Mortality Trends in Transition?

Global Insights and Lessons from COVID-19 and Past Pandemics

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www.eca2026.org

Agenda

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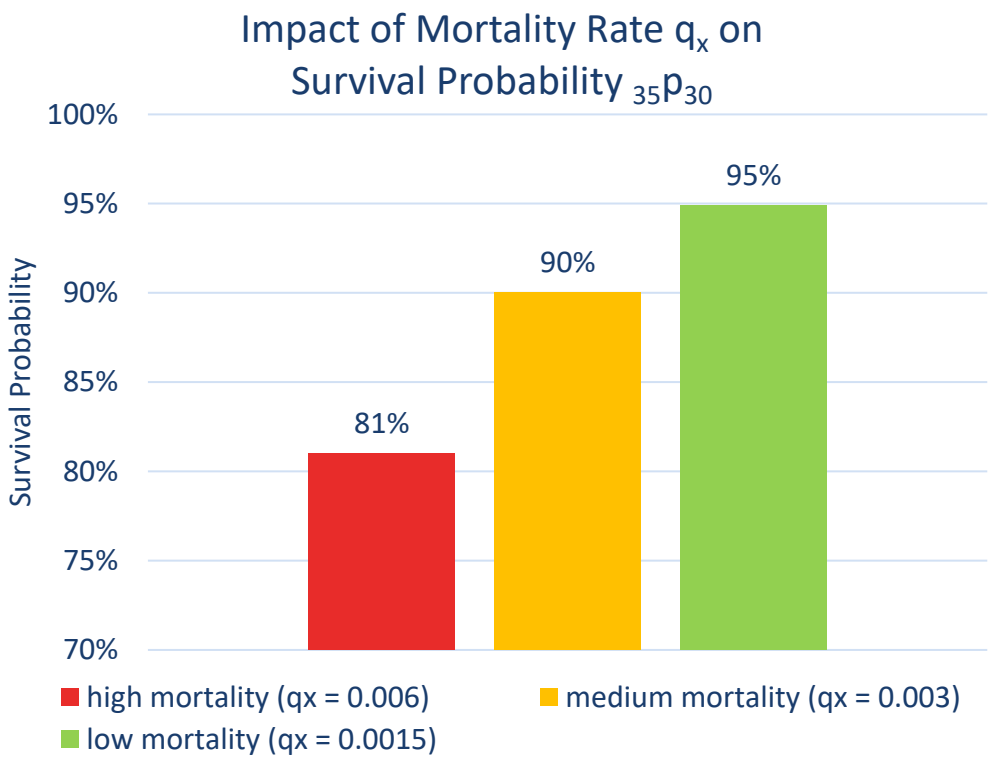
Recall: Survival Probability $_{35}p_{30}$

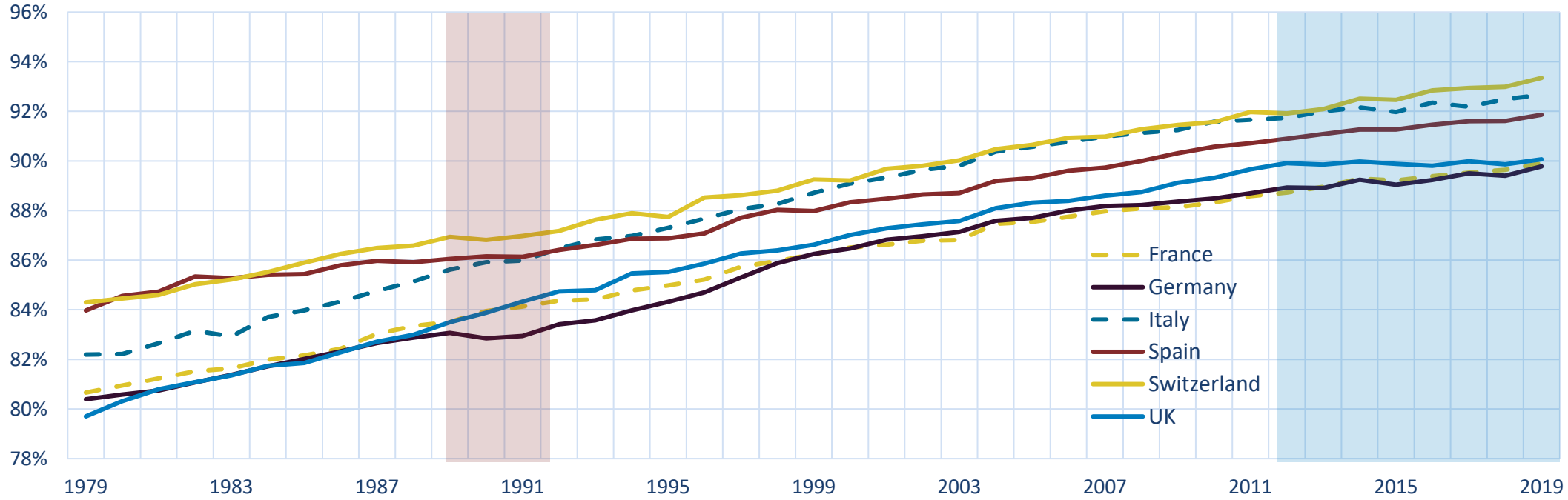
Why this Metric?

$$_{35}p_{30} := \prod_{i=0}^{34}(1 - q_{30+i})$$

- Probability that a 30-year-old survives to age 65
- Focus on core insured ages (30–65)
  - More targeted to mortality-driven protection products (e.g., term life, credit life)
- Compared to life expectancy: covers all ages, less targeted
- Higher $_{35}p_{30}$ = lower mortality (q_x)
- Assume unisex population (50/50)



