Life Science Report 2025

Turning evidence into excellence

Munich RE

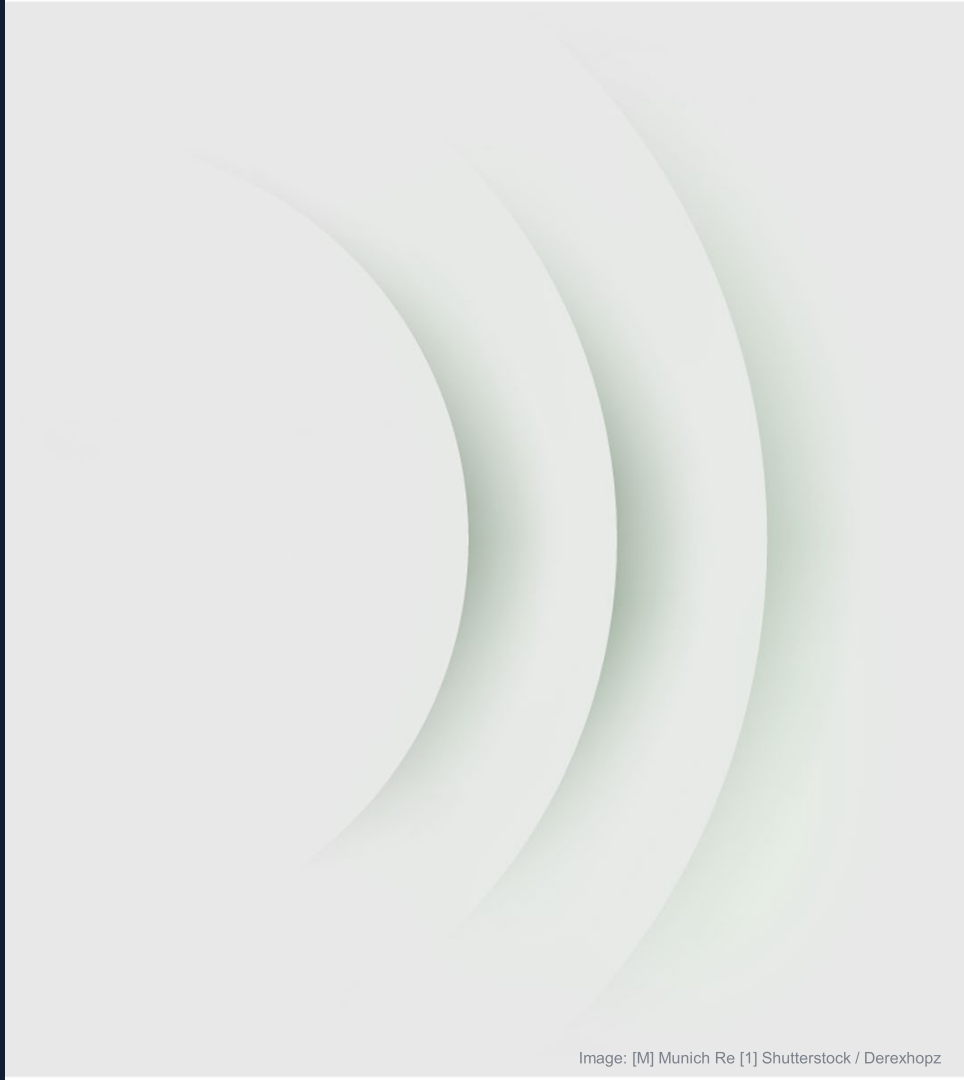


Image: [M] Munich Re [1] Shutterstock / Derexhopz

Life Science Report
Editorial

Munich RE

Turning Evidence into Excellence

Recent years have seen remarkable medical advances. From new diagnostic tests to extraordinary treatments, they have the potential to reshape the mortality and morbidity landscape, creating both opportunities and challenges for the life and health insurance industry. Enthusiasm balanced with caution is the new order of the day.

In this context, Munich Re's Life Science Report 2025 has been carefully crafted to provide life and health insurers with insights into the global trends and risks that will shape the industry over the next decade. In five tailored editions released in the first quarter of 2025, our global medical team will explore each area in depth, providing a comprehensive understanding of both the promises and pitfalls to help our clients better navigate in this new environment of changing mortality and morbidity risks.

