



ACTUARIAL SOCIETY
S O U T H A F R I C A

Progress update from the ASSA Climate Change Impacts on Mortality and Morbidity Working Party

Pamela Hellig

14 May 2024

TEMPERATURE CHECK



What level of risk do you feel climate change poses to the mortality and morbidity risks of life and health insurers in South Africa?

- High Risk
 - Moderate Risk
 - Low Risk
-

HOW INSURERS FEEL ABOUT CLIMATE CHANGE



SOUTH AFRICAN INSURERS

85%: climate change poses a low/moderate risk

55%: treating preparing for climate change as low/no priority

Source: RGA South Africa Climate Change Survey report 2024

REST OF THE WORLD

“The current impact of climate change on health and life insurance is perceived as limited but there is consensus that this may change in the long term.”

Source: The Geneva Association's **CLIMATE CHANGE: What does the future hold for health and life insurance?** report February 2024

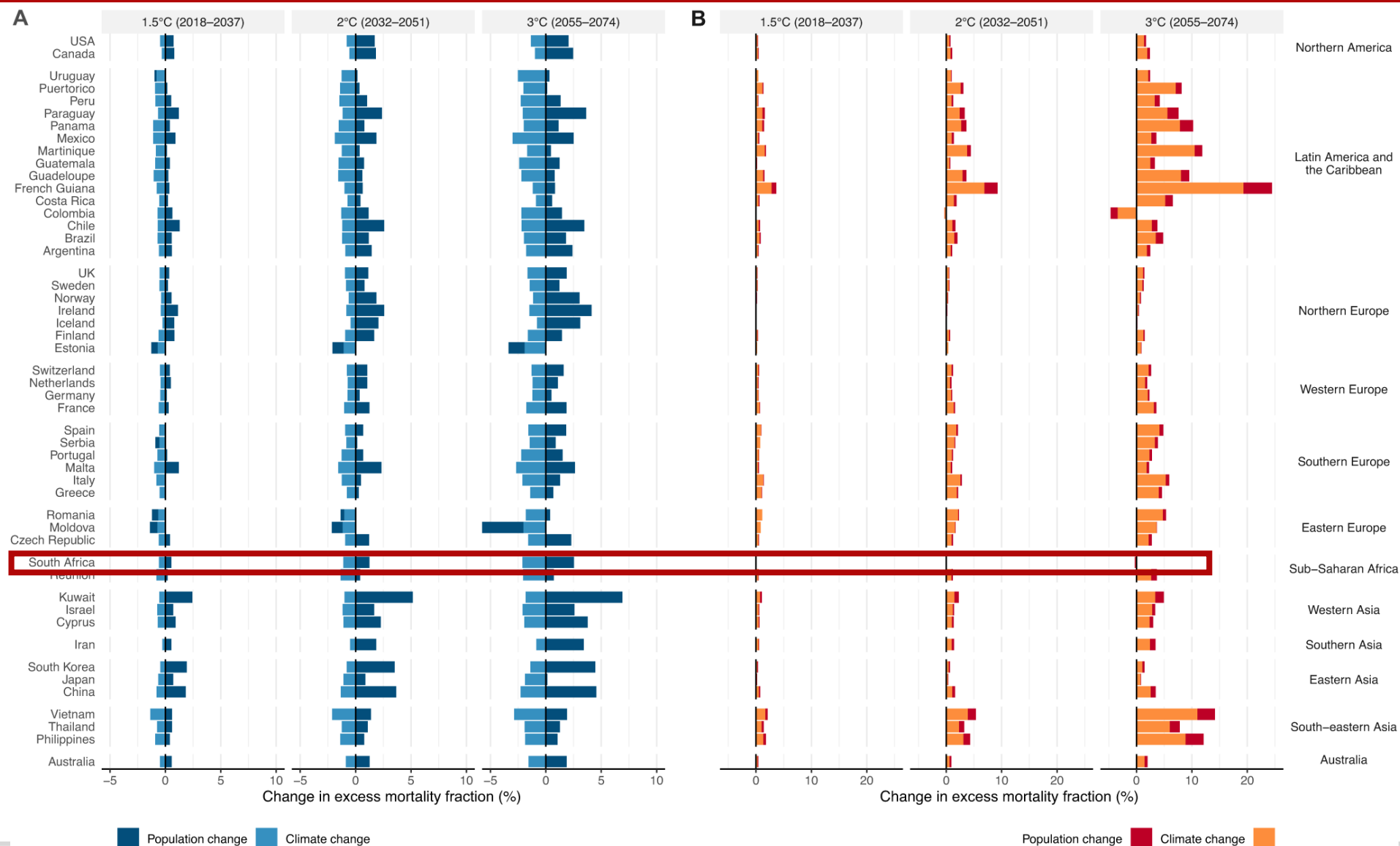
HOW INSURERS FEEL ABOUT CLIMATE CHANGE



Why we shouldn't care

1. It's a long-term risk
2. South African mortality won't be materially affected compared to some other countries

Contributions of climate change and population change to the changes in cold- and heat-related mortality at different levels of global warming



Source: Chen et al., Impact of population aging on future temperature-related mortality at different global warming levels



Climate change and mortality

The impact of climate change on
future mortality in South Africa

Chris Falkous

March 2024

RGAA

#ShowYourStripes for South Africa, created by Ed Hawkins, University of Reading, and licenced under CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

Falkous, Christopher (Unverified)



HOW INSURERS **FEEL** ABOUT CLIMATE CHANGE



Why we shouldn't care

1. It's a long-term risk
2. South African mortality won't be materially affected compared to some other countries
3. We can reprice our way out of it (sometimes)
4. Adaptation will kick in
5. We have more urgent things to worry about

Why we should

1. "Feel" is a four-letter word
 2. South African mortality and morbidity could be affected
 3. Regulation
-



Proposed Guidance on climate-related risk practices for insurers (Prudential Authority)

“Insurers should be **acutely aware of portfolio exposures to climate-related risks**, and where such exposures have a material impact on decision making.”

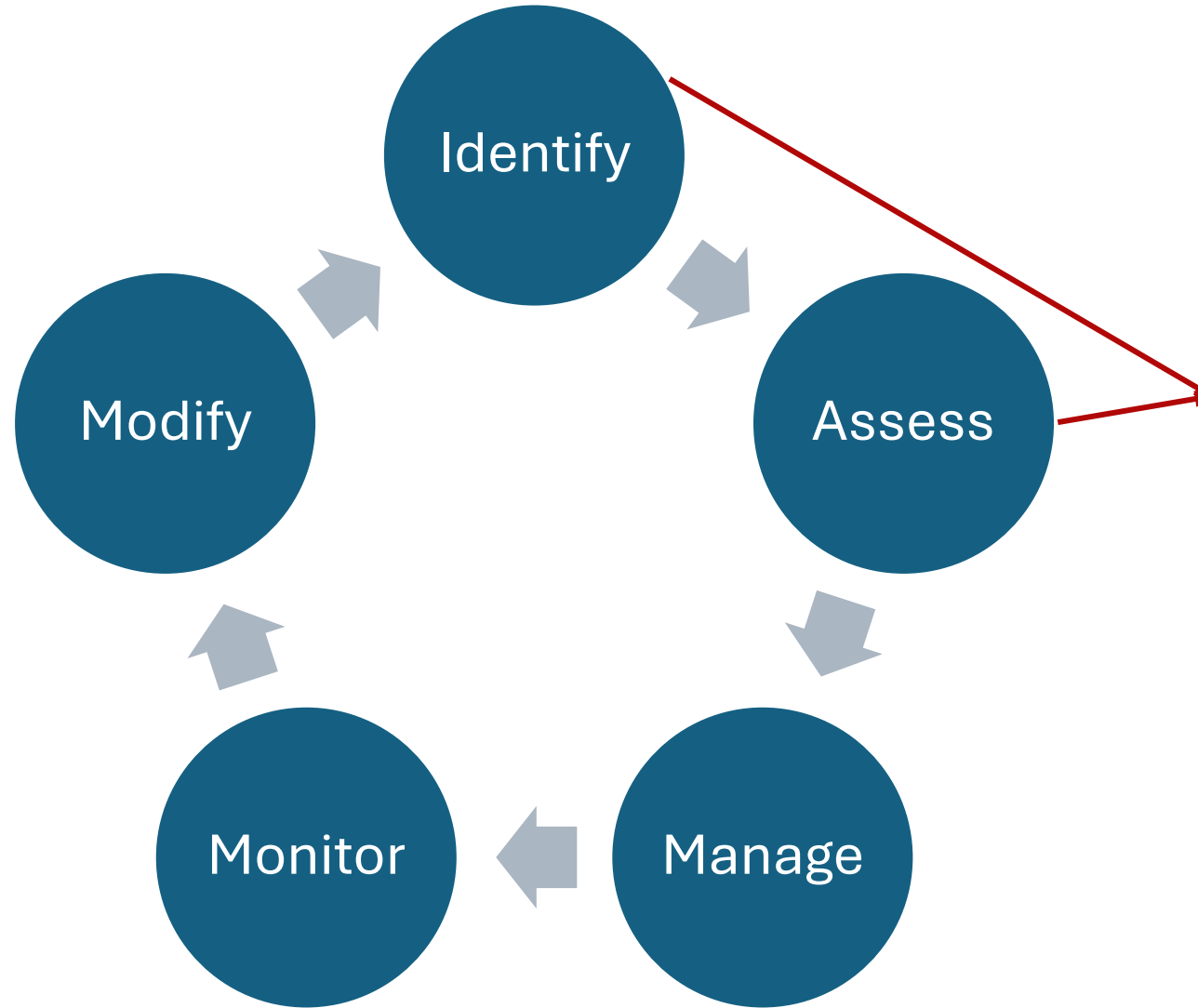
“Some climate-related risks may however **take longer to fully materialise**, and insurers should ensure that the **ORSA also includes appropriate scenarios with extended time horizon**, where relevant.”

