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A new perspective on pandemics: Covid-19 insurance impacts and challenges

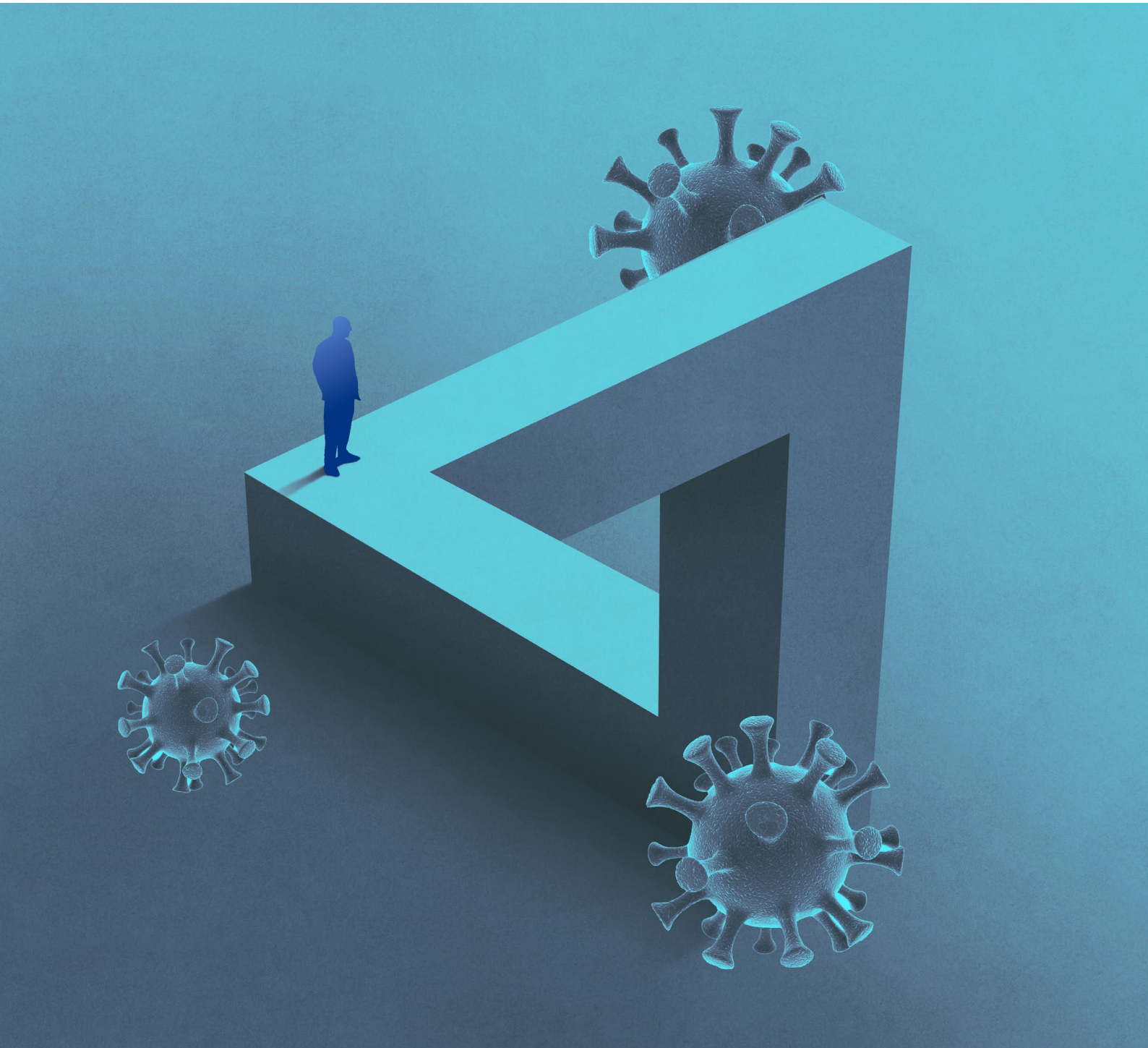


Table of contents

Foreword

In 2007 the CRO Forum published a paper on "Influenza Pandemics[1]" that provided a consolidated view of the potential impact of a Spanish Flu-like scenario in terms of both excess mortality and impact on assets, liabilities and operations of (re) insurance undertakings. The authors also identified steps toward better preparedness. Twenty-first century medical technology and hygiene practices were expected to make populations better equipped to deal with a life-threatening disease, particularly in developed economies.

Fifteen years later, **this paper aims to refresh the CRO Forum's perspective on pandemics** following the outbreak of Covid-19, a shocking event that has taken lives, changed the way people live and work, and appears now to be transitioning into an endemic phase. Although (re)insurers have weathered the storm relatively well[2], the general impact of Covid-19 has been profound and the increased mobility of people and goods has made containing the disease difficult and costly in social and economic terms. On the other hand, effective vaccines have become available at a remarkable speed and excess mortality is not expected to surpass that of the infamous Spanish Flu.

This paper covers **the challenges that (re)insurers, and risk managers in particular**, should address in preparing for another potential pandemic event, and analyses the perspective of users of internal models, given that since 2016 the Solvency II regime in the European Union allows the customisation of the methodologies for determining regulatory capital requirements[3].

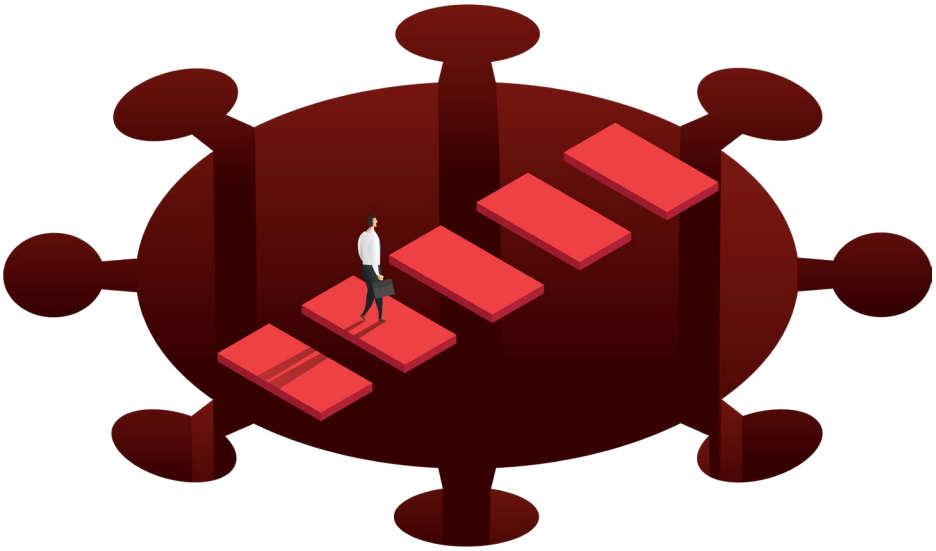
[1] Influenza Pandemics, The CRO Forum, 2007
[2] Global Insurance Market Report, International Association of Insurance Supervisors (IAIS), 2020
[3] Likewise, since 2011 Swiss insurance companies are required to adopt the Swiss Solvency Test, whose underlying principles are equivalent to those set out in Solvency II

Executive summary

Pandemics can challenge insurance companies in multiple ways, such as higher claims, devalued assets and operational disruption. Since epidemiologists are warning about increasing frequency of pandemics and a possible "big one[4]", it is essential that (re)insurance companies invest in preparedness and risk management to mitigate future losses and ensure service continuity, thus protecting the social role of insurance.

The Covid-19 pandemic was declared by the World Health Organization on 11 March 2020, with cases having spread to 114 countries. Within one year, the first vaccines were rolled out and soon after the first of a series of virus variants became dominant. Studies have shown a total number of global excess deaths during the years 2020/2021 around 15 million[5]. The characteristics of the virus have made it unlikely to be eradicated, although the currently dominant variants seem less deadly than the original Wuhan strain[6]. As it stands now, the severity of the Covid-19 pandemic is not expected to become as high as that of the Spanish Flu in 1918-1919, with its estimated 50 million deaths[7], but its social and economic consequences are enormous. The next pandemic could be even worse, depending on contagiousness, case fatality rate, availability of vaccines or therapies, and effectiveness of immunity over time. This paper provides an overview on how the Covid-19 pandemic has impacted (re)insurers.

From a life insurance perspective, despite increased mortality claims, a material long-term Covid-19 impact on mortality rates is currently not expected. For the savings and investment insurance



[4] Preserving ecology to prevent pandemic risk, The Actuary, 7 April 2021
[5] 14.9 million excess deaths associated with the Covid-19 pandemic in 2020 and 2021, World Health Organization, 5 May 2022; please refer to Chapter 1 for the number of officially reported Covid-19 deaths
[6] What Omicron's BA.4 and BA.5 variants mean for the pandemic, Nature, 23 June 2022
[7] Pandemics Throughout History, J. Piret, G. Boivin, 5 January 2021

business, changed market conditions have been correlated with increased portfolio lapses and lower new business premiums, but recovery has already been observed in 2021 in response to the vaccine programmes and improving economies. Imposed lockdowns and the fear of getting infected have reduced the use of preventive medicine and necessary treatment against other diseases, which might increase morbidity and health costs in the longer-term. As for the casualty business, workers' compensation, employers' liability, and personal accident/travel cancellation lines experienced higher claims. The Covid-19 pandemic has also shown that there are considerable second-order impacts from government-imposed lockdowns, quarantines and travel restrictions. These include reduction in premiums and claims volumes in motor and transport lines. On the other hand, supply chain disruptions may lead to inflation and a rise in various cost components of claims. Legal test cases on policy coverage resulted in different outcomes in different jurisdictions.

From an investment perspective, uncertainty induced by Covid-19 has led to market movements not seen since the 2007-08 financial crisis. The asset impacts on (re)insurers' balance sheets, however, were relatively short-lived because massive stimulus by governments and central banks' lending programmes led to a stabilization of global markets. The return of meaningful inflation for the first time in several decades, at the time of writing is triggering interest rate rises and further stock market declines. Volatility continues.

For the adopters of internal models, the Covid-19 pandemic prompts a critical review of models' assumptions concerning life and health coverages, financial and credit risks, non-life risks and dependence/correlation among risk classes. It is also necessary to confirm how different model components address pandemic risk, in order to avoid double counting and deal with any blind spots. Observing the future update of Covid-19 related losses, until it will disappear or become endemic, will help clarify whether it is a one-off event – to be treated within catastrophe risks and/or stress tests – or the sign of a structural break. In the short to medium-term, expert judgment is required, with the need, extent and scope of any reviews depending on the business, regulatory and social environment in which every single company operates.

Differences in how a pandemic affects insured people relative to the general population, can also be significant and should be accounted for. In absence of complete data, the value of using robust expert opinion on low-frequency/high-impact insurance risks, such as pandemics, can never be overstated.