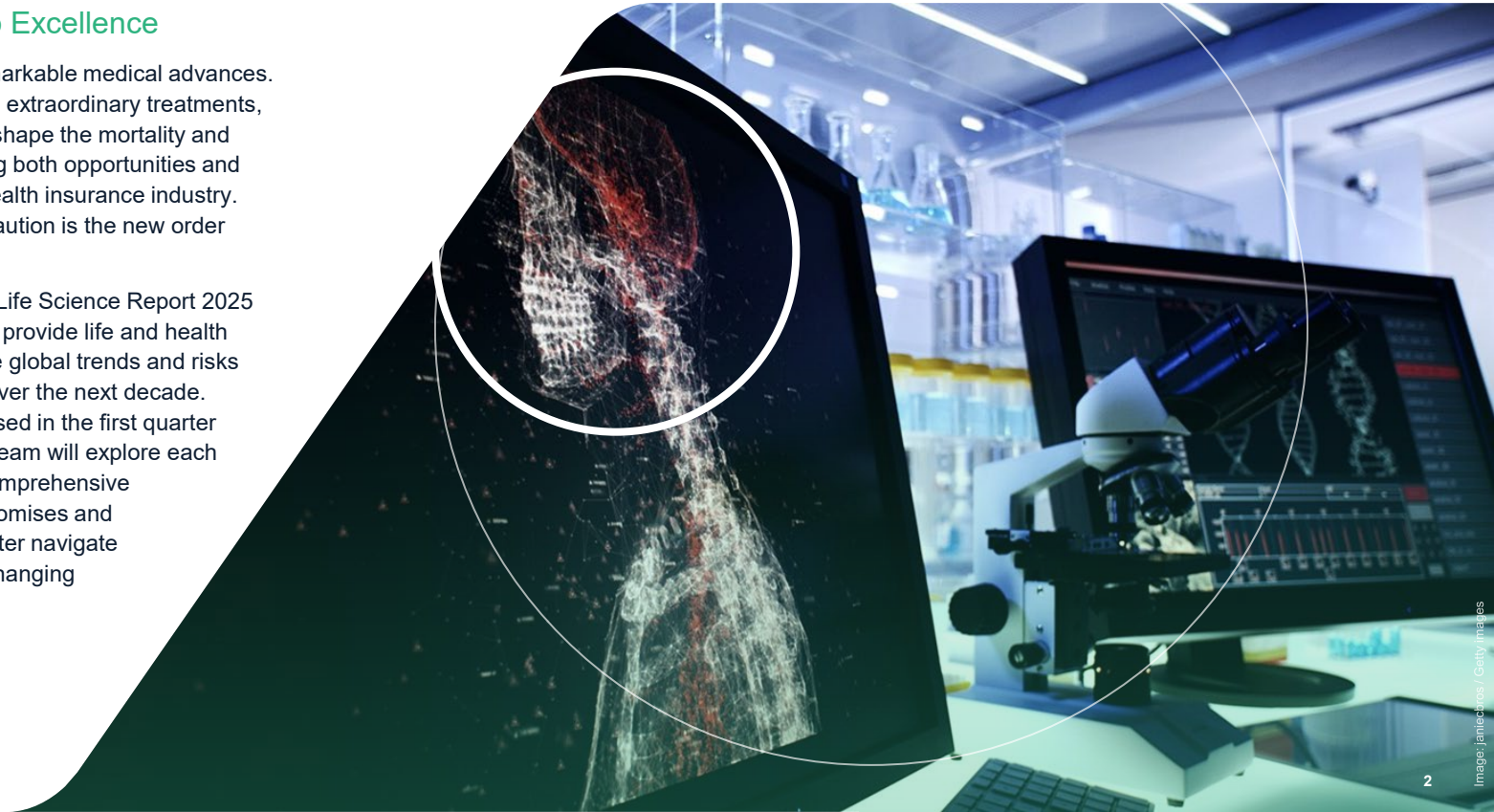


Image: Jarilechros / Getty Images

Life Science Report
Editorial

Munich RE

AI in Healthcare

The chapter on **Artificial Intelligence in Healthcare** examines the future impact of AI on medicine, focusing on the traditional domains of prevention, diagnosis, and treatment.

It also describes its impact on foundational medical knowledge, and the implications for life and health insurance.

Improving Cancer Outcomes

Advances in our understanding of cancer, along with novel treatments, continue to improve the survival rates of individuals with cancer.

The chapter on **Improving Cancer Outcomes** describes how progress in cancer genetics will change cancer classification, how new diagnostic tests will diagnose cancer sooner, and how innovative treatments will improve cancer survival rates.

Improvements in mortality and morbidity are on the horizon that will significantly change the future of life and health insurance.

Prevention

The **Prevention** chapter examines how insurers can develop prevention strategies for insured lives, based on a comprehensive understanding of insured portfolios and with the aid of personalized risk profiling, digital risk scores, and advanced analytics.

Insurers are now poised to assume a new role: as active participants in the well-being of their policyholders, which has the potential to transform life and health insurance from settling claims to actually improving lives.

Obesity

According to projections, by 2035, more than half of the global population will be overweight or obese.

The **Obesity** chapter assesses the potential of recently released anti-obesity medications to reverse this upward obesity trend, and to reduce mortality and morbidity from a wide variety of medical conditions.

The impact of these newer medications on the population is potentially enormous, as is their contribution to mortality improvement in the future.

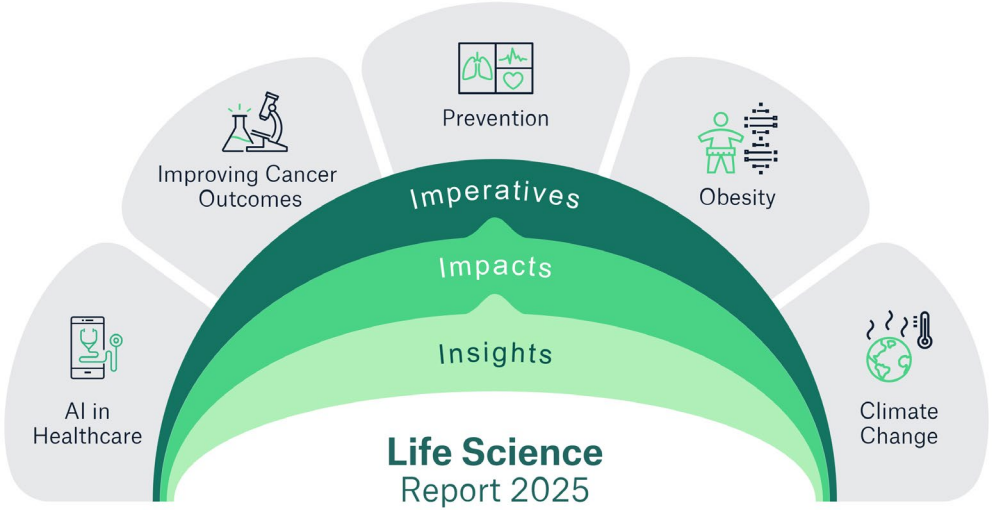
Climate Change

Recent and radical climate events raise urgent questions about the future impact of climate change on human health – and, by extension, on life and health insurance.

The **Climate Change** chapter explores climate-related hazards that could worsen mortality and morbidity and introduces a new modelling approach to assess potential impacts on underwriting, portfolio management and claims.

Life Science Report
Editorial

Throughout the report, Munich Re's global medical team offers in-depth insights into the medical, technological, and environmental factors that will influence underlying biometric risks and insurance operations, through three distinct sections in each chapter.



Imperatives

A list of the imperatives life and health insurers should consider in order to capitalize on the opportunities that biomedical advances will bring, and to prepare for scenarios that may pose a threat to operations and products.

Impacts

A description of the impacts of these changes on specific risk factors and product lines.

Insights

A review of the biomedical advances and risks, which provides succinct insights into their relevance for life and health insurance.

To make the Life Science Report an actionable business guide, we supplement each of the five chapters with an overview of Munich Re's regionally tailored services and solutions, which we invite you to explore further.

The Life Science Report 2025 will help you to turn **medical evidence into business excellence.**

Climate Change

Image: [M] Munich Re [1] AscentXmedia / Getty Images

Climate Change
Key Takeaways

Munich RE

- **There is uncertainty regarding the impacts of climate change** on various parts of the life and health insurance value chain.
- Exposure to heat, air pollution, wildfire smoke, increased frequency of more severe natural disasters, and emerging infectious diseases are **insurance-relevant hazards for mortality and morbidity that are amplified by climate change**.
- **Mental health disorders** as a major disability claims driver could be affected.
- Regional, market and product-specific **quantitative impact analysis** are required.
- **Monitoring of portfolios and claims** for climate impacts should be initiated.
- **Munich Re has developed a new modelling approach** that brings together life and health portfolio data and climate change scenarios.
- Consequently, **an analysis of possible business impacts and adaptation measures** under various climate scenarios is feasible.

Climate Change
Executive Summary

Munich RE

Climate Change
A Growing Concern for Life and Health Insurers

We are alarmed by news of the enormous impacts of climate change on all fields of daily life, which leads to the following questions:

- Will this impact life and health insurance?
- Which insurance applicants and products are affected?
- If there is an impact, how relevant is it and when will it be significant?
- What must life and health insurers do now, to estimate future impact?
- Can life and health insurers adapt their business to climate change impacts, so as to maintain profitability and avoid losses?