“If climate-related risks are **assessed as not material**, this should be **clearly documented and explained** in the ORSA documentation to allow for a supervisory review.”

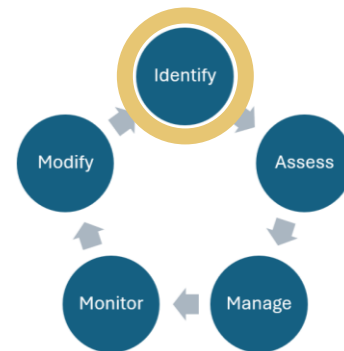
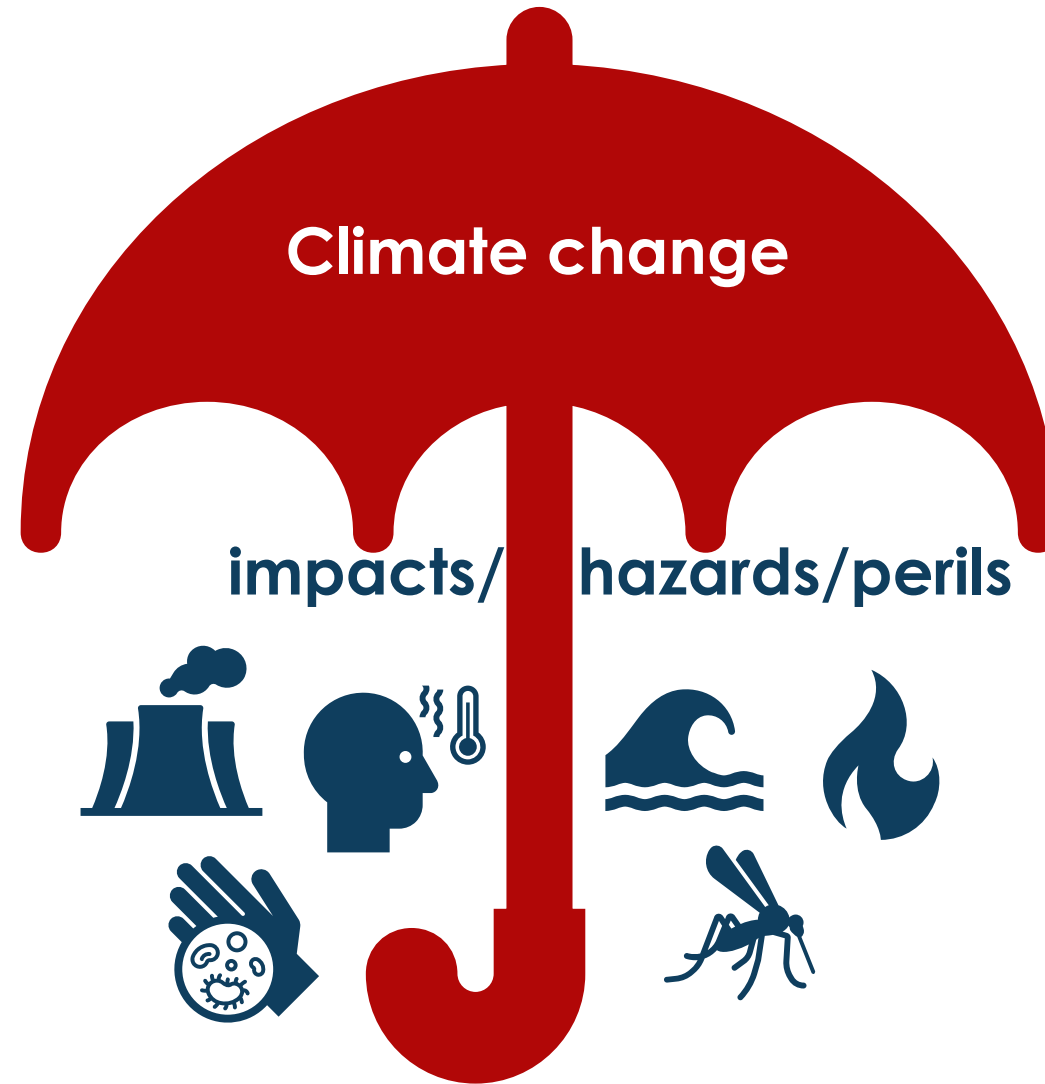


Our objective is to deliver a framework that all South African life insurers can use to assess and quantify the impact of climate change on their mortality and morbidity risks.

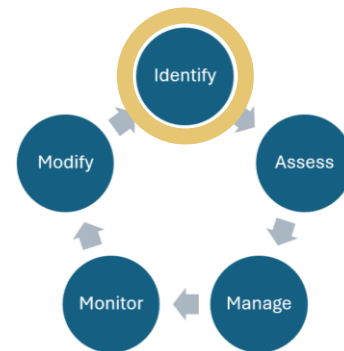
WORKING PARTY FRAMEWORK



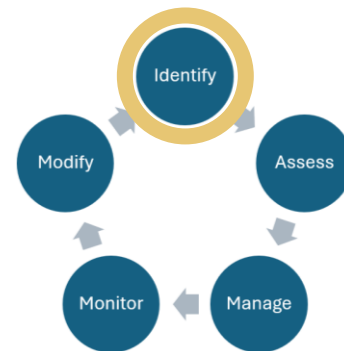
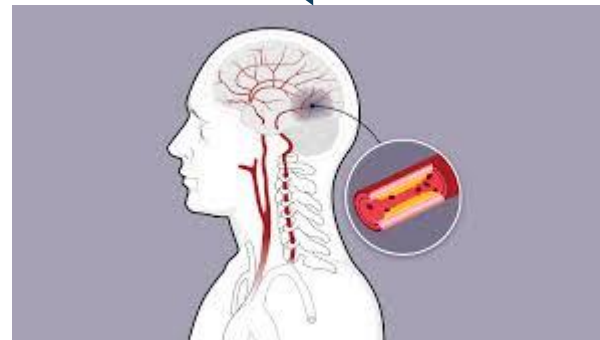
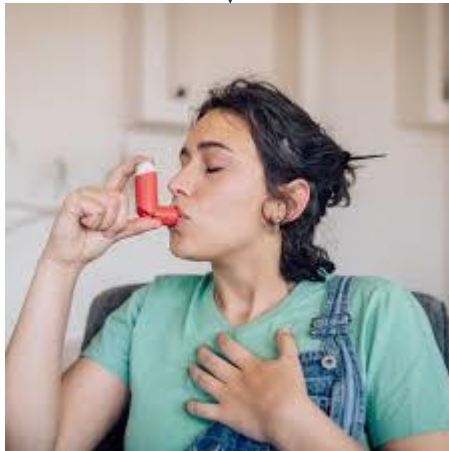
IDENTIFY: HAZARDS AND INDICATORS



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IDENTIFY: HAZARDS AND INDICATORS



Climatic conditions	Type	Health outcomes								Health outcomes				Indicator
		Cardiovascular diseases	Allergies	Diarrheal diseases	Malnutrition	Vector-borne diseases	Respiratory diseases	Cancer	Injuries & displacement	Heat-related illnesses	Other chronic illnesses	Degenerative diseases	Antimicrobial resistance	
Extreme events (acute)	Heat extremes	✓	✓		✓	✓	✓	✓		✓		✓		Daily temp
	Wildfires	✓	✓		✓	✓	✓	✓	✓	✓		✓		AQI
	Flooding		✓	✓	✓	✓	✓		✓				✓	Flood records
	Severe weather	✓		✓					✓	✓				Storm records
Slow-changing events (chronic)	Droughts			✓	✓	✓				✓	✓			Dam levels
	Rising temperatures	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	Daily temp
	Sea level rise			✓	✓	✓			✓					
	Water availability & quality			✓	✓	✓		✓			✓			
	Ecological changes		✓	✓		✓	✓		✓	✓			✓	
	Environmental degradation		✓		✓	✓	✓	✓	✓				✓	
	Air pollution	✓	✓			✓	✓	✓			✓	✓	✓	
	Food supply	✓		✓	✓			✓	✓			✓		

