

# Life Risks Solutions



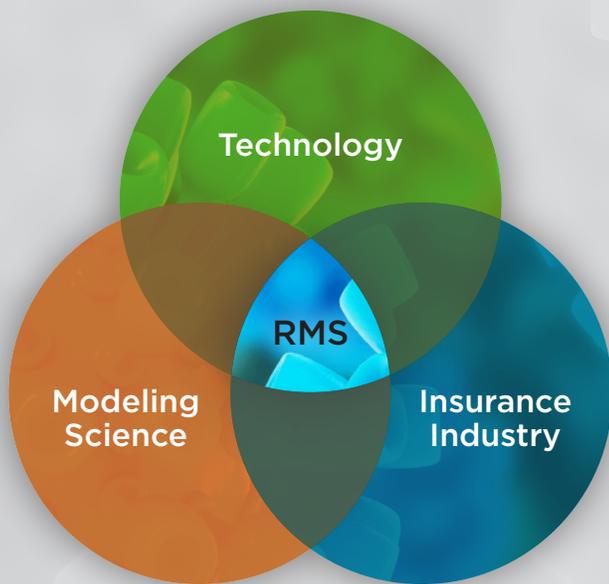
Managing Mortality and Longevity Risks





# RMS LifeRisks

RMS® lives at the intersection of modeling science, technology, and the insurance industry. We are recognized authorities in stochastic risk modeling, mathematical biology, and epidemiology. For over 10 years RMS LifeRisks® models have provided leading decision-support risk analytics to the life insurance industry. Here's how:



## Technology

Based in California's Silicon Valley, RMS models and solutions are delivered via a state-of-the-art software platform that maximizes computing power and utility to our clients.

## Modeling Science

A specialized RMS team of bioscientists monitors and interprets new medical science for insurance decision support. Modeling approaches are designed by career modelers, highly experienced in developing analytics for insurance risks.

## Insurance Industry

RMS works with insurers, reinsurers, and brokers to apply models that support their business processes.

# Quantifying Mortality Shocks

RMS models provide a causal analysis of each of the perils that give rise to mortality shocks. Risk can be quantified across perils, geographies, and lines of business for a holistic view of risk. By gaining a deeper understanding of the drivers of risk, companies can enhance their portfolio management decisions, use capital to maximize profitability, and leverage model output to help meet regulatory requirements.

## Excess Mortality Risk Perils, Defined



### Pandemic Influenza

The influenza virus is one of the fastest-mutating pathogens. Genetic shifts that evade human defenses cause global pandemics.



### Emerging Infectious Diseases

At least once a decade a new disease evolves for which medical science has no treatment.



### Mass-Casualty Terrorism

Terrorists threaten mass-casualty attacks using weapons of mass destruction, particularly posing group life concentration risks.



### Natural Hazards

Earthquakes, tsunamis, floods, and other natural hazards can kill tens of thousands of people, even in the developed world.



### Other Causes

Industrial and transport accidents, extreme weather, and other events drive additional mortality volatility.



## Significant Threats to Life Insurers

At least 30 previously unknown diseases have emerged in the last few decades, including HIV, SARS, Ebola, and hepatitis C and E. Pandemic influenza remains a potent threat, with new outbreaks of avian flu providing the potential for a humanly transmissible influenza pandemic of unprecedented virulence.

After pandemic influenza and emerging infectious diseases, terrorism and earthquake pose the next most significant threat to life insurers. These perils can be modeled at high or low resolution.

# Modeling Future Mortality

The RMS Longevity Risk Model projects future mortality improvements by blending medical science and best-of-class statistical and actuarial techniques. The model helps insurers and pension schemes better understand the underlying drivers of future mortality, allowing a more meaningful view of the risk.

## RMS Longevity Risk Model: Vitagions as Drivers of Future Mortality Improvements

### Current Drivers



#### Lifestyle Trends

Personal decisions such as smoking habits, diet, and exercise have a strong influence on mortality levels.



#### Medical Intervention

New medical treatments, drugs, and advances in biotechnology bring about extensions in life expectancy.



#### Health Environment

The availability of health care and public health standards control the living conditions that influence mortality.

### Future Drivers



#### Regenerative Medicine

New technologies such as stem-cell therapy and nanomedicine promise future mortality improvements.



#### Anti-Aging

Research into radical new approaches of extending healthy life may impact mortality levels some time in the future.

### “What-If” Scenarios

RMS LifeRisks provides insurers and pension schemes with 40+ “what-if” deterministic scenarios to add a real-world perspective along with a qualitative narrative.