These are the questions we wish to address below.

The Looming Health Threat
Why Insurers Must Prepare for Climate Change

Experts have stated that the impact, up to now, especially for mortality-related business, could be negligible in highly developed countries.

Nevertheless, facing the potentially greatest health threat in human history, as declared by the World Health Organization, the insurance industry must explore potential impacts in the coming decades.

In this challenging scenario the uncertainty around long-term projections may well be the greatest challenge for insurers that needs to be addressed.

Today, based on the current evidence, the consequences on mortality outcomes in the insured population are not yet foreseeable due to lack of scientific consensus on mortality modelling and regional differences.

Regional Risks
The Importance of Localized and Insurance-specific Climate Impact Analysis

Climate change and related events must be analysed on a regional level, as impacts are not uniform across geographical regions and markets.

Current impact models, e.g., for temperature changes, must also be modified and transferred to the insurance setting, as the impact on general and insured populations can be substantially different.

These revised models could identify vulnerable products and groups of individuals, but also the potential of adaptation measures.

Monitoring Insurance Impacts of Climate Change
A Way to Prepare for the Future

Insurers need an effective monitoring process to enable an insurance-specific and timely analysis of current and future impacts. We can help life and health insurers identify, assess and document climate-related impacts on their portfolio and devise effective adaptation measures.

Climate Change

Insights – Impacts – Imperatives

From an insurance perspective, major hazards related to climate change for mortality include both changes in heat and cold periods, as well as the synergistic influence of air pollution.

For morbidity outcomes, extreme heat and cold periods in conjunction with air pollution, severe natural disasters, exposure to wildfire smoke, and emerging infectious diseases are the relevant hazards.

The most vulnerable groups are the elderly (>65 years), persons with comorbidities, outdoor workers, and (pregnant) women.[1]

We focus in this report on insurance-relevant age groups, where data is available.

Image: miodrag ignjatovic / Getty Images

Mortality

Temperature changes affect mortality with varying magnitude, making people more likely to die from underlying health conditions.[2,3] Research on this topic is not yet conclusive and results vary. Cold-related deaths are more common than heat-related deaths in highly developed countries, driven by respiratory and cardiovascular causes.[4,5] However, it's unclear whether global warming will lead to a greater decrease in cold-related deaths compared to the increase in heat-related deaths.

While heat-related deaths are projected to increase uniformly, scenarios for cold-related deaths range from a massive decrease to no change. For example, a recent analysis found that seasons with excessive heat-related mortality are 5 times more likely now than in 2000, and even 10 times and 27 times more likely in a 1.5° and 2°C warmer future climate, respectively.[6] Structural adaptation, such as using air conditioning against heat and central heating against cold, or physiological adaptation to extreme heat, could mitigate the impacts.[7,8] Adaptation has already taken place over the last few decades, but whether this adaptation has limits remains unclear. With these uncertainties, projections need to be re-evaluated in the near future, as definitive long-term conclusions cannot be drawn.

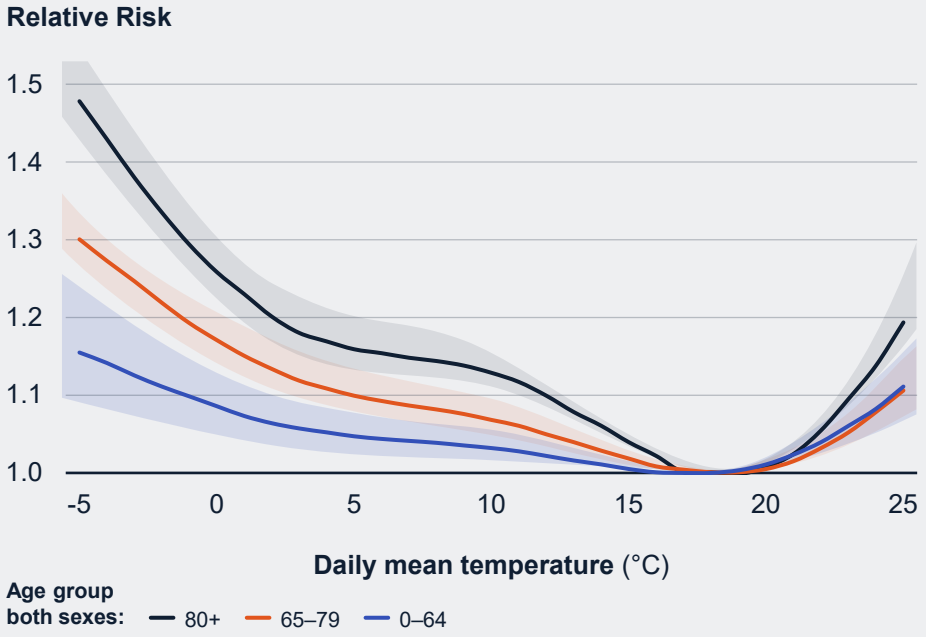


Figure: Relative Risk (RR) for death in association with daily mean air temperature. The risk for death is elevated over a wider temperature range below (cold-related deaths) than above (heat-related deaths) the optimum temperature (approximately 18°C for Europe). Persons below 65 years are less affected than other age groups. Adapted from: Ballester et al.[3]

Climate Change

Insights – Impacts – Imperatives

Munich RE

Morbidity

Rising temperatures, air pollution and wildfires have a clear effect on certain diseases like cardiovascular or respiratory disorders.[9] Days with excessively high temperatures can increase emergency department visits and hospitalizations by up to 50%.[10]

The impact of wildfire smoke is harder to predict, as the trends in the frequency and extent of wildfires are variable for many regions. In the US, Canada, Asia and Australia, an increase in wildfires and health-threatening smoke exposure has been observed. This trend could accentuate.[11]
In contrast, the trend for wildfires in Europe is less clear.

The increased frequency of severe natural disasters, such as severe storms and floods, could also increase morbidity levels, as could emerging infectious diseases.[12]

Climate change could become the dominant anthropogenic driver in enabling animal pathogens to jump to humans which could increase pandemic risk.[13] More than 50% of human infectious diseases can be aggravated by climate change.[14] In an increasingly globalized world, there is the risk of more frequent disease importation which can spark epidemics.

Image: Juan Silva / Getty Images

Morbidity

Effects on selected insurance-relevant impairments include

Mental Health

Climate change can significantly affect mental health, with heat and natural disasters like floods and wildfires being key influencing factors. Anxiety related to climate change, or solastalgia, is also a contributing phenomenon.