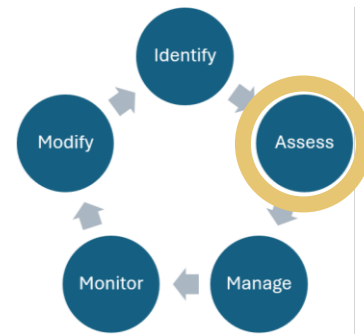
Source: The Geneva Association's **CLIMATE CHANGE: What does the future hold for health and life insurance?** report February 2024

ASSESS: MATCH HAZARDS TO PRODUCTS



Select the hazards most relevant to your business, depending on your:

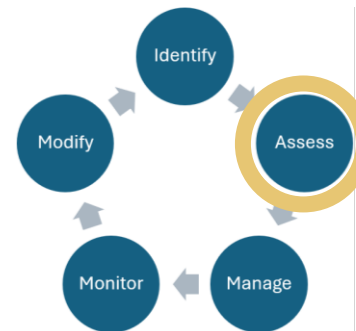
1. Product offering
2. Geographic region and concentration
3. Age profile of your policyholders
4. Health and socioeconomic status of your policyholders



ASSESS: MATCH HAZARDS TO PRODUCTS



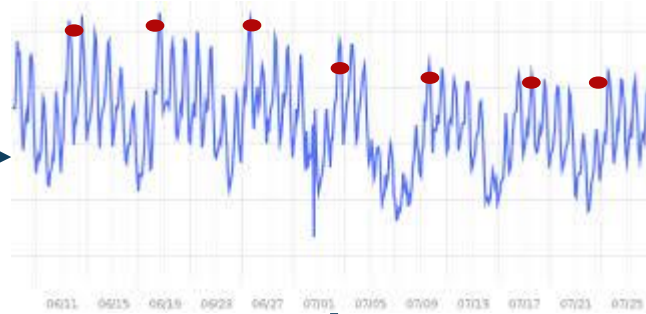
Product	Risk	Representative claim event	Climate change hazard and (risk indicator)
Funeral cover	Mortality	Death	Heat stress (Extreme heat days/max temp)
Life cover	Mortality	Death	Heat stress (Extreme heat days/max temp)
Severe illness cover	Morbidity	Cardiovascular disease	Heat stress (Extreme heat days/max temp)
Medical aid	Morbidity	Asthma diagnosis	Wild fires (Air quality index)
Hospital cash plan	Morbidity	Emergency room admission	Extreme heat Heat stress (Extreme heat days/max temp)



ASSESS: MEASURE THE IMPACT

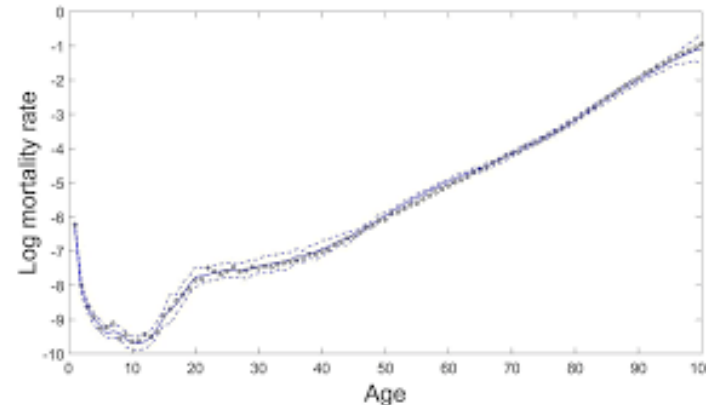


Exposure and
claims data

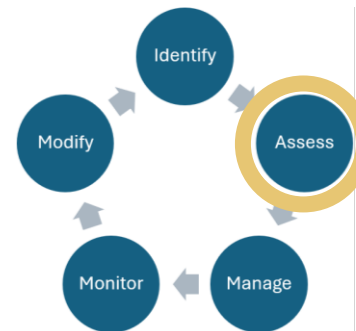


Excess
mortality

Excess deaths
on hot days?



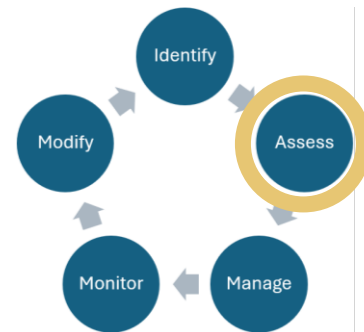
Adjust rates
for scenarios



ASSESS: WORKING PARTY POC



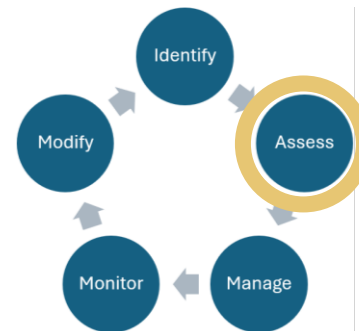
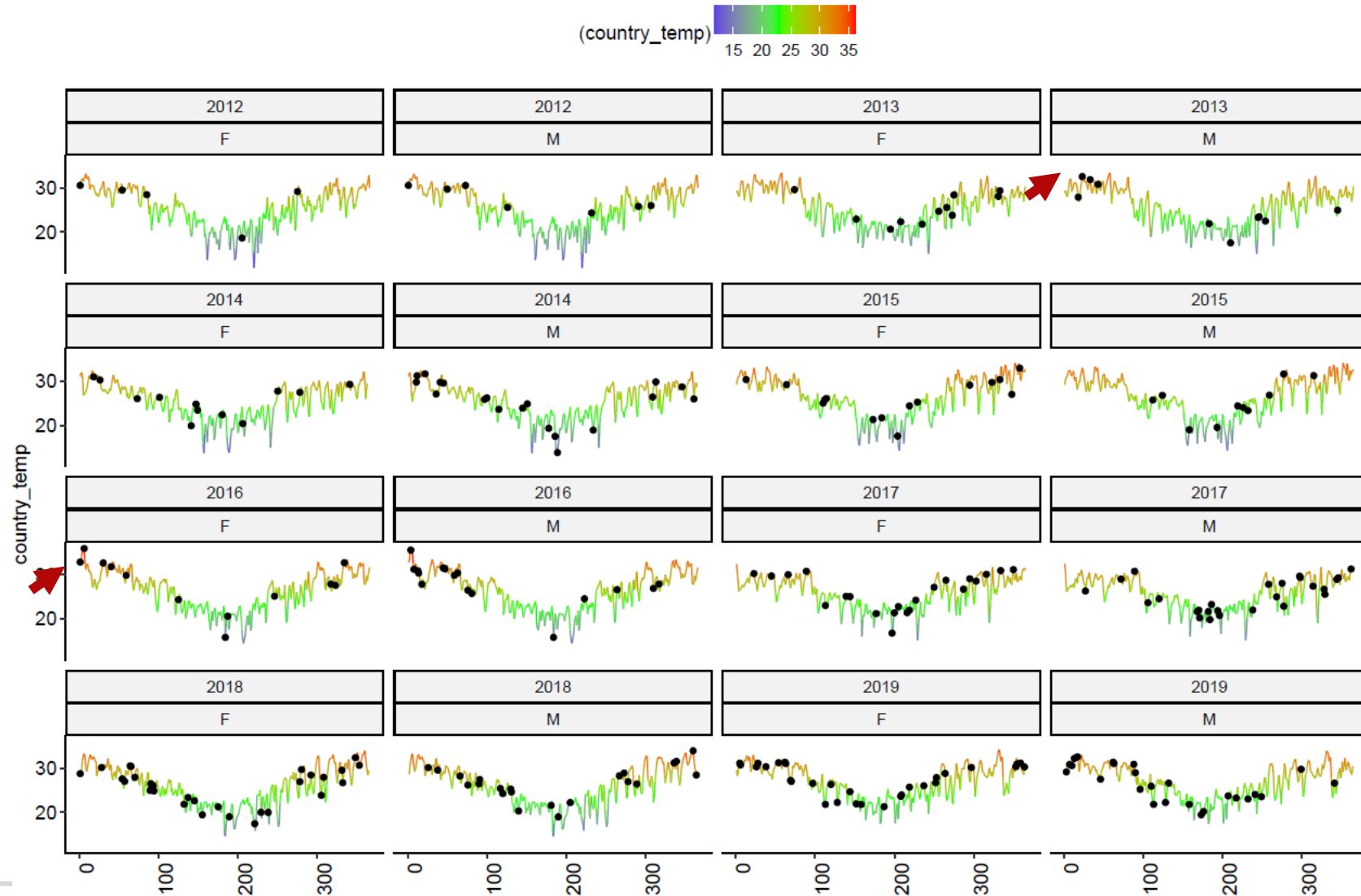
- Exposure and daily claims data sourced from Alexander Forbes and aggregated Insight data universe
- Daily weather data: ERA5 (ECMWF atmospheric reanalysis of the global climate)
- Identified 95th percentile mortality and morbidity events
- Joined data sets on postal code