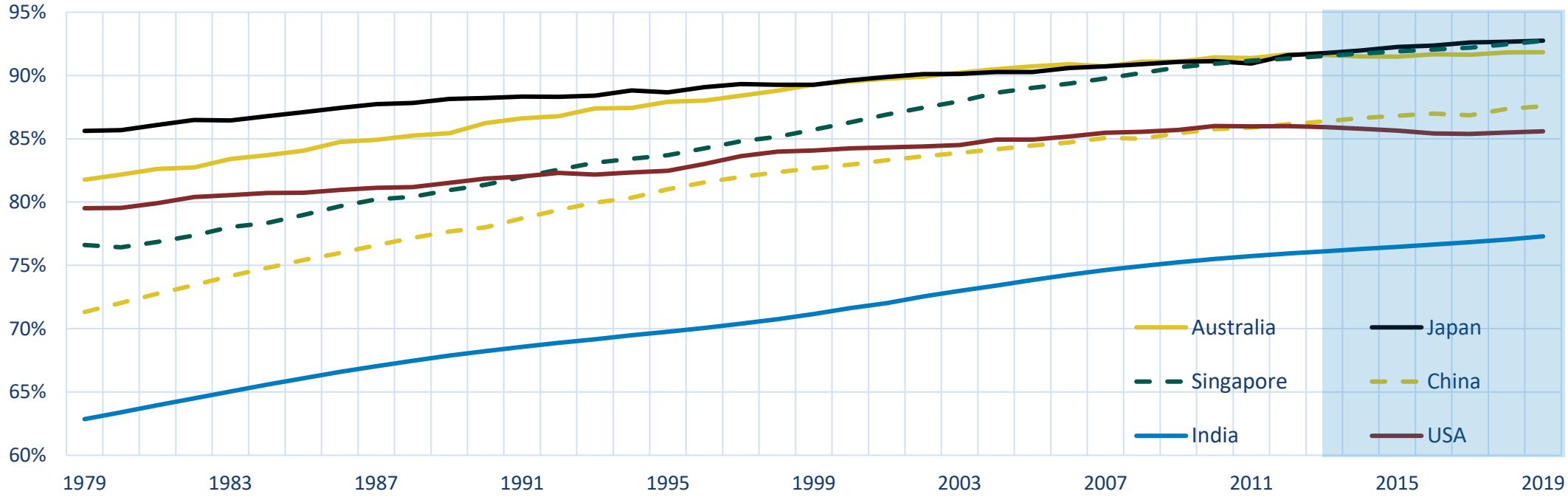
${}_{35}p_{30}$ in Europe - Four Decades of Improvement



- Strong, persistent improvement across all countries
- Country differences remain stable over time
- Outlier of trend: German reunion (1990), UK since 2013

Source: Own illustration based on data from UN WPP 2024, https://population.un.org/wpp/

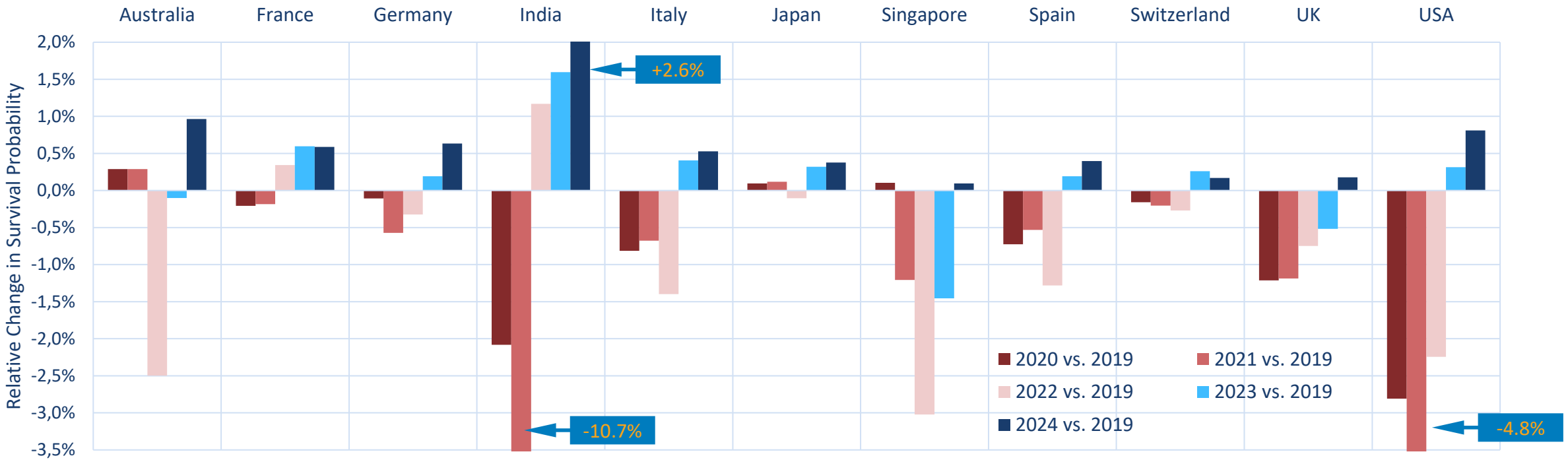
More Mortality Improvements Worldwide
Development of $_{35}p_{30}$



- Catch-up effects of China, India and Singapore
- USA without improvement since 2013

Source: Own illustration based on data from UN WPP 2024, https://population.un.org/wpp/