Heat increases the risk of hospitalization for mental health diagnoses such as bipolar disorder, anxiety, and post-traumatic stress disorder, by as much as 10%.[15-17] Heat also shortens sleep duration, which further impairs health.[18]

Following wildfires, prescriptions of antidepressants and anxiolytics can increase up to 7% and 9%, respectively,[19] as can emergency department visits for anxiety disorders (+6%).[20]

Asthma

Climate change also impacts asthma. This is due to longer pollen seasons, with higher pollen concentrations, and more aggressive pollen, caused by air pollution. New allergens due to invasive plant species also contribute.

Heat, thunderstorms, and wildfire smoke events can trigger asthma symptoms, increasing hospital admissions by up to 50%. Recent Canadian wildfires were the likely cause of a 45% surge in asthma hospitalizations in the Northeastern United States.[11]

However, in counterbalance, asthma prevalence and incidence have stabilized, or even decreased, in the working age group, although with some notable exceptions, such as the United States.

Other Impairments

A moderate effect on cardiovascular morbidity is anticipated under climate change, as cold temperatures have a more pronounced impact on cardiovascular events, like stroke and myocardial infarction, than heat.

Climate change is also expected to expand the reach of certain infectious diseases, such as West Nile virus and Dengue virus, which are now established in North America and Europe.

While public measures can control local outbreaks, as seen in the US with decreasing trends of locally acquired cases, climate change will continue to expand the geographic range with suitable conditions for these and other vectors, like ticks. However, treatments and countermeasures have been identified and can be effectively implemented.

Munich RE

There is considerable uncertainty about the impact of climate change on life and health insurance.

But, it is crucial that insurers evaluate this potential impact, both today and in the future.

To date, no dedicated data-based, quantitative impact analysis of climate change on life and health insurance has been conducted.

Qualitative, semi-quantitative and, for the first time, quantitative mortality and morbidity analysis are provided below:

Mortality Impacts

An exploratory analysis from Munich Re in Germany using a novel modelling approach found that mortality levels in death-benefit products did not excessively increase during heat periods in the last 10 years (see figure on the next page). This was a market-specific finding that may not apply to other markets.

In analysis such as these analytical challenges include the need for granular spatial and temporal data on death events, large portfolio data, and expertise from biomedical and climate experts.

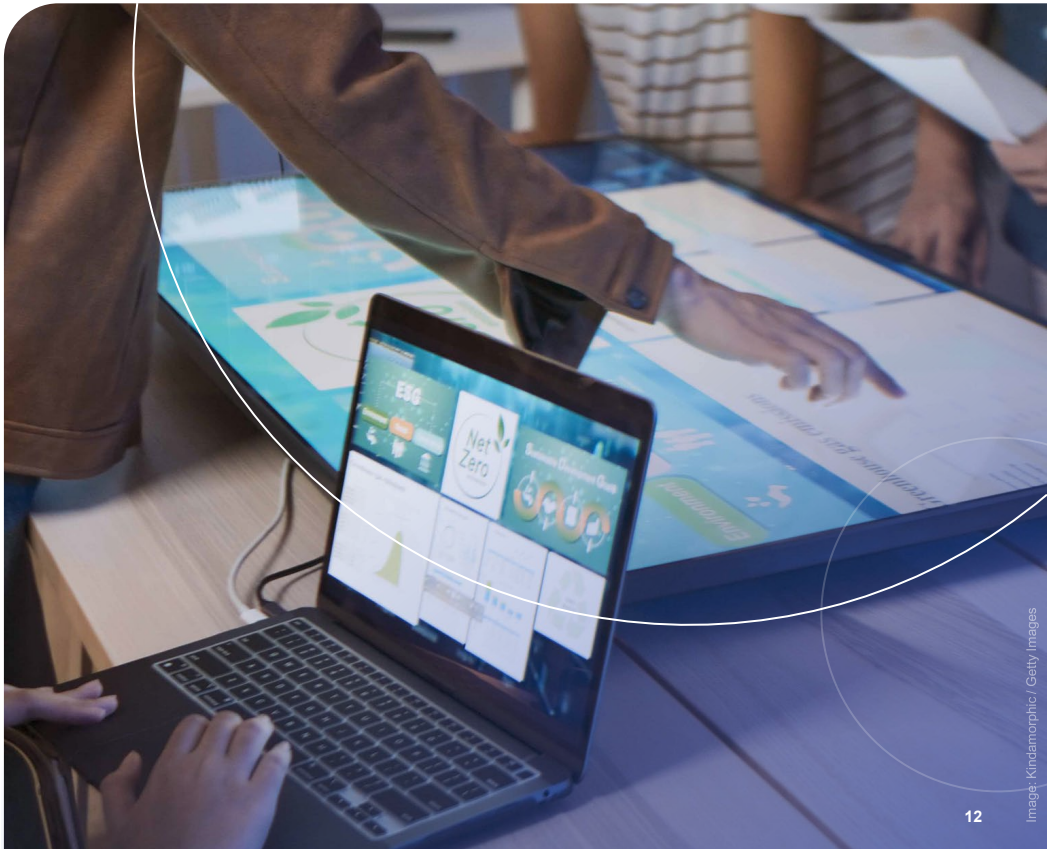


Image: Kindamorphic / Getty Images

Climate Change

Insights – **Impacts** – Imperatives

Munich RE

Building on our growing expertise in climate impact on life and health and using a refined modelling approach, we tested this hypothesis, by conducting a case study with data from the United Kingdom with adequate data granularity.

This analysis showed that extreme heat during the summer season is indeed associated with excess deaths in the insured population.

Although this observation has to be confirmed for comparable markets, which would rely on appropriate data sets, it demonstrates that monitoring of heat impacts is feasible.

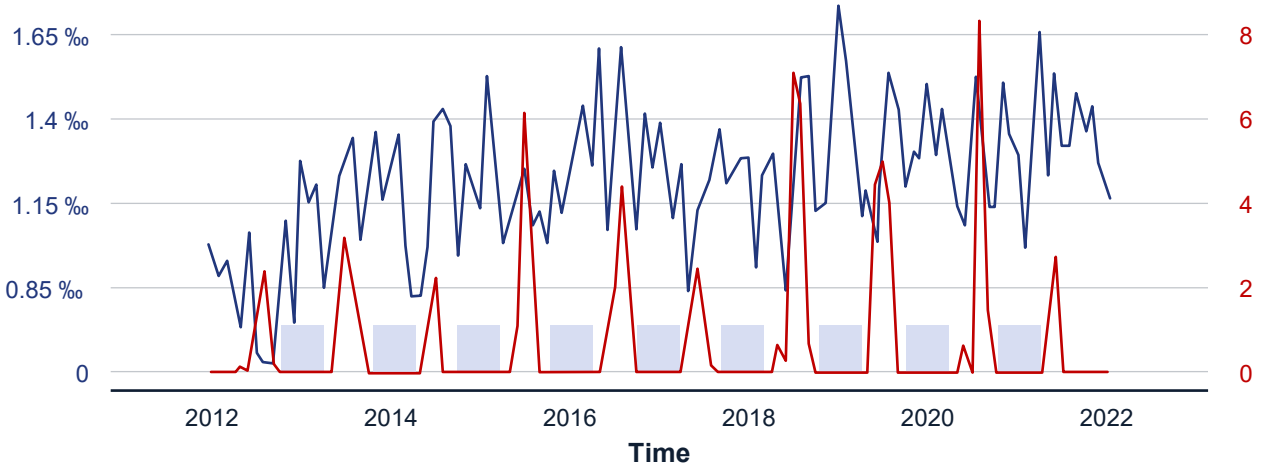


Figure: Heat and mortality curves from a large German federal state (term life only). Summer heat peaks (**red**) do not overlap with mortality peaks (**dark blue**) in every year.

