Insights into Life & Health reinsurance

Our response to the Covid-19 outbreak
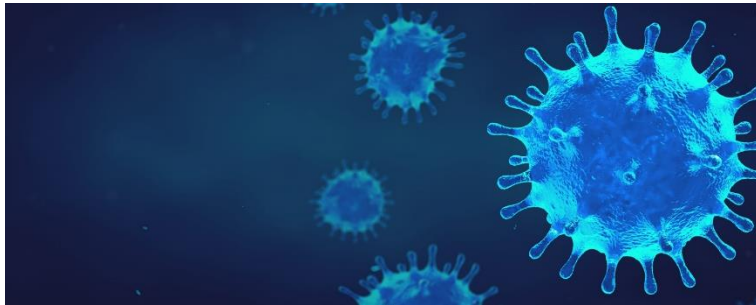
Claude Chèvre, Member of the Executive Board
25th International Investors' Day 2022
6 October 2022

Agenda

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Pandemics:
Not really a surprise

2

Impacts on the
L&H business

3
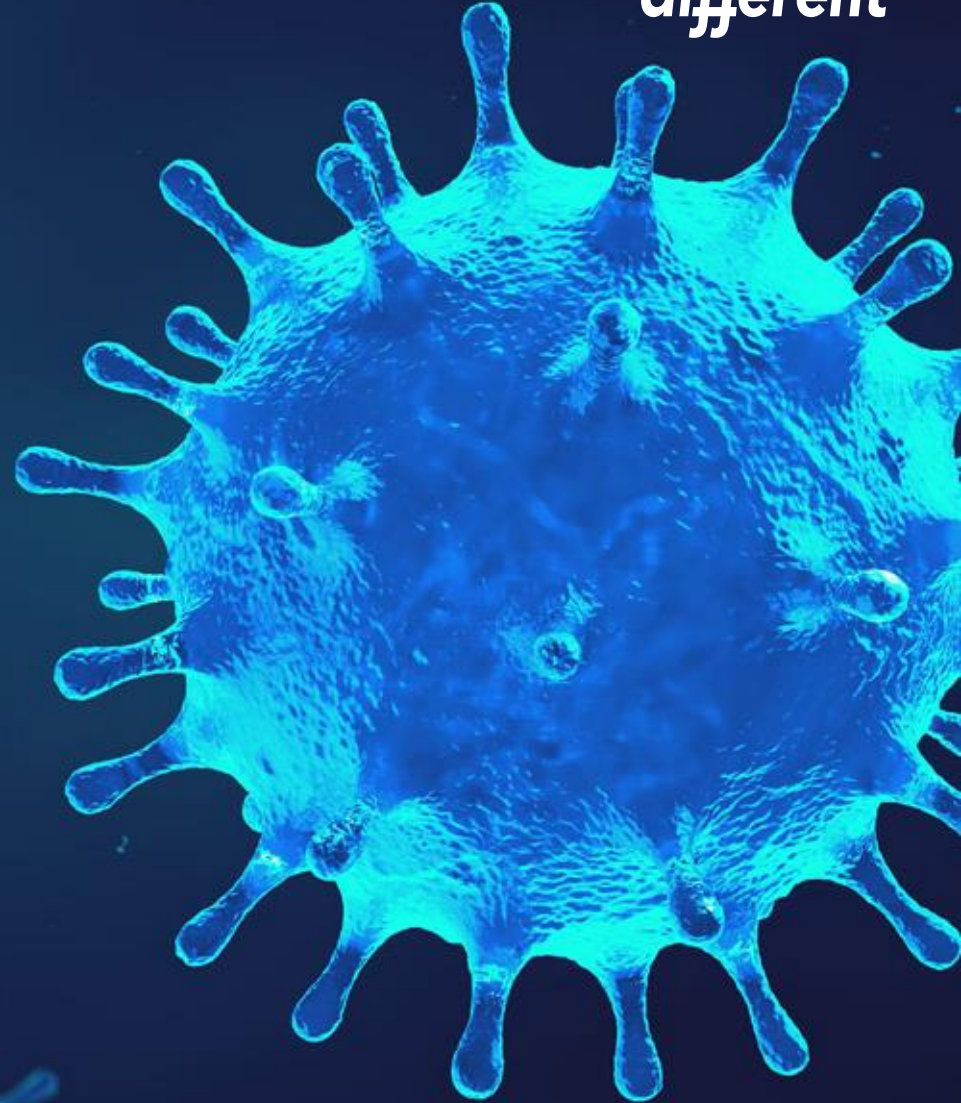
Conclusions &
Key takeaways

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somewhat different

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**Pandemics:
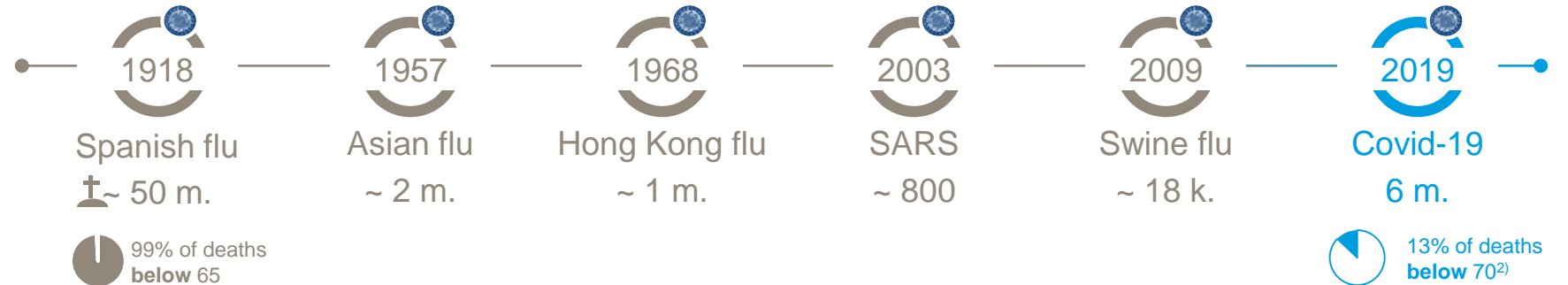Not really a surprise**

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Pandemics: Not really a surprise
Since the Middle Ages there have been a number of pandemic outbreaks

Pandemic

An epidemic that has spread over several countries or continents, usually affecting a large number of people[1]

Observed pandemic outbreaks – 20th & 21st century