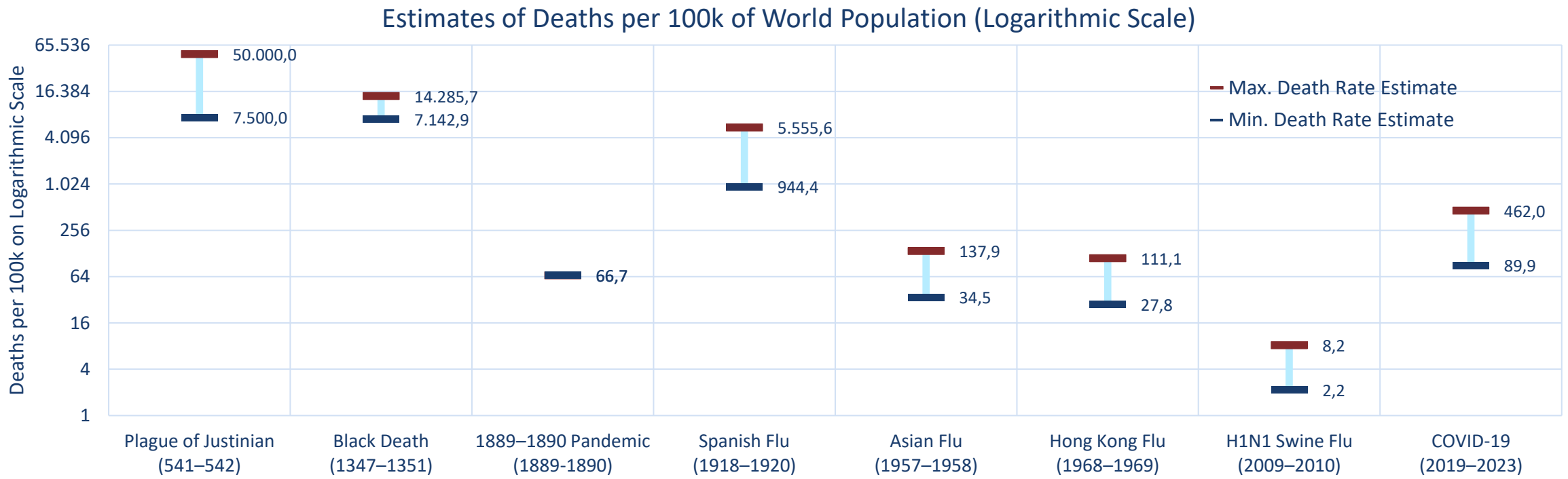
Impact of COVID-19 on $_{35}p_{30}$



- 2019 as baseline: positive = above pre-Covid level
- Clear impact also at insured ages (30–65)
- Persistent effects in some countries (e.g., UK, Singapore), but recovery by 2024

Source: Own illustration based on data from UN WPP 2024, https://population.un.org/wpp/

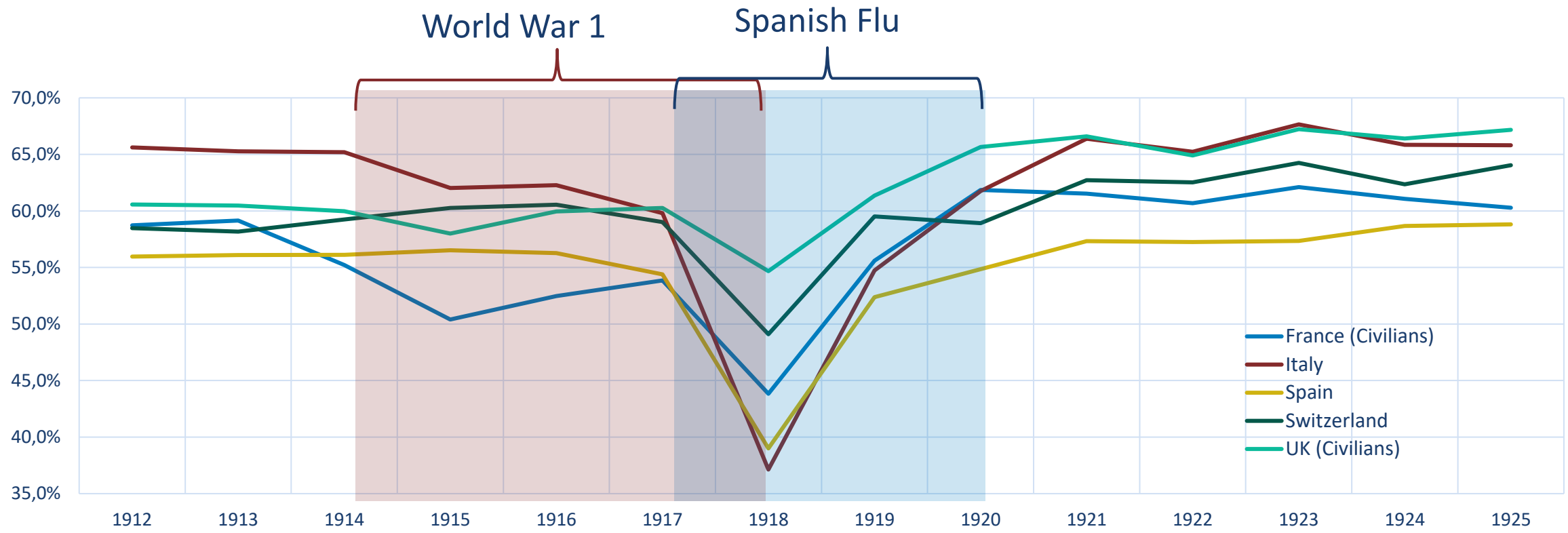
Short-Lived Pandemics: Global Outbreaks That Ended Within a Decade



- Pandemics typically last only a few years (not decades)
- COVID-19 pandemic was declared over by the WHO on May 5th, 2023

Source: Own illustration based on data from https://en.wikipedia.org/wiki/List_of_epidemics_and_pandemics, https://www.worldometers.info/world-population/world-population-by-year/

