Beware “net-zero” mortality and morbidity!

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It is held by some that that climate-change won’t have much impact on mortality and morbidity liabilities, and to the extent there are any impacts they will largely cancel out to a “net zero”, no material change. While this phrasing may echo the net-zero climate emissions target, is it a reasonable assumption? Is this net-zero ‘echo’ a potential trap?

John Jenkins and Nick Spencer recently took part in a panel discussion for the actuarial continuing professional development (CPD) platform, Actuview, considering the range of potential climate impacts on mortality and what factors insurers need to understand and address. What emerged from the panel was the richness and depth of knowledge required to understand climate impacts on liabilities.

In essence, there are four dimensions of potential relevance that insurers need to grapple with. They illustrate why the net-zero “nothing to see here” approach may be a trap.

1. **It depends on your products and your customer profile:** Climate change and the economic transition will have unequal impacts; vulnerabilities are likely to be magnified, especially socioeconomic and comorbidities. The SCOR paper “The Relevance of Climate Change for Life Insurance – Part 1 highlights five areas for insurers to consider: relevance to product, region, age profile, health and socioeconomic status and then (harder) indirect impacts such as mental health.
2. **It’s complex (and macro):** The macroeconomic impacts, from inflation and gross domestic product (GDP) growth to interest rates and public healthcare strains, could be the more significant in the shorter term. There are also intersections between severe weather and infrastructure failures—for example if excessive heat or cold coincides with power outages, making heating or air conditioning much harder. Post-weather events, such as failures in water systems, could lead to outbreaks of waterborne diseases.
3. **Climate pathways and events are very uncertain:** We just don’t know how climate events and pathways will unfold. Despite the 2015 Paris Agreement, greenhouse gas emissions have still risen every year except 2020 (due to the COVID-19 pandemic). Actual emissions aren’t following the neatly prescribed scenario pathways, and future policy actions and economic responses are unknown. There is also uncertainty regarding future extreme weather events, potential climate tipping points or other severe events—such as an antimicrobial resistance (AMR) pandemic envisaged in the recent “GFI Materiality of Nature-Related Financial Risks for the UK.” These different pathways, events and economic responses would all have different impacts.
4. **It has implications for operations and data and it provides opportunities:** Beyond the direct climate implications for business continuity, there are operational considerations especially in preparing for shifts in future risks. The Geneva Association report “What Does the Future Hold for Health and Life Insurance?” outlines areas for assembling data prospectively to understand future risks. It then looks to opportunities and innovations—for example, the potential for parametric insurance to support future affordability and greater financial inclusion through new products.

Certainly, after these considerations, those with liabilities with more affluent customers, in temperate climes, could find themselves at an average close to “net-zero” impact. However, even with this the trap of the average is akin to old adage of “my head is in the oven, my feet are in the freezer, on average I’m fine!” A “net-zero” liability impact could well hide both hotspots of risk as well as cold-spots of diminishing legacy product sales and missed opportunities.

Three climate-related risks the webinar considered were:

1. **Physical:** The key physical climate-related risks are heat, cold, air pollution, wildfires, storms, floods and droughts. For temperate climes, the overall picture is relatively benign and suggests modest mortality impacts. However, this high-level view hides a complex set of interactions and potential for localised, compounding effects. Data is also a significant challenge. Whilst we often attribute cold as a mortality factor, we may be significantly underreporting heat impacts.
2. **Transition:** Transitional efforts pull in different directions and in the long run may be positive. Compounding factors include the resilience of infrastructure under changed demand and weather; air pollution which may come less from transport and industrial sources but more from wildfires; and healthier lifestyles which may be encouraged by social factors but may be harder to attain due to inhospitable outdoor spaces and higher cost of nutritious foods.
3. **Systemic/macro risks:** Climate shocks and the green transition will have significant macroeconomic effects. In the short to medium term, they are almost certain to drive up costs, reduce productivity and increase the demand on healthcare systems. This will affect the quantity and quality of healthcare that a state is able to afford. These impacts will be exacerbated by other strains on the economy such as ageing demographics, lower economic growth, climate immigration and the availability of skilled workers.

So what should insurers do next?