1918	1957	1968	2003	2009	2019
Spanish flu	Asian flu	Hong Kong flu	SARS	Swine flu	Covid-19
~ 50 m.	~ 2 m.	~ 1 m.	~ 800	~ 18 k.	6 m.

99% of deaths **below** 65

13% of deaths **below** 70[2]

Global Covid-19[3] statistics

550 m. — Cases

6.3 m. — Deaths

As @ 2022H1

Cumulative Covid-19 deaths
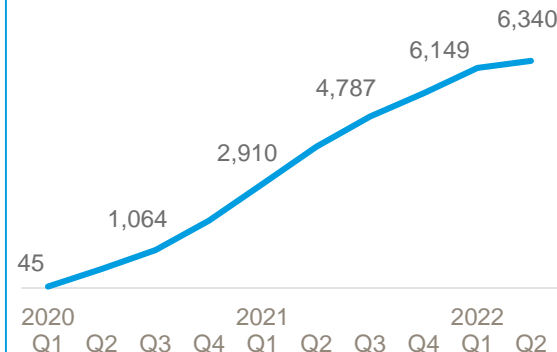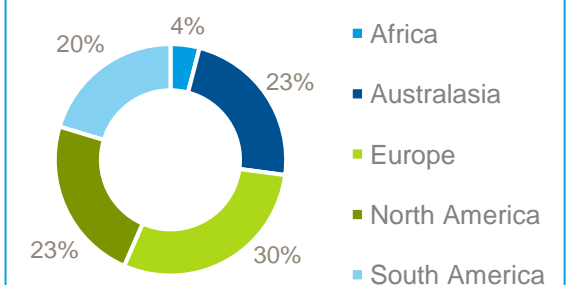
45
1,064
2,910
4,787
6,149
6,340

2020 Q1 Q2 Q3 Q4 | 2021 Q1 Q2 Q3 Q4 | 2022 Q1 Q2

Regional Covid-19 split

- 4%
- 23%
- 30%
- 23%
- 20%

■ Africa
■ Australasia
■ Europe
■ North America
■ South America

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Pandemics at Hannover Re life & health
Managing potential claims shocks is core to the role of reinsurance

Internal model

Pandemics: A L&H catastrophe risk and integral part of Hannover Re's internal model

2008	2016	1,041
Launch of internal model	Certification by regulator	EUR m. pandemic capital in 2019[1]