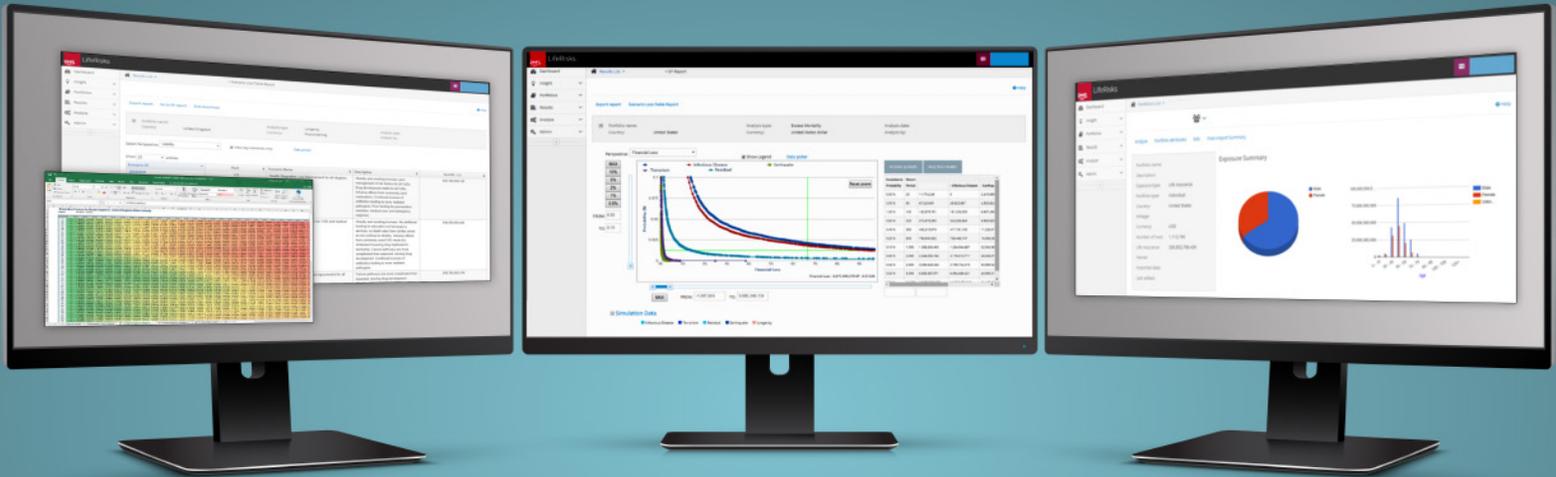


### Unique Approach to Quantify Future Risk

Mortality improvement is driven by a combination of social, economic, and medical factors. In recent years, clinically meaningful milestones were attained regarding cancer, cardiovascular disease, and other chronic diseases.

Detailed analysis of each ‘vitagion’ – driver of mortality improvement – provides an explanation of recent trends and a framework for projecting potential future improvements.

# Portfolio Management: Powered by Science. Controlled by You.



Manage your own portfolio by importing your exposure data. Choose your risk grouping structure to analyze and compare the associated risk.

View analysis results.

Harness the power of the cloud to process job queues at lightning speeds.

Clients can access RMS models, data products, and analysis outputs via the RMS LifeRisks platform. The platform is a hosted application enabling clients to access models and perform their own portfolio-specific analysis.

## Risk Diagnosis: The Power of Scenarios

RMS enables you to drill down into your model results, understand the drivers of risk in your exposures, and identify subsets of your portfolio and books of business that are contributing most to the risk you face. You can also pick scenarios that represent key thresholds of loss probability, derive narratives to communicate risk concepts, and use deterministic scenarios to explore specific issues.

## Model Your Risk: Insights From Leading Scientific Research in Real Time

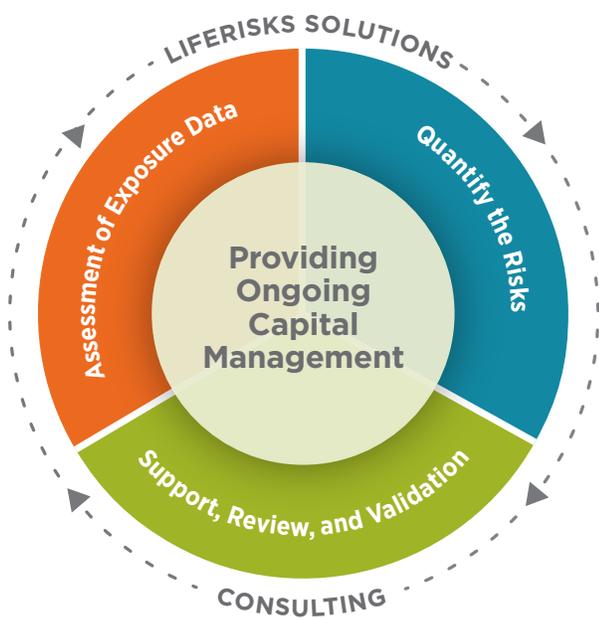
Obtain full probabilistic analysis from RMS models. Derive loss exceedance probabilities for individual portfolios. Combine results of different peril analyses on multiple portfolios across different countries.

## Export Outputs Into Your Business Processes

The model helps you create reports as well as extract risk metrics and export loss/fatality scenarios, mortality improvement tables, and life expectancies for input into your standard financial models and reports.

# Improving Risk Management

Solvency capital requirements need rigorous and evidence-based analyses. RMS models are currently being used by clients to satisfy their internal and regulatory requirements.



## Twenty Years of Evidence

RMS has been a risk management innovator for more than two decades, providing the capital management tools relied on by the large majority of the property, casualty, and life industries.