Whether the impact on mortality could potentially become clearer and relevant for life and health business **under current climate change projections needs to be closely monitored.**

Munich RE

Morbidity Impacts

Climate change-related events can affect living benefits and health insurance, at both underwriting and claims experience levels. Health insurance is particularly sensitive to climate impacts, as extreme heat, wildfire smoke or infectious disease outbreaks can immediately increase hospitalization and emergency department visits, thus increasing costs significantly.

1. Mental Health Impacts

With the increasing global burden of mental disorders, we expect the impact on life and health insurance to be substantial due to the sensitivity of mental health to climate events, also for younger age groups;[21] high prevalence even in the insured population (e.g., up to 11% of applicants report mental disorders using the medical underwriting tools for the German market); and the rise of what has been dubbed climate anxiety.[22,23]

We propose here a model where mental disorders will experience a relevant worsening due to climate change in the near future. If persons are hospitalized or receive drug prescriptions, it can lead to a reclassification of underwriting risk (e.g., from mild to moderate depression).

The consequence could be higher loadings or even declines. This could offset recent insurability improvements. To analyse the impact on mental disorders, we combined our medical expertise with the Location Risk Intelligence tool from Munich Re, which reflects key climate variables like temperature, both currently and under climate change scenarios.

We chose a mid-term horizon from 2030 to 2040 under the SSP5-/ RCP8.5 scenario, which is based on an increase of more than 2 degrees by mid-century.[24]

We estimate a potential increase in heat-attributed hospitalizations for mental disorders in selected regions from 4% to 10% (2030) and to 13% (2040),[16] shifting mild disease grades to moderate or severe, therefore impairing recent insurability improvements. Whether adaptation to the “new normal” of a changing environment would ameliorate the impact of the stress factor climate change is unclear.

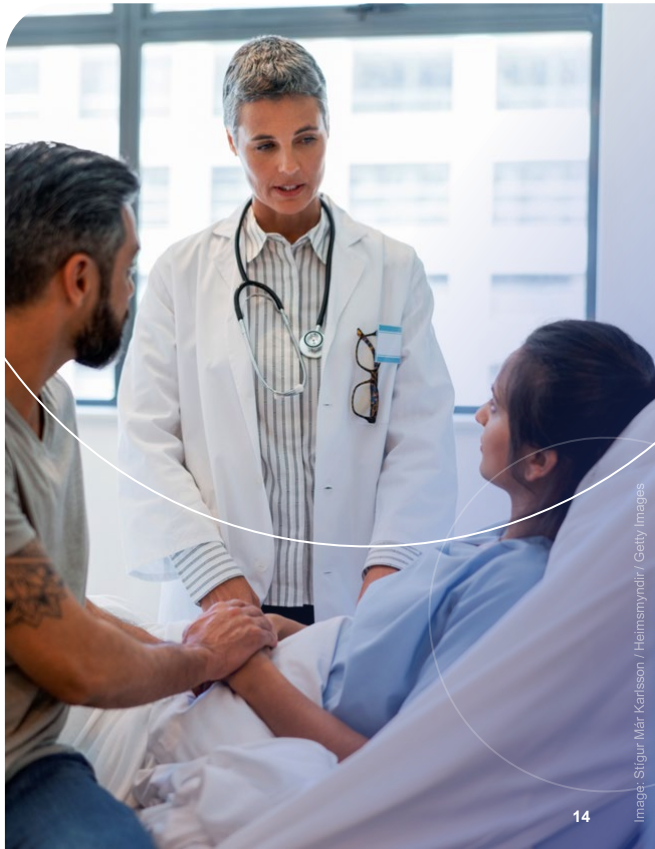


Image: Sigurður Karlsson / Heimsmyndir / Getty Images

2. Asthma Impacts

Global asthma burden is not expected to increase substantially in the general population. However, up to 3% of applicants using our digital underwriting tools for the German market currently report a history of asthma, of which only one in 20 report a history of hospitalization due to asthma. While models predict a 5-fold increase in heat-induced asthma hospitalizations by the end of the century, the relative proportion of these to all asthma hospitalizations is less than 1%. We do not foresee a significant absolute increase in respiratory disease hospitalizations due to heat periods.[25-27]

Nevertheless, every hospitalization that could be avoided would lead to more favourable conditions for applicants. The effect of hospitalizations on disability ratings would be cumulative from the underwriting perspective, as most asthma-related hospitalizations would lead to exclusion clauses.

Due to the aforementioned low absolute impact of heat on asthma, we do not expect a major increase in claims cases due to asthma in disability insurance. Nevertheless, as especially outdoor working conditions for those affected by asthma could worsen, any claims case could show impaired work recovery potential.

Health care costs will rise in the future due to climate change, with respiratory diseases as notable examples. The 2019–20 Australian wildfire season had significant and immediate impacts on health portfolios, with healthcare and economic costs for respiratory hospital admissions and emergency department visits increasing to around $AUD 17 million, roughly 9 times higher than in all previous seasons.[28]

Image: Brothers91 / Getty Images

Climate Change

Insights – **Impacts** – Imperatives

Munich RE

Model for impact on Underwriting, Claims and Health Business – Asthma and respiratory diseases

Example:
Increase in severe fires over time

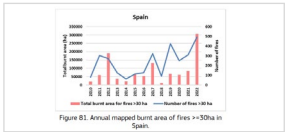
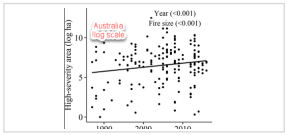


Figure 81. Annual mapped burnt area of fires >=30ha in Spain.