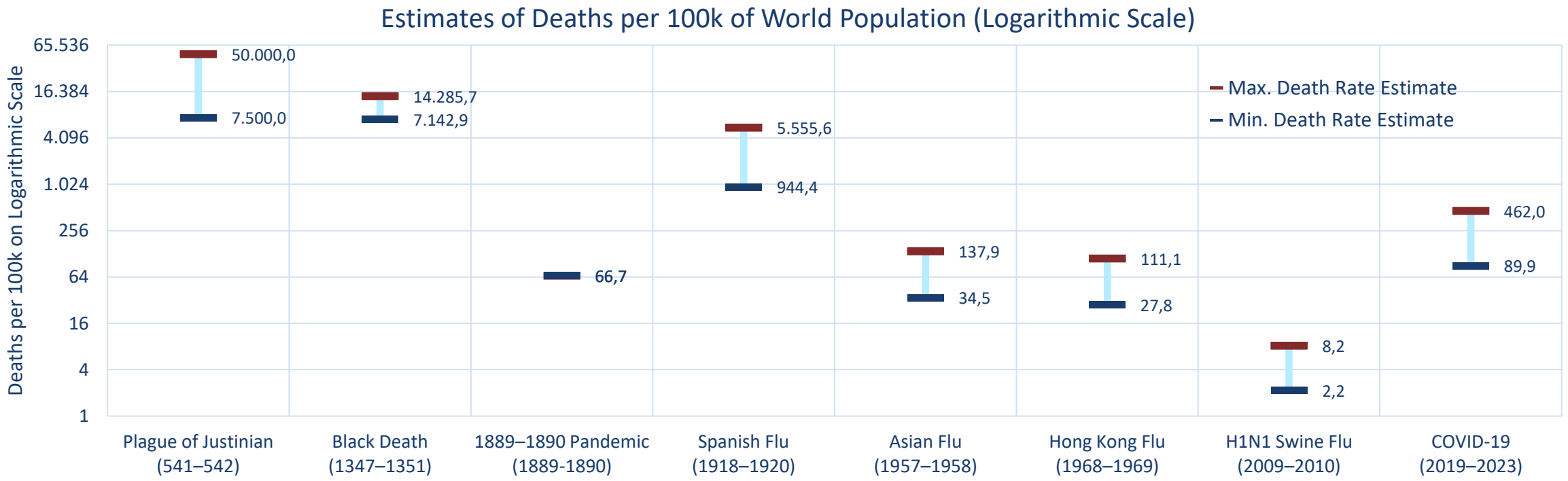
${}_{35}p_{30}$ around the Spanish Flu



- WWI already lowers survival before the pandemic (1914–1917)
- Spanish Flu: Additional sharp mortality shock in 1918
- Rapid recovery to pre-war levels by 1920

Source: Own illustration based on data from HMDB, https://www.mortality.org/

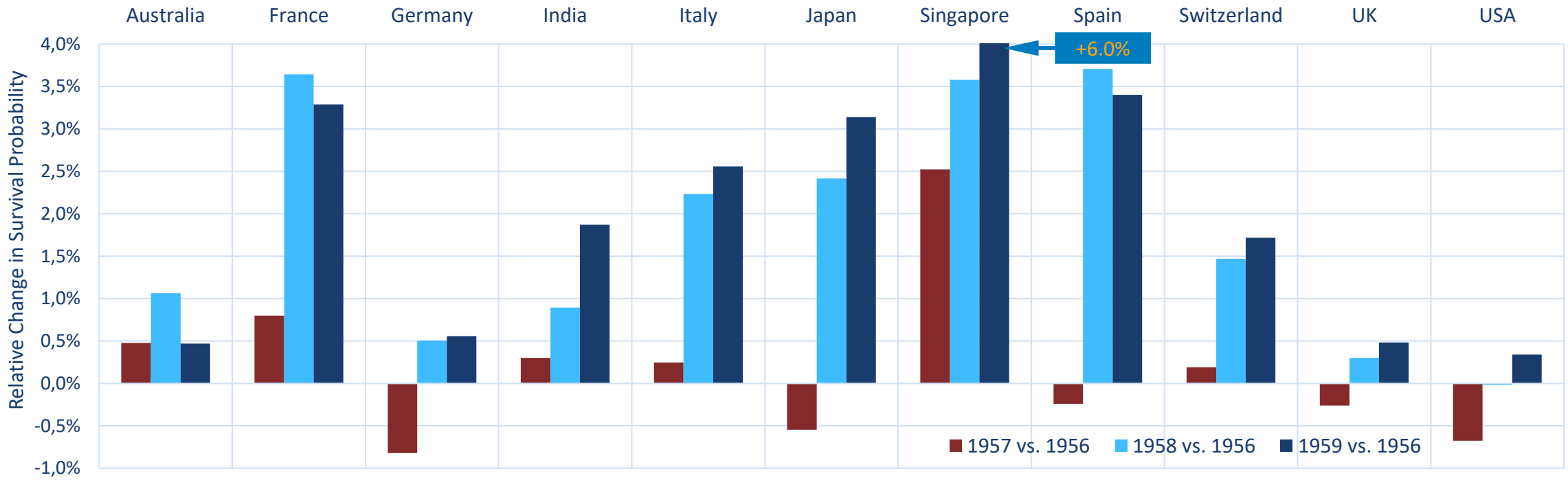
Short-Lived Pandemics: Global Outbreaks That Ended Within a Decade



➢ Asian & Hong Kong Flu: only 25–35% of COVID-19 mortality

Source: Own illustration based on data from https://en.wikipedia.org/wiki/List_of_epidemics_and_pandemics, https://www.worldometers.info/world-population/world-population-by-year/