ASSESS: WORKING PARTY POC



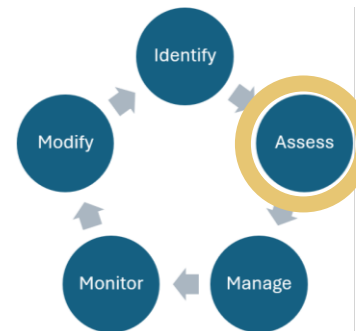
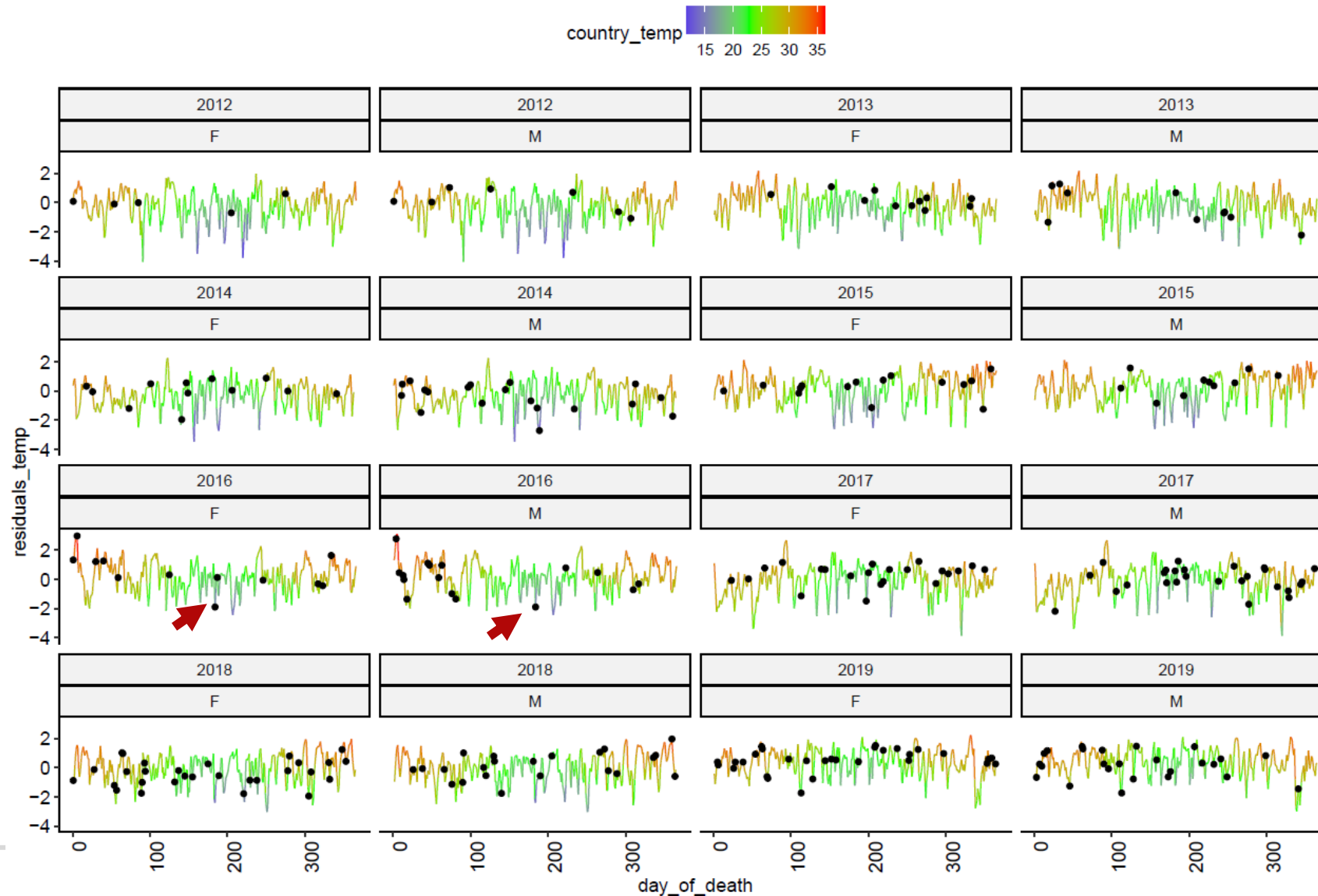
Temperature and mortality events



ASSESS: WORKING PARTY POC



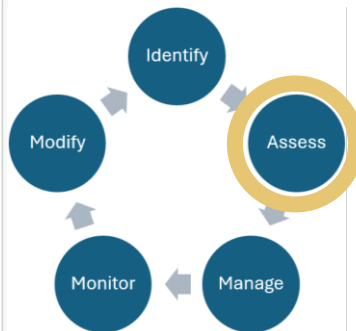
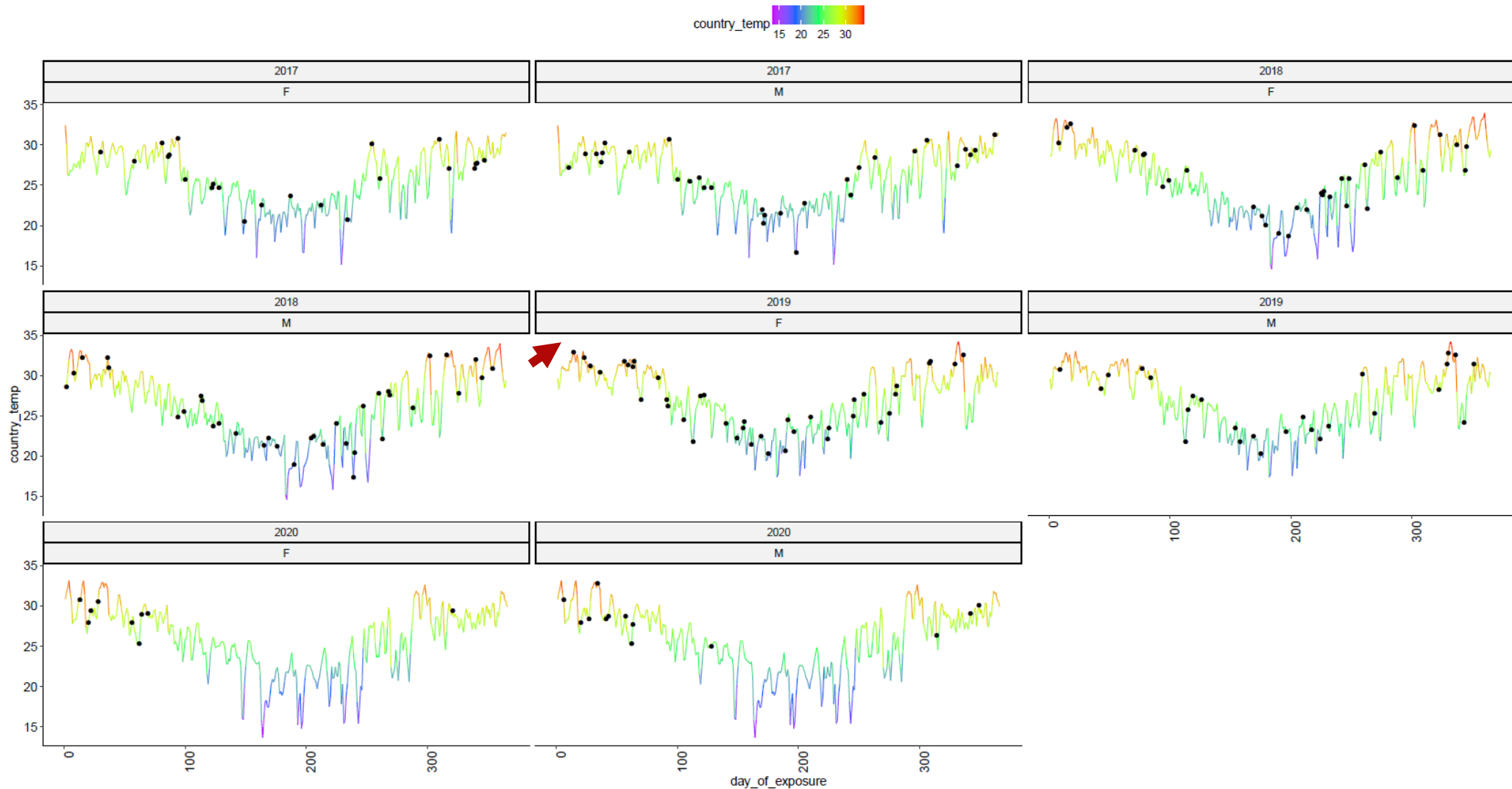
Mortality events and temperature residuals

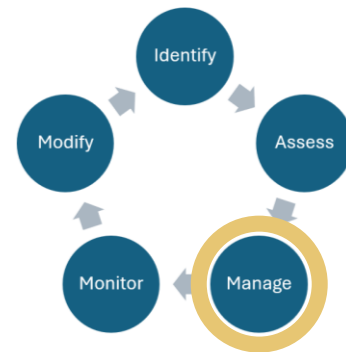


ASSESS: WORKING PARTY POC



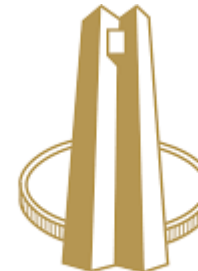
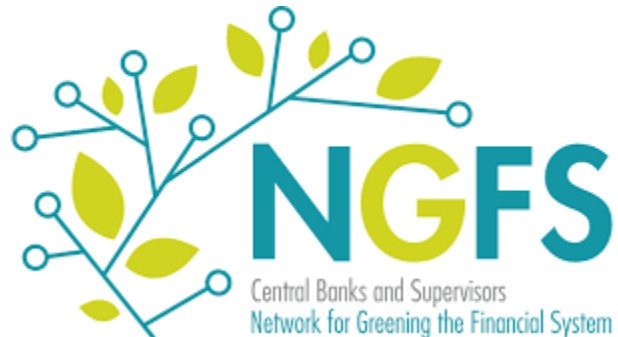
Heart attack events and temperature



