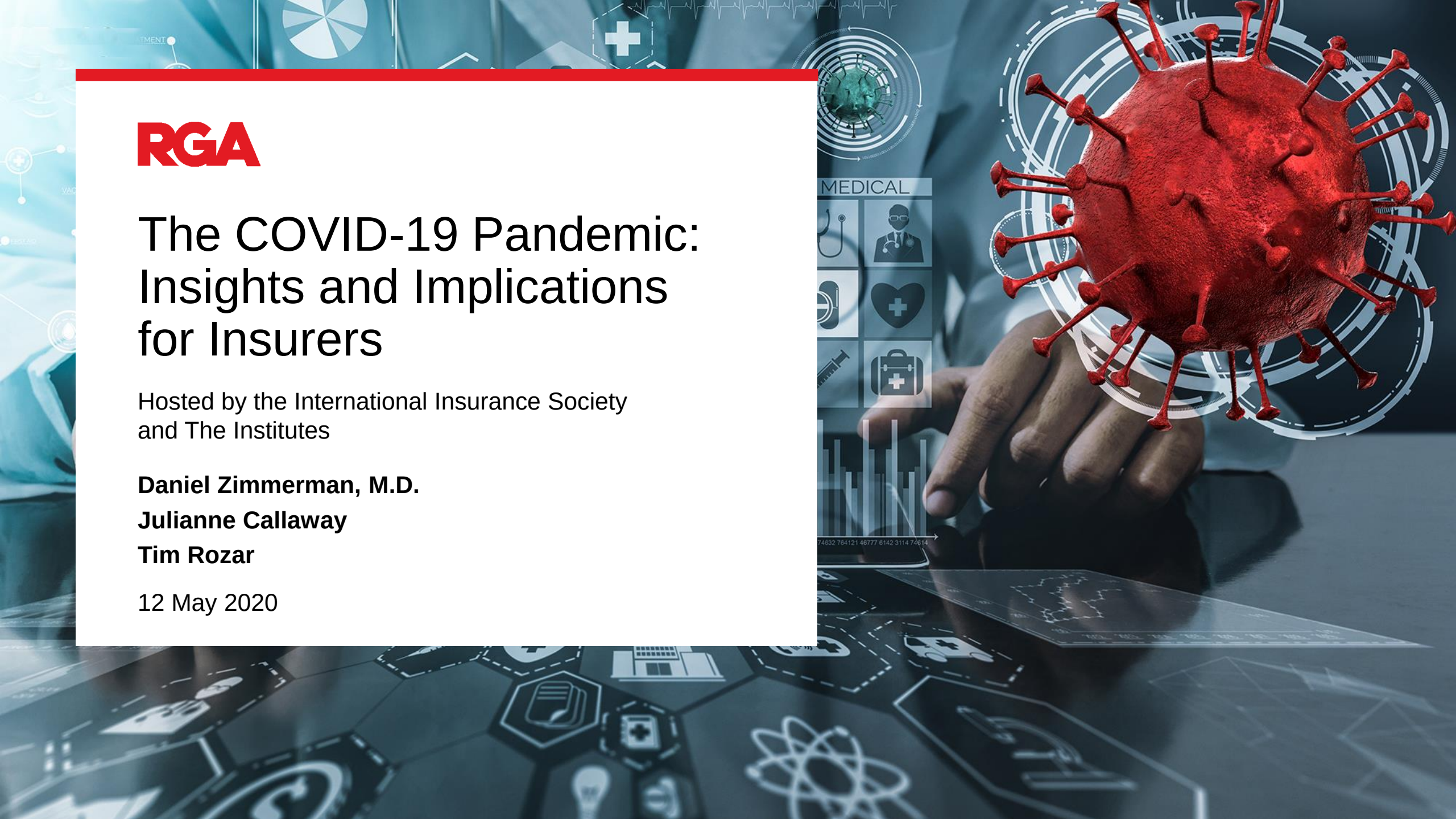


RGA

The COVID-19 Pandemic: Insights and Implications for Insurers

Hosted by the International Insurance Society and The Institutes

Daniel Zimmerman, M.D.

Julianne Callaway

Tim Rozar

12 May 2020

Agenda

Opening Remarks

Michael J. Morrissey, President and Chief Executive Officer, International Insurance Society (IIS)

The Medical View

Daniel Zimmerman, M.D., Senior Vice President and Chief Medical Director, Global Support Team

