

Life Risk Models



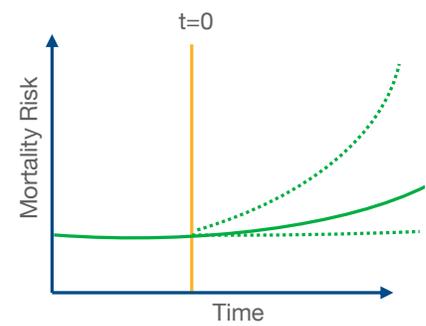
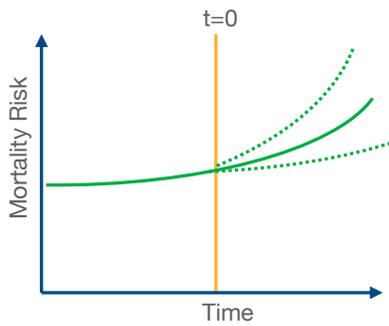
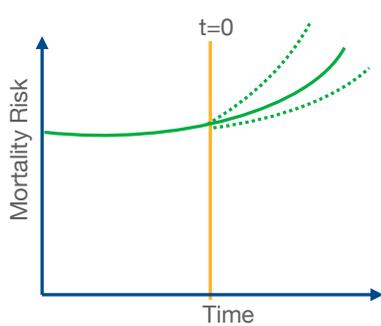
With a shift toward digitization, automation, and accelerated risk selection, the life insurance industry is transforming. Traditional methods of evaluating mortality risk are no longer adequate—life expectancy projections based on historical data don't accurately capture today's longevity trends, and aggregate views don't consider key differences among individual insureds.

JANE 

JOHN 

JULIE 

AGE: 55 HEALTH CLASS: Standard Nicotine OCCUPATION: Receptionist LOCATION: St. Louis, MO	AGE: 43 HEALTH CLASS: Standard Non-Nicotine OCCUPATION: Teacher LOCATION: Orlando, FL	AGE: 32 HEALTH CLASS: Standard Non-Nicotine OCCUPATION: Personal Trainer LOCATION: San Diego, CA
MOST AT RISK FOR: Cancer-related deaths	MOST AT RISK FOR: Heart disease	MOST AT RISK FOR: Injuries



Account for Changes in Mortality Trends over Time

Traditional mortality projections that incorporate only historical and simple trending data result in miscalculations of risk. The Mortality Projection Model incorporates the specific drivers behind mortality and calculations to provide users with a stochastic catalog that contains 4,000 realistic projections of individual mortality for each of the next 125 years.

An individual's overall mortality risk is informed by several factors: cohort mortality risk factors—health class, occupation, residence location—lifestyle habits, and individual socioeconomic factors. Aggregated historical data can mask trends in subpopulations, such as drug abuse in certain age groups or obesity in certain geographical areas.

By incorporating individual health and behavior data, the Mortality Projection Model enables you to quantify the risk of each policyholder at the portfolio level,

to provide individualized adjustments that drive more granular pricing capabilities. Users can input the biomedical data of an insured and execute an analysis for this individual, calculating adjustments to the mortality risk of an individual with specific characteristics.

Assess Correlations Across Risk Groups

Mortality improvements by age, sex, and socioeconomic class are not homogeneous; factors such as smoking, income, and obesity can exacerbate mortality risk. Enterprise Risk Management (ERM) departments are tasked with trying to understand and mitigate these risks wherever possible. The complex nature of these risks makes assessment across a portfolio challenging and can expose your firm to large-scale losses across multiple lines of business. The tool correlates risks and policies across your portfolio, leading to improved financial decisions.

Improve Portfolio Management

By accounting for potential variations in risk, stochastic modeling lets you quantify the impact of each type of portfolio risk, minimizing long-term liability concerns. Insurers can leverage the tool's flexible input assumptions to both understand current portfolio risk and to effectively plan for future risk. The Mortality Projection Model provides a comprehensive view of risk that allows you to implement sophisticated hedging strategies. By gaining insight into correlated impacts across the portfolio, you will be able to make better informed decisions when writing or ceding business. Comprehensive cashflow analyses can better shield a portfolio from unnecessary risk while enabling compliance with reserving regulations such as Solvency II.

Integrate Excess Mortality from Earthquakes, Terrorism, Pandemics, and Antimicrobial Resistance

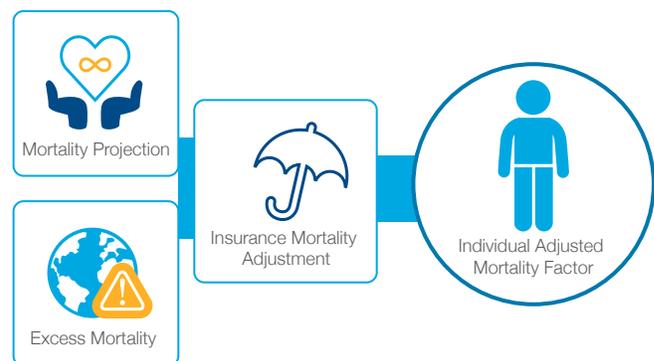
Group Life policies and portfolios must often consider excess mortality impacts, requiring actuaries to gather financial impact data from disparate data sources and models. By leveraging the stochastic catalogs (a set of thousands of simulated events that capture a range of loss scenarios) from each of three models, you can calculate impacts to mortality rates from potential earthquake shocks, terrorism shocks, and pandemics. Incorporating these scenarios directly into your existing workflow enables easier concentration management for these portfolios.