Extreme mortality swap

2013	7	335
First placement	# of tranches	USD m. current capacity

Pandemics can be managed through diversification
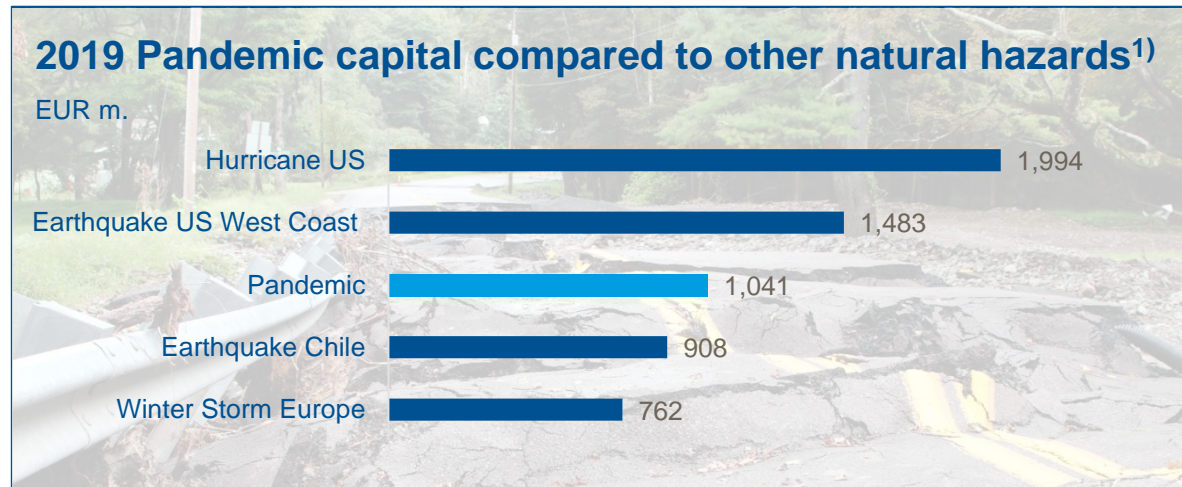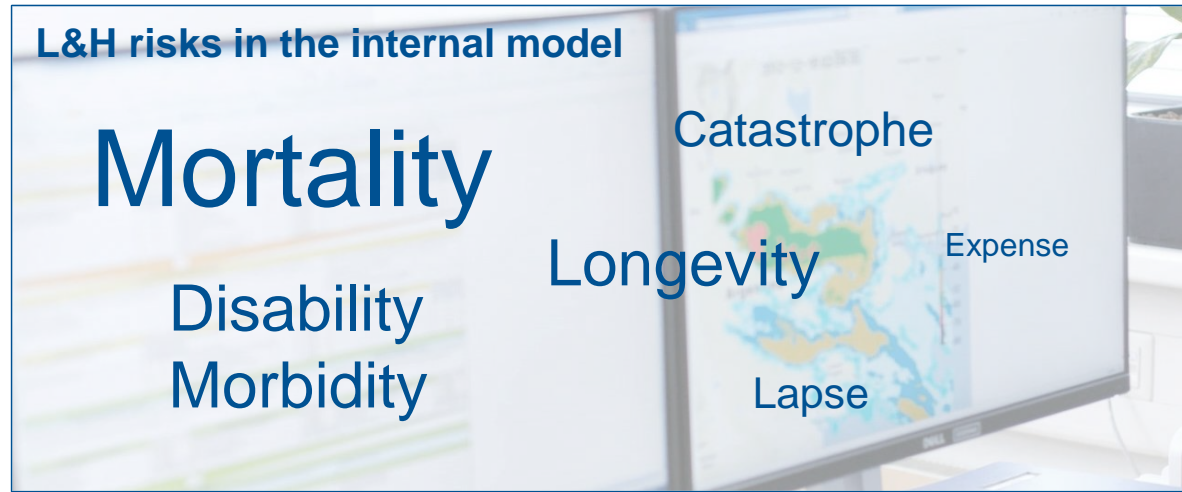
P&C   L&H
Business segments

Lines of business

Geographically

Professional reinsurers are well prepared to respond to the occurrence of pandemics. Proficient risk management and proper diversification are key instruments for managing pandemic risks.
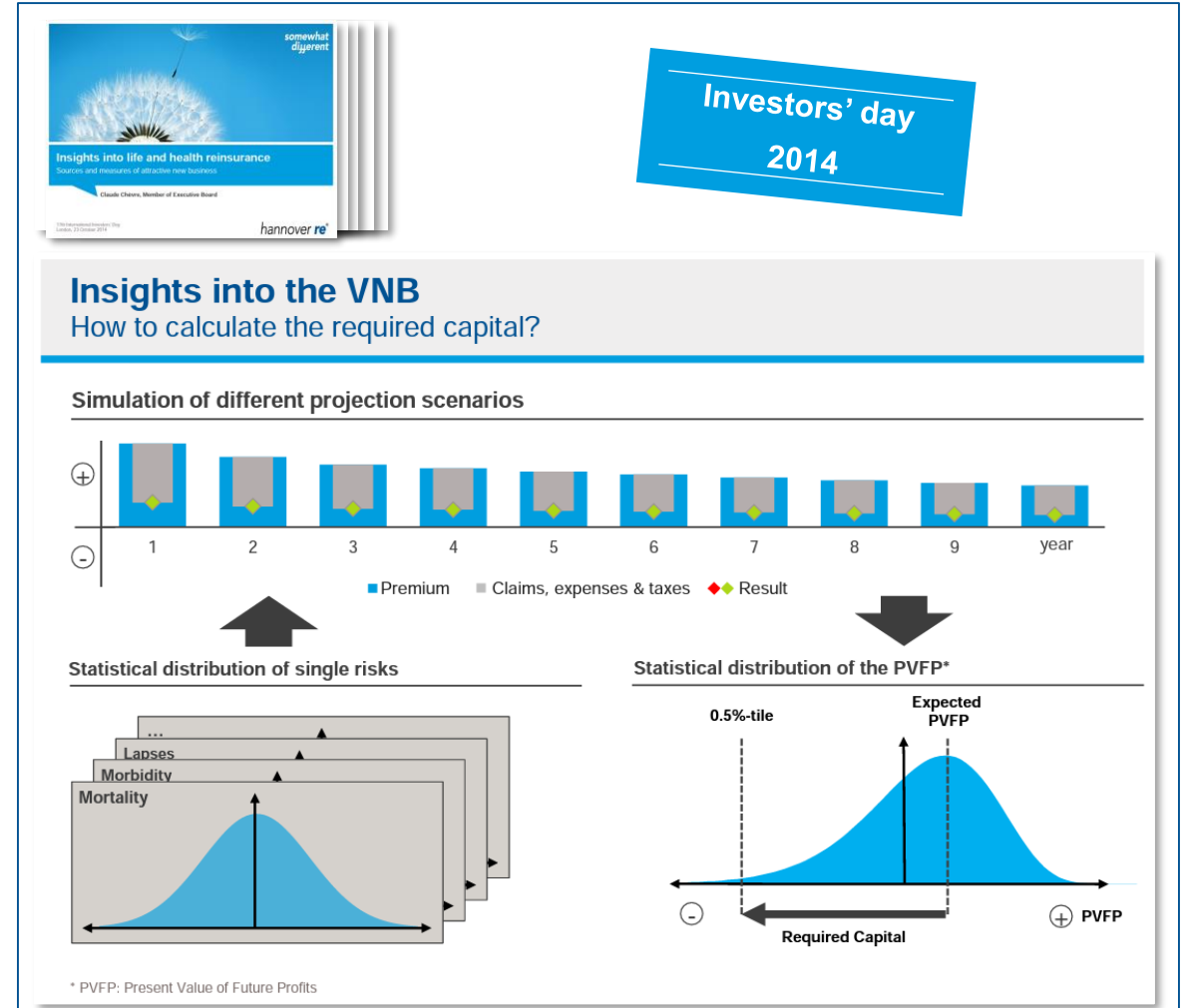
1) Required capital with a 99.5% confidence level on an aggregate annual loss basis; net of benefits from extreme mortality swap