Research Highlights

Julianne Callaway, Vice President and Actuary, Strategic Research

A Look to the Future

Tim Rozar, Senior Vice President, Chief of Staff to the CEO

Q&A

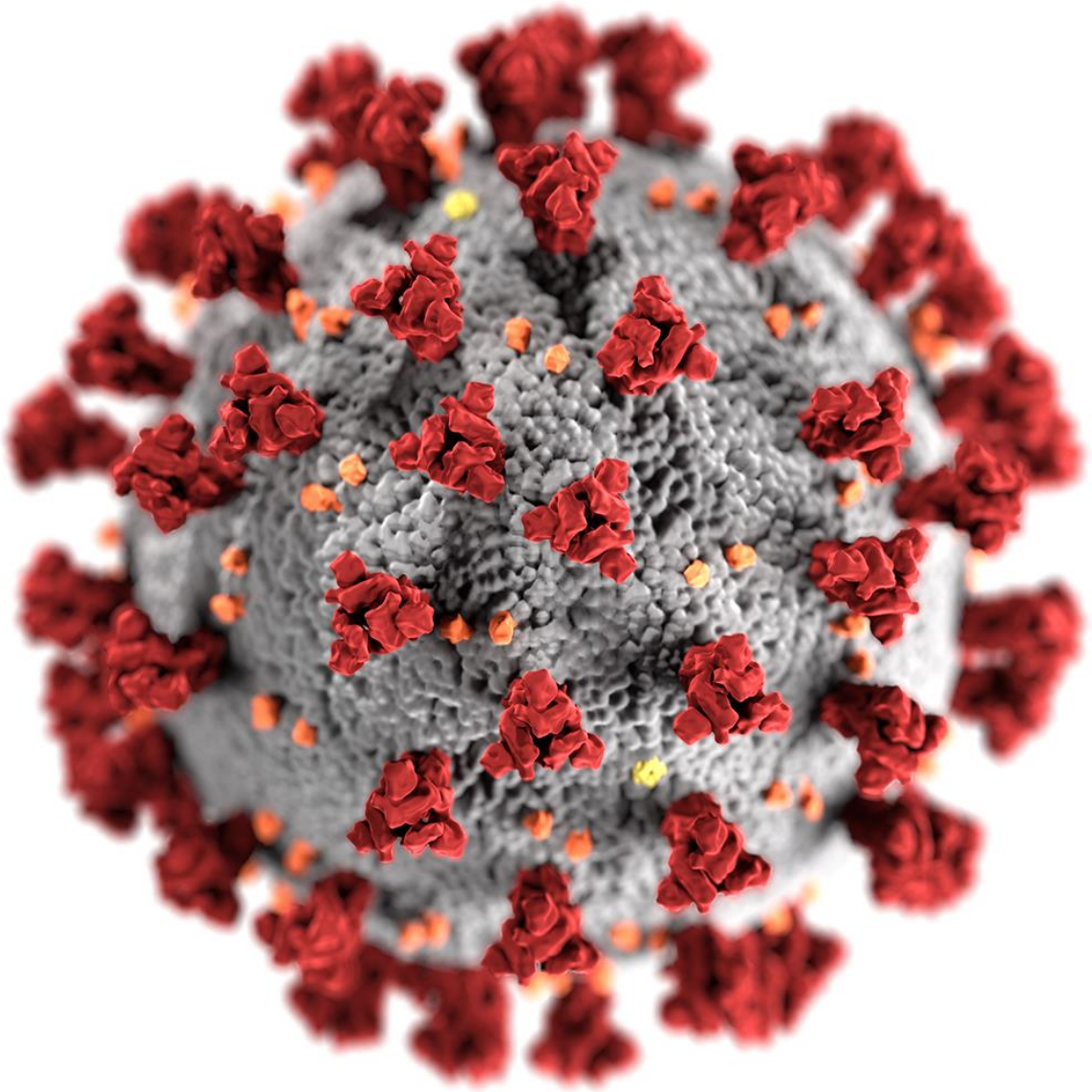
Michael J. Morrissey, President and Chief Executive Officer, International Insurance Society (IIS)

The Medical View

Daniel Zimmerman, M.D.
Senior Vice President and Chief Medical Director,
Global Support Team

The Medical View

- Epidemiology and Trends
- Prevention
- Clinical Manifestations
- Treatment
- Recovery and Immunity



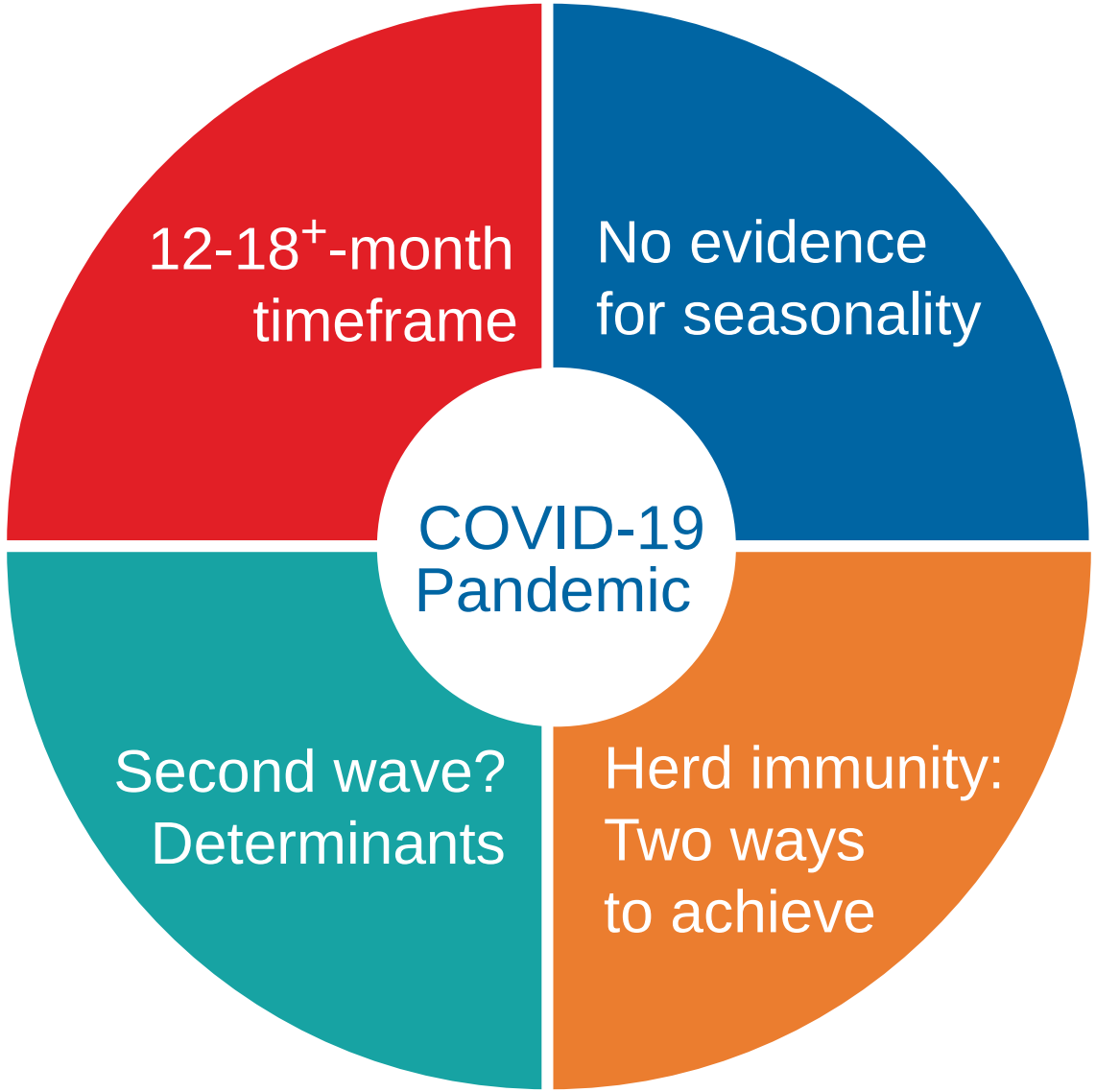
Epidemiology and Trends

Terminology

SARS-CoV-2 – the name of the virus

COVID-19 – the name of the disease caused by the virus

- Impact of social distancing
  - Differing strategies: Sweden
- Opening-up strategies
  - Testing and contact tracing
  - “Suppress and lift”
  - Mobile phone apps



Prevention

- Masks and face coverings
- Social distancing
- BCG vaccine – protective?