During a pandemic it is imperative to anticipate changes in operational risk profiles, due to absences, heightened stress, increases in fraud, technology failure, and cyber-attacks. In an extremely short time, priorities must be sorted to ensure people's safety and business continuity. While some challenges are specific to a pandemic crisis, the response can also build on many typical risk management practices. An integrated approach should be ready, anticipating the involvement of medical experts and relevant functions, such as human resources, communication, information technology, facility management, business continuity management, and risk management. In addition to disrupting lives and business operations, a pandemic can be an incentive to innovate and digitalise processes.

Overall, current experience with the Covid-19 pandemic is not calling for a fundamental revision of risk management frameworks but rather for evolutionary updates. Stress tests based on pandemic shocks can help consider critical risk factors and identify potential vulnerabilities. Meanwhile, Own Risk and Solvency Assessment (ORSA) exercises can be useful for CROs to periodically engage top management through comprehensive assessments that take stock of how all relevant risks and mitigations contribute to current and prospective solvency positions.

A number of mitigation actions are discussed throughout the paper. A key lesson learnt is that government intervention, containment measures and emergency regulations, subject to disease lethality, can affect (re)insurance business and operations more acutely than the contagion itself. CROs should drive verification of readiness to manage future acute crises by challenging the business continuity frameworks and having ready agile approaches to swiftly update (and report on) constantly changing risk profiles.

1 Covid-19 versus the most recent pandemics: an overview

A pandemic is an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people[8]. The emergence and spread of infectious diseases with pandemic potential have regularly occurred throughout history. Many infectious diseases leading to pandemics[9], have been caused by zoonotic pathogens that were transmitted to humans by increased contacts with animals through breeding, hunting and global trade activities.
Expanded cities, extended trade territories, intensified travelling as well as effects on ecosystems due to increased human population, have raised the emergence and spreading of infectious diseases leading to higher risks of pandemics.
The Covid-19 (2019 coronavirus disease) is only the most recent of a seemingly endless series of catastrophic pandemics that have occurred throughout history. Looking at the recent history of the 20th and 21st century, there have been several pandemics, all originating from viruses in the animal population passing onto humans. Epidemiologists are now warning about increasing frequency of pandemics. This paper refers to pandemic events that developed over a period of a few years, typically in one or more acute waves. This approach, consequently, excludes diseases such as, for example, HIV/AIDS.

INFLUENZA

The Influenza virus has often been a source of pandemics in the last 100 years. This virus is endemic in various species, including humans, birds and pigs, meaning that the infection continues to spreading in the population in a controlled and predictable fashion. In normal years, influenza leads to approximately 500 thousand deaths worldwide. This endemic situation is maintained as the virus continuously undergoes small mutations that can add up and, at some point, allow the virus to evade built-up immunity and re-infect people.
A rarer event is when a new subtype derived from animal influenza can infect and spread amongst humans. This will then have the potential to become a pandemic as there will be little to no immunity in the human population. This happened during the Spanish Flu pandemic in 1918-1919, which infected an estimated amount of 500 million people (25% of the global population) and caused approximately 50 million deaths.
Since then, most of the seasonal influenza has been from viruses descendant from the Spanish Flu virus. The other influenza

[8] The classical definition of a pandemic is not elusive, Bull World Health Organ. 2011;89(7):540-541
[9] Preserving ecology to prevent pandemic risk, The Actuary, 7 April 2021

pandemics, Asian Flu (1957-1959), Honk Kong Flu (1968-1970), and Swine Flu (2009-2010), have also been caused by combinations of the Spanish Flu virus with avian and swine influenza viruses.

SARS-COV AND MERS-COV

The first SARS-CoV pandemic in 2002-2003 is thought to have originated in the Guangdong province (China) from bats, and transitioned to humans through civets. In humans it caused a very lethal disease that killed roughly 10% of those infected. SARS-CoV quickly became a global threat because of its rapid transmission. SARS-CoV infection was reported in 29 countries in North America, South America, Europe and Asia. Overall, 8,437 probable cases were reported, with nearly 800 SARS-related fatalities. Case identification and isolation followed by contact tracing and surveillance proved effective in containing the global threat and eradicating the virus in almost 7 months. However, some SARS-CoV-like viruses found in bats have been shown to be able to infect human cells without prior adaptation, which indicates that SARS could re-emerge in the future.

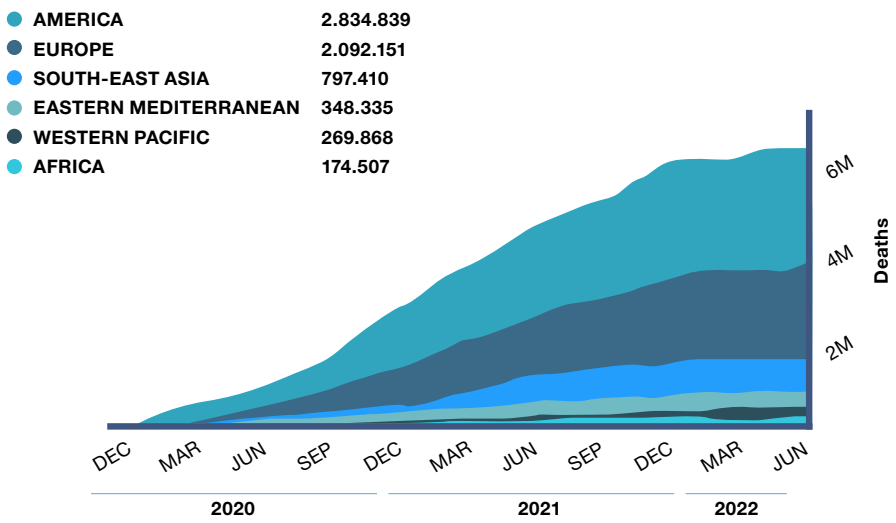
Ten years after the first emergence of SARS-CoV, MERS-CoV was reported in Jeddah, Saudi Arabia. Between 2012 and 2020, 2,519 laboratory-confirmed cases of MERS-CoV with at least 850 deaths were reported in 27 countries. All cases have been linked to persons in the Arabian Peninsula or who had returned from traveling in MERS-CoV endemic areas.

This second coronavirus pandemic originated from bats and was passed on to humans through camels. This virus has also proven to be extremely lethal with approximately 35% of people infected having died. The low contagion rate of the disease, has allowed to control the transmission in the absence of mitigation strategies, although the virus caused several outbreaks in hospitals of Saudi Arabia, Jordan and South Korea.

TIMELINE OF THE PANDEMICS IN RECENT HISTORY[10]

YEAR	PANDEMIC	PATHOGENS	VECTORS	DEATHS
1918-1919	Spanish Flu	Influenza A/H1N1	Avian	50 million
1957-1959	Asian Flu	Influenza A/H1N1	Avian	1-2 million
1968-1970	Hong Kong Flu	Influenza A/ H1N3	Avian	0.5-2 million
2002-2003	SARS (Severe Acute Respiratory Syndrome)	SARS-CoV (coronavirus)	Bats / Civets	813
2009-2010	Swine Flu	Influenza A/H1N1	Pigs	148-249 thousand
2015-present	MERS (Middle East Respiratory Syndrome)	MERS-CoV	Bats / Camels	858[11]
2019-present	Covid-19 (coronavirus disease)	SARS-CoV-2	Bats / Pangolins?	6.5 million[12] – 15 million (estimated excess deaths)[13]

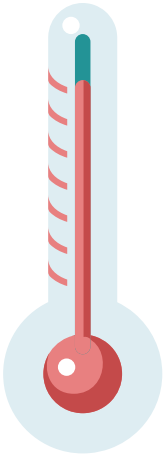
SITUATION BY WHO REGION



[10] Pandemics Throughout History, J. Piret, G. Boivin, 5 January 2021
[11] Middle East respiratory syndrome coronavirus, World Health Organization webpage, visited 31/08/2022
[12] Covid-19 Dashboard (World Health Organization webpage, visited 28/09/2022)
[13] 14.9 million excess deaths associated with the Covid-19 pandemic in 2020 and 2021, World Health Organization, 5 May 2022

SARS-COV 2 (COVID-19)

The current SARS-CoV 2 pandemic is also caused by a coronavirus, presumably transmitted from bats to pangolins and onto humans. Coronaviruses are well known and just like with the influenza virus, coronavirus is also prevalent in both humans and animals. In humans, coronavirus is mostly responsible for the common cold, but when the virus is able to transfer from animals to humans, the effects are unpredictable.
The Covid-19 pandemic was declared by the World Health Organization on March 11, 2020, with cases having spread to 114 countries. Within one year of the pandemic being declared, the first vaccines were rolled out and the first virus variant became dominant over the initial virus that started the pandemic. The initial vaccines have remained effective at preventing severe disease, while several new variants have caused large waves of infections by being more contagious and able to re-infect people. Due to these characteristics, the virus can potentially become endemic, eventually behaving like common cold and flu.
During the current pandemic, it has been difficult to estimate the mortality impacts, as the symptoms from Covid-19 are very similar to flu. The officially reported number of global Covid-19 deaths up to September 2022 is 6.5 million; this number, however, does not include the indirect effects and is dependent on the availability of testing facilities to identify all cases. For this reason, there have also been studies into the excess mortality impacts. Excess mortality is a more objective measure that captures all impacts of the pandemic, it takes the difference between the total number of deaths from all causes compared to the expected number of deaths derived from recent mortality statistics. These studies have shown a total number of global excess deaths during the years 2020/2021 of around 15 million[14].



LONGER-TERM CONSEQUENCES OF COVID-19

In addition to the excess mortality and public health challenges the world has been facing during the acute phase of the pandemic, there have been reported longer-term symptoms of Covid-19, investigated under the label long-Covid. For some patients, symptoms like the loss of taste or smell, fatigue, and shortness of breath, seem to prevail even if the infection with the SARS-Cov-2 virus has passed the acute phase. For now, it is too early to quantify the impact of these longer-term symptoms.
In most countries, the pandemic countermeasures and the emergency mode the health system has operated in, may have caused delays in diagnosis and treatments of other diseases including, for example, cancer or diabetes. This might lead to a transient increase in mortality from diseases other than infectious diseases in the aftermath of the pandemic. The stress experienced by so many people during the pandemic – arising, for example, from the sudden change in daily life environment, financial uncertainties, concerns about the well-being of friends and family – may lead to an increase of mental health problems like depression. Even in less extreme cases, changes of habits and lifestyle during the pandemic lockdowns – like reduced activity and practicing less sports – may spill over to the post-pandemic world and have potential consequences on the health status of the population.
On the economic side, the slow down experienced during the acute phase of the pandemic, may have led to less funding available for certain parts of healthcare systems. On the other hand, certain mechanisms might partially mitigate the adverse effect of Covid-19 on mortality: the flu mortality during the Covid-19 pandemic has reported to be reduced, possibly as a side effect of social distancing measures that acted against the influenza virus as well. Looking into the immediate future, a lower mortality in the frail part of the population may occur, due to a “mortality shift”: patients who died from Covid-19 while suffering from co-morbidities, might have died from those in the near future. This death count has been brought forward by the pandemic.