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Internal model: defines capital needs
Pandemics are reflected within L&H catastrophe risk

L&H risks in the internal model

Mortality

Catastrophe

Longevity

Expense

Disability

Morbidity

Lapse

2019 Pandemic capital compared to other natural hazards[1]

EUR m.

Hurricane US	1,994
Earthquake US West Coast	1,483
Pandemic	1,041
Earthquake Chile	908
Winter Storm Europe	762

1) Required capital with a 99.5% confidence level on an aggregate annual loss basis

Insights into life and health reinsurance
Sources and measures of attractive new business

Claude Chèvre, Member of Executive Board

17th International Investors' Day
London, 23 October 2014

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Insights into the VNB
How to calculate the required capital?

Simulation of different projection scenarios

■ Premium ■ Claims, expenses & taxes ◆◆ Result

Statistical distribution of single risks

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Lapses
Morbidity
Mortality

Statistical distribution of the PVFP*

0.5%-tile
Expected PVFP

– Required Capital + PVFP

* PVFP: Present Value of Future Profits

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Extreme mortality swap: cover against extreme mortality shocks
Triggered for the first time in the measurement period 2020/2021

Risk

Extreme increase in mortality rates independent of the cause of death

Index cover

Weighted to HR portfolio
In the US, UK and
Australia for the age band
18-69

Tranches

Year, USD m.	Starting year and capacity of a 5-year tranche
R	Reference period of a tranche
●	Observed index for a measurement period of a tranche
E	Current estimate of the index for a measuring point of a tranche

Detachment point: 120%

Attachment point: 110%

Reference point: 100%

Measurement period

| '15 '16 | '16 '17 | '17 '18 | '18 '19 | '19 '20 | '20 '21 | '21 '22 | '22 '23 | '23 '24 | '24 '25 |

2017, USD 96 m.

2019, USD 159 m.

2021, USD 80 m.

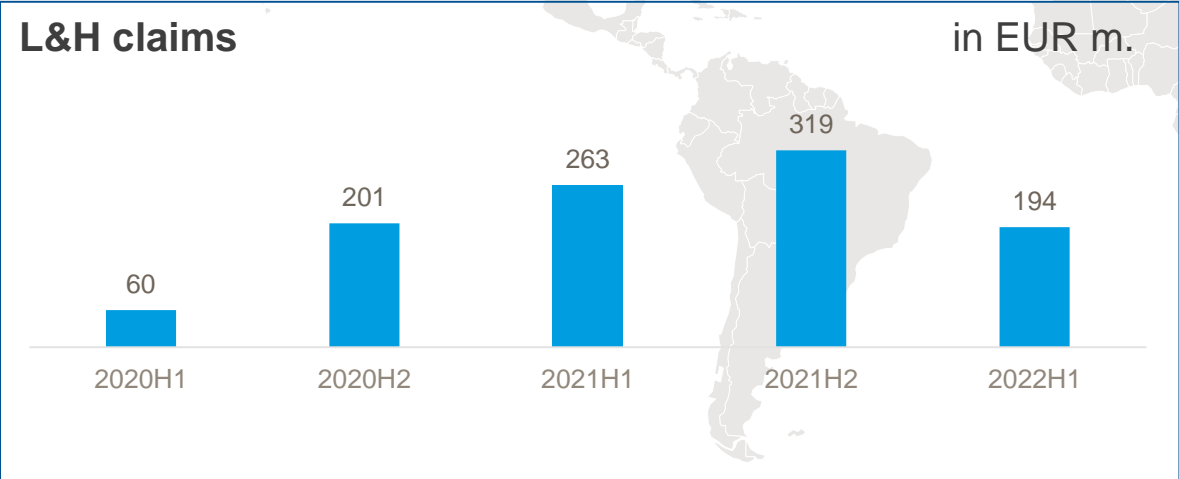Simplified illustration

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2 Impacts on the L&H business