Coalition for Epidemic Preparedness Innovation

- Created in 2017
- Stimulate and accelerate the development of vaccines against emerging infectious diseases and enable access to these vaccines for people during outbreaks
- Moving quickly to rapidly develop vaccines against COVID-19
- www.cepi.net

Vaccine update

- Leveraging prior research
- Accelerating the timeline – collaboration
- Many candidate vaccines and strategies*
- Safety and efficacy
- Long-term protection needed
- Older individuals – immune response
- Mass production
- Acceptance of vaccine by people?

*virus, viral vector, nucleic acid, protein-based

https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/coronavirus-vaccine/art-20484859

Clinical Manifestations

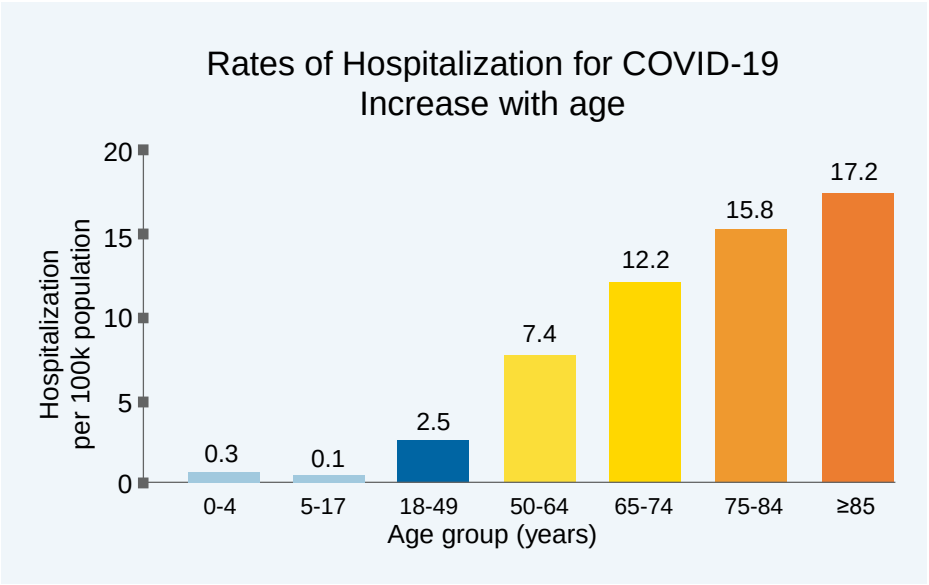
Risk factors for serious disease

- Age 65 and older
- People in nursing home or LTC facility
- Chronic lung disease
- Serious heart conditions
- Immunocompromised
- Certain cancers
- Obesity, BMI >30
- Diabetes
- Chronic kidney disease
- Liver disease

Unexpected consequences

- Kidney failure requiring dialysis
- Cardiac “injury”
- Neurological symptoms including stroke
- Abnormal clotting of blood
- Liver damage
- Children with emerging inflammatory condition

Rates of hospitalization increase with age



CDC – adapted from U.S. Government Image – MMWR 17 Apr 20

Treatment

- Remdesivir
- Convalescent plasma
- Other antivirals
- Azithromycin
- Monoclonal/polyclonal antibodies
- Hydroxychloroquine and chloroquine (antimalarials)
- Stem cells and other cells

- Use caution when reviewing and interpreting results of clinical trials

Longer Life Foundation

RGA collaboration with Washington University in St. Louis School of Medicine

Cutting-edge research

www.longerlife.org

LinkedIn/Twitter

Novel technologies being employed: cloning of SARS-CoV-2 proteins in human cells to identify how they interact to identify druggable targets

Recovery and Immunity

A very complex issue…

More questions than answers!

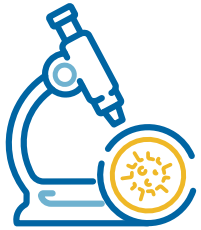
- What is the correlation between resolution of symptoms and length of viral shedding?
- Could there be long-term health consequences in those who recover from COVID-19?
- Are antibodies protective?
- What if someone has a low or undetectable level of antibody?
- Is there a risk of reinfection?
- What is the quality of antibody tests now available?
- Will it be possible to issue “immunity certificates”?

Research Highlights

Julianne Callaway, FSA, ACAS, MAAA
Vice President and Actuary, Strategic Research

Challenges

Evolving landscape of data and expert guidance

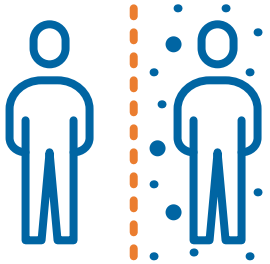


Procedural Changes

- Limiting tests to hospitals
- Counting probable cases and deaths, not just confirmed

Under-/Overcounting

- Only counting hospitalized COVID-19 deaths
- Dying from another cause while also having COVID-19



Government Interventions

- Societal changes impact mortality experience
- These changes impact expert model projections