[14] 14.9 million excess deaths associated with the Covid-19 pandemic in 2020 and 2021, World Health Organization, 5 May 2022

YEAR TIMELINE OF EVENTS[15]

Mar. 11, 2020
WHO declares COVID-19 a pandemic with more than 100.00 cases and 4.000 deaths in 14 countries.

April 2
Confirmed cases of COVID-19 top 1 million worldwide.

Aug. 11
Sputnik V COVID-19 vaccine becomes the first COVID-19 vaccine to receive regulatory approval for widespread use in Russia.

Sept. 28
Global death toll reaches 1 million.

Dec. 2
U.K. becomes the first country to approve the Pfizer/ BioNTech COVID-19 vaccine for prevention of COVID.19.

Dec. 14
The U.K. reports a new SARS-CoV-2 variant of concern, lineage B.1.1.7 (Alpha).

Late-Dec.
The Delta (B.1.617.2) variant is the first identified in India.

Jan. 27, 2021
Global COVID-19 cases reach 100 million.

Mar. 11, 2021
After 1 year of pandemic, there are 118 million confirmed cases, 2.6 million death, 66.7 million recovered and 70.5 million fully vaccinated individuals.

Jun.
WHO indicates that Delta is becoming the dominant variant worldwide.

Aug. 5
Global COVID-19 cases reach 200 million.

Aug. 23, 2021
FDA approves the first COVID-19 vaccine. Pfizer/BioNTech now marketed as Comirnaty®.

Nov. 24
South Africa reports a new variant of concern, the Omicron (B.1.1.529) variant.

Jan. 7, 2022
Global COVID-19 cases surpass 300 million.

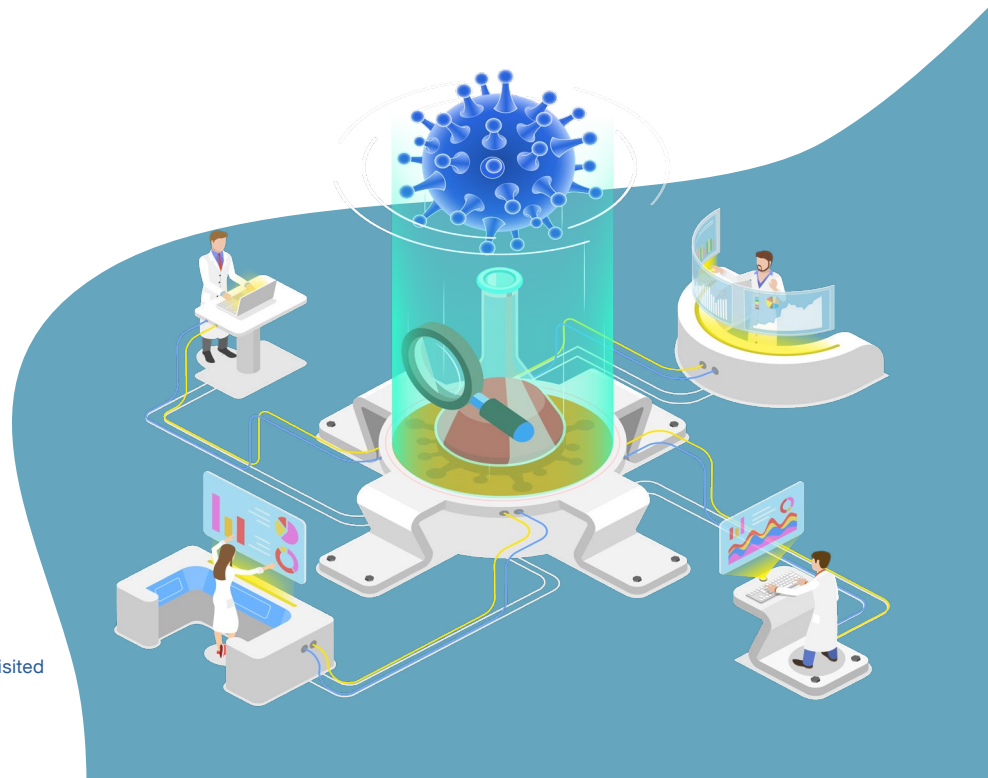
Jan. 11
WHO announces that Omicron is outpacing Delta as the globally dominant COVID-19 variant.

Jan. 11
WHO announces that Omicron is outpacing Delta as the globally dominant COVID-19 variant.

Jan. 31, 2022
FDA approves the Moderna COVID-19 vaccine. Now marketed as Spikevax for prevention in individuals 18+.

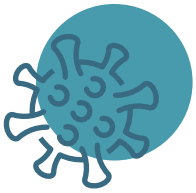
Feb. 8
Global COVID-19 cases surpass 400 million.

Mar. 11, 2022
The pandemic countries with 447 million confirmed cases, 6 million deaths, 380 million recovered cases and 10.8 billion doses of COVID-19 vaccine administered. 36.7% of the world remains completely unvaccinated, and only 13.6% of people in under-resourced countries have received at least one dose.



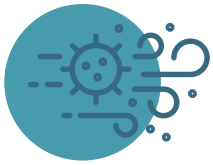
[15] Covid-19, American Society of Microbiology webpage, visited 31/08/2022

THE MAIN FACTORS THAT HAVE DETERMINED THE SEVERITY OF THE COVID-19 PANDEMIC



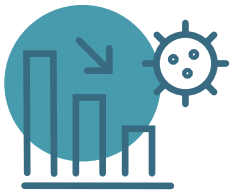
CONTAGIOUSNESS
The virus started out contagious enough to quickly cause a pandemic. Furthermore, various mutations have increased contagiousness and caused break-through infections in previously recovered people. Some infections turned out to be asymptomatic while still contagious, thus making the virus difficult to contain without society-disrupting lock-down measures.

AVAILABILITY OF AN EFFECTIVE VACCINE
Because of the work done in previous years on the development of mRNA vaccines, the development of the first Covid-19 vaccine took only about a year, compared to the 10-15 years usually needed for many other vaccines. Also, vaccines proved to be highly effective (with rates of above 90%) at preventing severe illness and death. This meant that it was possible to build up immunity in the population much faster and with fewer deaths.



CASE FATALITY RATE
In general, if death occurs very quickly after the infection, there is less opportunity for the virus to spread and cause a pandemic. However, with SARS-CoV2 death occurs in 3-4 weeks, long enough to infect other people. A reduction in death rates over time may be most likely due to the population building up immunity.

SOCIAL ACCEPTANCE OF PUBLIC HEALTH MEASURES
The public opinion on public health measures, from mask-wearing to (partial) shut-down of public life, assumed very different stances across countries, from wide acceptance to downright opposition. Ultimately, the management of the pandemic situation is a political process, and decisions may be driven by various factors, not limited to actuarial or epidemiological models.



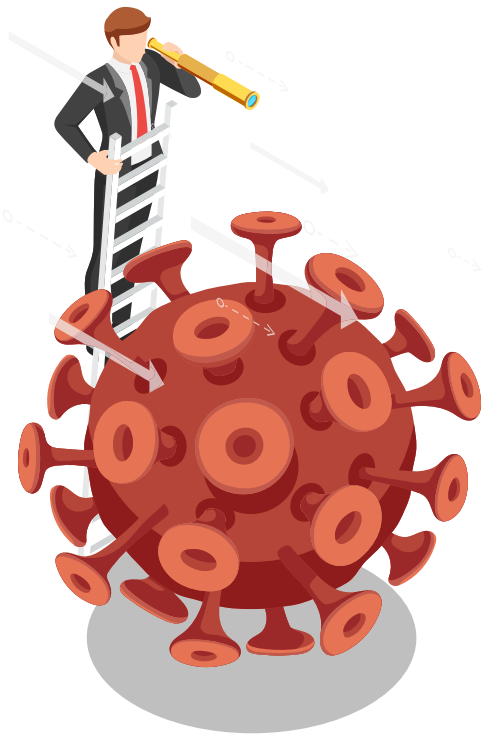
EFFECTIVENESS OF IMMUNITY OVER TIME
Although new mutations are able to re-infect people, immunity from past exposures to a vaccine or virus remains highly effective at preventing severe illness and death.

The last wave of the pandemic has not generally caused the same elevated hospital occupancy, with fewer deaths despite a much larger number of infected people. If this trend continues, it could take a few more waves before excess mortality normalizes to a level comparable to flu.
As it stands now, the severity of the Covid-19 pandemic is not expected to become as large as the Spanish Flu in 1918-1919, but it is already much larger than the other more recent pandemics from Influenza, SARS and MERS.
Despite high contagiousness and fatality rate, death toll has been mitigated by the quick development of vaccines, longer effectiveness at preventing severe disease, and implementation of public health measures.
The availability of reliable data to detect an outbreak, feed models for projecting potential development paths for a pandemic, and assess the countermeasures planned or taken, will be key to navigate societies through pandemic times. The Covid-19 pandemic has sparked some innovative ideas, such as large-scale monitoring through wastewater monitoring, although it remains to be seen how much effort and resources will be dedicated to such approaches during non-pandemic times.
Another pivotal element in future pandemic management, will be the ability of decision makers to communicate effectively and reliably to a broader public, especially on public health measures.

2 Pressures on products and liabilities[16]

Due to the potentially profound impact of a pandemic, the insurance industry must evaluate its financial impact on both sides of its balance sheet. Indeed, with the arrival of the Covid-19 pandemic, insurance companies found themselves in the eye of the storm. In just few days, many organisations had to make their entire operations remote, with the measures taken to limit the spreading of the disease being the most significant source of disruption for the economic activity in countries around the world. At the same time, they were fielding calls about changing coverage, answering questions about business interruption policies and continuing to pay claims for life, health and disability insurance[17].

A number of companies noted that a global pandemic cannot be covered solely by the insurance and reinsurance industry. The unprecedented level of government and central bank support to the global economy was noted as being vital, and companies suggested that the development of new products and solutions would benefit from a public-private partnership model. Under such a model, (re)insurers could provide a certain level of protection against pandemic risks within a framework of state-backed pandemic risk pools. The (re)insurance industry could then support any pandemic risk pooling as a service provider by offering its know-how (e.g. to set up a risk scheme and structure coverage) and infrastructure (e.g. to distribute coverage, collect premium, and handle and pay losses in a professional way) to master pandemic risks.