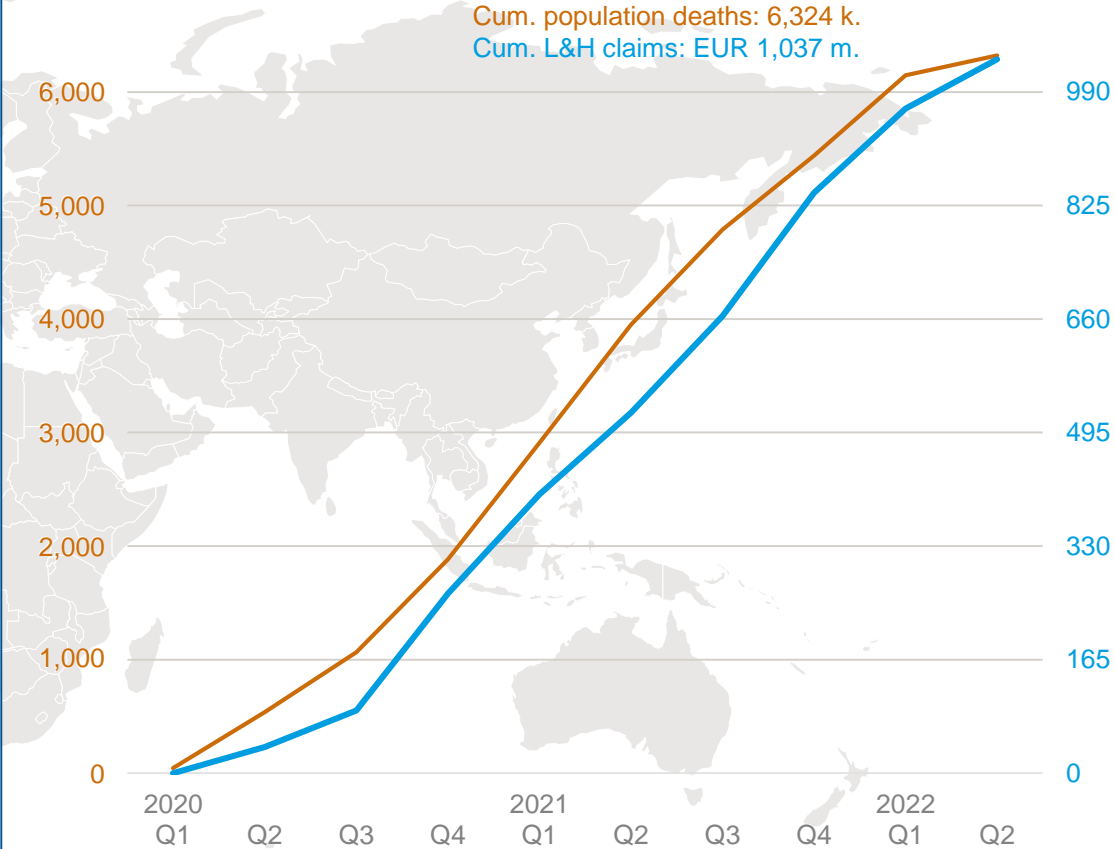# Development of worldwide cumulative population Covid-19 deaths
Reasonably good proxy for Hannover Re's cumulative Covid-19 claims