Research Approach

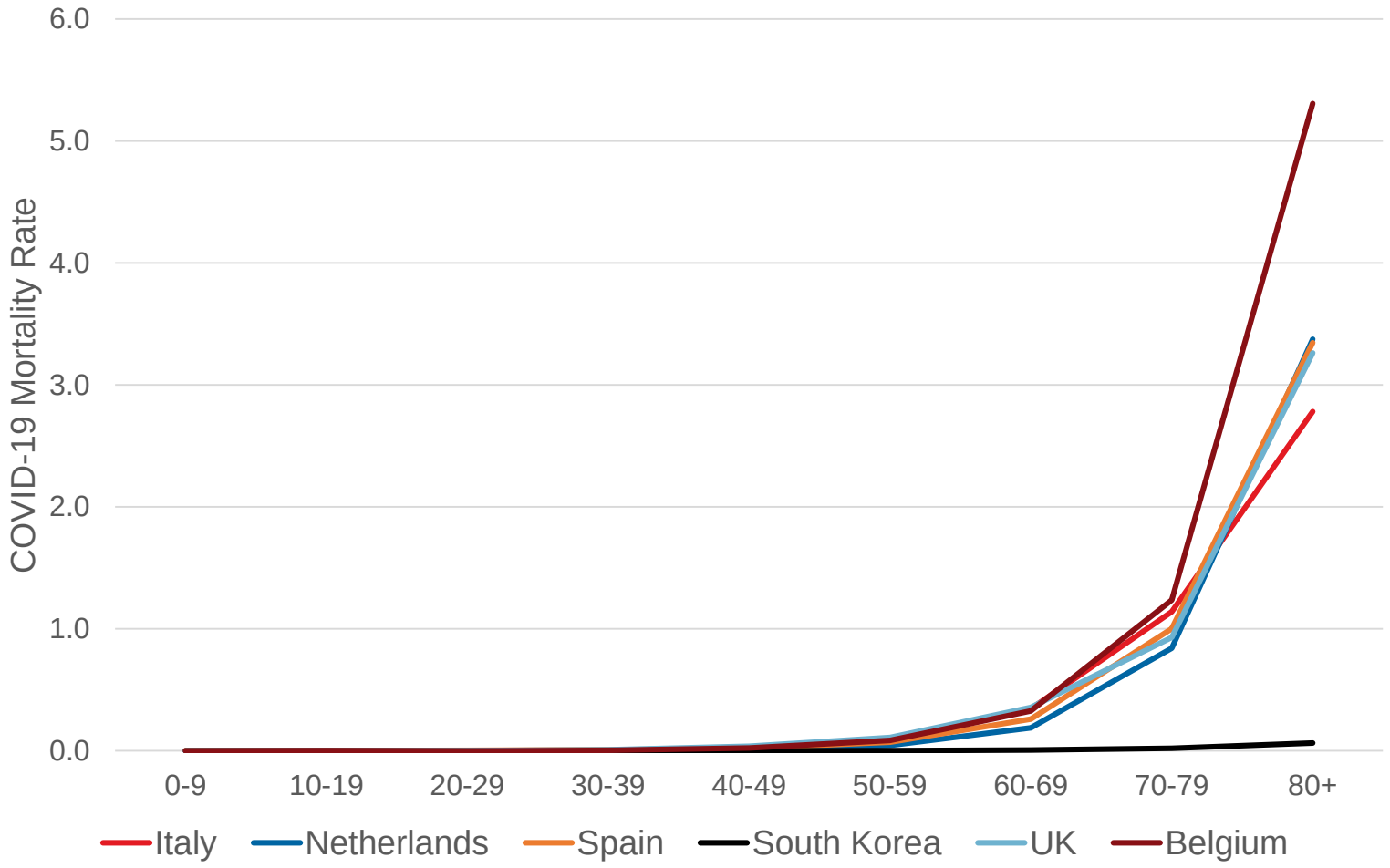
Wide-Ranging Expertise

- Epidemiological
- Actuarial
- Advanced analytics

Data

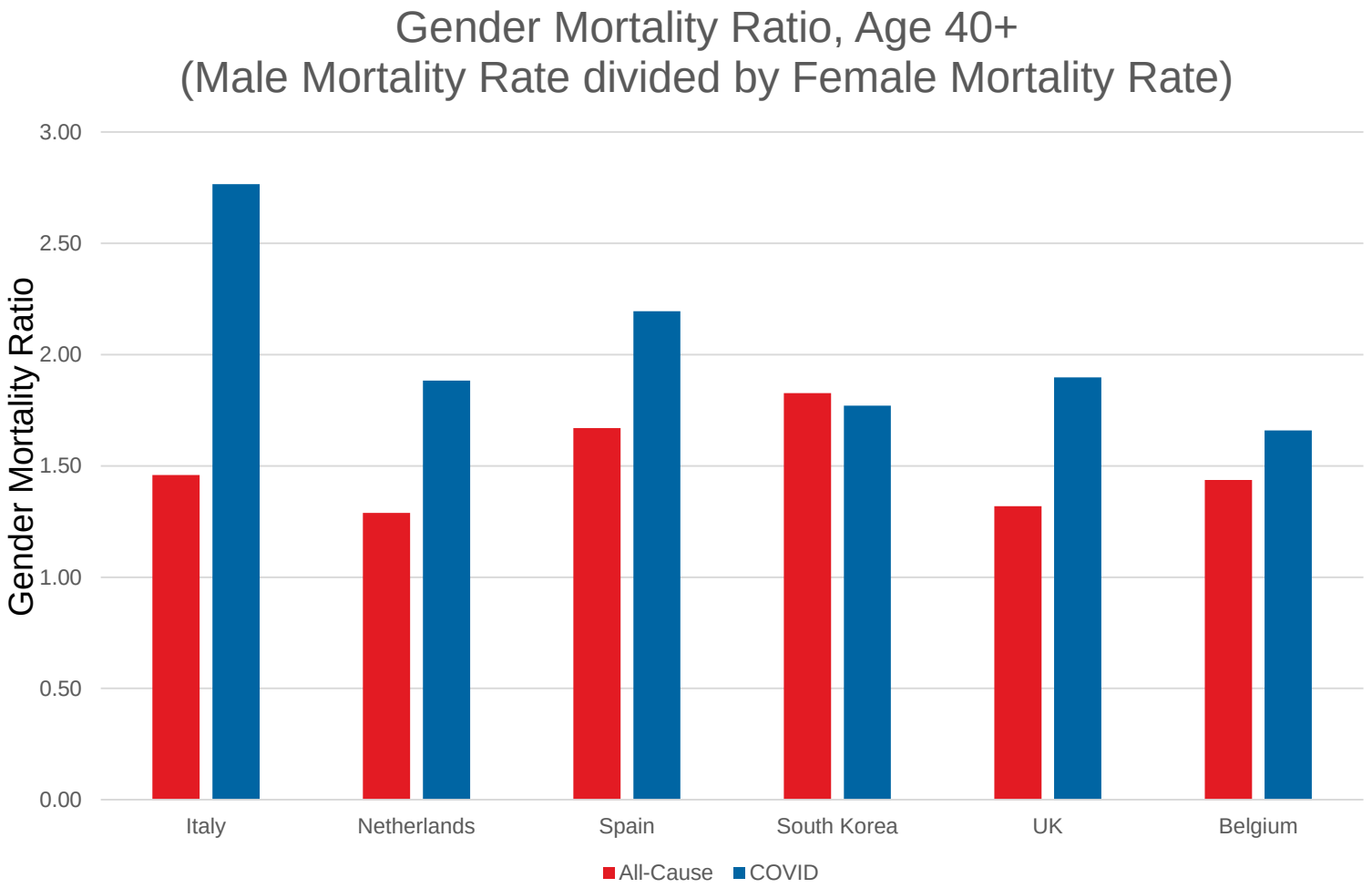
- Government data
- Academic institutions
- Scientific literature