## Applying Scientific Integrity and Rigor

Objective evidence of the underlying risk processes forms the analysis philosophy behind RMS models. Diligence in gathering data and applying rigorous interpretation is the hallmark of RMS science.

## Independent and Impartial Risk Analysis

RMS provides impartial risk analysis, as our models support insurers, reinsurers, intermediaries, and the capital markets. The assessment of risk is provided based on a fresh analysis of all the data.

## Capital Management: The Next Generation

RMS models are designed for incorporation into a company's business management processes. By making it easy to run analyses and organize data, you can monitor risk positions at frequent intervals, respond to change, and optimize your risk management strategy.

## Risk Transfer

RMS analytics are used to design and support risk transfer decisions that protect companies and optimize capital efficiency. Our models provide an independent and objective view of risk for both sides of the transaction. Narratives and scenarios from the models help develop an intuitive understanding of the risk being transferred.

Risk transfers offer financial protection and capital efficiency gains, including mitigation of regulatory capital requirements.

## Risk Transfer to the Capital Markets

RMS has a dedicated team for capital markets transactions, providing support to clients in the application of modeling to insurance-linked securities.

### Experienced Modeling Agent

Design a transaction and produce a risk report for a proposed transaction.

### Rating Agency Liaison

Work with the rating agency to get a successful rating on the transaction.

### Development of the Offering Circular

Supply supporting methodology and legal documentation for potential investors.

### Investor Roadshow

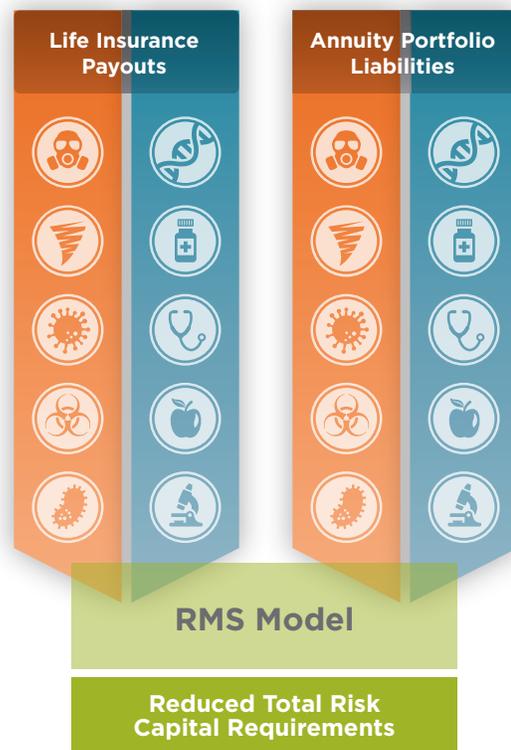
Make presentations to potential investors as part of the marketing of the transaction.

### Calculation Agent

Provide independent arbitration of settlement.

## Hedging Mortality and Longevity Risk

Insurers managing risk capital requirements for both life insurance exposure and annuity liabilities need to understand the causes of fluctuations in both. Scenarios of the causes of change in future payouts enable the understanding of how different books of business offset each other. Understanding the causes of change provides insights into correlation structures and enables efficient risk capital management transactions.



# Services Beyond the Screen

RMS models are an independent and objective view of risk, and they are calibrated using verifiable scientific evidence about the processes that drive that risk. The RMS team is experienced in working with companies who use the models and are required to defend risk management decisions that arise from applying the models.



## Consultancy Services

The LifeRisks Consultancy Team has the expertise to help you effectively manage your mortality risks, meet regulatory challenges, and capitalize on business opportunities.

## Risk Management

- Economic capital modeling for longevity, mortality, catastrophe, and mortality/longevity hedge
- Internal model calibration, internalization of models, and technical documentation
- Validation of reserves, pension scheme valuation assumptions, and mortality/longevity risk modeling
- Bespoke scenario analysis for risk reporting

## Risk Transfer

- Analyzing risk underlying cede or assumed reinsurance
- Risk analysis and structuring of excess mortality/longevity securitizations
- Quantification of hedge benefit associated with mortality/longevity risk swaps
- Evaluation of pension de-risking options

## Understanding the Risk

RMS consulting focuses on providing risk quantification, as well as a complete understanding of the underlying drivers of risk that provide a roadmap for actionable results.

Risk Management Solutions is the world's leading provider of catastrophe risk models to the insurance industry.

With more than 400 clients in over 100 countries, RMS has models that have been used with over \$2 trillion worth of insurance and capital markets transactions.



To learn more, visit [www.rms.com/liferisks](http://www.rms.com/liferisks) or email [liferisks@rms.com](mailto:liferisks@rms.com).



©2019 Risk Management Solutions, Inc. RMS is a registered trademark and the RMS logo is a trademark of Risk Management Solutions, Inc. All other trademarks are property of their respective owners.

**GLOBAL HEADQUARTERS**

7575 Gateway Blvd.  
Newark, CA 94560 USA  
1.510.505.2500

**EUROPEAN HEADQUARTERS**

Peninsular House  
30 Monument Street  
London EC3R 8NB UK  
44.20.7444.7600