Some factors influencing Hannover Re's Covid-19 claims

- Structure of the insured portfolio (age, socio-economic profile)
- General Covid-19 impact and base mortality in the region
- Response of local authorities
- Structure of primary and reinsurance covers
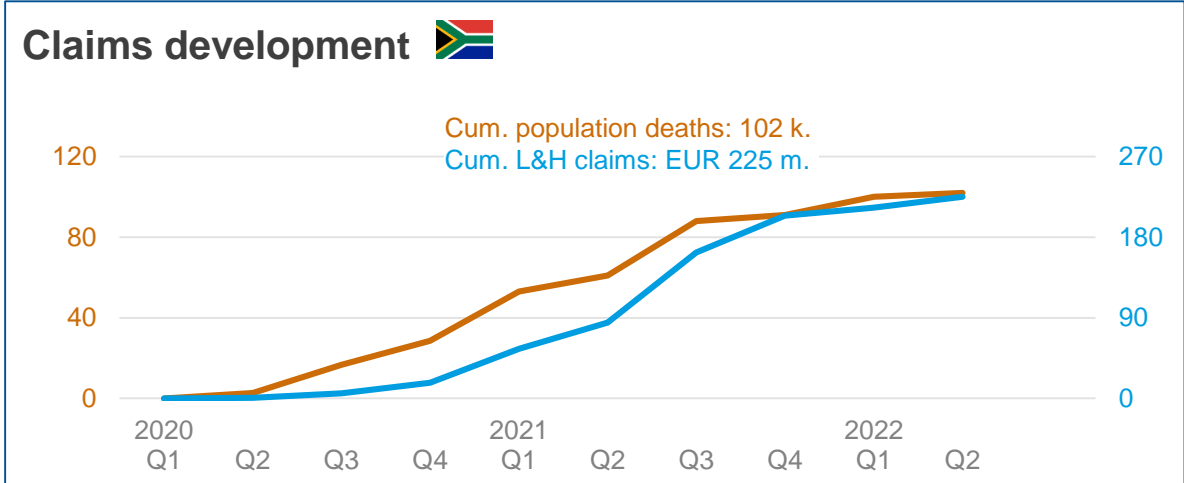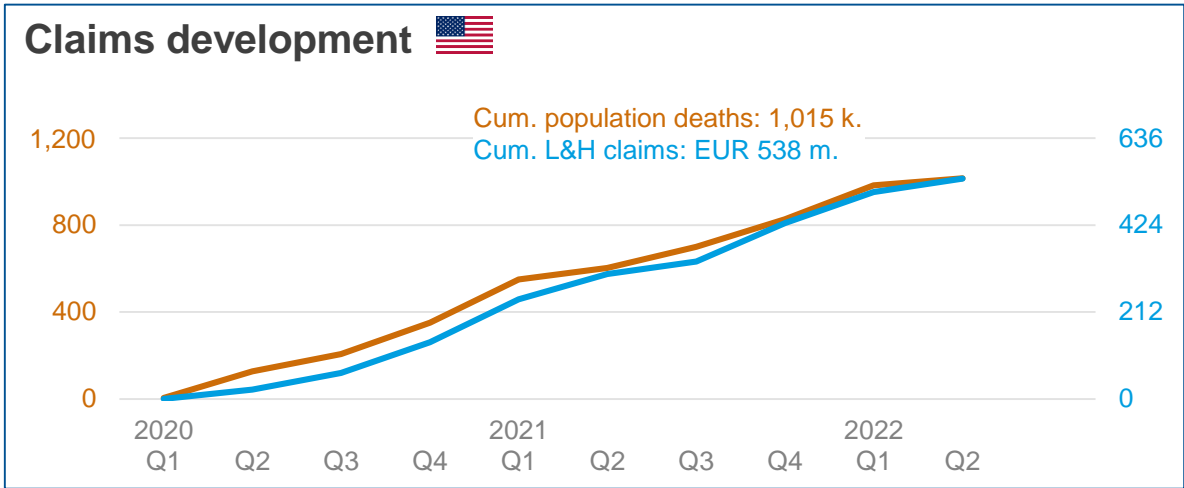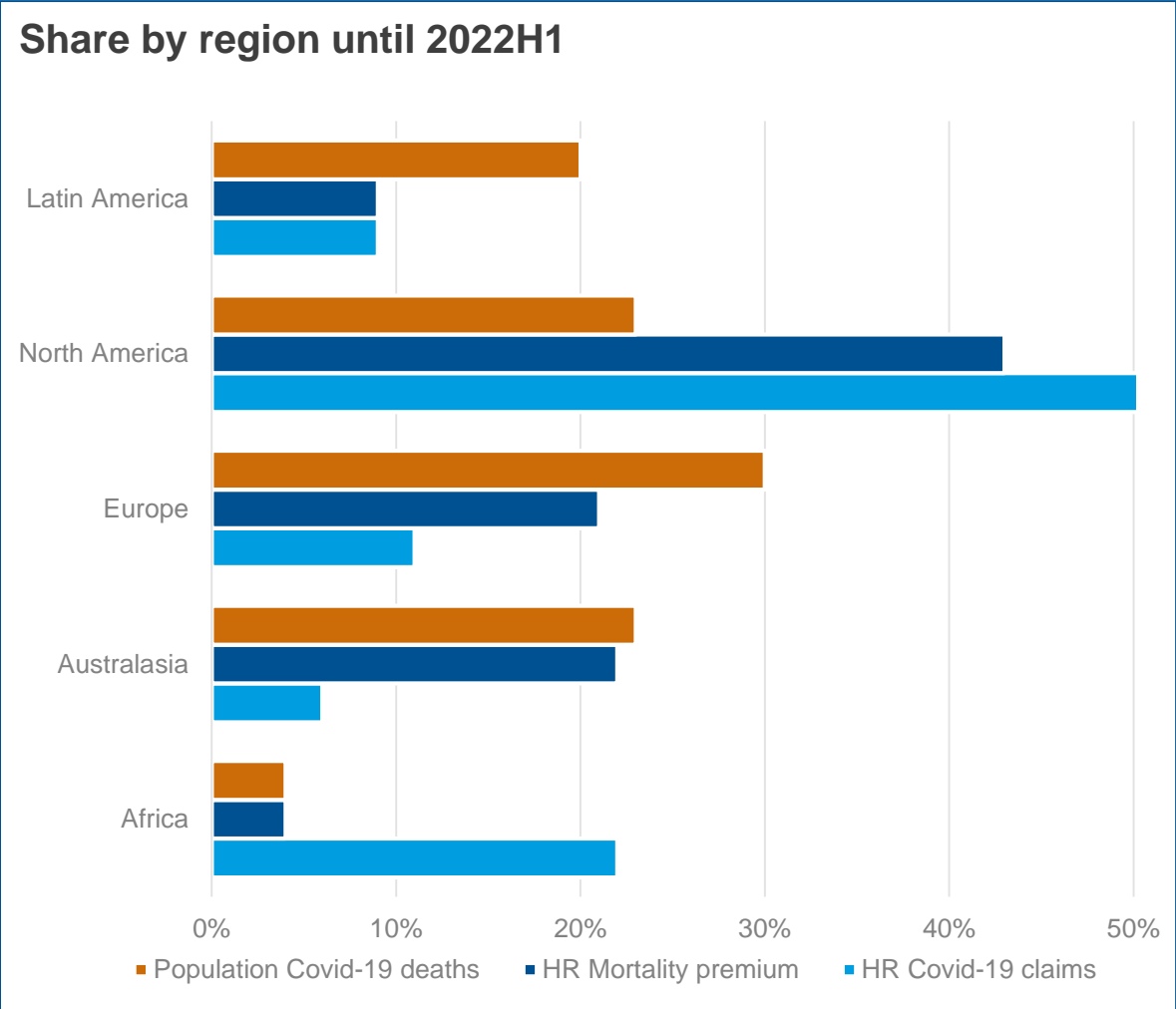- Data availability and reporting delays

Claims development

Cum. population deaths: 6,324 k.
Cum. L&H claims: EUR 1,037 m.