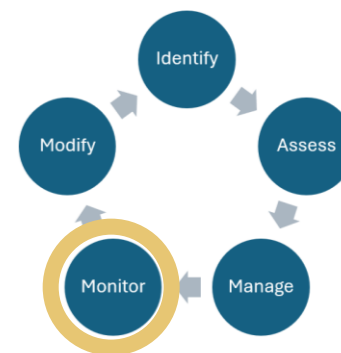




Scenario analysis: select appropriate scenarios and use your assessment to quantify impacts



South African Reserve Bank



MODIFY: LOOK TO THE FUTURE



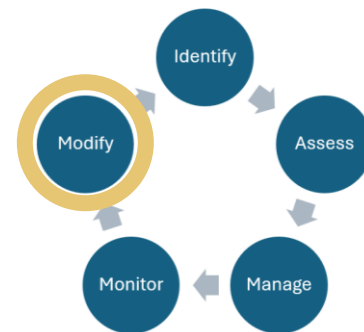
Technology

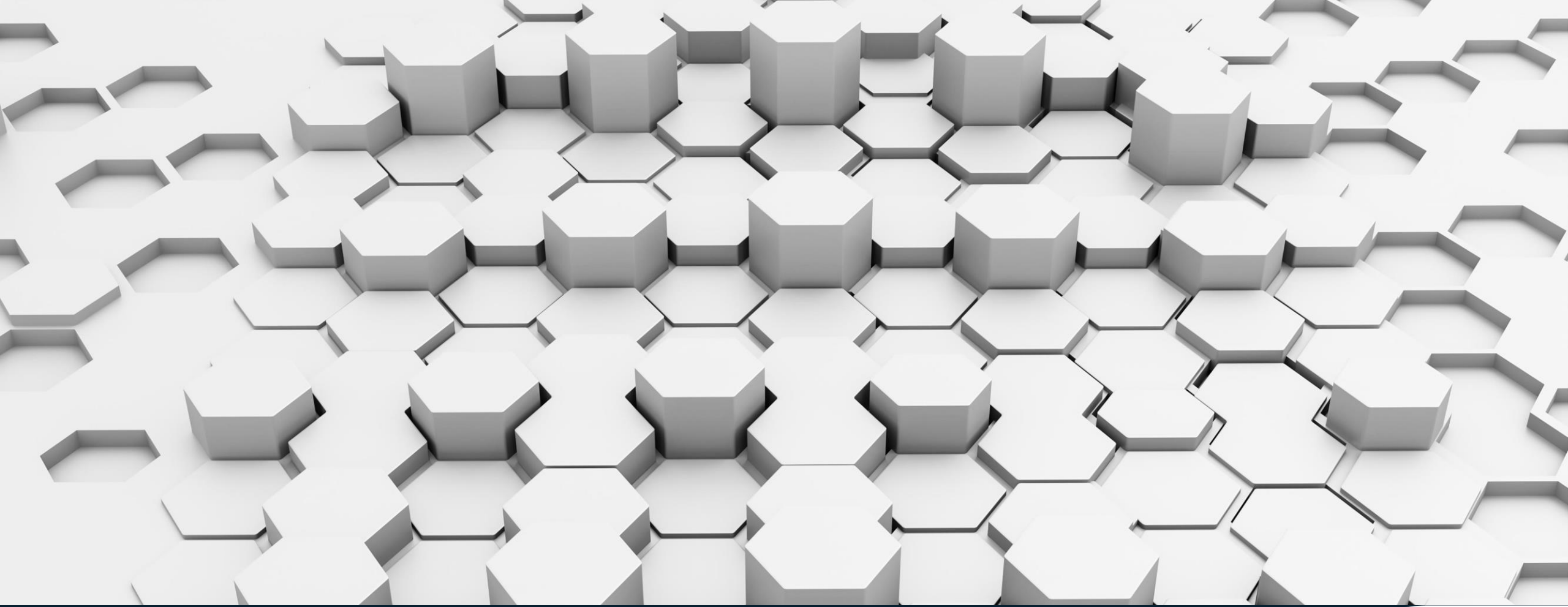
Migration

Adaptation

Maturing
climate risk
management

Stakeholder
attitudes





**Share your feedback or join the
working party
pamelah@insight.co.za**





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IfoA Climate Change Stress and Scenario Testing Working Party Framework

Adél Drew

14 May 2024

AGENDA



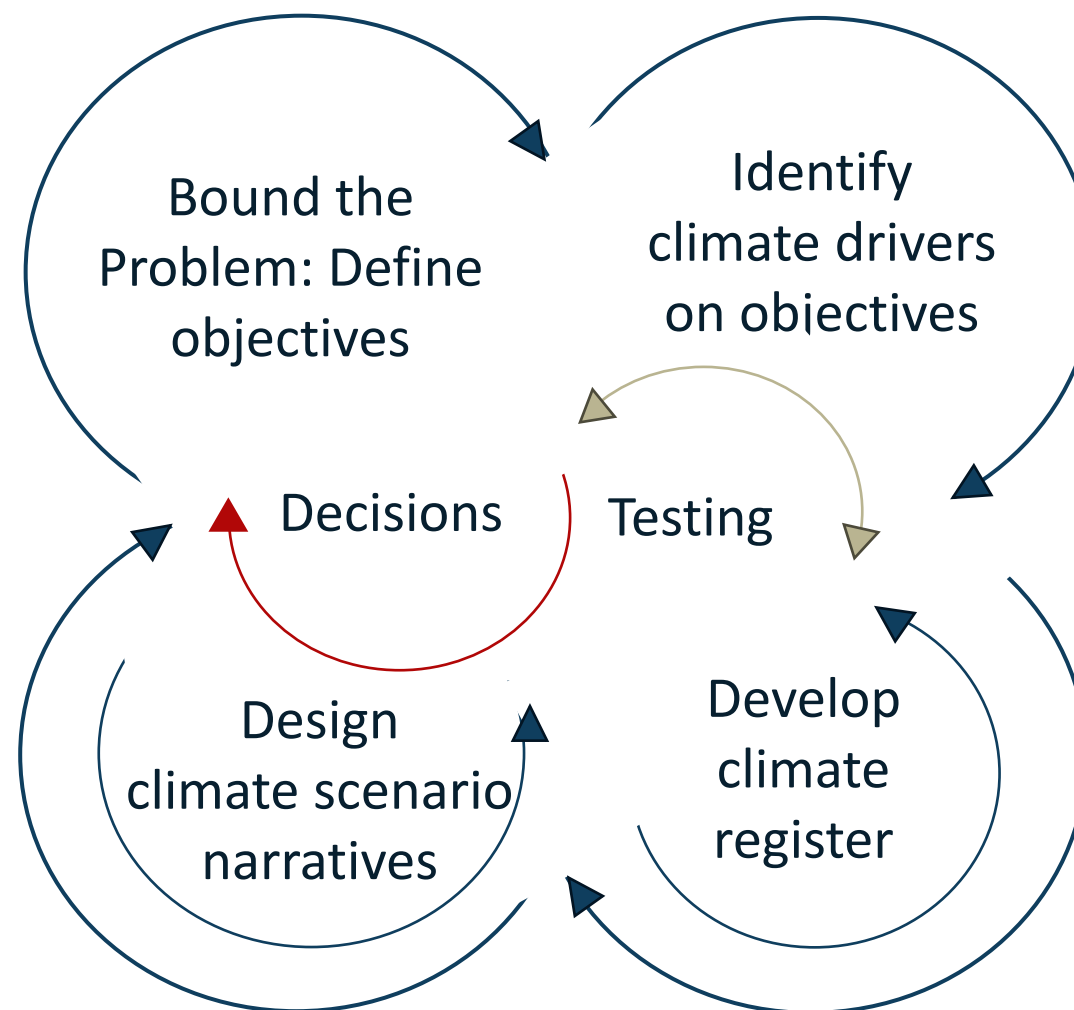
- Overview of the climate SST framework
- Proposal for a climate scenario analysis framework
- Worked example



Overview of the climate SST framework



- Framework for developing **good climate narrative scenarios** that are bespoke to an organisation
- A **formal structure** for enabling the ongoing evolution of stress testing and scenario analysis that is transparent and adaptable