COVID-19 Mortality Rate by Age for Select Countries



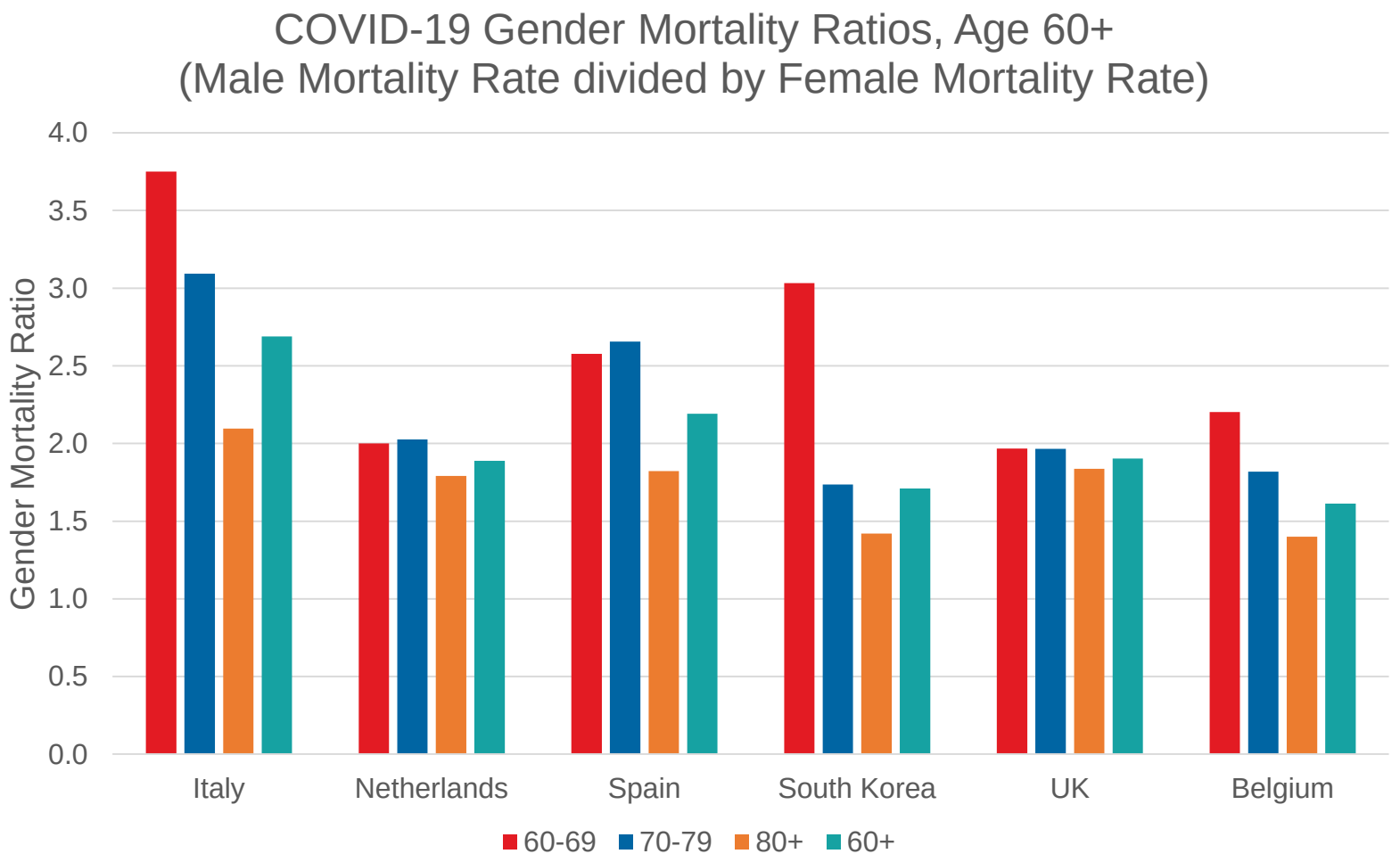
- The COVID-19 mortality rate is much higher (roughly 20 times greater) for people over age 60 compared those under age 60
- The age shape of COVID-19 mortality experience is very different from that of previous pandemics