[16] Reported impacts of the Covid-19 pandemic on the insurance sector, as well as actions taken in response, are based on a review of CRO Forum's members 2020 and 2021 public disclosures (annual reports, solvency and financial condition reports - SFCRs, and financial condition reports - FCRs)

[17] Ready and resilient: Insurance strategy for a Covid-19 world, PwC, 2020

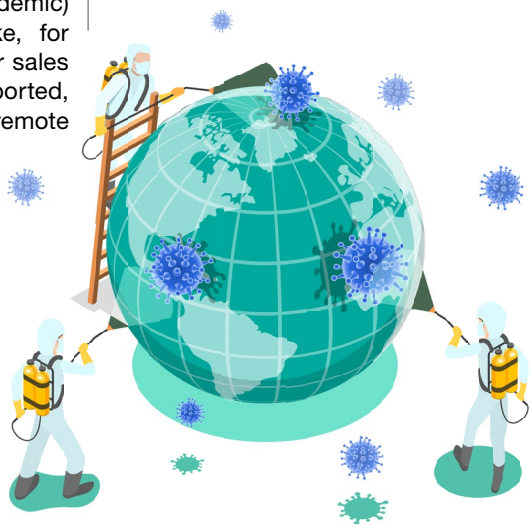
LIFE INSURANCE

Protection business writers reported increased mortality claims globally, with an offsetting impact on annuity books due to higher than expected deaths. Companies with diversified books of business (e.g. protection and annuities for life insurers; P&C and motor for non-life) observed a beneficial resilience to the impacts of the pandemic. Insurers generally noted that, while there remains a large amount of uncertainty, they do not expect a material long-term impact on mortality rates.

For mortality business one would not assume, and in fact (re)insurance companies did not experience, increased lapse levels throughout the pandemic. For savings and investment business, on the other hand, changed market conditions with plummeting stock markets in early 2020 and overall increased economic uncertainty might be correlated with increased portfolio lapses and lower new business premiums. Some recovery was observed in 2021 in response to the vaccine programme and the generally more positive economic signs.

Companies reported lower sales of products (at least initially, pending development of tools to allow remote valuations) that previously required, or strongly benefited from, in-person activity such as equity release mortgages (products offering up-front loans to customers, repaid using proceeds from the customer's residence) needing property valuations. There was a knock-on impact from lower interest rates (cut by governments in response to the wider economic impacts of the pandemic) leading to reduced demand like, for example, annuity products. Lower sales of advised products were also reported, while advisers transitioned to remote working.

Higher uncertainty in business premiums, risks coverage, claims and liabilities



HEALTH INSURANCE

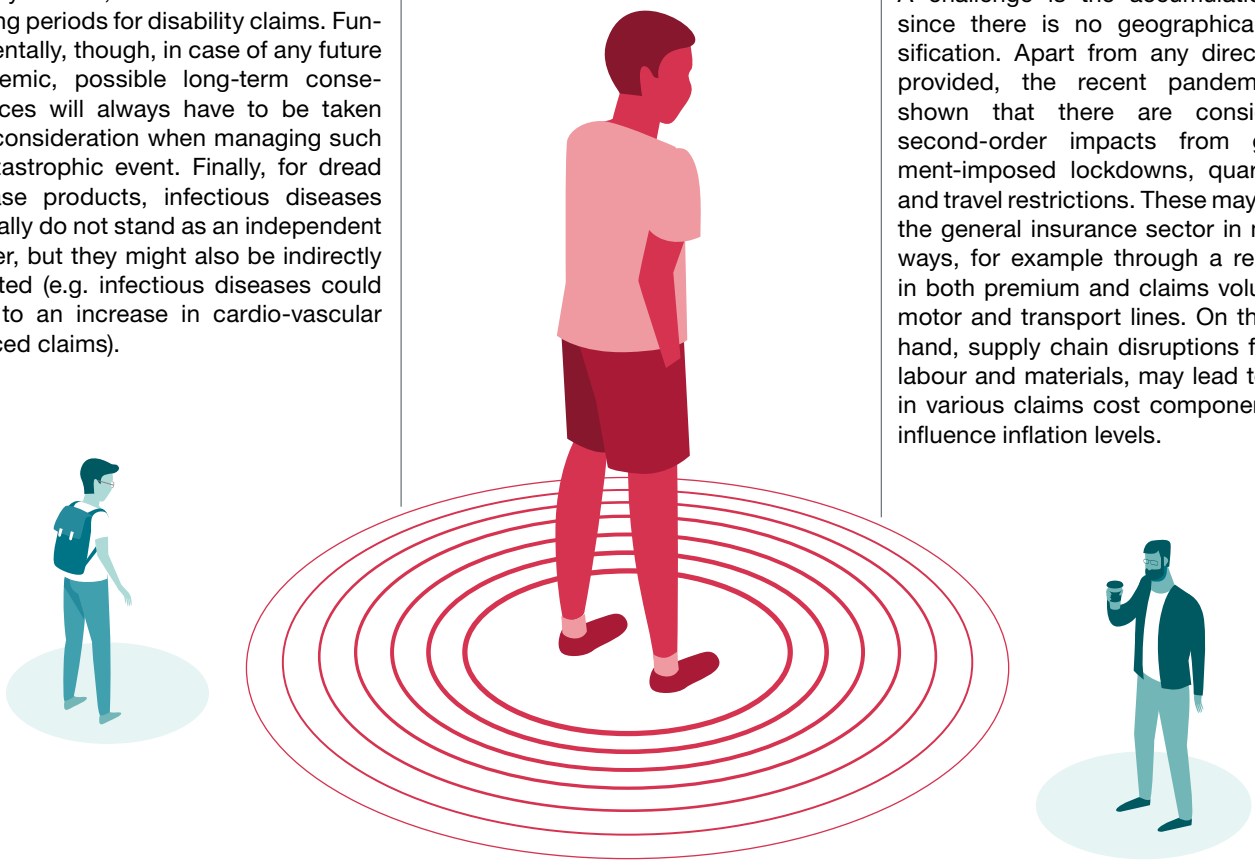
Volumes sold to the market in private health (re)insurance are smaller in scale than for life (re)insurance, hence losses due to pandemics are similarly smaller; in particular for the recent Covid-19 pandemic, these losses lie in a smaller range. Moreover, sold products differ considerably across markets, so even a uniform spread of a disease across the world would lead to a quite diverse picture in claims. Effects on profitability can be attributed to different sources: on the one hand, direct immediate effects due to disease treatment itself; on the other hand, indirect effects such as government-imposed measures like lockdowns. A pandemic leads to an increase in claims directly attributable to the treatment of the disease and indirectly through increase in costs for/use of protective equipment. In case of a catastrophic event, saturation effects can be expected due to limited availabilities, for example of hospital beds. Furthermore, daily sickness benefit allowances will get utilized to a higher degree. On the other hand, especially as a result of imposed lockdowns, but also due to increased fear of getting infected, the use of preventative medical check-ups and necessary treatments against other diseases will be reduced. While such behaviour, at first sight, will immediately lead to lower costs for private health insurance, it might be expected to increase the cost in the longer-term. Concerning the recent Covid-19 pandemic, it is still too early to balance out these effects against each other. This holds true for possible long-term consequences of pandemics, e.g. a long-Covid syndrome.

LIVING BENEFITS

Living benefits come in the form of life insurance riders attached to a life insurance policy, or sold on a stand-alone basis. Sometimes they are also known as accelerated death benefits and are available on both term life insurance and permanent life insurance policies. Living benefits essentially allow the insured to access money from the policy's death benefit while they are still alive. These funds can be used to pay for expenses associated with terminal or chronic illness, such as medical care, hospice or nursing home care, in-home caretakers and more.
As with health (re)insurance, volumes sold are smaller than pure life (re) insurance, but are still of considerable size. Experience with past influenza pandemics has not shown massive impact on claims for long-term disability and long-term care products. The recent Covid-19 pandemic similarly does not currently suggest substantial increases in losses, although more time is needed to watch for possible long-term consequences due, for example, to a long-Covid syndrome, and also mindful of waiting periods for disability claims. Fundamentally, though, in case of any future pandemic, possible long-term consequences will always have to be taken into consideration when managing such a catastrophic event. Finally, for dread disease products, infectious diseases typically do not stand as an independent trigger, but they might also be indirectly affected (e.g. infectious diseases could lead to an increase in cardio-vascular induced claims).

PROPERTY AND CASUALTY

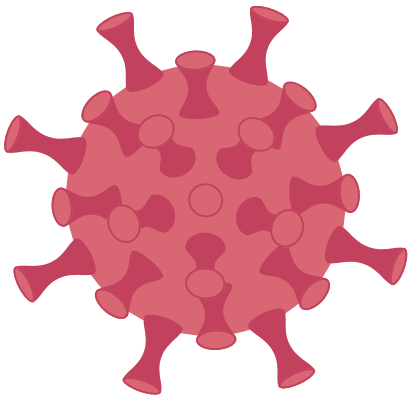
Still shortly before the pandemic, experts believed that in contrast to the life and health lines of business, P&C business might only be affected to a minor extent by pandemics. The experience with Covid-19 now gives further information on this topic.
The private (re)insurance sector provides substantial coverage in many casualty line classes potentially exposed to pandemics, such as workers' compensation, employers' liability, personal accident and travel cancellation insurance. Indirect losses from pandemics would also be covered, for example under credit business or Directors and Officers (D&O) liability insurance. Standard property policies impose a physical damage trigger for business interruption coverage, and hence it would not cover such losses in a pandemic event. Pandemic risks, as a rule, are and will be excluded in event cancellation/film insurance, especially after the claims experience made with Covid-19.
A challenge is the accumulation risk, since there is no geographical diversification. Apart from any direct cover provided, the recent pandemic has shown that there are considerable second-order impacts from government-imposed lockdowns, quarantines and travel restrictions. These may impact the general insurance sector in multiple ways, for example through a reduction in both premium and claims volumes in motor and transport lines. On the other hand, supply chain disruptions for both labour and materials, may lead to a rise in various claims cost components and influence inflation levels.



LEGAL CLAIMS

Claims volumes increased, and legal test cases with regards to policy coverage resulted in different outcomes in different jurisdictions. For example, the FCA test case in the UK ruled in favour of the arguments put forward by policyholders regarding "disease clauses" and "denial of access clauses", and the French courts also ruled in favour of policyholders. The Austrian Supreme Court ruled in favour of the insurance industry in connection with business interruptions arising from Covid-19, and the legal disputes in the US were mostly resolved in favour of the insurers.

Companies have amended policy wording where appropriate, to clarify terms of cover so that customers fully understand the terms and conditions. A number of insurers reported ongoing uncertainty with regards to the final cost of claims. A global pandemic (and in particular the consequences of containment measures) cannot be covered solely by the insurance and reinsurance industry[18]. The development of new products and solutions would benefit from a public-private partnership model.