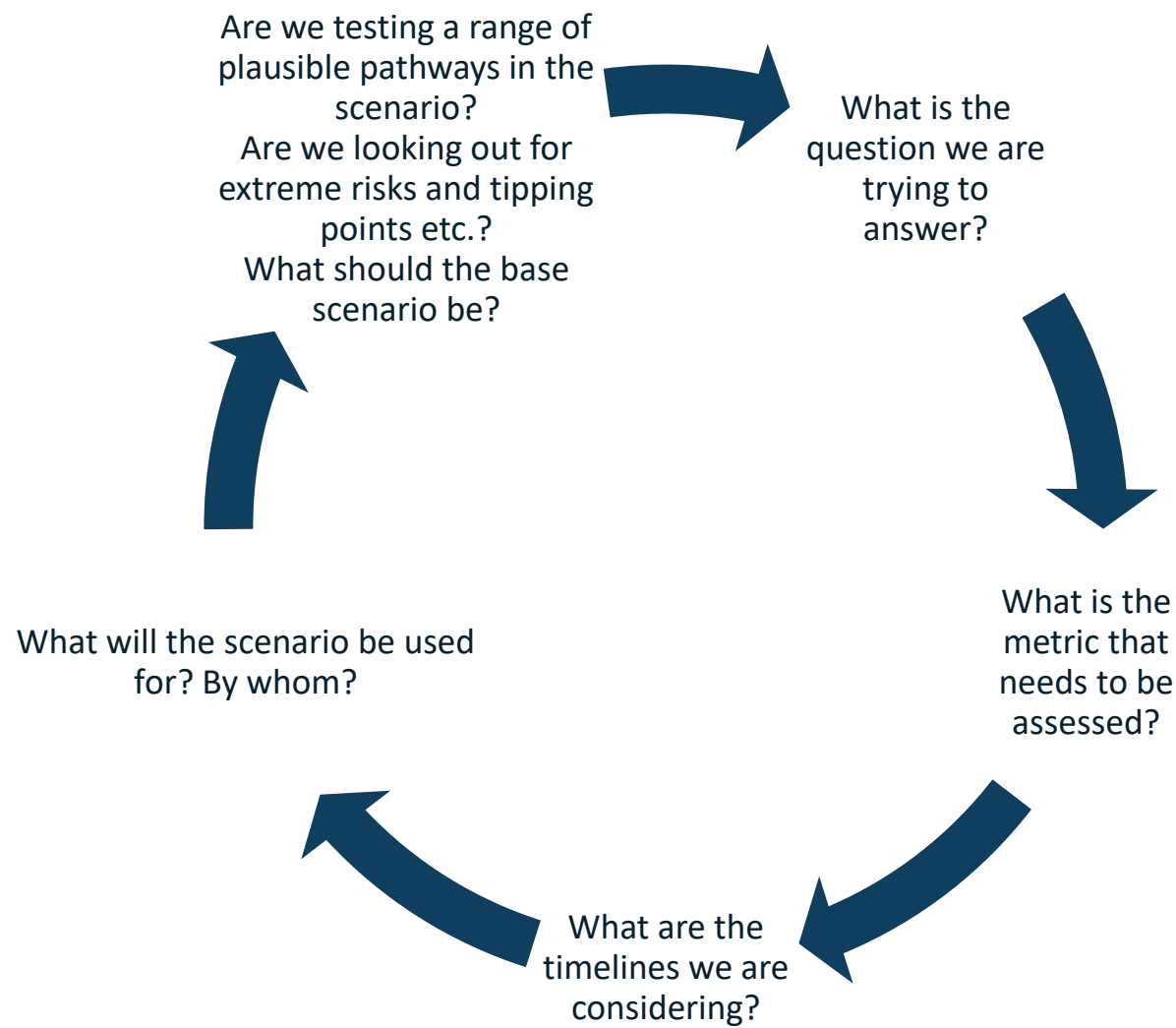


PROPOSAL FOR CLIMATE SCENARIO ANALYSIS FRAMEWORK



1. Bound the problem: Define objectives

- Focus attention
- Enable understanding of the uncertainty





How could the profitability of a whole of life insurance product change because of climate change?

Simplifying assumptions

- **Only sells WoL product**
- **Fixed sum assured**
- **Only has policyholders in the UK**

1. Bound the problem: Define objectives

- Changes in:
 - Mortality
 - Lapse
 - Demand
 - Expenses
- Against a profitability target
- Considering different climate pathways; including more extreme tipping point scenarios

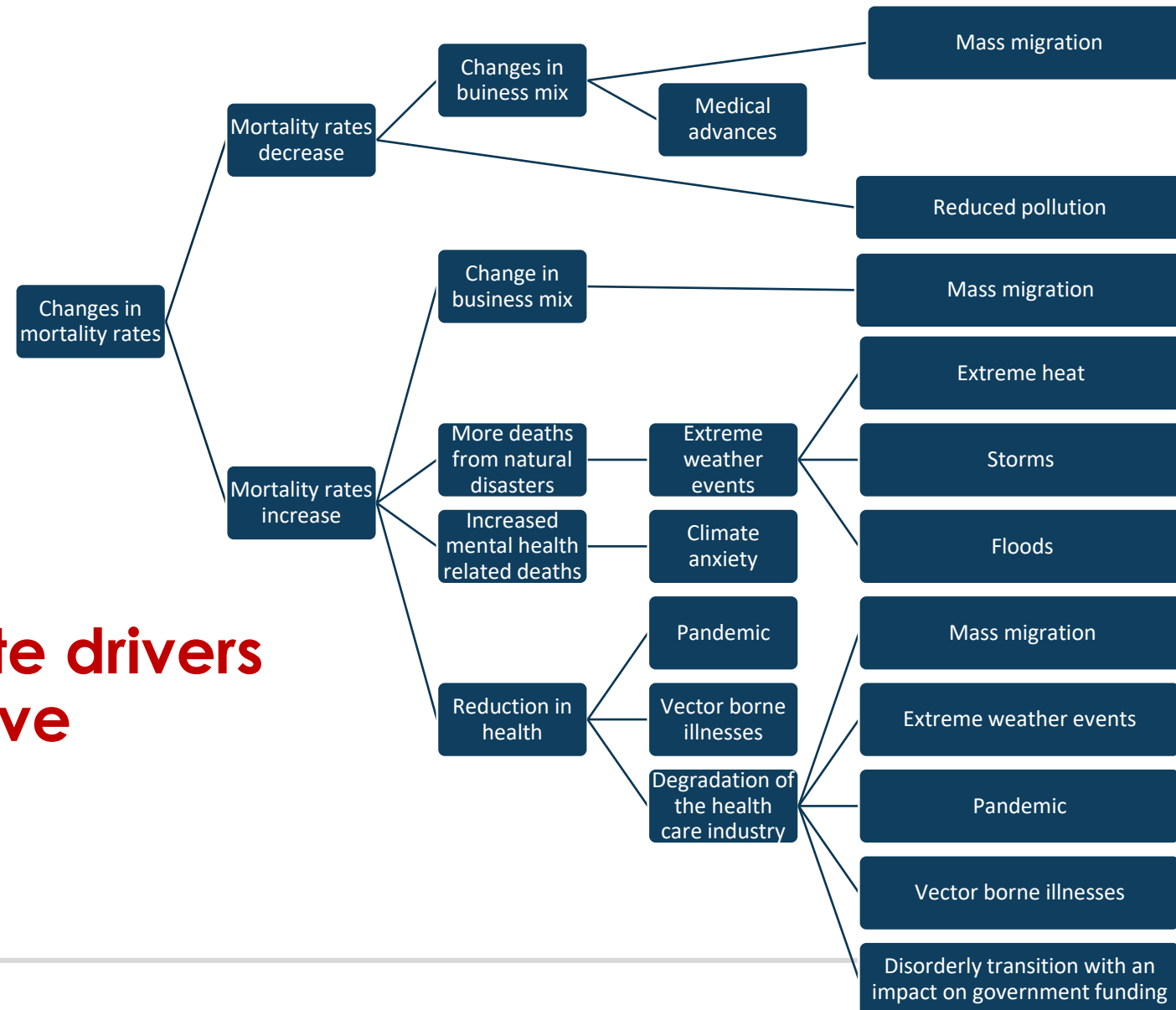


2. Identify climate drivers on the objective

- Start with things that could impact the objective
 - Step back to attach it to a climate driver
- Threats and opportunities
- Identify the building blocks for a climate register
- Identify interconnected and overlapping effects