All-Cause and COVID-19 Mortality Differences by Gender



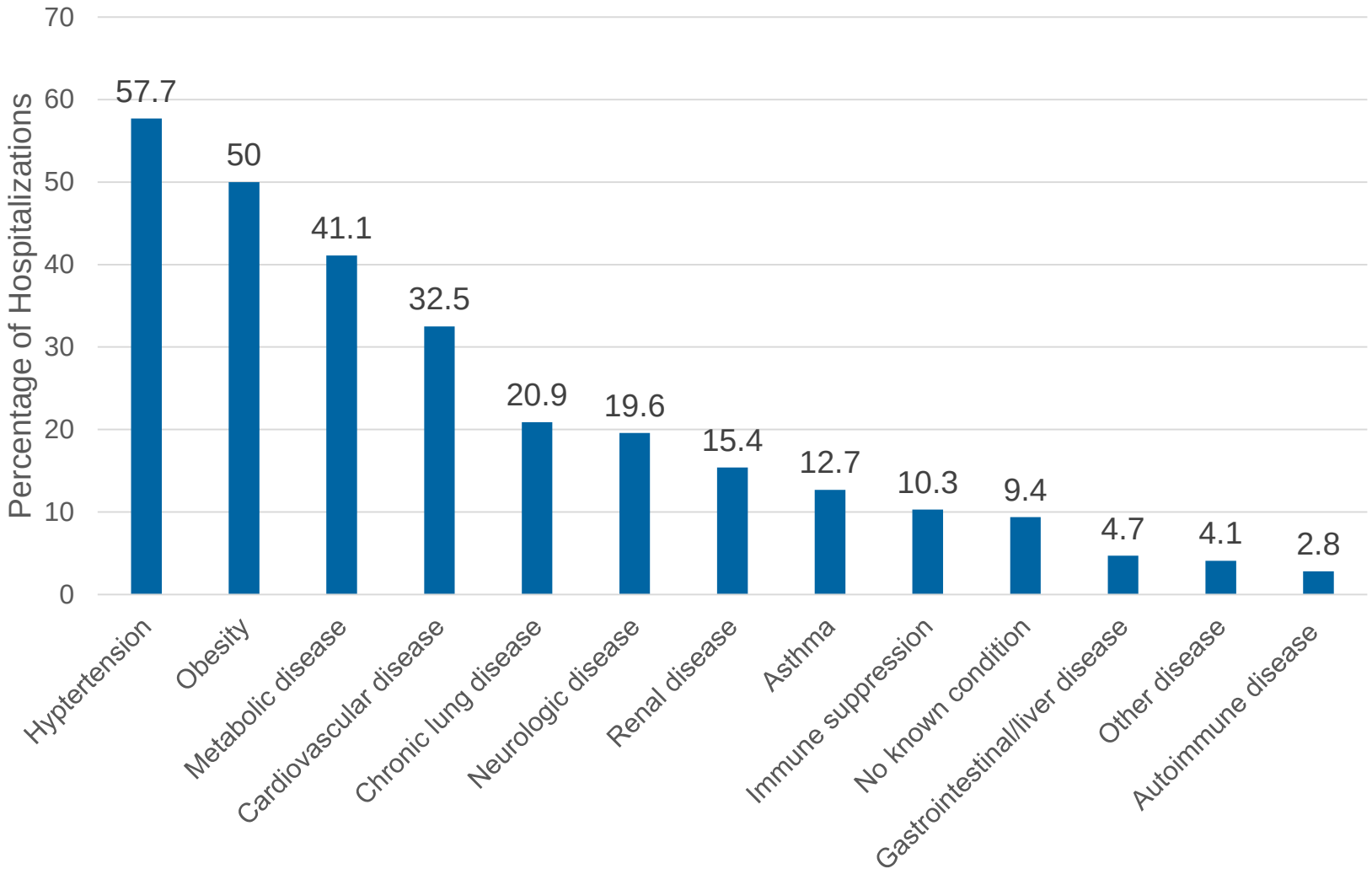
- The COVID-19 Gender Mortality Ratio (GMR) is generally higher than the all-cause GMR, suggesting that there is a bigger sex differential in COVID-19 than in all-cause mortality
- Possible explanations for worse male COVID-19 experience:
  - Lifestyle
  - Behavioral
  - Biological

COVID-19 Gender Mortality Ratios by Age Group



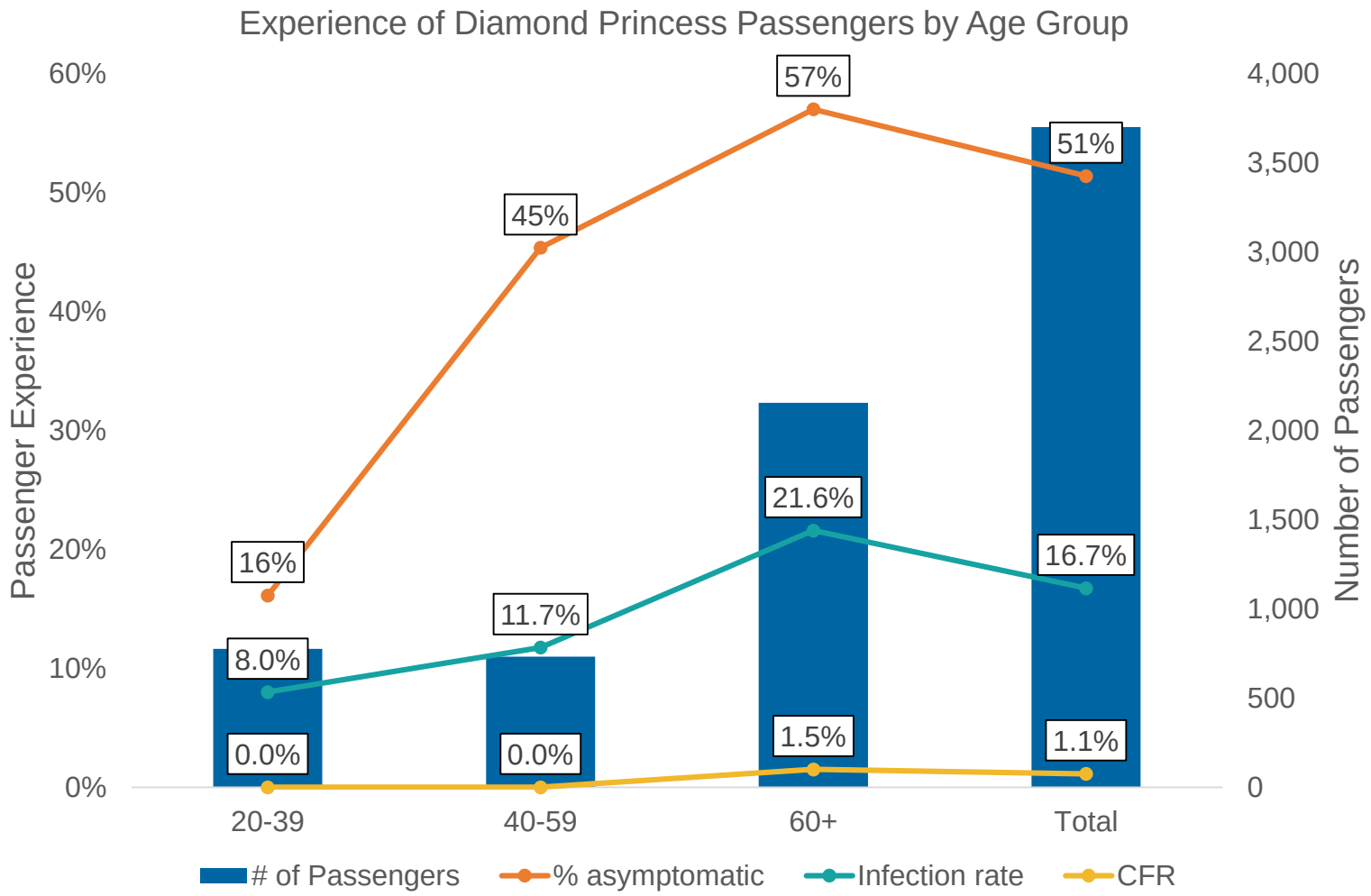
- Male COVID-19 mortality experience is typically about twice the COVID-19 mortality experience of females
- The differences are more pronounced at ages 60-69 than at older ages