L&H claims   in EUR m.

Source: Coronavirus Pandemic (Covid-19) - Our World in Data

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Development of regional cumulative population Covid-19 deaths
Quality of proxy for Hannover Re's cumulative Covid-19 claims varies by region

Share by region until 2022H1

Legend:
- Population Covid-19 deaths
- HR Mortality premium
- HR Covid-19 claims

Regions (top to bottom): Latin America, North America, Europe, Australasia, Africa

X-axis: 0% 10% 20% 30% 40% 50%

Claims development 🇺🇸

Cum. population deaths: 1,015 k.
Cum. L&H claims: EUR 538 m.

Left axis: 0, 400, 800, 1,200
Right axis: 0, 212, 424, 636

X-axis: 2020 Q1 Q2 Q3 Q4 | 2021 Q1 Q2 Q3 Q4 | 2022 Q1 Q2

Claims development 🇿🇦

Cum. population deaths: 102 k.
Cum. L&H claims: EUR 225 m.

Left axis: 0, 40, 80, 120
Right axis: 0, 90, 180, 270

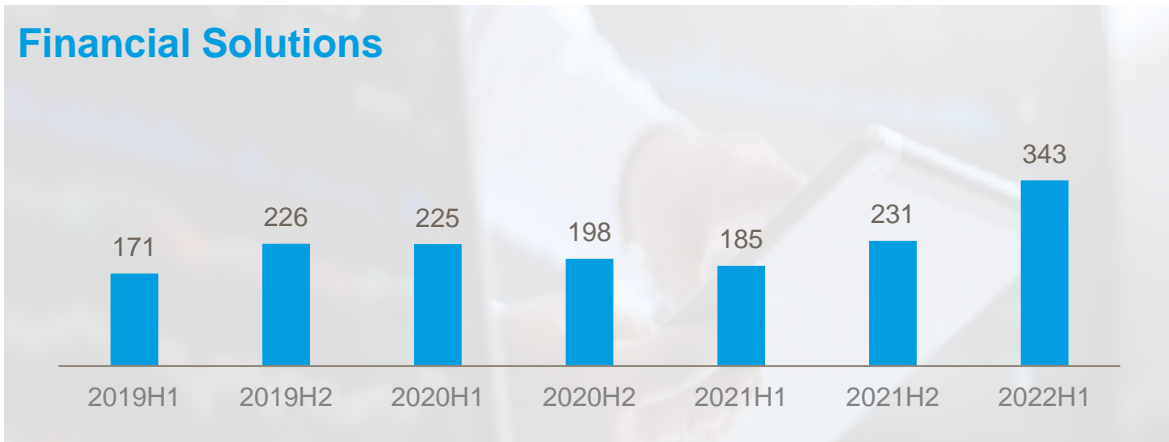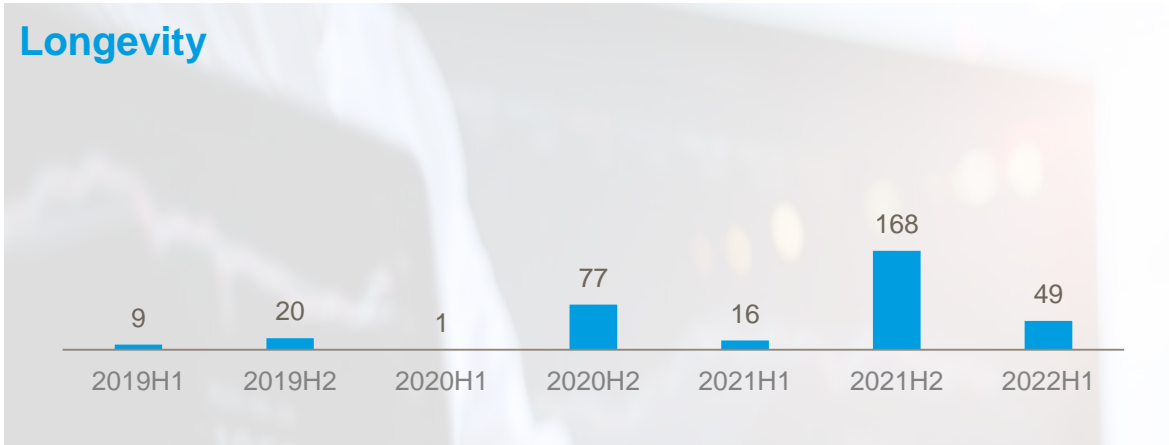X-axis: 2020 Q1 Q2 Q3 Q4 | 2021 Q1 Q2 Q3 Q4 | 2022 Q1 Q2

Source: Coronavirus Pandemic (Covid-19) - Our World in Data

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Strong contribution from non-negatively affected business
Financial impact of 2nd order effects difficult to estimate

Non-negatively affected business, EBIT in EUR m.