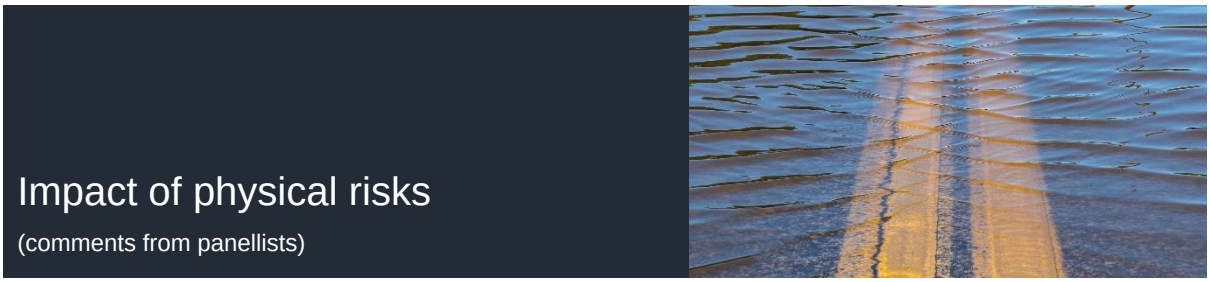
1. **Understand the background and deepen your knowledge:** The panellists started with an outline of the effects from physical risks, transitional risks, macroeconomic changes and business implications. We have summarised some of their core observations in the appendix.
2. **Understand the interconnections between your risks:** Use complexity-based analysis to help identify tipping points and what potential early warning systems can be put in place. Develop a systems map of your risks and their interactions; this will help identify potential tipping points and "precursor" warnings, highlighting where a modest additional impact could have an outsized influence when a system is already stressed.
3. **Get a better picture of your insurance portfolio:** Use the complexity analysis to improve the integration of climate-related risks into your insurance risk profiles and develop a scenario framework that generates business-relevant impacts.
4. **Get better and more agile warning systems**: Use the scenario framework to consider the liability impacts through different sustainability pathways, determine relevant risk factors and work back to develop data collection and analysis to support those future needs.
5. **Implement preventive and mitigating measures**: Consider customer education and apps that may help them mitigate adverse health outcomes (a double win). Broader efforts would include public-private engagement and policy advocacy that can support public health, such as heat wave alerts and providing advice on mitigating severe weather impacts.
6. **Identify opportunities**: Parametric tools which pay out immediately once a predefined event has occurred are one example of new product innovation that can retain affordability and meet new demands.

These steps make it possible to convert the "net-zero" trap into a triple win for insurers: better managed risks, more business opportunities and better customer outcomes.

The full Actuview panel recording on Climate Impacts on Mortality and Health Liabilities is available at https://actuview.com/videos/panel-1-climate-impacts-on-mortality-and-health-liabilities-4165.

Four dimensions of climate change on mortality and health liabilities

Notes from Panellist Comments[1] (references not independently verified)



Heat and temperature-related mortality: Extreme heat exacerbates conditions such as cardiovascular and respiratory diseases. Over the last 20 years studies have shown there has been a global reduction in cold-related excess death ratios of 0.5%, partially offset by a 0.2% increase in heat-related excess death ratios. However, the overall impact varies significantly by region, and other research indicates that official records may significantly underestimate heat-related impacts.

- **Air pollution**: Air pollution, especially particulate matter (PM) 2.5, poses significant health risks. Wildfires are an example of a source of it being intensified by climate change. Recent studies estimate that wildfire-related PM2.5 exposure causes approximately 100,000 deaths per year, with 13% of this mortality having been attributed to the additional impacts of climate change.
- **Floods and droughts**: Floods and droughts are significant climate hazards, especially in low-income and middle-income countries. In addition to the direct effects, they can lead to waterborne diseases, malnutrition and mental health issues. Whilst global flood mortality has been reasonably stable since the 1990s, the mortality decline that has been witnessed in high-income countries may reverse with increased severe weather events and greater incidence of flooding.
- **Infectious diseases**: Climate change is almost certain to increase the incidence and range of certain vector-borne illnesses such as malaria and dengue fever.
- **Health systems**: Health systems may face logistical challenges during crises, reducing their effectiveness, alongside increased strain from weakened public finances and labour shortages. Issues with water security affect hygiene and increase the risk of waterborne diseases while food insecurity affects nutrition and increases the risk of health complications.
- **Mental health strain**: Those impacted by extreme weather events, especially those displaced, can experience trauma, anxiety and depression. More broadly, reduced access to green spaces, eco-anxiety and reductions in physical, food or economic security could affect the whole population.