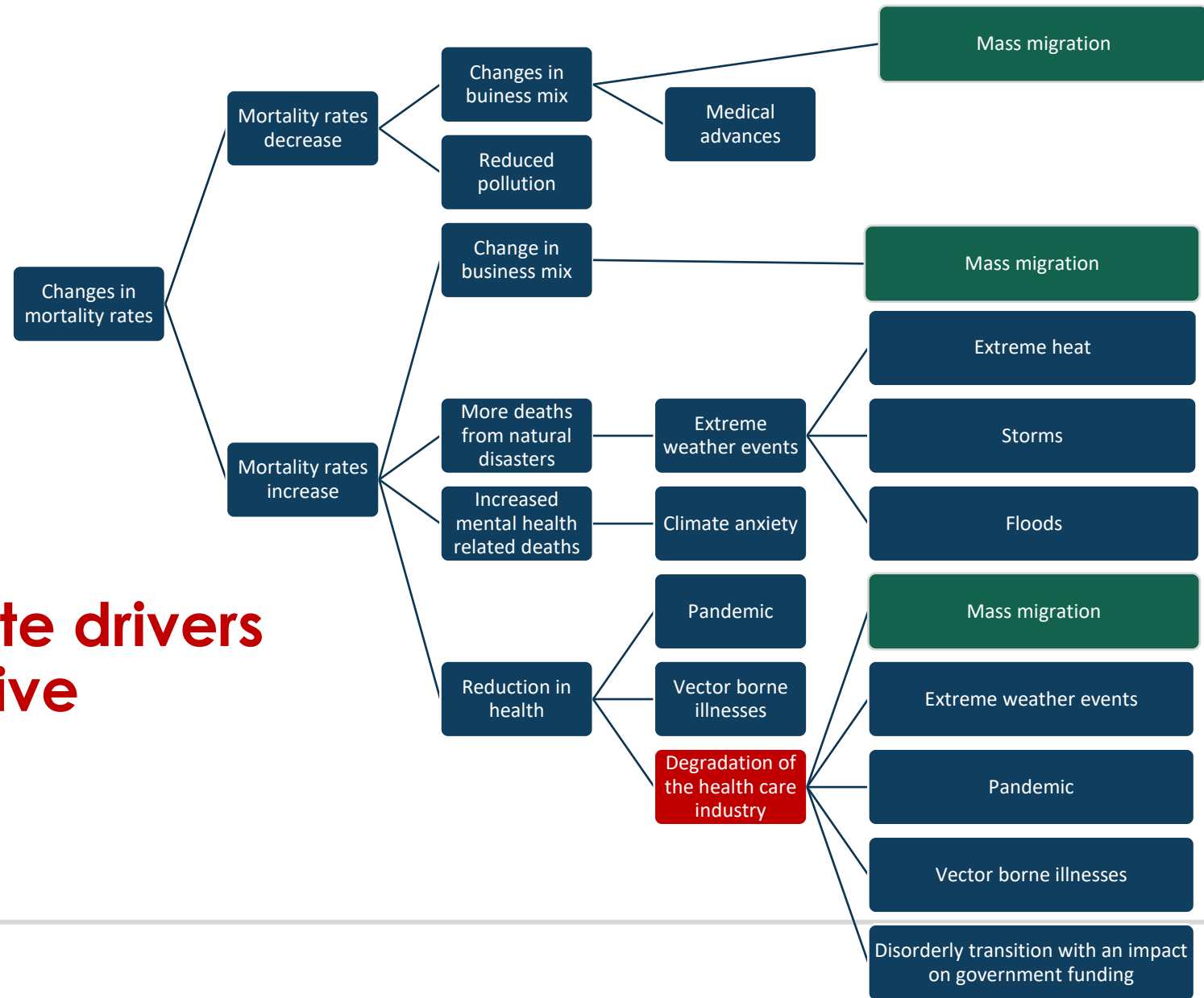


EXAMPLE



2. Identify climate drivers on the objective

EXAMPLE



2. Identify climate drivers on the objective

PROPOSAL FOR CLIMATE SCENARIO ANALYSIS FRAMEWORK



Column	Description
Climate driver	Event/series of events attributable to climate change that may impact the insurer
Impact on objectives	Transmission channels(s) that lead to an impact on the insurer's objectives
Research	Current research on the topic relating to the climate driver with links
Time horizon	Estimate of the time horizon over which each of the risks defined in each transmission channel is expected to arise
Materiality	Description of the materiality in terms of the qualitative impacts on the business (could be split by product)
Which underlying risks does the climate driver impact?	Mapping transmission channels to insurer risks. This could include a direct mapping to regulatory solvency risk groups (i.e., SII risk modules)
Impact assessment	Assessment of the impact on business. At first qualitative then include quantitative assessment when SST completed
Expert opinion on impact	Current views of business and climate experts (generated via discussions/ interviews etc)

3. Develop a climate register

- A structured approach to enable expert judgements to be made on potential risk drivers or opportunities
- Set out in a way that is transparent and allows for updating
- Aim is to identify key elements to include in a climate narrative



3. Develop a climate register

Climate driver	Impact on objectives	Research	Time horizon	Materiality	Underlying risks	Impact assessment	Expert opinion on impact
Mass migration	Could impact mortality rates through a change in the mix of business, relevance of underlying mortality data or have an impact on healthcare provision in the UK if the healthcare system becomes overloaded	L. Perch-Nielsen, S., B. Böttig, M. & Imboden, D. Exploring the link between climate change and migration. Climatic Change 91, 375–393 (2008)	Mortality rates: 15-20 years Overloaded healthcare: 15-20 years	<u>Low</u> Mortality impact remains a relatively small risk from mass migration <u>Medium</u> Greater demand for healthcare provision leading to excess deaths	• Mortality • Mix of business • Health U/W	<stress test results>	Greatest impact to the insured population is likely to come from excess/early deaths if the UK healthcare system becomes overburdened
Extreme heat	Could result in increased deaths and additional pressures on the healthcare system over acute periods	Steven Woolf, Joseph Morina, Evan French et al The health care costs of extreme heat (2023)	Mortality: 5-10 years Healthcare system: 5-10 years	<u>Low</u> Mortality: Exposures remain small Health: Healthcare inflation may be material, shift claims spike to earlier in the year, offset by fall in winter spike	• Mortality • Health U/W		In the UK extreme heat is unlikely to have a major impact on life expectancy of insured population



4. Design climate scenario narratives

- Design informed scenario narratives that will help provide information on the problem statement that can help drive decisions
- Based on expert judgement of exposures for the specific organisation and objective

Scenario	Title describing the crux of the scenario
Scenario narrative	Narrative for the scenario and how it emerges; focusing particularly on implications for the problem statement
Risk exposures	Describe the exposures because of the scenario narrative. These should be for the firm specifically but should also describe exposures within the environment in which it operates as relevant
Under which climate pathway/s is this scenario able to manifest?	Consider if the scenario is more or less likely along a particular climate pathway; or how it could differ under different climate pathways
What does this mean for us?	• What are the implications for our business? • Would we have seen it coming through our current controls / structures?
Decisions	• Is there something we need to do to manage the risk or take advantage of an opportunity? • Are there KRI's we need to introduce to get early warnings that this scenario could be emerging? • Are there any low cost / low regret decisions we can make today to increase our resilience?



4. Design climate scenario narratives

Scenario	UK health care degradation
Scenario narrative	Due to the transition to a low carbon economy the UK has experienced volatile inflation and macro-economic stress for a number of years. The NHS, in particular, has experienced pressure on its resources from reduced government funding as well as supply chain disruptions resulting in increased costs and shortages in essential medical equipment, frequent strike actions due to not being able to keep up with pay and working condition demands. Furthermore, as a result of climate change, additional pressures are put on the NHS which it has been unable to prepare for due to reduced funding during the transition. These additional pressures are from increased extreme weather events, mass migration and the rise of vector borne illnesses. Transition pressures have also increased inflation in the UK impacting the ability of individuals to afford private health care, exacerbating health issues, and making more expensive protection products like WoL insurance unaffordable. As a result of concerns about the UK government's ability to manage public services, maintain social stability, and address the economic repercussions of the healthcare crisis, credit rating agencies downgrade UK debt. This results in UK asset values falling.