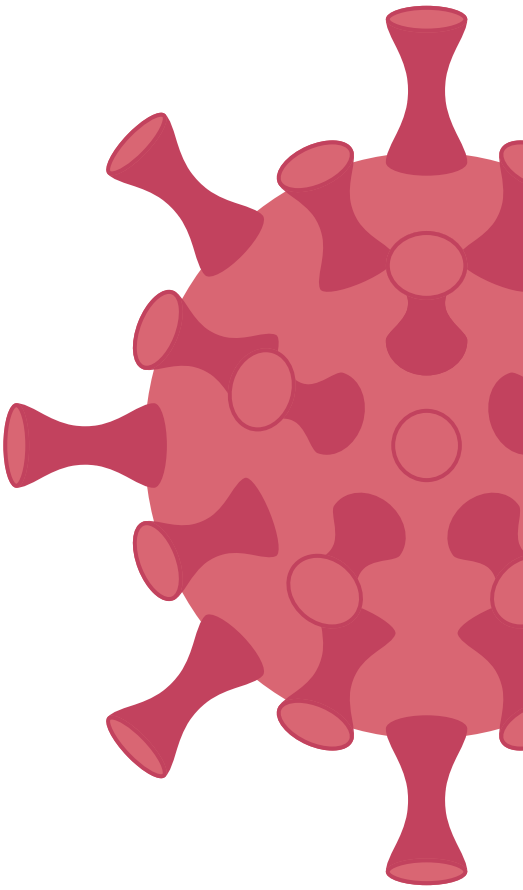


ACTIONS TAKEN

Companies took a number of actions, both to mitigate risk to their own business and to support customers and distributors. Some insurers noted that they repriced and/or wrote less new business in particular lines (such as property, casualty and trade credit), to manage their exposure. Others referred to purchasing additional reinsurance or retrocession cover.

Use of derivatives and changes in asset allocation to reduce the financial impacts were also observed. One company issued a bond providing protection against extreme mortality up to 2025 in specified regions. A number of companies noted adverse impacts of Covid-19 on underwriting performance. To date, there has been relatively limited public information on companies changing their underwriting process specifically in response to the pandemic. Some insurers, however, noted the introduction of additional underwriting questions (e.g. related to testing positive or exposure; whether the applicant had recently travelled extensively), pricing adjustments and increased manual underwriting. Others slightly increased their medical underwriting limits, so that more applications could be processed without the need for additional medical evidence (which would have been difficult to obtain during lockdowns and periods of social distancing).

On the other hand, actions taken to support customers included policy additional features (e.g. extending home policies to also offer healthcare cover), entirely new products (e.g. simplified access to private health care), discounts on renewal, flexibility on premium payments, free online consultations for Covid-19 symptoms, streamlined claims processing, and even ex-gratia payments or extended periods of cover. Companies also supported their distributors, for example through education materials and early payment of commission incentives. In general, companies reported positive feedback from customers and distributors, with a number noting an improvement in their Net Promotor Score.



OPPORTUNITIES

There is an anticipated increased demand for health and protection products, with some companies indicating a desire to amend or extend their product offering to address customer needs with regard to their own financial well-being. It is also expected an increasing responsibility on individuals to provide for their own financial well-being, with state-funded social security systems likely to be under mounting strain as the world emerges from the pandemic. This would be expected to increase demand for savings products in general. Overall, companies may wish to revisit product design features and, where possible, strengthen the resilience of their product offering to changes in lapse rates, meanwhile retaining a core focus on meeting customer needs.

[18] An Investigation into the Insurability of Pandemic Risk, The Geneva Association, 2020

3 Navigating the storm in assets management

How the asset side of an insurance company's balance sheet is affected in a pandemic, is hard to estimate and is largely dependent on the magnitude of the event. Financial market reactions could be temporary-only or have long-lasting effects, but due to underlying macroeconomic effects as well as market psychology ("fear factor"), falling equity markets are to be expected. However, provided the consequences for daily life and business are not truly devastating or long-lasting, relatively quick recovery from a downturn could also be expected, with some business sectors (e.g. tourism, aviation) affected more than others[19].

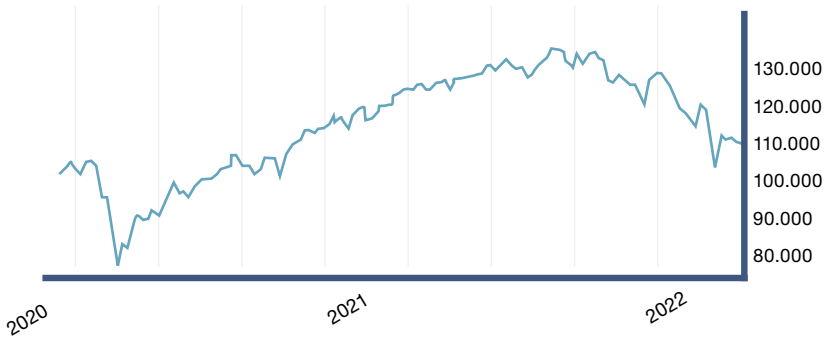
OVERVIEW OF THE PRESSURE ON ASSETS

In the early phases of Covid-19, the disease progression was limited to parts of mainland China and financial markets did not immediately price in the subsequent implications, with several of the main equity indices reaching all-time highs in February 2020.
As the disease progressed outside of China and the World Health Organization declared Covid-19 a pandemic, financial markets experienced a stock market crash and significant widening of credit spreads. Global fears of the spread of Covid-19 and its impact on the health of the population and the economy, resulted in dramatic market movements not seen since the 2007-08 financial crisis.
Fearing worldwide economic shocks and resulting business failures from the impact of the pandemic and lockdowns, massive stimulus was provided by governments via employee and employer financial supports and by central banks via interest rate cuts and lending programmes. These supports led to a stabilization of global markets followed by a gradual improvement to pre-Covid-19 levels.
The asset impacts on (re)insurers' balance sheets were severe but relatively short-lived. Spreads decreased from their March 2020 highs during April and May, and subsequently levelled off from June-October 2020. A further decrease back to pre-Covid-19 levels was then observed towards the end of 2020, which may be linked to the timing of vaccines becoming widely available.

The longer-term impacts of the stimulus and a return to (a new) normality continue to be played out with the return of meaningful inflation for the first time in several decades, resulting in interest rate rises from central banks and stock market declines. A period of increased volatility continues.

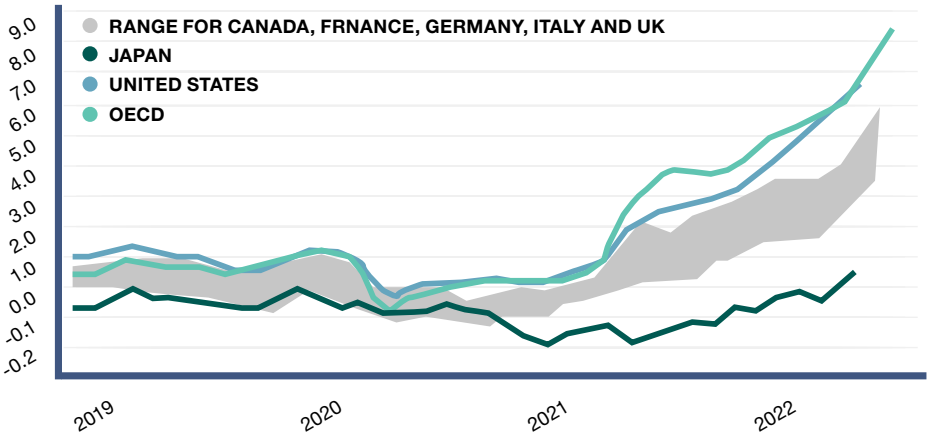
[19] Influenza Pandemics, The CRO Forum, 2007

ISHARES MSCI WORLD ETF (URTH)

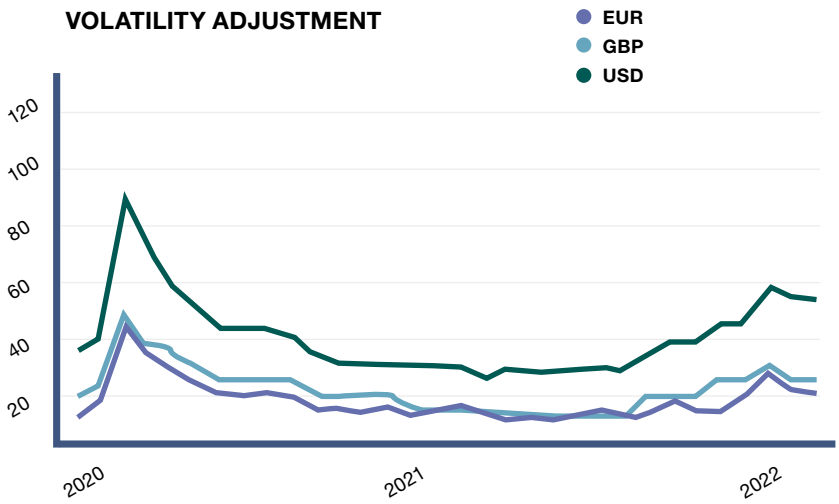


As the WHO declared Covid-19 a pandemic, financial markets crashed. Subsequent massive stimulus led to stabilization, but the sustained stimulus and new geopolitical tensions were accompanied by the return of meaningful inflation, interest rate rises and new stock market declines.

YEAR ON YEAR INFLATION IN COSUMER PRICES



VOLATILITY ADJUSTMENT



The Solvency II Volatility Adjustment (VA) provided some benefit in the valuation of liabilities at the peak of market volatility due to the Covid-19 pandemic; the VA is again providing some benefit in 2022 with increased market volatility due to inflation and geopolitical tensions.

RESILIENCE OF (RE)INSURERS BALANCE SHEETS

Despite the pandemic resulting in a combination of both insurance and market risk events together, there is little evidence that this resulted in severe financial difficulties within the insurance sector[20].

Liquidity will need to be monitored carefully during the pandemic and any financial market turbulence. An increased allocation to cash may be suitable for a period, to avoid the need to sell riskier assets at unfavourable prices due to short-term volatility or market liquidity. However, as part of capital and liquidity management measures, many (re)insurers were required by their regulator, or chose to defer, dividend payments.

Improved Asset-Liability Management (ALM), market risk budgeting and experience of using market consistent valuation methods through prior periods of financial market volatility, have generally led to more resilience within insurance company balance sheets to such periods.

Valuation techniques that include the use of the Long-Term Guarantee (LTG) measures, can also provide some stability during periods of volatility. Covid-19 demonstrated the benefits of the use of the LTG measures, such as the Volatility Adjustment (VA) for European (re)insurers[21]. Whilst further improvements in the VA methodology are still required, the graph below illustrates the increase in the VA applied for reporting periods in Q1 and Q2 2020, and hence some resulting benefit in the valuation of liabilities. Companies were generally able to keep on holding their long-term investments, and use of the VA offsets some of the short-term asset volatility.

Market performance was highly influenced by government responses to the pandemic

LESSONS LEARNED

Overall market movements in the most recent pandemic were short-lived, partially due to the scale of the pandemic and central bank and government interventions. (Re)Insurers, however, should not necessarily take this as the blueprint for future pandemics, as a stronger and longer-lasting asset reaction may occur in future pandemics.

