary, otherwise pension amount
Retirement health	Disabled or normal health retirement
Occupation	Blue- or white-collar worker
Married/companionship	Pension optional form (single life or joint and survivor annuity)

driven by socioeconomic changes, health care advances or other significant factors.

In contrast, multifactor modeling offers a more robust, data-driven approach by incorporating multiple variables that are known to influence mortality, such as ZIP code, occupation (often categorized by "collar type"), gender, pension amount and other socioeconomic indicators. Each factor's impact on longevity is statistically measured, allowing actuaries to evaluate how different combinations of characteristics affect an individual's life expectancy. This method enables the creation of individualized mortality tables tailored to each participant's unique profile, rather than relying on a broad, one-size-fits-all approach.

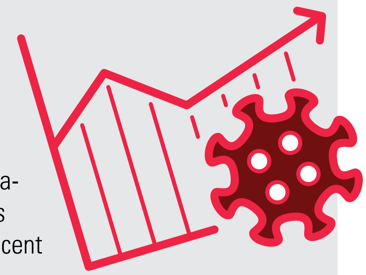
Multifactor modeling improves upon the limitations of experience studies by using predictive analytics to anticipate future mortality patterns, rather than just extrapolating from past data. For instance, pension participants living in high-income ZIP codes who have white-collar jobs and receive higher benefit amounts may experience longer life expectancies than those in lower income regions or blue-collar occupations. By integrating these factors, multifactor models generate more precise assumptions that better reflect the real diversity in life expectancies within a pension plan's population. This precision ultimately should lead to more accurate liability projections and funding strategies, allowing pension plans to manage their financial risks more effectively.

Unlocking the Benefits of Improved Mortality Assumptions

Incorporating multifactor modeling methods into a plan's mortality assumptions can lead to more accurate valuations and better risk management. The following are some key impacts observed in the U.S. pension system.

- **Tailored mortality assumptions:** Using more refined mortality assumptions should result in more accurate cost calculations and provide greater stability in liability measurements from year to year. This precision aids in financial planning and helps reduce unexpected funding requirements. As a general rule of thumb, a one-year change in life expectancy typically leads to a 4% change in liability. Misestimating the life expectancy of a plan's population in one direction or the other can have significant downstream implications for the plan.

U.S. Mortality Trends and COVID-19



The COVID-19 pandemic continues to influence mortality rates in the United States, especially for older populations, though its impact is diminishing over time. Recent analyses from the Social Security Administration (SSA) and the Retirement Plans Experience Committee (RPEC) reveal that excess mortality (the difference between the actual number of deaths and expected number of deaths) due to COVID-19 has decreased significantly since the pandemic's peak but remains modestly above prepandemic levels, particularly among those age 65 and older. This lingering effect warrants attention from pension plan sponsors and trustees.

The industry suggests taking a thoughtful approach when evaluating how COVID-19 may impact plan liabilities. While mortality rates are gradually returning to expected norms, some plans may find it prudent to apply a modest "COVID-19 load" to account for any lingering mortality effects in the short term. However, it's essential to assess this adjustment on a plan-by-plan basis, as regional variations in COVID-19 impact could lead to differences in mortality trends across populations. By staying attuned to evolving mortality data and regional nuances, plan sponsors can make more informed adjustments to long-term planning assumptions, promoting stability and accuracy in future projections.

- **Improved cash flow and head count projections:** With a better understanding of participants' longevity, pension plans can more accurately project future costs and assess sustainability. A clearer picture of the plan's maturity, including the number of active employees and their income levels supporting current and future retirees, can enhance strategic decision making.
- **Quantifying equity within the system:** By understanding the real differences in life expectancy among various groups, pension plans can ensure that the funding and risk management strategies are fair and stable. This helps prevent situations where some

groups place a greater financial burden on the plan simply because they tend to live longer, ensuring that the plan remains well-funded for both current and future retirees (intra- and intergenerational equity).

- **Enhanced understanding of longevity risk:** If the participants in a pension plan live longer than expected, the plan will end up paying out more money than trustees had planned for. This is the largest liability side risk for a DB pension plan. Multifactor modeling can give plans an improved understanding of this risk by allowing them to understand the characteristics of individuals within the plan that lead to longer or shorter lives.

Challenges and Next Steps in Adopting Multifactor Modeling

While multifactor modeling offers significant advantages, implementing it can present challenges. The process requires access to comprehensive, high-quality data, including details such as ZIP codes, pension amounts, job categories and optional forms, all of which are important for accurate results. While setting up these systems may involve some additional effort in the first year, the long-term benefits should outweigh the initial time investment.

There are specialist organizations that work with pension plans and their advisors to better understand their longevity characteristics. Pricing for these services depends on the organization but may be comparable to an experience study. Plans interested in pursuing a multifactor approach to longevity assumptions may want to consult such an organization or discuss with their plan actuary for further guidance and the plan administration to assess the availability of the necessary data.

Conclusion

Understanding and accurately predicting longevity is vital for the health and stability of pension plans. Traditional SOA mortality tables have served as a solid foundation, but they fall short of capturing the intricate diversity in life expectancy seen across the U.S. Factors such as lifestyle, socioeconomic status and geographic location all significantly influence longevity, and a one-size-fits-all approach can lead to miscalculations in pension liabilities.

Emerging strategies, including multifactor modeling using data proxies such as ZIP codes, provide a more tailored and precise method of assessing longevity. These approaches can not only enhance the accuracy of pension valuations but also improve cash flow projections, promote equity within the system and offer a deeper understanding of longevity risk. By moving beyond the traditional tables, pension plans can better adapt to the complexities of their participant populations, ultimately leading to more sustainable and equitable outcomes.

bio

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Endnotes

1. Calculated as of January 1, 2021 assuming improvements using MP-2021 through the end of 2021.
2. *National Vital Statistics Reports*; U.S. State Life Tables, 2021 (August 21, 2024); page 6.
3. Kaplanis et al. "Quantitative analysis of a population-scale family trees with millions of relatives." Science. 2018.
4. U.S. and World Population Clock; U.S. Census Bureau; Data as of October 25, 2024 rounded to nearest million.
5. *2024 National Findings Report*; "County Health Rankings & Roadmaps; Creating Thriving Communities Through Civic Participation."