U.S. COVID-19 Hospitalizations with Underlying Medical Conditions



- According to the U.S. CDC, the majority of COVID-19-related hospitalized patients have an underlying medical condition
- Nearly 90% of COVID-19-related hospital admissions in the U.S. involve co-morbidities

COVID-19 Experience of Diamond Princess Passengers by Age Group



The *Diamond Princess* cruise ship offers a rare opportunity to understand features of the virus that are hard to investigate in the wider population

- Represents experience from affluent, generally healthy people
- All passengers were tested, allowing for analysis of:
  - Asymptomatic prevalence
  - Estimates of Infection Fatality Rates
- Over half of the passengers were aged 60+ and this was the only age group that experienced deaths; many who died had underlying health conditions

Data Sources

Country	Source	Date
Italy	Epicentro - Higher Institute of Health	4.23.2020
Netherlands	National Institute for Public Health and the Environment	4.29.2020
South Korea	Korea Center for Disease Control and Prevention	4.29.2020
Spain	Ministry of Health, Consumption and Social Welfare	4.29.2020
United Kingdom	Office for National Statistics	4.17.2020
Belgium	Belgian Scientific Institute of Public Health, Sciensano	4.28.2020
U.S.	Centers for Disease Control and Prevention	4.25.2020
Diamond Princess	https://cmmid.github.io/topics/covid19/diamond_cruise_cfr_estimates.html	3.23.2020