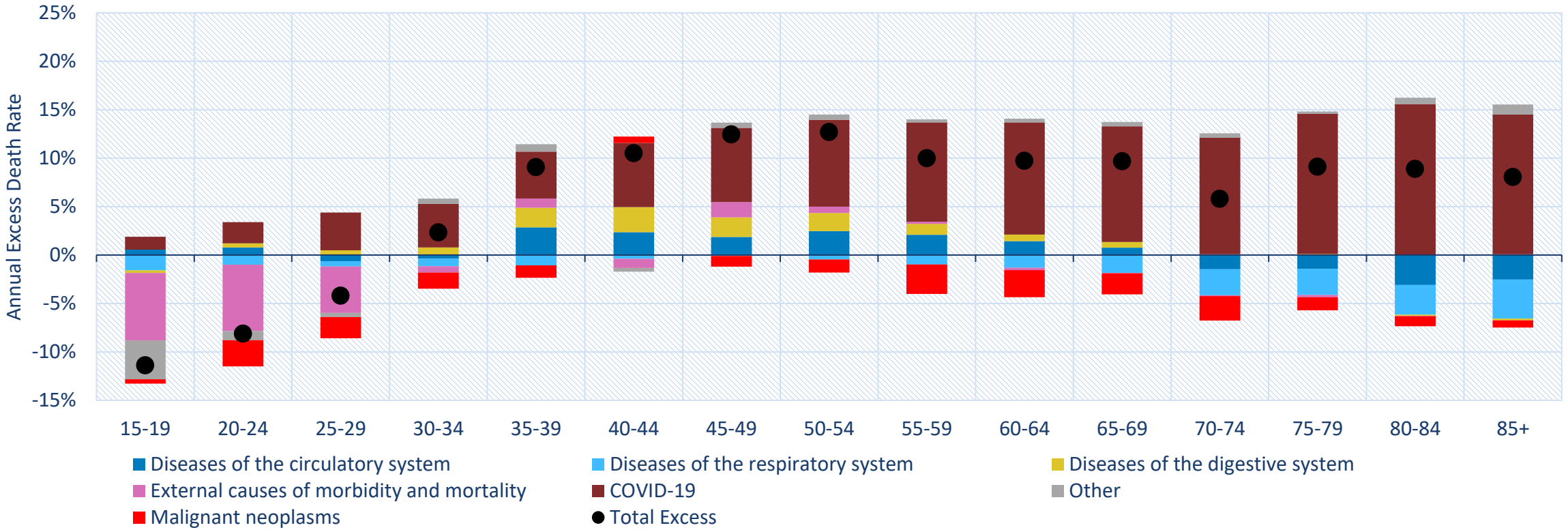
Example: Impact of Asian-Flu on $_{35}p_{30}$



- Asian-Flu in Feb 1957 – Feb 1958
- Only **minimal short-term impact** visible on survival probability $_{35}p_{30}$
- General mortality improvement outweighs pandemic effect

Source: Own illustration based on data from UN WPP 2024, https://population.un.org/wpp/

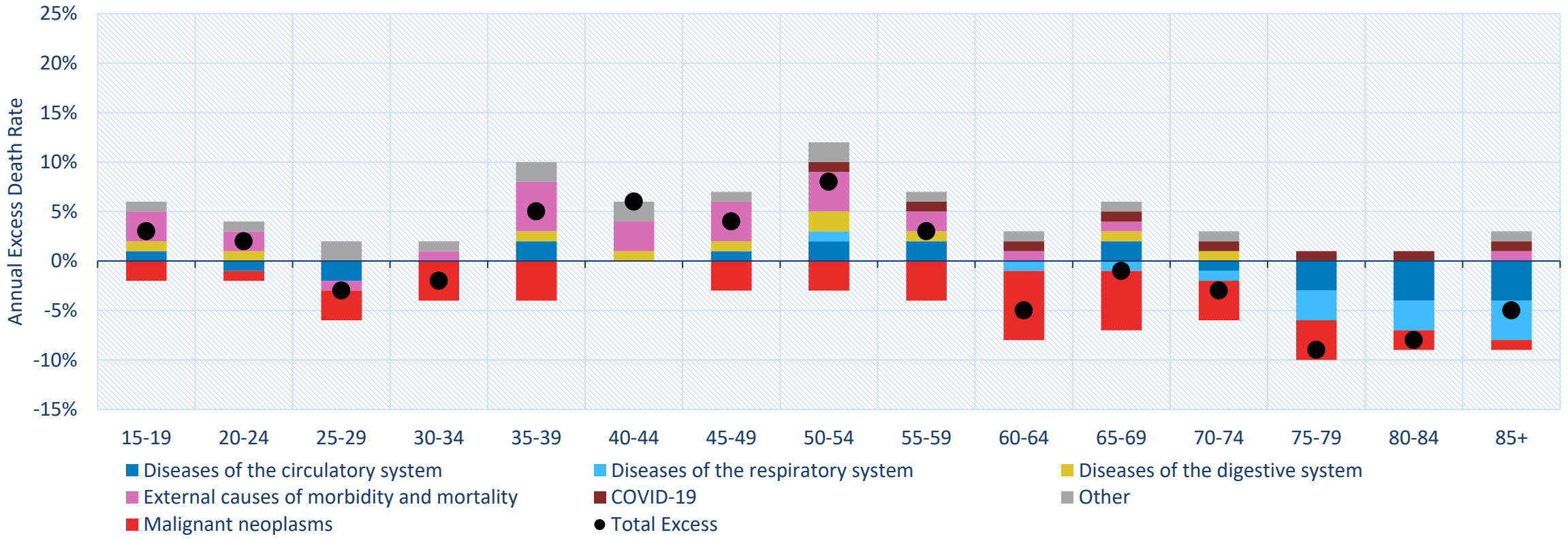
UK: Excess Death Rate 2020 vs 2015-2019



- In 2020, Covid caused excess mortality in all ages 30+
- Less mortality in ages below 30 due to less accidents during lock-downs