Severe wildfires ↑ → **Wildfire smoke** ↑

Extreme heat ↑ → Ground Ozone concentration

Population in "wildland-urban" interface prone to wildfire exposure ↑ →

Exposure to harmful air ↑

Allergen burden due to climate change (pollen, different plant species) ↑

Reduction of pollutants from carbon energy (if achieved) ↓

Increase in Asthma morbidity ↑

- Increased emergency visits ↑
- Increased medication use ↑
- Increased health care costs, especially ambulatory and emergency cases ↑

Allergic predisposition →

Cases relevant for Underwriting ↑

Claims cases due to higher morbidity →

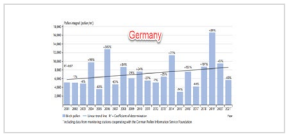
Regional differences ↑

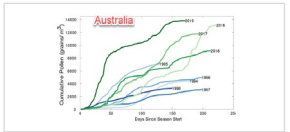
Affected Products: Disability, Health; more exclusions/loadings ↑

Reactivation potential ↓

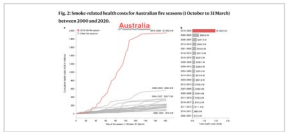
Analytical challenges ↑

Example:
Increase in pollen concentrations over time





Example:
Smoke-related health care costs Australia



Asthma is one of the most common impairments disclosed in Underwriting.

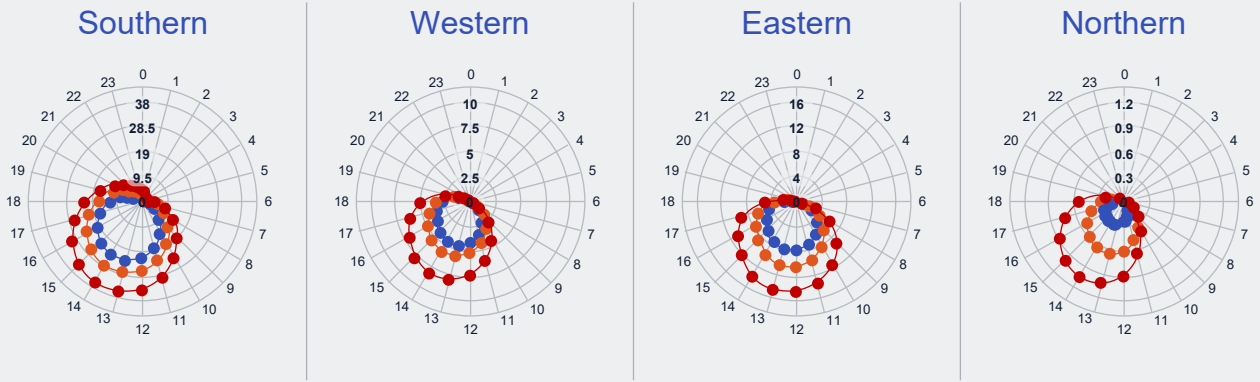
Asthma and respiratory diseases are particularly vulnerable to environmental hazards.

3. Impact on Outdoor Activities

Outdoor work activities could become a challenge in the next decades.[1] Insured individuals with heat-sensitive impairments like mental or cardiovascular disorders may experience reduced work capacity, leading to a higher number of valid claims for occupations that require high-strain outdoor activities.

Reintegration into previous jobs may be challenging due to increased heat exposure. Adaptation measures could be limited, potentially leading to an increase in claims cases.

Europe



Adapted from van Daalen et al.[1] 1990–2000 2001–2011 2012–2022

Mean annual risky hours per person for physical-activity-related heat stress (activities of medium intensity) per European subregion by time of day for three time periods (**blue**: 1990–2000, **orange**: 2001–11, and **red**: 2012–22).

The outer grey ring shows the time of day on a 24-hour clock, with the inner grey rings showing the number of risky hours. In Europe, the number of hours of moderate physical intensity under hot conditions and outside the usually hottest hours of the day increased between 94% and 382%. This indicates that also physical work activities will have to be shifted to unusual hours or will no longer be possible for certain persons in the future.

Climate Change

Insights – Impacts – **Imperatives**

Munich RE

Climate change and global warming will continue, potentially accelerate or even exceed current scenarios.

Measurable impacts on mortality and morbidity within the general population have been demonstrated. To understand, quantify and react to these impacts, the insurance industry should consider the following:

1

Introduce a Monitoring Process for Underwriting, Portfolios and Claims

Insurance companies should start monitoring their underwriting, portfolios, and claims for climate impacts. Establishing a monitoring process is crucial to identifying effects.

2

Munich Re has **data models to evaluate impacts**. Data requirements for life and health insurers can vary by product and market but need a minimum spatial and temporal resolution.

These models enable impact projections under a future climate, building on our experience with natural disaster risk models.

3

Monitoring will also help assess adaptation measures.

As such, **collaborate** with Natural Disaster/ Climate units within your business to build on existing expertise in climate change and to enable the monitoring process.

Climate Change

Insights – Impacts – **Imperatives**

Munich RE

4

Be Prepared for Future Reporting Regulations

Future regulatory requirements could potentially demand analysis of climate risks in life and health portfolios, comparable to current regulations for non-life business. Based on their knowledge from monitoring climate impacts as described, insurers would be prepared for these requirements.

5

Sustainability and Social Responsibility

Life and health insurers could position themselves within their market by evaluating climate risks. This would demonstrate their willingness to take responsibility within society and protect their insured and stakeholders in the long term with fair risk assessment and sustainable business models.

6

Explore New Customer Services such as asthma air quality warning apps or heat alert apps, which need to be evaluated by (re)insurance medical consultants in terms of their efficacy in the insured population.

7

These could be scalable to various markets and regions. **Insurance-tailored adaptation measures could be developed**, e.g., for occupational outdoor activities. Overall, adaptation is potentially effective for many climate risks but will differ for individual markets and insurance products.

8

Quantitative climate impact analysis is possible. Munich Re can offer these analyses based on our expertise in medical and environmental risks.

We will see more demand for life and health impact analysis in a changing climate, which has also been acknowledged by the Geneva Association.

Climate Change

Munich Re’s services & solutions

Image: [M] Munich Re [1] AscentXmedia / Getty Images

Munich Re's interdisciplinary risk expertise

Assessing potential impacts of climate change on life and health portfolios

Munich RE

Modelling approach for impact analysis

Guiding questions

How to prepare for potential impacts of climate change on life and health portfolios?

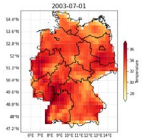
How to anticipate potential risks of climate change?	How to assess climate-related hazards that could worsen mortality and morbidity?	How to prepare for potential audit and reporting requirements?
Clients are encouraged to monitor mortality data for heat-associated deaths.	**Clients can reach out to Munich Re to discuss climate-impact analysis.**	**Clients can benefit from Munich Re's approach to scenario modelling.**

Combining Munich Re's risk expertise

Data on Natural Hazard	Risk Management Partners
Medical Expertise	Life & Health
Climate Expertise	Climate Change Solutions

Experience

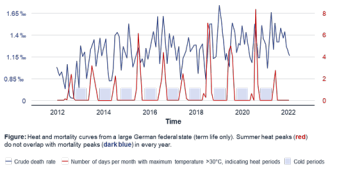
Natural Hazard + LH portfolios



Year	Month	State	Actuals
2003	7	Region A	0.0019
2003	8	Region A	0.0020
2003	9	Region A	0.0024
2003	10	Region A	0.0022
2003	11	Region A	0.0018

New dimension of life and health risk analysis

Projection



Contact

If you want to know more about our climate change expertise and education offers.