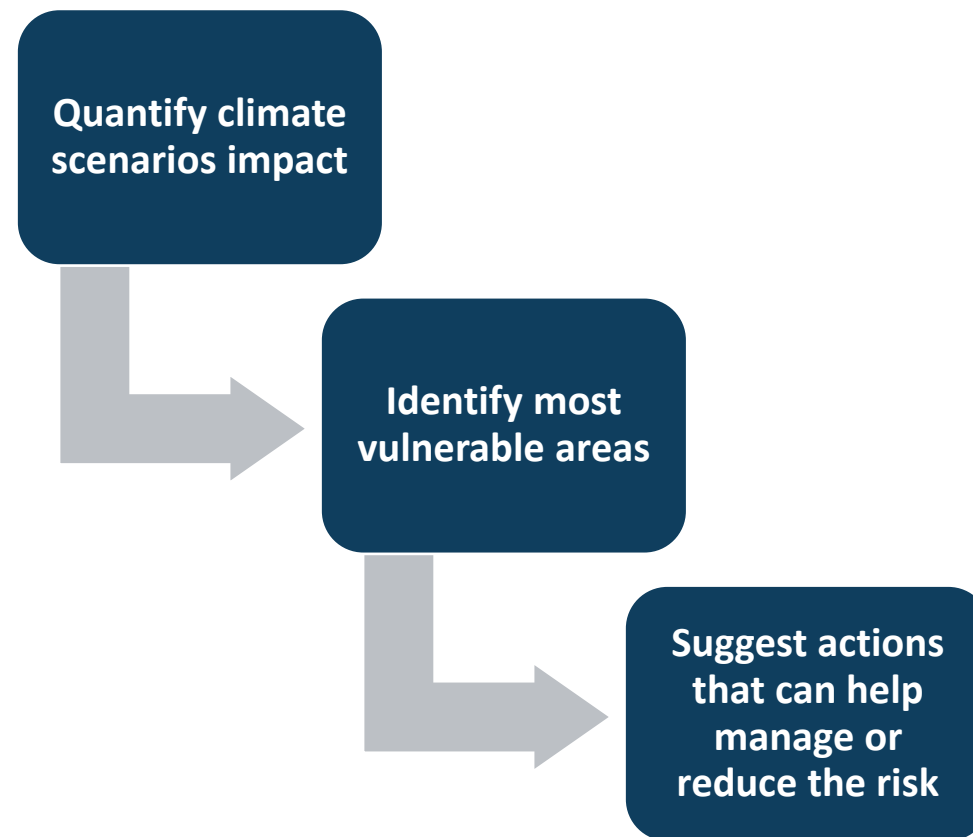
4. Design climate scenario narratives

Scenario	UK healthcare collapse
Risk exposures	- Increased mortality due to delay in screening and other healthcare services, similar to COVID environment but indefinitely - Reduced demand for WoL protection policies - Increase in lapses - Potential for social unrest - Increase in fraudulent claims - Reduction in value of reserves
Under which climate pathway/s is this scenario able to manifest?	- Could probably occur under all scenarios, but under disorderly transition the inflationary impacts could be more onerous - Under a hot house world, and too little too late the pressures on the NHS could be greater from physical climate factors in addition to the delayed economic adjustments
What does this mean for us?	- WoL product becomes more expensive and harder to price in an uncertain future - SCR margin needs to be increased - Do not have sight of pressures on the UK healthcare system to have any early warnings on this situation
Decisions	- Start monitoring NHS waiting times / funding allocation to healthcare in the UK - Increase SCR coverage ratio to 200%



5. Climate scenario testing and decision making

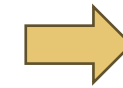
- Quantify climate scenarios
- Identify and assess most vulnerable areas
- Vulnerable areas will vary based on your own portfolio of customers, investments, risk appetite, etc.



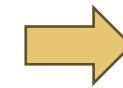


5. Climate scenario testing and decision making

Scenario	UK healthcare collapse
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Decisions	- Start monitoring NHS waiting times / funding allocation to healthcare in the UK? - Increase SCR coverage ratio to 200%?



Quantify the impact on P&L, balance sheet, SCR, etc. to understand the impact on profitability, reserves, capital requirements



Quantify the impact on different climate pathways to understand how the change in parameters impacts the results

IFoA Climate Change SST Working Party Framework

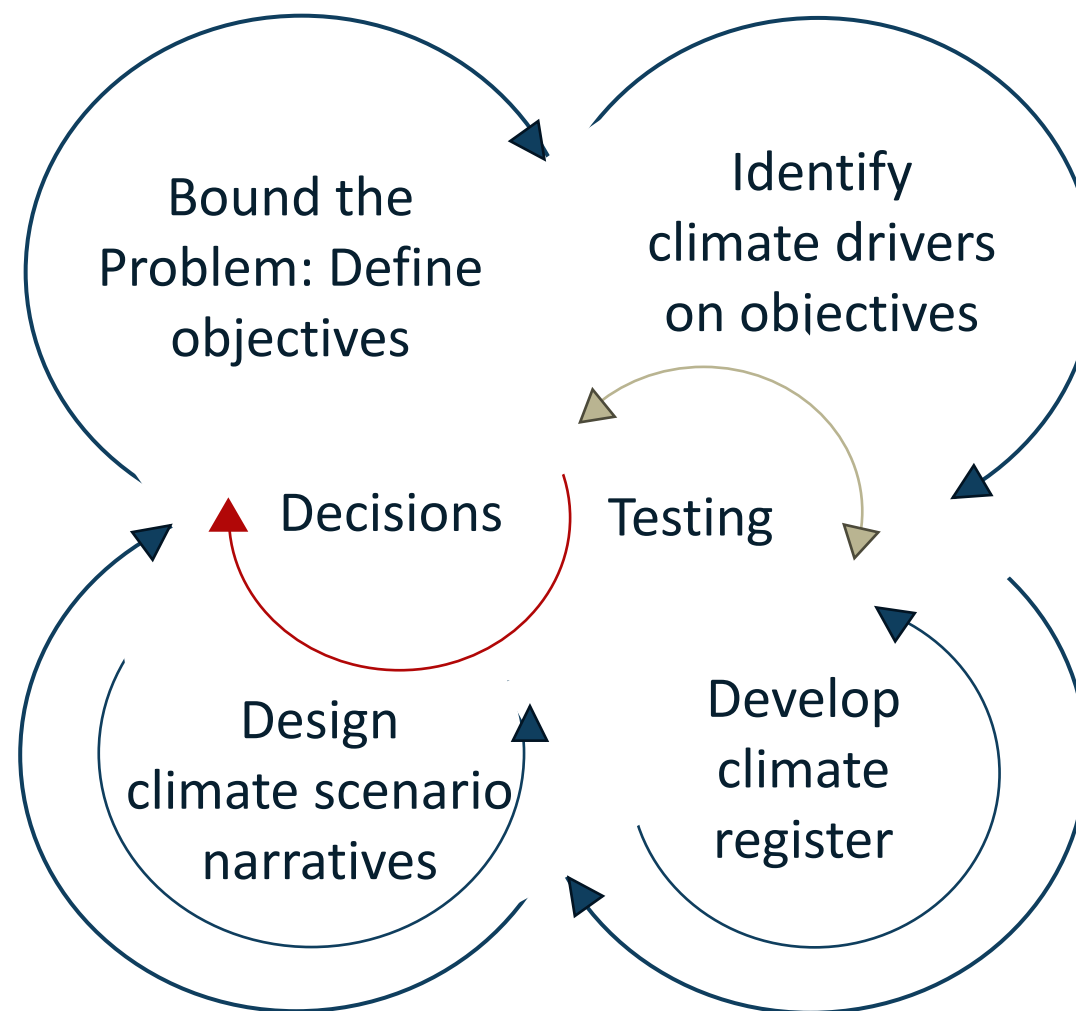


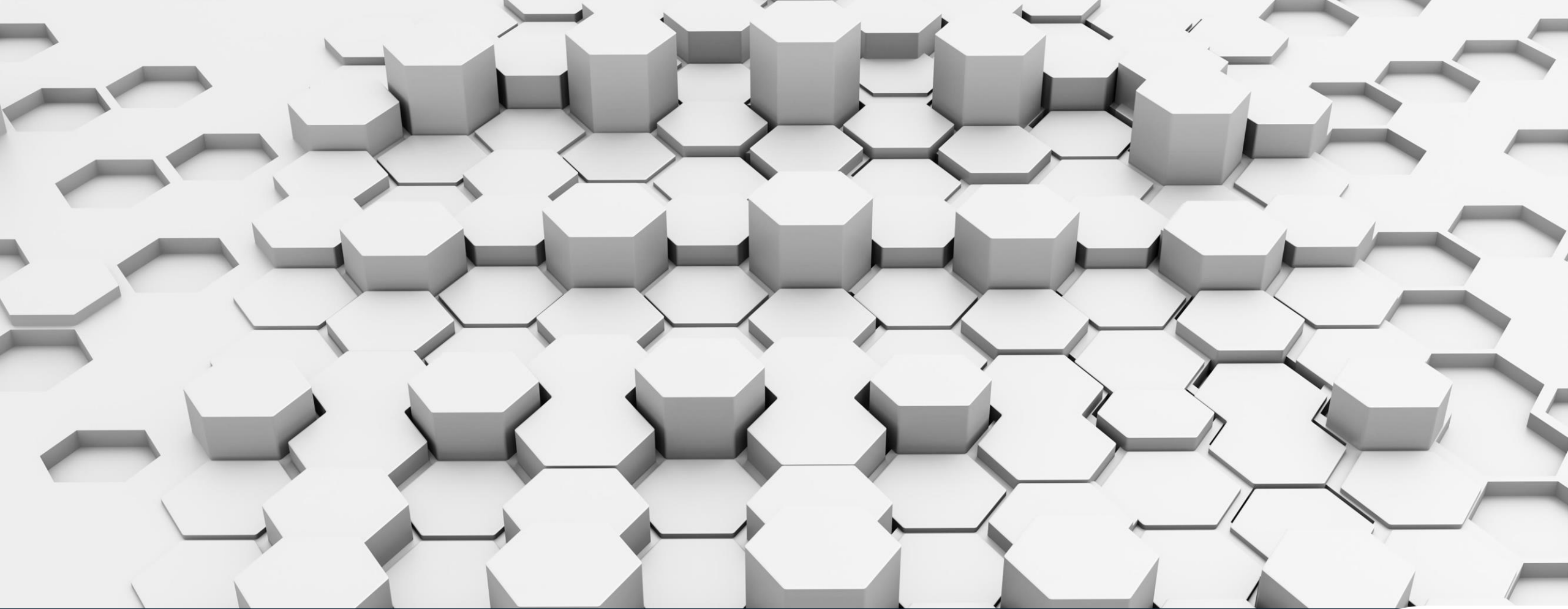
Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.





Thank you

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