Source: Own illustration based on data from Office for National Statistics (ONS) , UK

UK: Excess Death Rate 2024 vs 2015-2019

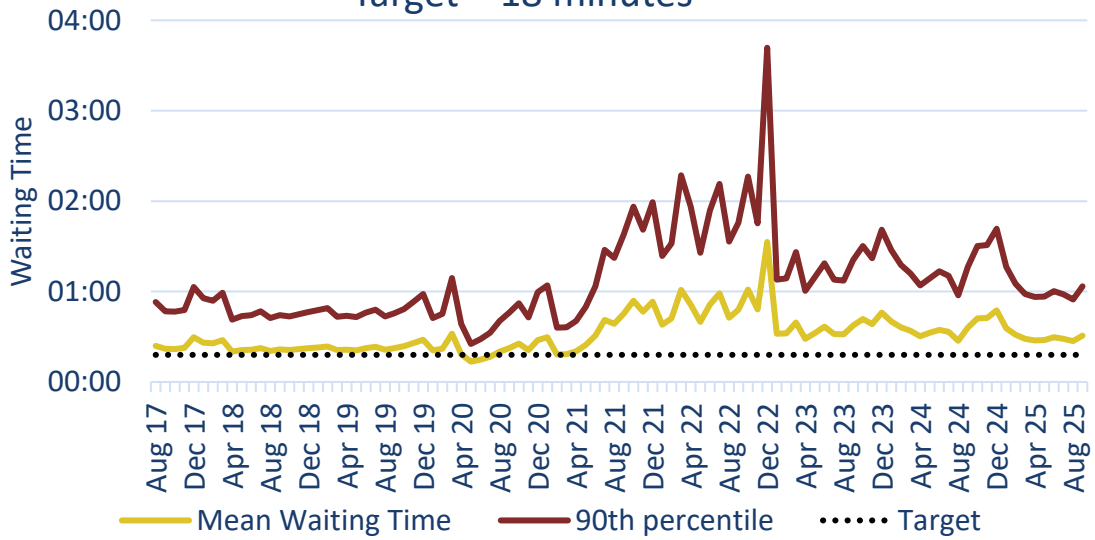


- In 2024, still excess mortality in ages 35 to 54
- Negative excess in ages 60+ suggests return to pre-pandemic trend

Source: Own illustration based on data from Office for National Statistics (ONS) , UK

UK: Crises in the National Health Service

England: Category 2 Ambulance Waiting Times (includes suspected heart attacks and strokes), Target = 18 minutes

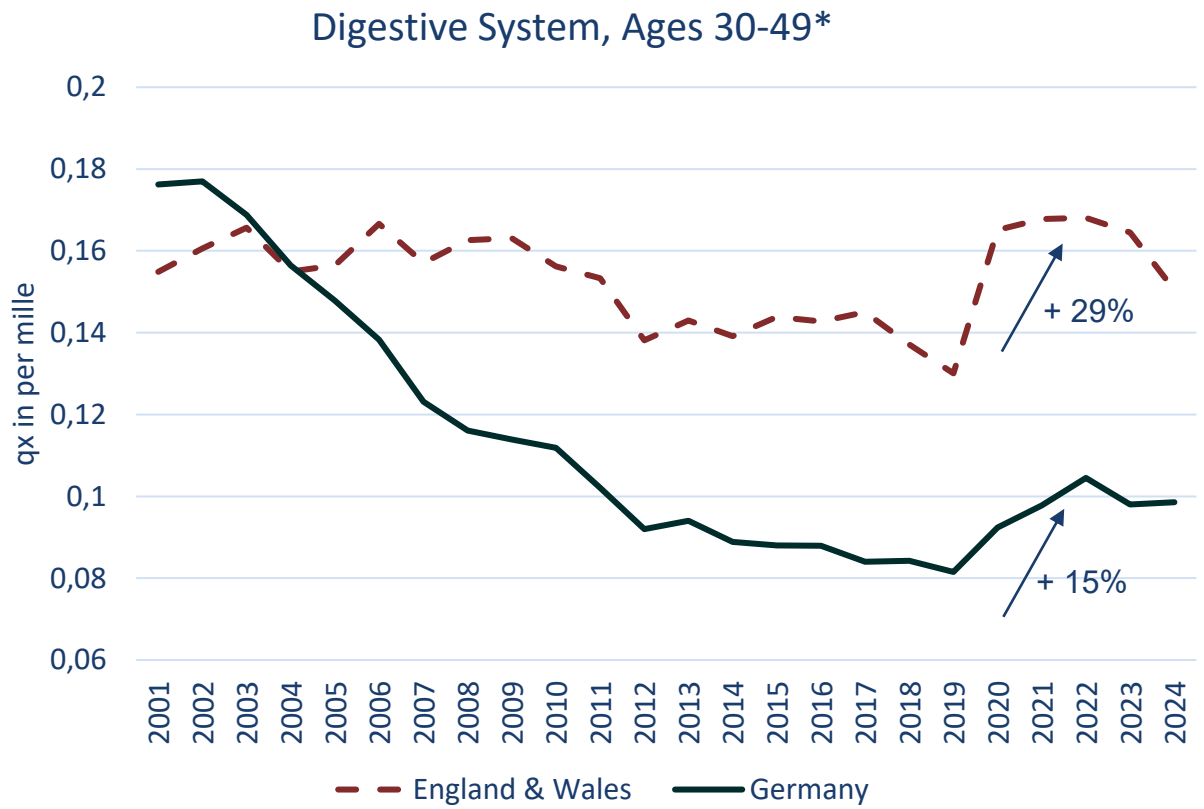


England: A&E Patients waiting > 12 hours for admission after decision to admit

- Rapid assessment and transport are critical in cases of heart attack or stroke
- Ambulance response times have increased since 2021
- Emergency department delays have increased since 2021