Please reach out to your local Client Manager

Location Risk Intelligence from Risk Management Partners

Exploring physical risks caused by natural hazards and climate change

Munich RE

	Wind- and water-related climate risks analysed by Location Risk Intelligence	Fire- and heat-related climate risks analysed by Location Risk Intelligence
Solution	Tropical cyclones, floods or heavy precipitation can lead to increased mortality, injuries and water-borne illnesses, driving up claims, disrupt healthcare access and placing a financial burden on insurers. Address the impact of wind and water-related physical risk events by improving climate analysis for a better understanding of the current situation and future climate developments, and for more reliable predictions. Developing climate-responsive insurance products and promoting preventive health measures can help mitigate risks.	Wildfires, such as the recent ones in California, and extreme heat waves increase mortality from heat stroke, respiratory and cardiovascular complications, and exacerbate chronic diseases. By understanding the impact of climate risk on the life & health business and utilizing detailed climate risk insights, insurers can better predict health impacts and adjust underwriting, ultimately improving their business and competitive position.
Benefits	**More accurate risk assessment:** Understanding and predicting mortality and morbidity trends better is the basis for precise underwriting and pricing decisions. **Enhanced customer protection**: Climate-informed policies allow insurers to offer coverage tailored to emerging health risks, improving policyholder security and satisfaction. **Competitive advantage and differentiation:** Leverage climate risk analytics to support development of innovative products.	**Improved risk assessment:** Gain detailed climate risk insights to better predict the impact of wildfires and extreme heat on mortality and health conditions, leading to more accurate underwriting and pricing. **Better claims management**: Understanding wildfire and heat trends enables insurers to anticipate claim volumes to potentially optimize reserve allocations, improving financial stability.
Contacts	**Risk Management Partners** North America **Nicholas Peterson** npeterson@munichre.com **Risk Management Partners** Europe/Latin America **Sabine von Loeben** svonloeben@munichre.com **Dugan Trevathan** dtrevathan@munichre.com **Risk Management Partners** Asia Pacific/Middle East, Africa **Markus Waniek** mwaniek@munichre.com	**Risk Management Partners** North America **Nicholas Peterson** npeterson@munichre.com **Risk Management Partners** Europe/Latin America **Sabine von Loeben** svonloeben@munichre.com **Dugan Trevathan** dtrevathan@munichre.com **Risk Management Partners** Asia Pacific/Middle East, Africa **Markus Waniek** mwaniek@munichre.com

Learn more

Learn more

Location Risk Intelligence from Risk Management Partners

Exploring physical risks caused by natural hazards and climate change

Munich RE

Solution

Heat- and humidity-related climate risks
analysed by Location Risk Intelligence

Extreme heat waves can increase mortality rates and contribute to heatstroke, dehydration, and cardiovascular diseases while especially coastal regions experience high humidity levels, worsening heat stress and raising hospitalization rates.

Heat stress models help insurers anticipate increased claims for heat-related illnesses, allowing them to optimize reserves and refine cover-age strategies.

Benefits

Improved risk assessment allows you to refine underwriting and pricing models, ensuring premiums accurately reflect rising health risks.

Anticipate claims related to heatstroke, dehydration and cardio-vascular disease, supporting financial planning through climate analysis.

Contacts

Risk Management Partners
North America
Nicholas Peterson
npeterson@munichre.com

Risk Management Partners
Europe/Latin America
Sabine von Loeben
svonloeben@munichre.com
Dugan Trevathan
dtrevathan@munichre.com

Risk Management Partners
Asia Pacific/Middle East, Africa
Markus Waniek
mwaniek@munichre.com

Learn more

Epidemic Risk Solutions

Global warming as a driving force of increased epidemic and pandemic risk

Munich RE

	Public sector early response cost financing Munich Re Epidemic Risk Solutions	Integrated pandemic risk management solution Munich Re Epidemic Risk Solutions
Solutions	Outbreak early response cost financing, to help mitigate the increased risk of epidemics and pandemics. For example, disruptions to ecosystems from natural resource extraction and climate change, have increased the risk of Ebola and Marburg outbreaks. Africa Risk Capacity's (ARC) Outbreaks & Epidemics risk insurance product is calibrated to deliver the funds to execute actions at the early stage of an outbreak.	To narrow the protection gap and strengthen resilience to the increasing threat of epidemics and pandemics, we bundle our in-depth expertise to provide suitable parametric risk transfer. We offer solutions for different lines of business. For example, by partnering with International SOS, we have combined financial protection and C-suite health advisory for pandemic risks.
Benefits	In the case of developing nations such innovative funding mechanisms enable rapid country-led outbreak responses aiming to outpace the exponential rate at which disease can spread, with the aim of mitigating an epidemic and potentially preventing a pandemic. Having successful collaborations and partnerships, we can jointly contribute to closing the financial gap for developing nations affected by climate risk and related epidemic catastrophic events, increasing resilience worldwide.	We offer liquidity and health expertise to increase resilience: ▪ ESG – Demonstrate resilience against pandemics to stakeholders ▪ Health & Safety – Maintain duty of care for staff and visitors during an epidemic or pandemic ▪ Business Continuity – Liquidity & safe return to business as usual ▪ Reputation – Reduce risk from workplace outbreaks and mitigation For life & health insurers, we can offer a range of products, in particular Affirmative Pandemic Reinsurance and parametric extreme mortality stop loss covers for the purposes of economic coverage and solvency capital optimisation.
Contacts	**Jordan Tapper** jtapper@munichre.com Learn more	**Tracey Wood** twood@munichre.com Learn more