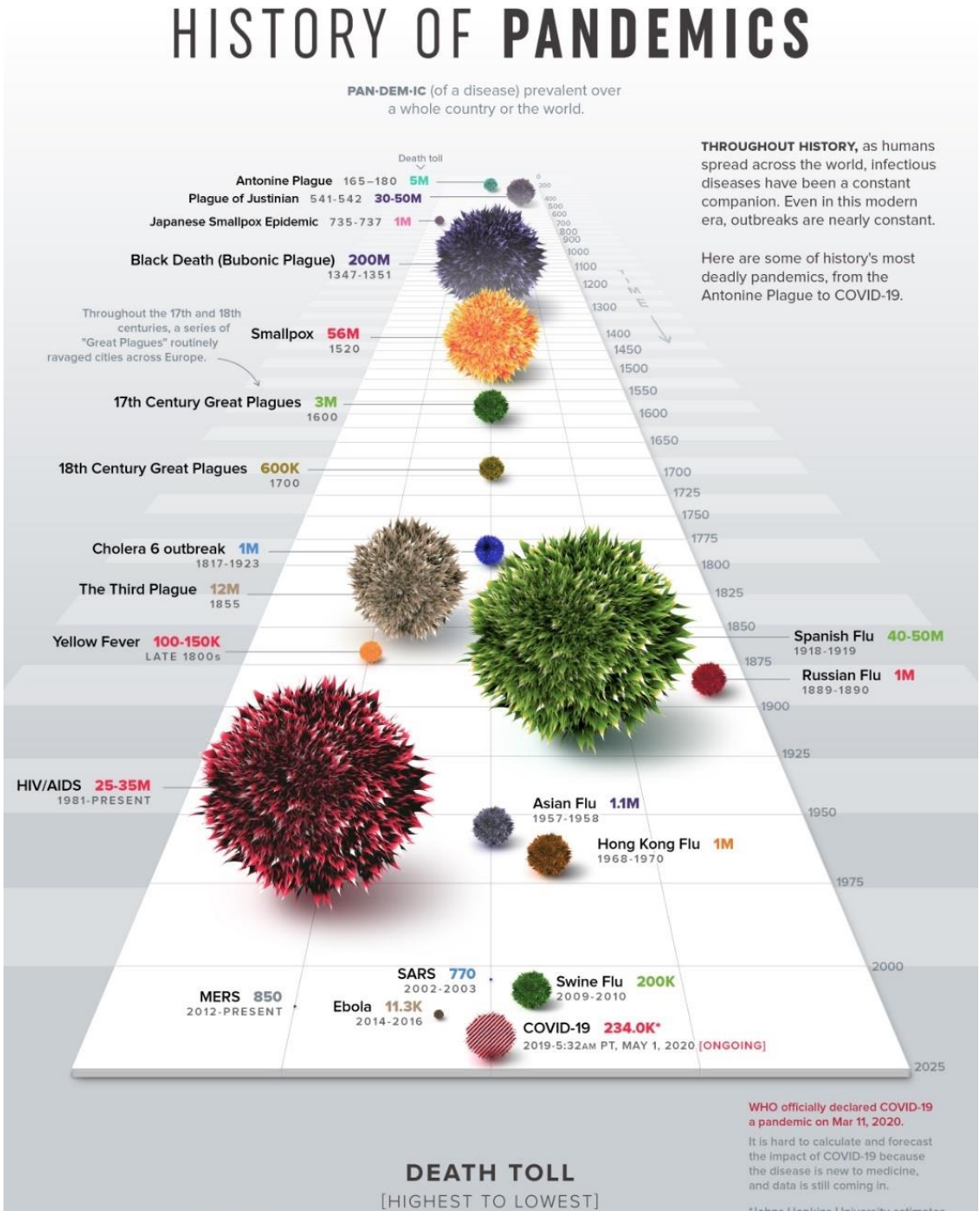
A Look to the Future

Tim Rozar, FSA, CERA, MAAA
Senior Vice President, Chief of Staff to the CEO

Looking Back to Look Forward

If you've seen one, you've seen…one

- Limited data points to analyze
- Every situation unique
  - Epidemiology
  - External influences
  - Response capabilities
- Must avoid complacency or overconfidence



https://www.visualcapitalist.com/history-of-pandemics-deadliest/

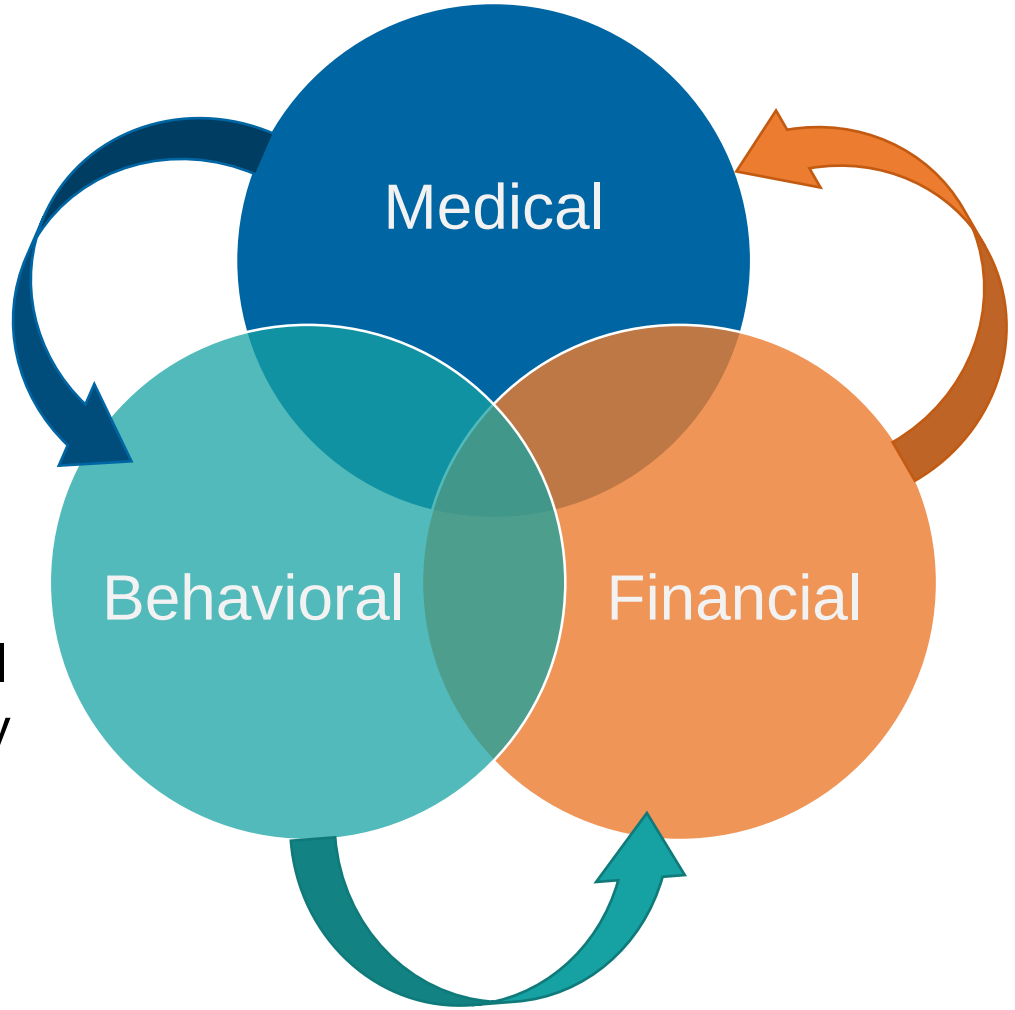
Primary Determinants of Impact

Medical

- Disease characteristics
- Healthcare delivery capacity
- Therapeutics
- Secondary ripple effects (often surprising, e.g. motor vehicle accidents)

Behavioral

- Mitigation actions
- Consumer/ intermediary trends
- Government, central bank, and regulatory actions
- Adverse selection



Financial

- Impact of mitigation
- Balance sheet resilience
- Macro-economic conditions

Potential Long-Term Impact on Insurance Industry

More questions than answers…

Medical

- Long-term impact on COVID-19 survivors
- Mortality improvement trends
  - Short-term vs. longer-term
  - Research and medical advances
  - Behavioral changes
- Evolution of risk assessment
- Investment in expertise

Behavioral

- Demand dynamics
  - Perception of value of insurance/reinsurance
  - Distribution channels
  - Risk transfer by companies
- Optionality, adverse selection, and fraud
- Regulatory/ratings
  - Coverage requirements
  - Extended grace periods
  - Capital ratios
- Trust
  - Models, financial strength, social responsibility

Financial

- Balance sheet impacts
  - Asset portfolios
  - Recalibration of capital models
- Strategic business analysis
- Impact of stimulus efforts
  - Austerity, interest rates, inflation
- Consumer
  - Unemployment
  - Disability
  - Disposable income

Q & A

Additional Questions

rgare.com/webinar-contacts