Source: Own illustration based on data from
NHS England ambulance statistics, https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/, accessed on Oct 23rd, 2025
NHS A&E data, https://www.england.nhs.uk/statistics/statistical-work-areas/ae-waiting-times-and-activity/, accessed on Oct 23rd, 2025

Reversing trend during the pandemic

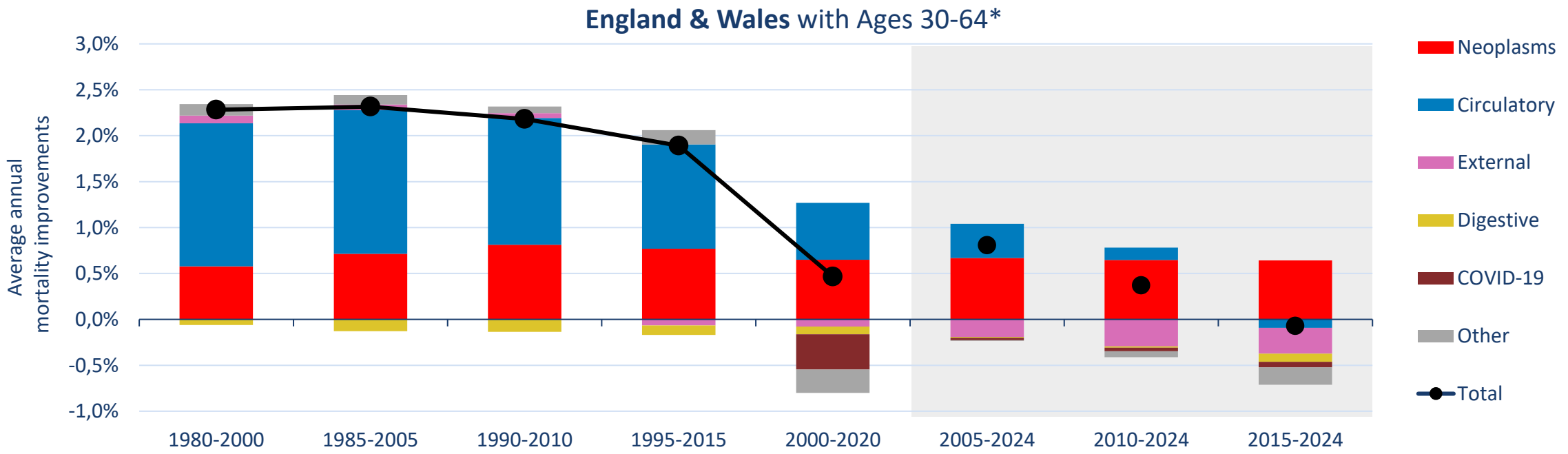


*Age-standardized population
Source: Own illustration according to
ONS, Office for National Statistics. Deaths registered summary statistics, England and Wales, 2023, https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathsregisteredsummarystatisticsenglandandwales, accessed on Sep 30th, 2024
Destatis. Statistisches Bundesamt. Gestorbene: Deutschland, Jahre, Todesursachen, Geschlecht, Altersgruppen. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Todesursachen/_inhalt.html#235880, accessed Oct 23rd, 2024

- Increase in diseases of the liver
- Increased alcohol consumption during lock downs by people with already high consumption[1)]
- Limited medical treatment[2)]
- Higher alcohol-related mortality in Q2 and Q3 2020 in England & Wales[3)]

Sources:
1) Rossow I, Bartak M, Bloomfield K, Braddick F, Bye EK, Kilian C, et al. Changes in alcohol consumption during the COVID-19 pandemic are dependent on initial consumption level: findings from eight European countries. Int Environ Res Public Health. 2021;18:10547
2) Kilian C, Carr S, Schulte B, Manthey J. Increased alcohol-specific mortality in Germany during COVID-19: State-level trends from 2010 to 2020. Drug Alcohol Rev. 2023;42(3):633–40.
3) Office for National Statistics. Quarterly alcohol-specific deaths in England and Wales: 2001 to 2019 registrations and Quarter 1 (Jan to Mar) to Quarter 3 (July to Sept) 2020 provisional registrations; 2021.

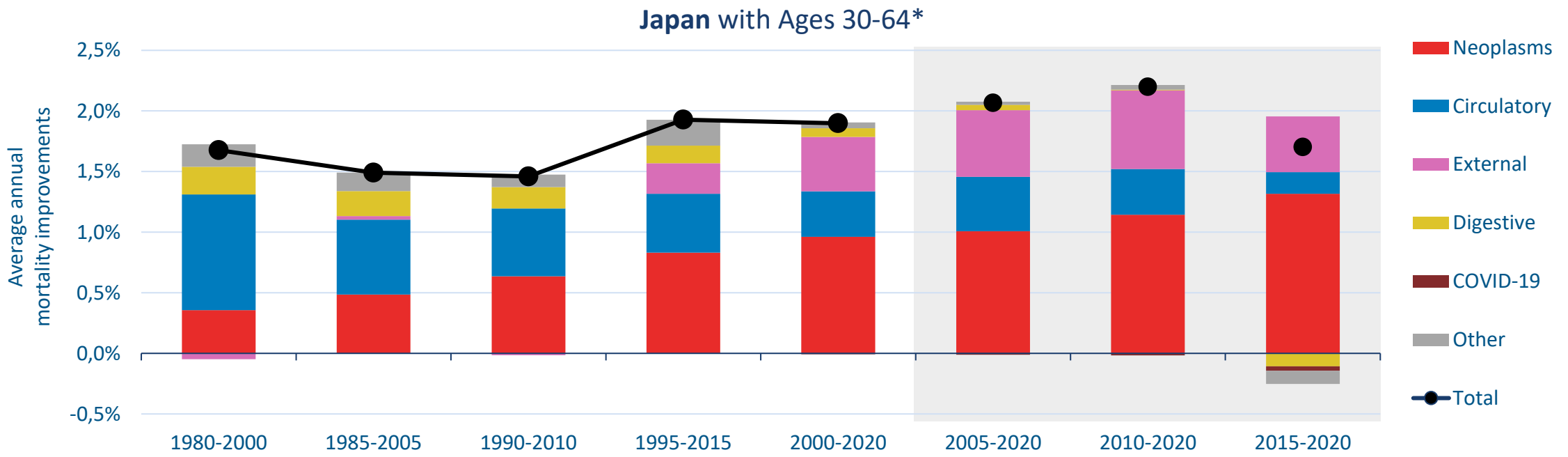
Rolling Average 20-year Mortality Improvements by Cause of Death