Financial market performance was highly influenced by the role of government responses to the pandemic (travel restrictions, lockdowns and financial aid to individuals and businesses) and central banks interventions through interest rate cuts and lending programmes. There is a question of whether there is a limit to what governments and central banks can do in future pandemics and whether they will be in a position to provide the same level of support again.

[20] Global Insurance Market Report, International Association of Insurance Supervisors (IAIS), 2020

[21] According to the European Insurance and Occupational Pensions Authority, the volatility adjustment is a measure to ensure the appropriate treatment of insurance products with long-term guarantees under Solvency II. (Re)insurers are allowed to adjust the risk-free rate to mitigate the effect of short-term volatility of bond spreads on their solvency position.

4 Prioritizing operations

From an operational standpoint, a global pandemic can represent a major and simultaneous disruption of all of the internal procedures as well as external operations. The Covid-19 outbreak has re-written the assumptions to be considered in pandemic scenarios, by potentially establishing the current situation as a base-scenario, particularly with the pace with which the disease has spread worldwide and the governments have reacted to curb it. Prioritizing has become of essence. In an extremely short time, priorities must be sorted to ensure people's safety, business continuity, and a contingency plan to both fulfil known goals and face an unknown future.

With regard to insurance companies, once health provisions are in place and compliant to the authorities' recommendations so that personnel are safe, it is fundamental that policyholders maintain protection. New safety measures and protocols, together with flexible and hybrid work arrangements, have effectively contributed in containing the spread of the disease among the workforce, but have also jeopardized business continuity.

There are many aspects to be considered with regard to both crisis management and the anticipation of return to normality. Pandemic scenarios should be dynamic and built by considering key risk drivers, such as the duration of the outbreak, absentee rate or IT infrastructure capability. Related changes in operational risk profiles, such as increases in fraud, technology failures, and cyber, reputational and conduct risks, should be considered as well. While some challenges are specific to a pandemic crisis, the response can also build on many typical risk management practices.

HEALTH AND SAFETY AT WORK

Right since the outbreak of Covid-19, health and safety of workers became the top priority. While implementing invasive contingency regulations issued by health authorities worldwide, involving lockdowns and social distancing measures, companies have had to timely design extraordinary operational procedures, such as disinfection of work premises, distribution of personal protective equipment, and issuance of travel restrictions.

Companies have resorted to flexible work arrangements or strengthened those in place. Hybrid work, telecommuting, and remote work have proven to be an effective preventative measure during the pandemic, particularly for vulnerable workers. As the coronavirus pandemic declines, though, the aftermath of isolation and uncertainty is ever-present in workers' as well as the general population's lives. Working remotely, while safer, can expose employees to digital burnout due to the blurry boundaries between professional and private life. Engagement, job performance and relationships with colleagues are thus at risk. In addition, circumstances involving possible liability towards employees must be identified and managed.

Along with safety measures, clear internal communication and medical advice channels help mitigate distress and dispel concerns. Prompt communication has become critical, with a compelling need to set up communication channels for managing the emergency and clarifying crisis management measures. Insurers must reach out to customers, distributors, workers, and business units, because people need reassurance as well as guidance on how to operate and what to expect in the new environment. Participation in decision-making, flexible working hours and clear tasks, when possible, also promote well-being.

BUSINESS CONTINUITY

Once prevention measures are in place, though, the disruption of work habits across all levels of the organization may still jeopardize business continuity. To ensure continuity of service, the focus should be on critical processes, planning for staff unavailability, and evaluating operational changes, along with appropriate training. In addition, the availability and viability of succession plans should be reviewed, while overall performance should be monitored. From a technological standpoint, infrastructure, networks, hardware and applications licenses should support the revised operational environment, while third parties must be engaged to ensure their service levels. Any avoidable changes should be postponed in favour of stability. It is important that, already under normal

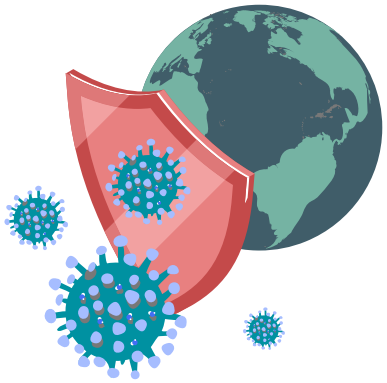
circumstances, the regular design and testing of business continuity plans already take into account pandemic risk. Agility and flexibility should be pursued, by accounting for protracted uncertainty around pandemic development and containment measures, empowering local teams to manage the emergency according to local circumstances and regulations, and considering the possibility of new restrictions after initial containment relaxation.

The cost of getting back to (a new) normality, is something insurance firms should consider in their post-pandemic scenarios. With possible changes in risk appetites, some controls may be relaxed or removed to keep the business running, and the related costs for restoring such controls may be underestimated[22].

TECHNOLOGY

Efforts in risk management should not be undermined by failure to appraise technological capacity, stability, and security. Companies should make sure that hardware, IT infrastructures, networks, and licenses appropriately support the transition of the operational environment toward a crisis situation and back to a new normal context, also by swiftly acquiring any necessary tools. The networks and virtual private networks (VPN) must be able to handle the demand and minimize the potential of not being connected, as well as handle the increased volume of customer interactions. In addition, the IT infrastructure itself must be able to support the changing work environment by considering a greater capacity. More online services should be held in due consideration as a result of the inability of customers to visiting physical distribution networks. A likely higher number resorting to call centre services, may also put under greater pressure the corporate services.

Systems upgrades, configurations changes, new user endpoints and revised processes can all contribute to making technology more vulnerable. Control and cyber security measures should then be accurately appraised to protect the new operational setting and ensure its availability, confidentiality and integrity. In addition, project priorities should be reviewed in order to avoid or defer changes that may carry unnecessary risk. At the same time, planning for the long-term use of newly acquired equipment should take place, along with the preparations for the return to (a new) normality.



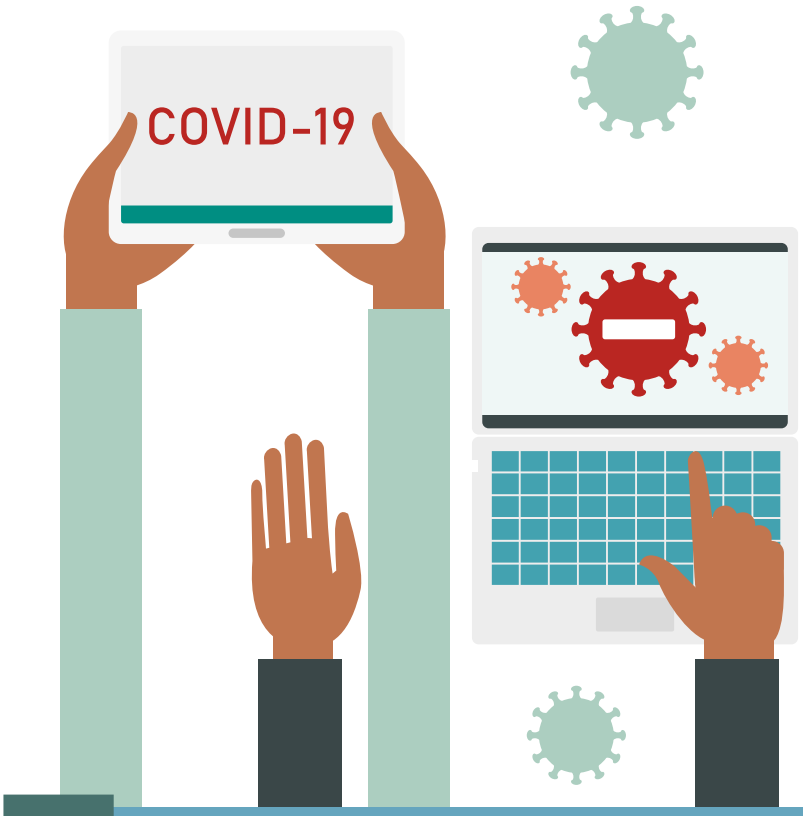
[22] Key takeaways from pandemic discussions with subscribers, ORX Scenarios, 10 April 2020

SECONDARY RISKS

Undoubtedly, secondary risks intensify or emerge anew due to misjudgement, negligence, stress, and unfamiliar procedures. Against processing errors, frauds and cyber-attacks, reviewing the effectiveness of key controls in the new operating environment and warning employees against possible scams (e.g. phishing, fraudulent websites and equipment supply swindles) are of paramount importance. In a process leading to securing procurement and online services, among other instances, legally binding e-signatures should increasingly replace physical signatures.

Conduct risk would also be heightened. Any health or new pandemic cover should be reviewed, understanding the interplay between insurance and government backed initiatives, by considering how distributors sell products in the new environment, and taking care of updating customer communication and support. Compliance may be especially challenging with the use of digital channels.
Risk assessment and management must account for the new environment through an agile approach that enables swift updates of the risk profile. Less urgent activities may be deprioritized in favour of crisis-specific risk management. Attention should be paid to political decisions, since the Covid-19 experience has made it clear that government intervention, containment measures and emergency regulations, can affect operations more acutely than the contagion itself. Continuous reappraisal of crisis management measures is required, with an eye to their operational sustainability.

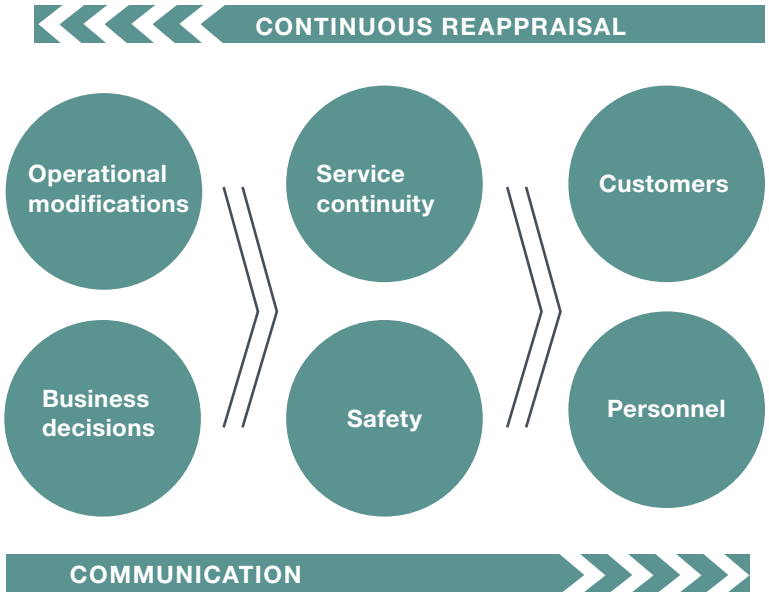
Crisis developments as well as return to normality should be anticipated



COVID-19 AND DIGITALISATION

In addition to disrupting lives and business operations, the Covid-19 pandemic has acted as an innovation catalyst. Insurance companies have taken the opportunity to reconsider their value chains and develop new processes, exploiting technology and tapping into customers' needs. Lanfranchi and Grassi[23] analysed the initiatives put in place by insurance companies at global level, and noticed that 30 major players, collectively, launched at least 112 initiatives.
The majority (54%) of these initiatives regarded specifically health insurance. Another 27% of the initiatives cut across several lines of business, ranging from health to car and home insurance. Insurance companies have taken advantage of their existing technology arrangements or opted for new technologies altogether. Several insurance companies offered remote medicine solutions to their customers, such as live-video conferencing with medical experts. In the U.S., one company trained its existing chatbot to detect suspicious infections. Among CRO Forum members, investments were made to facilitate the customer journey, for example by removing the need of posting documents or acquiring the capability to capture electronic signatures.
The Covid-19 pandemic also highlighted the critical role, in both hindering and facilitating the shift to digitalisation, played by national regulatory frameworks and existing IT infrastructures. In this regard, the three main regulatory barriers identified by the Geneva Association are paper document delivery provisions, insurance distribution regulation, and a lack of telehealth provisions for medical exam procedures[24].
From a risk management perspective, innovation and digitalisation should trigger risk profiles reviews to ensure that fraud, cyber, continuity, reputational and conduct risks, among others, improve or anyway remain within the set tolerance.