CHALLENGES IN DATA QUALITY AND ATTRIBUTION

Efforts to understand the impacts of climate change on excess deaths struggle with poor data quality and a lack of robust methodologies. For example, estimates of mortality related to nonoptimal temperatures vary widely, ranging from 1.7 million to 5 million deaths per year.

Official records often underestimate the association between climate hazards and health, with reporting typically only capturing the direct cause of death. One Australian study suggested heat-related mortality might be underestimated by 50fold. Another example of this is the reporting of deaths from hurricanes. Traditional surveillance methods primarily capture direct mortality, from drowning or electrocution, with around 24 deaths per hurricane. Looking more broadly, indirect mortality from contaminated food and water, disrupted medical care and mental health impacts might put the number closer to 7,000. These factors can persist for months or even years due to delayed treatments and infrastructure damage.

While in aggregate the data shows a relatively low physical risk impact on mortality, we must be careful to acknowledge the data challenges and complex interactions and compounding effects which can complicate this picture.

1. Based on event transcript, not independently verified.

Impact of transition risks

(comments from panellists)

Transitioning to a low-carbon economy introduces significant lifestyle and environmental changes, reflecting influences from the adoption of new technology and the shifts in consumer behaviours, as well as new infrastructure for low-carbon energy as needed to adapt to changes in the climate.

The net impacts are uncertain—the degree of transition adaptation must be considered in the context of the physical climate impacts. Potentially there could be net gains in longevity and health—although in practice adaptation is likely to lag climate impacts, so the net position may vary over time.

1. **Infrastructure and urban planning**: Investments in resilient infrastructure, such as better sanitation, secure clean water supplies and robust healthcare facilities can enhance overall public health. Enhanced building codes can protect inhabitants from extreme weather, reducing injury and mortality rates during disasters.
2. **Changes in physical activity**: Efforts to create greener, more walkable cities could also encourage physical activity, potentially reducing obesity and cardiovascular diseases. Conversely, increased temperatures and severe weather may limit outdoor activities, leading to more sedentary lifestyles.
3. **Dietary shifts**: Plant-based diets, or simply reduced meat consumption, are promoted to reduce an individual's climate impact but it also can have a health benefit, potentially reducing rates of heart disease and certain cancers. This could be significant—one study found the prevented mortality from a more sustainable diet would be about 6 million deaths per year. On the other hand, food shortages and increased costs may mean fewer people are able to access a nutritious diet, with more dependence on ultra-processed foods.
4. **Occupational health risks**: New jobs in green industries expose workers to new materials with potential new unknown hazards. Workers in high-carbon industries may struggle with transitioning to new jobs and suffer subsequent mental and physical health impacts along with downturns in the local economy.
5. **Policy changes**: Many green technologies have knock-on health impacts, especially in regard to air pollution. Policy changes to encourage "low-carbon" solutions could then also lead to improved population health, especially in urban settings, e.g., via stricter emission standards and incentives to adopt electric heating and transport.

This interplay between climate change, lifestyle adaptations and policy responses creates a complex, interconnected system. To solve them, governments would need to adopt a multifaceted approach that includes robust public health strategies, resilient infrastructure, equitable policies and proactive industry-specific measures to mitigate health liabilities. Insurers should prepare and anticipate how these approaches may unfold, so they can identify the potential gains and shortfalls that will then arise.

Impact of macroeconomic and systemic risks

(comments from panellists)

In temperate, higher-income countries the physical risks may not rise that quickly and may not be immediately material. In the shorter term, the most significant impact on the liabilities may arise from the macroeconomic impacts along with those from broader systemic risks.

- **Economic impacts**: The transition to a low-carbon economy will require substantial investments and almost certainly will result in higher costs, prices and inflation in the short to medium term. This is also likely to drive an increase in interest rates, directly impacting life and health insurers, particularly those with long-term reserves and significant investment portfolios.

  Higher inflation leads to increased claims costs for health insurers due to rising expenses for hospitals, drugs and medical treatments. In addition, the increase in climate-related illnesses could lead to an increased demand for healthcare, causing these costs to increase disproportionately. Even in systems with fixed fees for medical practitioners, the volume of treatments would increase, contributing to higher overall costs. This is almost certain to lead to an increase in insurance premiums, reductions in affordability and potential reductions in insurance coverage.