- **Strong slowdown** in mortality improvements
- Improvements in circulatory disease have slowed significantly
- Improvement in cancer continues, but not compensating for worsening in other causes

Age-standardized population
Source: Own illustration according to WHO Mortality Database, WHO Mortality Database, URL: https://www.who.int/data/data-collection-tools/who-mortality-database, accessed on Oct 23rd, 2024

Rolling Average 20-year Mortality Improvements by Cause of Death



- **No slowdown** in mortality improvements
- Shift in main drivers: from circulatory to neoplasms
- External causes improve due to lower suicides

Age-standardized population
Source: Own illustration according to WHO Mortality Database, WHO Mortality Database, URL: https://www.who.int/data/data-collection-tools/who-mortality-database, accessed on Oct 23rd, 2024

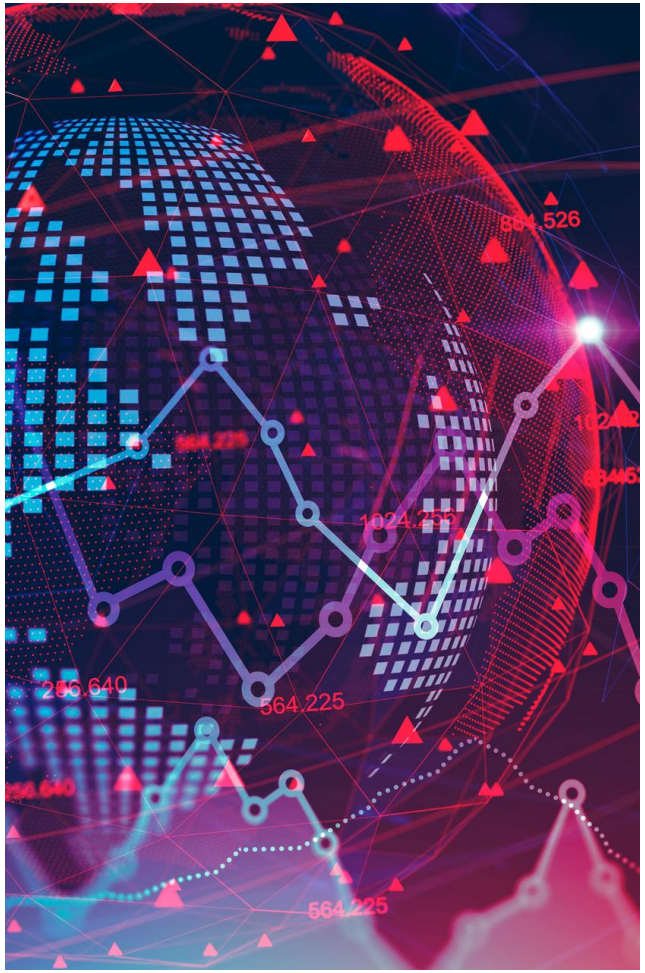
Insured Portfolio vs General Population: Mortality Impact During and After the Pandemic

Key Considerations:

- **Individual Underwriting**
  - Filters out applicants with pre-existing health conditions, leading to a healthier insured population.
- **Group Insurance Characteristics**
  - Typically covers actively employed individuals — generally healthier and more socioeconomically stable.
- **Socioeconomic Factors**
  - Alcohol and drug-related mortality increased notably in lower socioeconomic groups, which are often underinsured or uninsured.
- **Coverage Exclusions**
  - Drug-related deaths are frequently excluded from coverage
  - Suicide is often excluded, especially during the initial policy period.

Mortality Trends in Transition?

- Mortality has largely returned to pre-pandemic levels by 2024
  - consistent with historical pandemic patterns
- Recovery path is slower and more uneven than in the past
  - significant heterogeneity across countries (e.g., UK vs Japan)
- Mortality improvements were already slowing before COVID
  - declining gains in circulatory diseases
  - shift in key drivers: circulatory to neoplasms
- Indirect effects of COVID remain relevant
  - healthcare system pressure
  - behavioral changes
- Future trends remain uncertain
  - progress in cancer treatment and prevention
  - Development of cardiovascular risk factors
  - Long-term effects of healthcare system strain



- Dr. Marius Hermanns – Senior Pricing Actuary, Gen Re
- Responsible for mortality products globally (Life/Health R&D)
- Qualified Actuary (DAV) and Certified Actuarial Data Scientist
- Focus: mortality modeling, pricing analytics, and research on climate and behavioral risk drivers

- Gen Re delivers reinsurance solutions to the Life and Non-Life insurance industry
- A Berkshire Hathaway Company
- https://www.genre.com