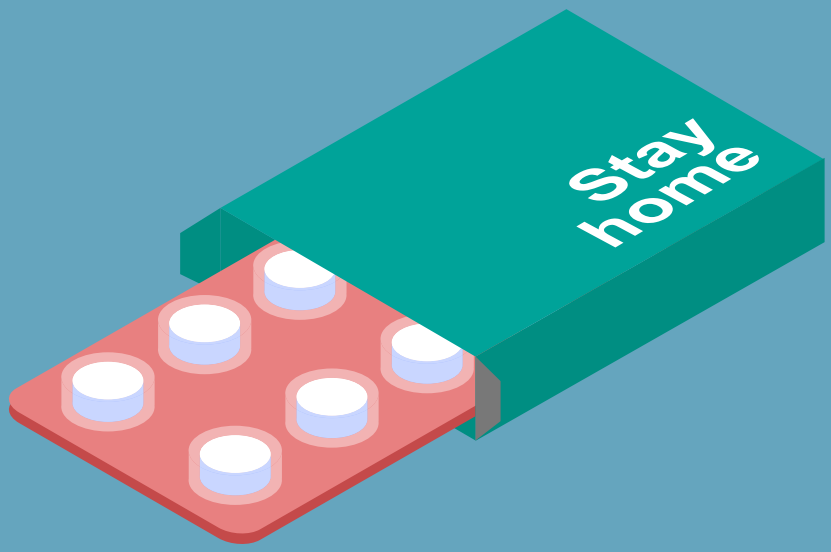
[23] Examining insurance companies' use of technology for innovation, The Geneva Papers on Risk and Insurance - Issues and Practice (2022) 47:520–537
[24] Regulatory Considerations for Digital Insurance Business Models, The Geneva Association, 2021



CONCLUSIONS

To develop timely decisions, crisis developments as well as return to normality should be anticipated and discussed with business owners. An integrated approach could be developed by means of a task force involving medical experts and relevant functions, such as human resources, communication, information technology, facility management, business continuity management, and risk management. Ad-hoc dashboards and lean reporting can help develop a shared view.

While focusing on own operational specificities, it is key to account for epidemiological, medical and plausible containment outcomes, as well as the possibility of multiple waves of infection. Maximum capability should be deployed for crisis management, but control functions should carefully weigh any collaboration and resist the temptation to let the first line disregard key controls. If the crisis is prolonged, attention and response should remain proportionate over time.



5 Challenges for internal model adopters

Since 2020, Covid-19 has been impacting population health, financial markets and real economy. For (Partial) Internal Model ((P)IM) adopters[25], this prompts a critical review of model assumptions concerning life and health coverages, financial and credit risks, non-life risks, and the dependence/correlation among risk classes, in order to assess their appropriateness with respect to direct and indirect effects of the pandemic. The need, extent and scope of the review are highly dependent on the business and regulatory environment in which each company operates. In particular, diversification level, country specific rules/coverages (e.g. the extent of public intervention on the health sector or court rulings concerning contingent business interruption coverages in the P&C sector) and differences between direct insurers and reinsurers should be considered. On top of that, each government enforced different containment measures with a broad range of policies on lockdowns and vaccination campaigns even inside the European Union, with indirect effects.Making sound assumptions on future pandemics is challenging also because there is still uncertainty about the potential developments of Covid-19.

LIFE UNDERWRITING

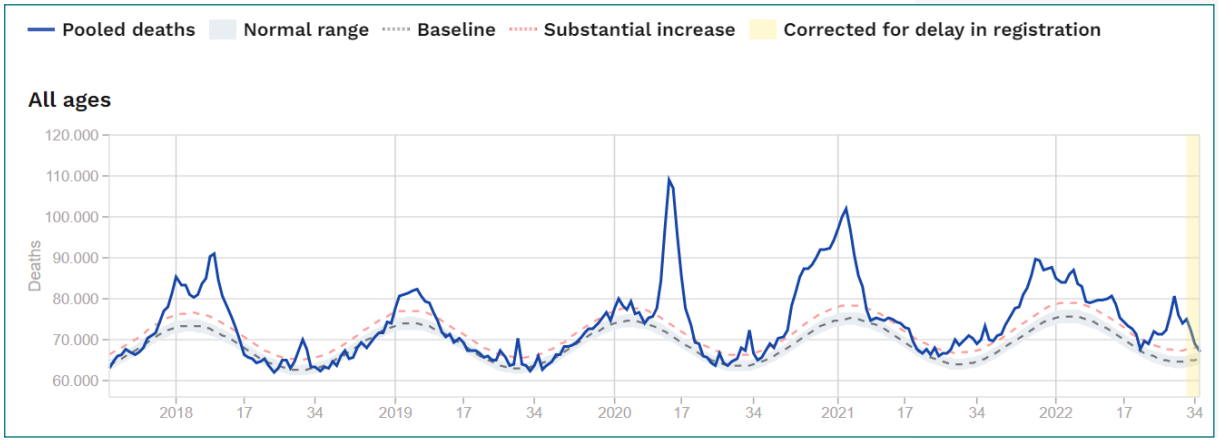
The primary biometric factor directly impacted by Covid-19 is mortality. The change in mortality is directly observed from the available statistics on population deaths: during 2020 and 2021 there was a large impact on population mortality due to the pandemic, especially on the elderly population and on those living with comorbidities.
Nevertheless, the impact of Covid-19 on the insured population has likely been lower than the impact on the overall population. Firstly, because average age of the policyholders is generally lower than the age of the overall population, and secondly because of the medical selection usually applied by companies during the underwriting process. A Society of Actuaries Research Institute publication provides a favourable comparison of the mortality experience in the USA between insured and general population[26]. Irrespective of this difference, during the last two years insurers have similarly recorded higher mortality

[25] Since 2016, the Solvency II regime in the European Union allows personalised methods (namely, internal models) to determine regulatory capital requirements. Similarly, the Swiss Solvency Test came into force in 2011.
[26] U.S. Individual Life COVID-19 Mortality Experience Study – Fourth Quarter 2020 Update, Society of Actuaries Research Institute, 2021

than expected for their insured portfolio. Biometric risk experience is usually the basis for the definition of best estimate operating assumptions and underwriting risk calibration, the latter for insurance companies adopting a (P)IM for the calculation of the Solvency Capital Requirement (SCR). It is anyhow necessary to distinguish between short-term and medium/long-term impacts on the operating assumptions and underwriting risk definition.

Pooled weekly total number of deaths in the data-providing EuroMOMO 29 European partner countries, all ages. During 2020 and 2021 there was a large impact on population mortality due to the Covid-19 pandemic.

SOURCE:



Short-term effects

Short-term effects are usually not captured in the definition of the best estimate operating assumptions, since they are considered as one-off impacts that are not justifiably projected over the insured portfolio run off. On the contrary, catastrophe risks and volatility components of the underwriting risks are more adept for capturing respectively the effects of an extreme event like mortality due to a pandemic and the one-off changes in the number or amounts of insurance claims paid.

Focusing on life catastrophe risk, this is linked to a one-time shock from the extreme, adverse tail of the probability distribution from more common events (mortality); its measurement under Solvency II approach, reflects the loss in basic own funds that would result from an instantaneous increase to the best estimate mortality assumption over one year.

It is reasonable to assume that insurance and reinsurance undertakings that apply a (P)IM for the life catastrophe risk calibration adopt frequency-severity models with different levels of sophistication and that they verify whether the pre-Covid-19 considerations and modelling assumptions, generally based on past pandemic events like the Spanish Flu, are still valid given the recent pandemic experience.

This validation can be done by verifying whether the assumed increase in mortality reflecting the 1 in 200-year event[27] is still adequate and where the Covid-19 effects on insured population mortality could be positioned within the internal model risk distribution reflecting own portfolio risk. For example, according to The Lancet, the Covid-19 global all-age rate of excess mortality due to the Covid-19 pandemic was about 120 deaths per 100 thousand of the population[28]. Specific considerations have to be further developed on the lower expected impact on insured portfolios, possibly registered during the pandemic because of policyholders' age and medical selection. It is reasonable to assume that the estimated 1.2 per thousand on the population would have been lower if counted on the insured people.

Another aspect to be potentially considered by (P)IM adopters, is the assumption related to the pandemic frequency. While past and recent experience could support the severity calibration, frequency assumptions are mostly impacted by the expectation of future pandemic events. The World Health Organization has warned of a "big one," a pandemic with a substantially higher case fatality rate than Covid-19. Catastrophe experts estimate there were as many as five near-miss pandemics in the past 20 years, and suggest that ecological changes have shortened the return period of the "big one[29]".Finally, (P)IM adopters should ask themselves whether the current level of sophistication of the life catastrophe calibration modelling is still adequate.

Going now to analyse the medium/long-term effects, the last two years' experience represents a "short-term" effect of the disease, but it could have a low predictive power of the medium and long-term effects of Covid-19 on the biometric factors. For this reason, proper considerations will have to be made both on best estimate operating assumptions and underwriting risk calibration[30].

[27] According to art. 101 of the European Solvency II directive, the Solvency Capital Requirement shall correspond to the Value-at-Risk of the basic own funds of an insurance or reinsurance undertaking subject to a confidence level of 99.5% over a one-year period.
[28] Estimating excess mortality due to the Covid-19 pandemic: a systematic analysis of Covid-19-related mortality, 2020–21, The Lancet, 10 March 2022
[29] Preserving ecology to prevent pandemic risk, The Actuary, 7 April 2021
[30] As of September 2022, the American Academy of Actuaries and the Society of Actuaries propose to assume deterioration in mortality for 2023 and 2024, followed by zero improvement in 2025, then grade from 2025–2032 to long-term mortality improvement level.