- **Labour productivity and economic output**: Professions that are directly affected by climate change and those carried out outdoors or in buildings without climate control (e.g., agriculture, construction) are likely to see reduced labour productivity. This would exacerbate economic strains on affected countries. There is potential for new insurance products to partially mitigate impacts on individuals, for example with income replacement products which pay out during extreme heat waves.
- **Demographics**: Europe is characterised by an ageing population which is more susceptible to climate-related health risks due to preexisting conditions and comorbidities. Such a demographic shift would result in a higher proportion of vulnerable individuals, increasing the demand for healthcare services and thus healthcare costs. This would exacerbate the existing increase in costs from inflation and climate-related strains.

  At the same time as an increasing ageing population, there is currently a shortage of skilled workers, particularly in healthcare and nursing. If this persists, it would continue to put a strain on the system, especially in its ability to meet any increased demand.

- **Public health infrastructure**: Healthcare systems can be assessed on three broad metrics: the availability and affordability of care; the quality of care provided (i.e., having qualified staff and good infrastructure); and the presence of early warning systems (e.g., for pandemics).

  Ageing populations and economic strains are likely to lead to pressures on public finances and constrain the resources spent on public healthcare systems. Reductions in availability, quality and preparedness of public healthcare increases mortality and morbidity risks—and may be particularly impactful when preexisting strains make the system much less resilient to peak demands and health shocks.

Implications for insurers

(comments from panellists)

Integrating climate-related risks into business operations is a challenge—climate-related risks have a wide-ranging, cross-cutting nature, feeding into and exacerbating existing business risks. Not only is there much uncertainty in the impacts, but the distribution of them will also be very uneven. Inequalities are likely to rise, with impacts that depend on geography, public healthcare quality and underlying vulnerabilities, especially comorbidities. These factors will require judgment on the unknowns and how they apply to a firm's specific liabilities.

There is a need to increase internal ability and agility to be able to identify critical risks that can have a consequential impact on the business. This requires both deeper knowledge and proactive engagement.

DEEPER KNOWLEDGE

1. **Understanding long-term trends**: Climate change influences long-term trends in global temperatures, severe weather events and public health, with the need to allow for adaptations and behaviour shifts in response to these changes. Given the range of possible pathways, it is crucial to be able to monitor and assess how trends play out and identify future sensitivities.
2. **Understanding short-term volatility and adaptation**: Climate change is likely to bring more challenges from extreme events rather than shifts in the averages. Adaptations will occur but are likely to lag—a city like Seattle can adapt to Houston-style weather, but not instantly. This will also depend on the situational context—we see now that public health and finances are still recovering from the COVID-19 pandemic—with preexisting strains likely to magnify the impact of any climate stresses.
3. **Understanding macroeconomic impacts and other intersections**: Inflation and interest rate shifts could significantly affect insurers' liabilities. On a stress basis, there is a rising risk of pandemics and broader economic downturns. Looking further out, additional regulations and emerging focuses, such as nature-related risks, will require ongoing monitoring and adaptation. Macroeconomic impacts could well be the most material short-term impacts on liabilities.

ACTIONS

4. **Integrating climate-related risks into business operations**: Firstly, consider the ways climate-related risks impact key business risks and the outcomes in the current risk register and Own Risk and Solvency Assessments (ORSAs). Next, assess the resultant impacts and check whether there is a need to reassess risk appetites and mitigation. Ideally this should be done from a whole-system perspective, working back from business-level outcomes to map the interactions and understand how climate change affects critical business risks and outcomes.
5. **Embracing complexity and building resilience to tipping points**: The Earth Systems Institute highlights five major systems that are already at risk of crossing into tipping points at the present level of global warming.[2] Insurers need tools and approaches that acknowledge we are almost certain to experience at least some of these shocks. Complexity science can help map climate and other risk influences on insurers' businesses, helping them understand the impacts of climate risks and tipping points across their whole organisation. This helps identify not only critical nodes and watch points but also where a series of more modest impacts can magnify to greater business-level impacts.

2. Global Tipping Points (2023). Global Tipping Points Report 2023. University of Exeter's Global Systems Institute. Retrieved 8 December 2024 from https://report-2023.global-tipping-points.org.

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