Longevity

2019H1	2019H2	2020H1	2020H2	2021H1	2021H2	2022H1
9	20	1	77	16	168	49

Financial Solutions

2019H1	2019H2	2020H1	2020H2	2021H1	2021H2	2022H1
171	226	225	198	185	231	343

2nd order effects

Economic downturn

- Anti-selective lapses
- Increased / decreased demand for life insurance
- Delays in health diagnoses and treatments
- Relaxation of underwriting criteria
- Move into digital sales channels with limited experience

…

Long Covid

No reported claims

Wrongly reported claims

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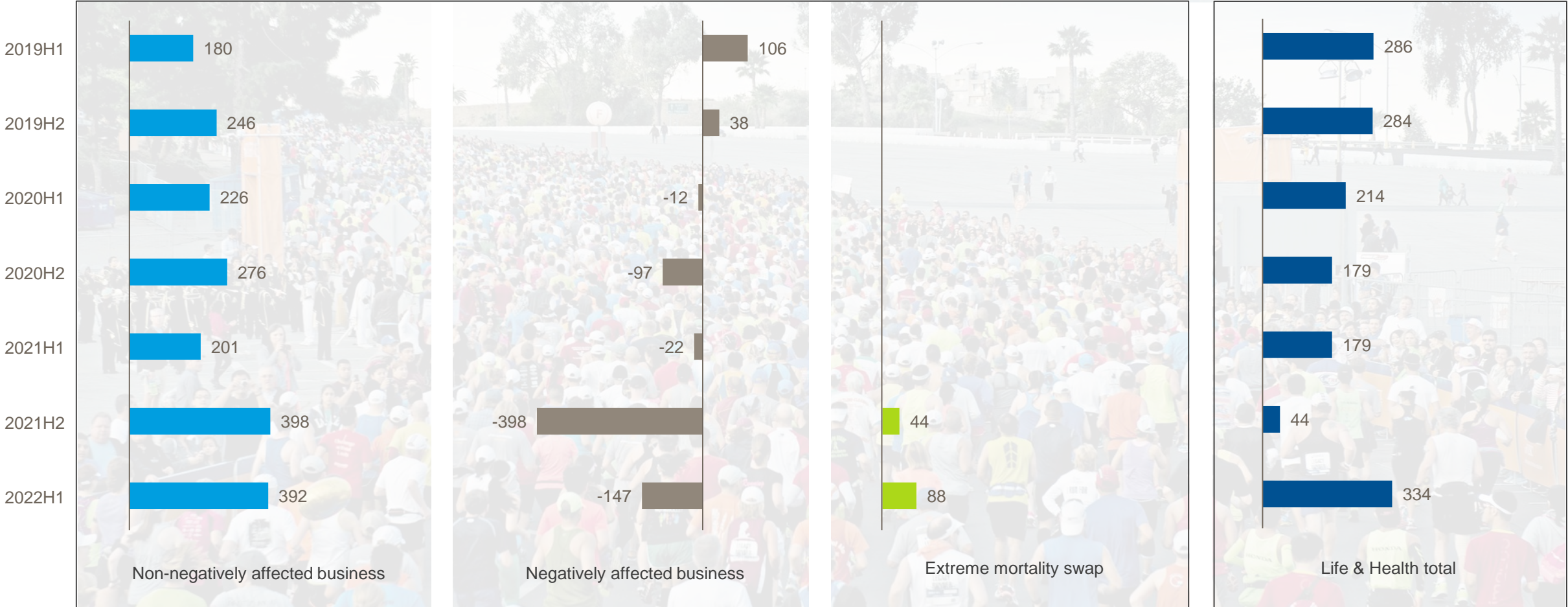
Non-negatively affected business and extreme mortality swap
More than compensate the losses from Covid-19

EBIT contribution, EUR m.

	Non-negatively affected business	Negatively affected business	Extreme mortality swap	Life & Health total
2019H1	180	106		286
2019H2	246	38		284
2020H1	226	-12		214
2020H2	276	-97		179
2021H1	201	-22		179
2021H2	398	-398	44	44
2022H1	392	-147	88	334

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3 Conclusions & key takeaways

somewhat different
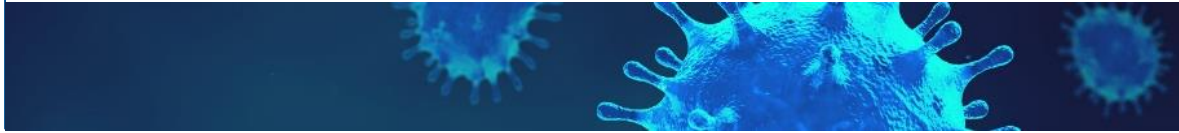
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There are various options
To enhance further resilience against future pandemics

✓ Shorten rate guarantees for pandemic-exposed product lines
  – Refrain from offering whole of life guarantees for mortality & morbidity

✓ Focus on new opportunities from non-negatively affected lines of business
  – Increase offerings in financial solutions & longevity

✓ Strengthen data analytics capabilities
  – Validate and back test the internal pandemic model to further optimise diversification

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Key takeaways

Pandemics

- Various pandemic outbreaks have been observed
- Most were caused by viruses not bacteria
- Different age groups were / are affected
- Effective risk management is key

L&H business

- 1,037 EUR m. cumulative Covid-19 claims as at 2022H1
- Claims occurred not always in line with mortality exposure
- Data quality varies from region to region
- Risk management shown to be effective

Conclusions

- Occurrence of pandemics must be expected
- Diversification is of utmost importance
- Data analytics is essential

Life and health reinsurers do have options to further increase their resilience against future pandemics.

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