Climate Change
References

1. van Daalen KR, Tonne C, Semenza JC, et al. The 2024 Europe report of the Lancet Countdown on health and climate change: unprecedented warming demands unprecedented action. Lancet Public Health 2024. DOI: 10.1016/S2468-2667(24)00055-0.
2. Curriero FC, Heiner KS, Samet JM, Zeger SL, Strug L, Patz JA. Temperature and mortality in 11 cities of the eastern United States. Am J Epidemiol 2002;155(1):80-7. DOI: 10.1093/aje/155.1.80.
3. Ballester J, Quijal-Zamorano M, Mendez Turrubiates RF, et al. Heat-related mortality in Europe during the summer of 2022. Nat Med 2023;29(7):1857-1866. DOI: 10.1038/s41591-023-02419-z.
4. Gasparrini A, Guo Y, Hashizume M, et al. Mortality risk attributable to high and low ambient temperature: a multicountry observational study. Lancet 2015;386(9991):369-75. DOI: 10.1016/S0140-6736(14)62114-0.
5. Masselot P, Mistry M, Vanoli J, et al. Excess mortality attributed to heat and cold: a health impact assessment study in 854 cities in Europe. Lancet Planet Health 2023;7(4):e271-e281. DOI: 10.1016/S2542-5196(23)00023-2.
6. Luthi S, Fairless C, Fischer EM, et al. Rapid increase in the risk of heat-related mortality. Nat Commun 2023;14(1):4894. DOI: 10.1038/s41467-023-40599-x.
7. Medina-Ramon M, Schwartz J. Temperature, temperature extremes, and mortality: a study of acclimatisation and effect modification in 50 US cities. Occup Environ Med 2007;64(12):827-33. DOI: 10.1136/oem.2007.033175.
8. Tian Z, Zhu N, Zheng G, Wei H. Experimental study on physiological and psychological effects of heat acclimatization in extreme hot environments. Building and Environment 2011;46(10):2033-2041. DOI: 10.1016/j.buildenv.2011.04.027.
9. Liang C, Yuan J, Tang X, Kan H, Cai W, Chen J. The influence of humid heat on morbidity of megacity Shanghai in China. Environ Int 2024;183:108424. DOI: 10.1016/j.envint.2024.108424.
10. Clark DG, Jackson EH, Hohl CM, Liang KE. Extreme heat impacts on acute care: Examining emergency department visits and hospital admissions during the 2021 British Columbia heatwave. The Journal of Climate Change and Health 2024;17. DOI: 10.1016/j.joclim.2024.100310.
11. Ostrovsky AM, Chen JR. The intracontinental impact of Canadian wildfires on US asthma and COPD patients and atmospheric conditions. Journal of Public Health 2024. DOI: 10.1007/s10389-024-02343-7.
12. Kraut, G, Pandemic Risk Management and Insurance, in Handbook of Insurance, Vol 1, 3rd Edition, Springer 2025. DOI: 10.1007/978-3-031-69561-2
13. Mora, C., McKenzie, T., Gaw, I.M. et al. Over half of known human pathogenic diseases can be aggravated by climate change. Nat. Clim. Chang. 12, 869–875 (2022). https://doi.org/10.1038/s41558-022-01426-1
14. Carlson, C.J., Albery, G.F., Merow, C. et al. Climate change increases cross-species viral transmission risk. Nature 607, 555–562 (2022). https://doi.org/10.1038/s41586-022-04788-w
15. Lawrence KG, Sweeney MR, Werder EJ, et al. Residential natural hazard risk and mental health effects. Am J Epidemiol 2024. DOI: 10.1093/aje/kwae200.
16. Park J, Kim A, Bell ML, Kim H, Lee W. Heat and hospital admission via the emergency department for people with intellectual disability, autism, and mental disorders in South Korea: a nationwide, time-stratified, case-crossover study. Lancet Psychiatry 2024;11(5):359-367. DOI: 10.1016/S2215-0366(24)00067-1.
17. Rizzo Pesci N, Teobaldi E, Maina G, Rosso G. Climate Change and Psychiatry: The Correlation between the Mean Monthly Temperature and Admissions to an Acute Inpatient Unit. International Journal of Environmental Research and Public Health 2024;21(7). DOI: 10.3390/ijerph21070826.

Climate Change
References

18. Minor K, Bjerre-Nielsen A, Jonasdottir SS, Lehmann S, Obradovich N. Rising temperatures erode human sleep globally. One Earth 2022;5(5):534-549. DOI: 10.1016/j.oneear.2022.04.008.
19. Wettstein ZS, Vaidyanathan A. Psychotropic Medication Prescriptions and Large California Wildfires. JAMA Netw Open 2024;7(2):e2356466. DOI: 10.1001/jamanetworkopen.2023.56466.
20. Zhu Q, Zhang D, Wang W, et al. Wildfires are associated with increased emergency department visits for anxiety disorders in the western United States. Nature Mental Health 2024. DOI: 10.1038/s44220-024-00210-8.
21. Patrick R, Snell T, Gunasiri H, Garad R, Meadows G, Enticott J. Prevalence and determinants of mental health related to climate change in Australia. Aust N Z J Psychiatry 2023;57(5):710-724. DOI: 10.1177/00048674221107872.
22. Hickman C, Marks E, Pihkala P, et al. Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. Lancet Planet Health 2021;5(12):e863-e873. DOI: 10.1016/S2542-5196(21)00278-3.
23. Hajek A, König H-H. Climate Anxiety and Mental Health in Germany. Climate 2023;11(8). DOI: 10.3390/cli11080158.
24. IPCC. Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. 2023. DOI: 10.59327/IPCC/AR6-9789291691647.
25. Soneja S, Jiang C, Fisher J, Upperman CR, Mitchell C, Sapkota A. Exposure to extreme heat and precipitation events associated with increased risk of hospitalization for asthma in Maryland, U.S.A. Environ Health 2016;15:57. DOI: 10.1186/s12940-016-0142-z.
26. Konstantinoudis G, Minelli C, Lam HCY, et al. Asthma hospitalisations and heat exposure in England: a case-crossover study during 2002-2019. Thorax 2023;78(9):875-881. DOI: 10.1136/thorax-2022-219901.
27. Astrom C, Orru H, Rocklov J, Strandberg G, Ebi KL, Forsberg B. Heat-related respiratory hospital admissions in Europe in a changing climate: a health impact assessment. BMJ Open 2013;3(1). DOI: 10.1136/bmjopen-2012-001842.
28. Johnston FH, Borchers-Arriagada, N., Morgan, G.G. et al. Unprecedented health costs of smoke-related PM2.5 from the 2019–20 Australian megafires. Nature Sustainability 2020;4:42-47. DOI: 10.1038/s41893-020-00610-5.

Life Science Report

Contributors

Prof. Dr. Mathias Orban
Senior Medical Consultant
Munich Re Life & Health Europe & Latin America
morban@munichre.com

Dr. Alban Senn
Chief Medical Officer, Head of Medical Research & Development
Munich Re Life & Health Europe & Latin America
asenn@munichre.com

Dr. Anne Zutavern
Medical Consultant
Munich Re Life & Health Europe & Latin America
azutavern@munichre.com

Dr. Jürgen Schimetschek
Scientific Advisor
Munich Re Climate Change Solutions
jschimetschek@munichre.com

Dr. Christiane Suchy
Medical Consultant
Munich Re Life & Health Europe & Latin America
csuchy@munichre.com

Julia Dworzak
Junior Consultant Climate Risks
Munich Re Risk Management Partners
JDworzak@munichre.com

Steven Wiseman
Senior Medical Consultant
Munich Re Life & Health Europe & Latin America
swiseman@munichre.com

Life Science Report 2025

Imprint

Munich RE

Image: [M] Munich Re [1] Shutterstock / Derexhopz