Earthquake model Simulates the number of fatalities caused by ground shaking, tsunamis, and fire following earthquakes. The simulation can produce not only expected losses but also large loss scenarios for a wide range of annual probabilities.

Terrorism model Offers a complex analysis that incorporates the number of fatalities that occur in buildings of different construction types that sustain varying levels of damage. The stochastic

catalog contains simulated terrorist attacks for both international and domestic groups employing either conventional weapons (bomb blast or aircraft) or CBRN (chemical, biological, radiological, and nuclear) weapons.

Pandemic model Captures excess mortality related to global infectious disease outbreaks of the following diseases and pathogen types: influenza viruses, coronaviruses, filoviruses, Rift Valley fever and Crimean-Congo hemorrhagic fever, Lassa fever, cholera, plague, and meningococcal meningitis, as well as other emerging/re-emerging infectious diseases.



Antimicrobial Resistance model Antimicrobial resistance (AMR) is an emerging risk that may cause an increase in mortality; the antimicrobial resistance model provides a unique opportunity to evaluate the impact of AMR on future mortality. Our stochastic approach in projecting AMR-related mortality includes scenarios with policies and practices in place that positively control AMR emergence, along with simulations featuring the impacts of minimal control measures. The AMR model is available to integrate fatalities resulting from the development of antimicrobial resistance into your view of mortality risk.

Validation

The Mortality Projection Model has been through an extensive calibration and validation process prior to release, including back-testing with historical mortality and insurance data. Training and testing methodologies have been used to validate model results. Furthermore, the model has been validated against other modern statistical models to evaluate the functionality and effectiveness of this novel approach in mortality estimation/projection.

Integrated Solution Enhances Workflows and Drives Decision-Making

Using new tools can be disruptive, counterproductive, and time-consuming. Our Life Risk Models allow you to implement a single streamlined platform to integrate companywide analytics across multiple data sets and lines of business. Our flexible solution can be tailored to your existing workflows and systems, providing rapid analytics where they're needed most. The financial component was developed by statisticians and actuaries to provide you the ability to readily analyze the impact of highly complex policy terms at the individual- and portfolio-level.



Verisk: A Trusted Partner

Verisk is a valued partner with nearly 50 years of serving the property and casualty insurance industry as a trusted data steward. Our deep insurance domain expertise and extensive history creating products and services for the insurance industry uniquely positions us to extend this value and offer transformative solutions to the life insurance industry. We have a long and proud history of building and delivering innovative solutions that solve industry challenges, integrating directly into client workflows and leveraging our extensive data assets and advanced analytics capabilities to help in decision making and drive profitable growth.

Model Highlights

- Easy-to-use, customizable stochastic view of mortality risk provides individual- and portfolio-level insights for life insurers and annuity providers
- Quantifies the significant influences on mortality projections, including changing habits and medical advancements, to capture evolving risks and trends, such as an older population living longer than expected
- Accounts for mortality risk correlations across demographics and insurance products to aid competitive pricing and sustainable growth
- Provides smoother workflows and improved efficiencies with a single platform
- Employs insured population-specific data to provide an accurate risk estimation for any specific group tailored to demographic, health, and socioeconomic status
- Facilitates risk management, risk transfer, and risk mitigation decisions that align with strategic goals
- Extensively validated and peer-reviewed

Models at a Glance

Modeled Causes of Death and Excess Mortality	<p>Causes of Death</p> <ul style="list-style-type: none"> - Smoking-related cancers and chronic obstructive pulmonary disease - Cardiovascular diseases - Injuries (including intentional and unintentional accidents) - Other causes of death (varies by age group and includes other types of cancer, liver diseases, dementia, and various other non-major causes of death) <p>Excess Mortality</p> <ul style="list-style-type: none"> - Pandemic due to disease outbreaks - Earthquake due to earthquake in susceptible regions - Terrorism due to terrorist act in specific locations - Antimicrobial Resistance (AMR): emerging mortality due to increase in risk of AMR
Model Domain	United States, United Kingdom, and South Korea
Stochastic Catalog	Mortality due to common causes of death for the next 125 years through 4,000 simulations
Supported Policies	<ul style="list-style-type: none"> - Group life - Individual life - Individual annuity - Pension
Input	<ul style="list-style-type: none"> - Sex - Age - Health status, including obesity status* - Socioeconomic status* - Smoking status* - Location* - Insurance plan status* <p><i>*Optional</i></p>
Model Output	<ul style="list-style-type: none"> - Stochastic projection of mortality by cause - Economic loss/gain at the individual or portfolio level - Evaluation of socioeconomic/health metrics impact on mortality projection



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