Medium/long-term effects

As medium and long-term effects are concerned, it is market practice to distinguish between level and trend components of the operating factor. Mortality best estimate assumptions are usually defined via mortality rate tables, to which a selection factor can be applied to tailor mortality to the insured portfolio, and via mortality trend assumptions, by embedding a mortality change in the future due to health status changes and their impact on life expectancy.
Given the current available information on the pandemic and without any evidence of its impact on future mortality of the population, it is difficult to embed the expectation of the consequences of Covid-19 on future mortality yet.
In terms of level component, mortality experience registered during Covid-19 could be considered as an "outlier" in the data; best estimate and risk can be projected based on a "normalized" mortality. In this case, it is difficult to distinguish the "outlier" effects from historical data, and judgement is required.
In terms of the trend component, where using experience data for deriving new projected tables is even more difficult, expert judgement should be applied as well.
However, the application of expert judgement is also difficult because different assumptions can be made on the effects on the population: an increase in life expectancy because of the selection effect of "the strongest survive" (due to vaccine and resistance to virus or as an indirect effect of public health improvement), or a decrease in life expectancy because of the prolonged pandemic event, the development of new stronger variants, the result of a lower prevention, and the potential presence of prolonged symptoms. Furthermore, it is fundamental to avoid double counting effects between best estimate and risk capital when embedding future expectations in mortality related to Covid-19.
All considerations above could be applied to other biometric factors, such as morbidity and disability, even if business-specific considerations could be done for income protection and businesses particularly exposed to temporary diseases. Although there are no comprehensive statistics on the population (statistics would be strongly impacted by the national environment anyway), there could be a general deterioration of the health status as a consequence of lower medical prevention, generally lower access to healthcare systems, and long-Covid.
Concluding, it is too early to draw conclusions on the effects of Covid-19 on life expectancy. The longer the projection term, the greater the uncertainty. Any changes applied now would be subject to expert judgement.

NON-LIFE UNDERWRITING

For what concerns the non-life business (and health "similar to non-life" business) so far, Covid-19 experience has confirmed the prevalence of indirect impacts over direct ones. In fact, aside from direct impacts on the health side where pandemics were included in policy conditions and/or public involvement on health protection is lower, the most important impacts were related to lockdowns and travel restrictions that affected non-damage business interruption coverages, event cancellation and travel insurance (trip interruption), which saw an increase in claims, along with motor insurance, which conversely saw a decrease in claims. Lockdowns affected health business too, because of postponement or cancellation of non-critical medical services – by choice or due to lesser availability – with a decrease in claim rates and overall losses during the pandemic and, possibly, an increase of morbidity/mortality afterwards.

The degree to which the experience during the Covid-19 pandemic could lead to a review of risk models for non-life business, should be established by taking into account whether the claims experience fell or not compared to pre-pandemic model assumptions (in particular health CAT sub-modules) and the very nature of the coverages/products that generated such losses. For instance, it should be carefully considered whether the coverages introduced during the pandemic are relevant for future risk assessments, since the choice to offer them could not be taken in the future.

> A critical review of model assumptions may be needed to reconsider their appropriateness

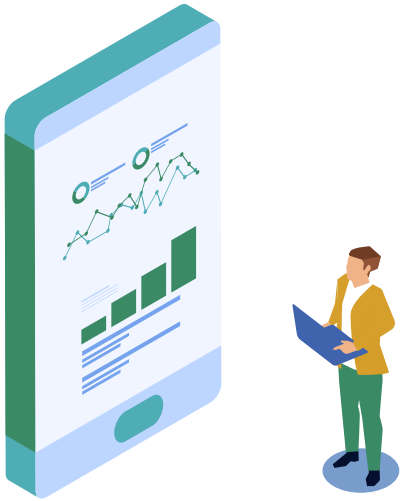
The indirect effects are, possibly, even more difficult to assess, since they stem from a multitude of factors – ranging from disease spread to governments' actions – with many complex interactions. Moreover, such an assessment should also factor in the possibility that the lessons learnt from this pandemic inform different reactions in the future.
Lockdowns mitigated overall claims but had possibly generated volatility in the short term. Again, whether to include such experience in future models should be the matter of careful judgement and may eventually lead to the introduction of more sophisticated models.

Each effect could potentially contribute to a measurable increase in short-term volatility. However, that should not translate straightforwardly into a change in model assumptions. There should be consideration for the actual performance of pre-pandemic models (has the SCR been breached?) and the relevant exposures (has the company reviewed coverage exclusions?), along with the dependencies among risk factors, which can exhibit different behaviours than assumed pre-pandemic.
Moreover, it is important to observe the future development of losses related to Covid-19 until the disease will disappear or become endemic, to assess whether it is a one-off event – to be treated within catastrophe risks and/or stress tests – or the trigger of a different regime. In this latter case, a change in expected claims frequencies/severities shall be modelled along with a careful assessment on volatilities.

MARKET, CREDIT AND CORRELATIONS

Further areas to be considered are the possible impact of the pandemic on other risks, specifically market and credit, and the relationship between them and technical risks. The impact was significant but short-lived. In the case of market and credit risks, for which it could be reasonable to assume no model recalibration given the short-term effects, (P)IM adopters may want to reassess correlation assumptions between underwriting, market and credit risks.

Correlation assumptions for (P)IM adopters could be tested given the current experience. Questions may cover the adequacy of the correlation among underwriting risk factors (life/health CAT vs. other life and non-life), but also the correlation between life CAT and market and financial risks. As for the correlation between life CAT and other underwriting risks, the same above considerations are applicable and proper expert judgment is needed, since it is not yet possible to derive statistical evidence from data. With regard to the correlation between life CAT and market and credit risks, as said above, the market reaction follows the same course as in a crisis scenario with a temporary effect.



WHAT'S NEXT FOR THE (P)IM ADOPTERS?

(P)IM can be used at the start of a pandemic to preliminarily evaluate the unfolding situation, but cannot provide information on the dynamics of the situation itself. Just a (P)IM is not extensive enough to provide insight on all aspects of the pandemic.
An extreme scenario like the recent pandemic, leads (P)IM adopters to ask questions about the adequacy of both the model as a whole and the assumptions related to each risk module/factor. Hence, (P)IM adopters should carefully assess whether, where (risk models and/or stress tests) and to what extent (model assumptions/structure), new experience is to be included in future risk assessments. Such activity requires the assessment of which effects are repeatable as a result of policy conditions, and should be focused on those impacts that actually led to higher-than-expected losses.

Even if (P)IM adopters can demonstrate that current models fit with the purpose, they should nevertheless question model adequacy on a continuous basis by performing stress, sensitivity and scenario analyses.

Current experience confirms that government interventions, public willingness to adhere to containment measures and speed (and availability) of vaccines, all of which vary from country to country, could affect the possibility to counteract the pandemic. (P)IMs cannot explicitly model all variables that affect pandemic evolution (e.g. quality of national health systems, virus mutations, contagiousness, governments' actions), along with their complex interactions[31].
A viable approach to take into account these aspects, could be the review of relevant models' parameters and assumptions through expert judgment. In any case, the value of adding robust expert opinion on low-frequency/high-impact insurance risks such as pandemics can never be overstated.

[31] Mitigation Policies and Covid-19 Associated Mortality – 37 European Countries, Centers for Disease Control and Prevention, 2021

A 360-degree perspective: the role of CROs

Pandemics can challenge insurance companies in multiple ways, including higher claims, devalued assets and operational disruption. Since epidemiologists are warning about increasing frequency of pandemics and a possible "big one[32]", it is essential that insurance companies invest in preparedness and risk management to mitigate future losses and ensure service continuity, thus protecting the social role played by insurance.

Current experience with the Covid-19 pandemic is not calling for a fundamental revision of risk management frameworks, thus CROs can still review preparatory activities according to the typical enterprise risk management (ERM) approach. Identification of risks arising from future pandemics, should look beyond life and health risk and include market risk, credit risk and operational risk, particularly in terms of business interruption, cyber risk and people risk. Non-life business can also be affected by pandemics, particularly in certain lines of business like, for example, non-damage business interruption.

With regards to risk modelling and valuation, it is necessary for CROs to confirm how different model components address pandemic risk to avoid double counting (like, for example, between mortality and life-catastrophe risk) and address any blind spot. Correlation assumptions (for example between market risk and life risk) should also be verified. As mentioned in Chapter 5, several pandemic variables and country-specific factors, along with their complex interactions and second-order effects, are however difficult to model based on evidence.

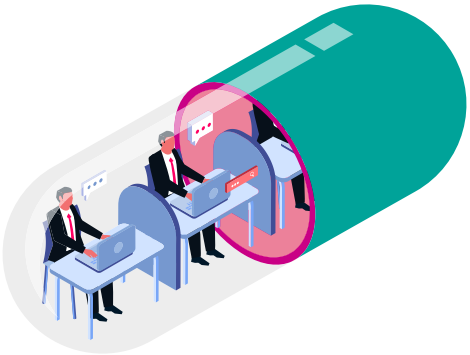
Expert judgement by CROs as well as chief actuaries, business managers and relevant experts, should therefore support the review of models. At the same time, while waiting for the Covid-19 pandemic to run its course, it is essential for CROs to keep observing trends to confirm the validity of model algorithms, assumptions, calibrations and correlations, both in possible future crises and in the endemic Covid-19 era.

Stress tests based on pandemic shocks can help consider critical risk factors and identify potential vulnerabilities. A number of mitigation actions have been discussed throughout the paper. Diversification of investment assets, holding a range of ages within life portfolios, reviewing underwriting process/limits, buying reinsurance, and using insurance-linked securities and mortality swaps, are all possible strategies that CROs can discuss with business management. Mortality risk can be diversified through annuity products. Non-insurable risk components should be identified and unambiguously excluded by contractual terms to avoid possible disputes.

Similar to the case of risk models, mitigations and management actions should be subject to constant review and adaptation to both the new normal and possible future pandemics. Own Risk and Solvency Assessment (ORSA) exercises can be useful for CROs to periodically engage top management through comprehensive assessments that take stock of how all the relevant risks and mitigations contribute to current and prospective solvency positions.

In addition to reviewing pandemic risk identification, modelling, valuation and mitigation, CROs should check readiness to manage future acute crisis phases. With Covid-19, CROs have been especially called to increase the frequency of solvency and liquidity monitoring (also for extraordinary supervisory reporting) and to contribute to the safety and continuity of insurance operations.

CROs should therefore challenge the business continuity frameworks to account for future pandemic scenarios, and have ready an agile approach to swiftly update (and report on) a continuously changing risk profile. To update the risk profile, ensuring the availability of epidemiologic scenarios (based on viral transmissibility, pre-symptomatic/asymptomatic contribution to disease transmission and disease severity) to feed economic, financial and insurance models, takes on a particular importance.



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