



The COVID-19 Pandemic: Insights and Implications for Insurers

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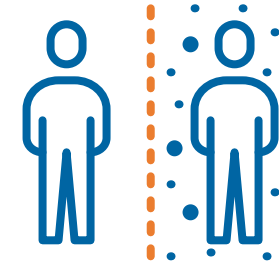
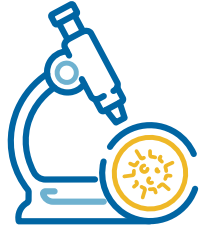
Research Highlights

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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

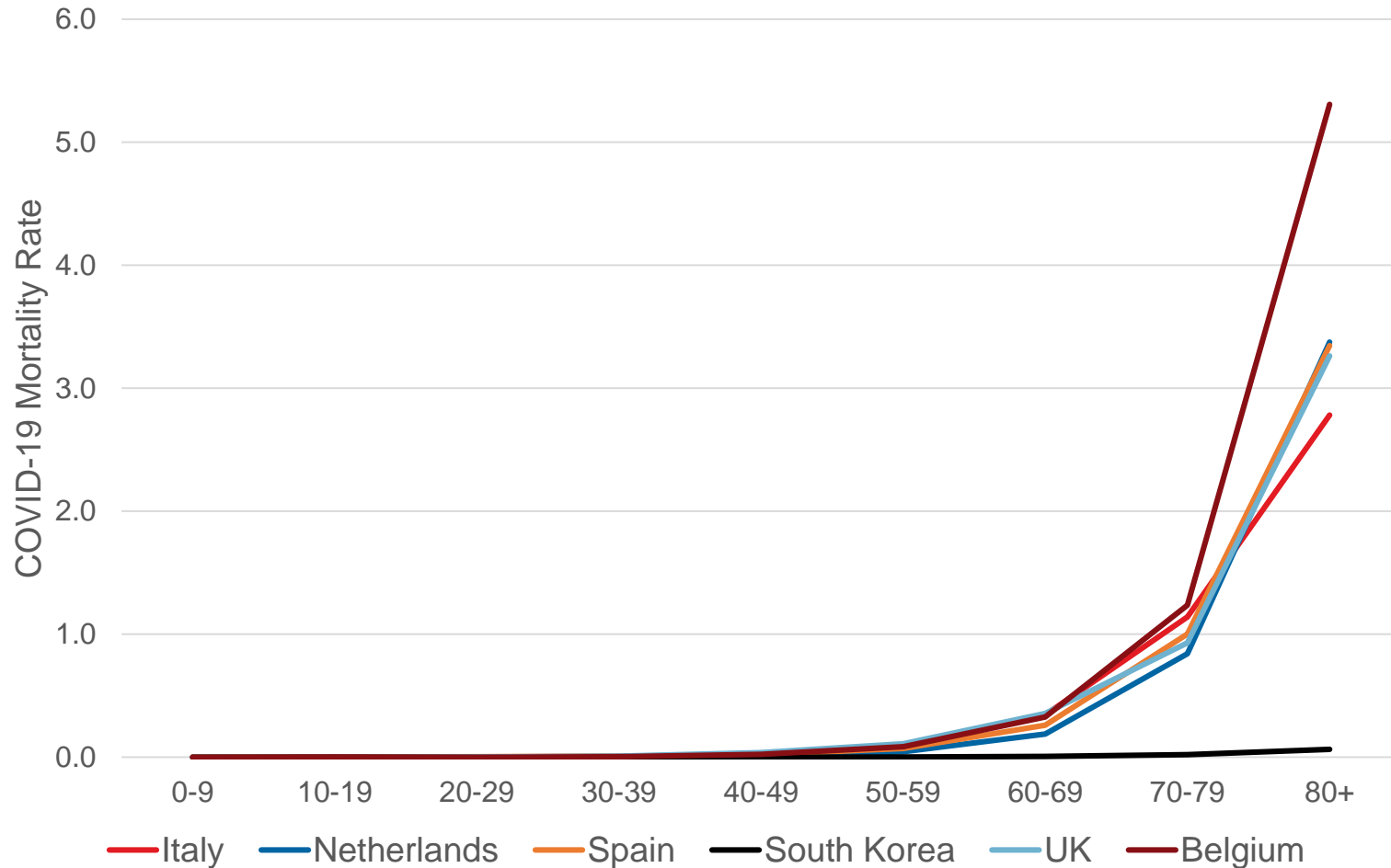
- Epidemiological
- Actuarial
- Advanced analytics



Data

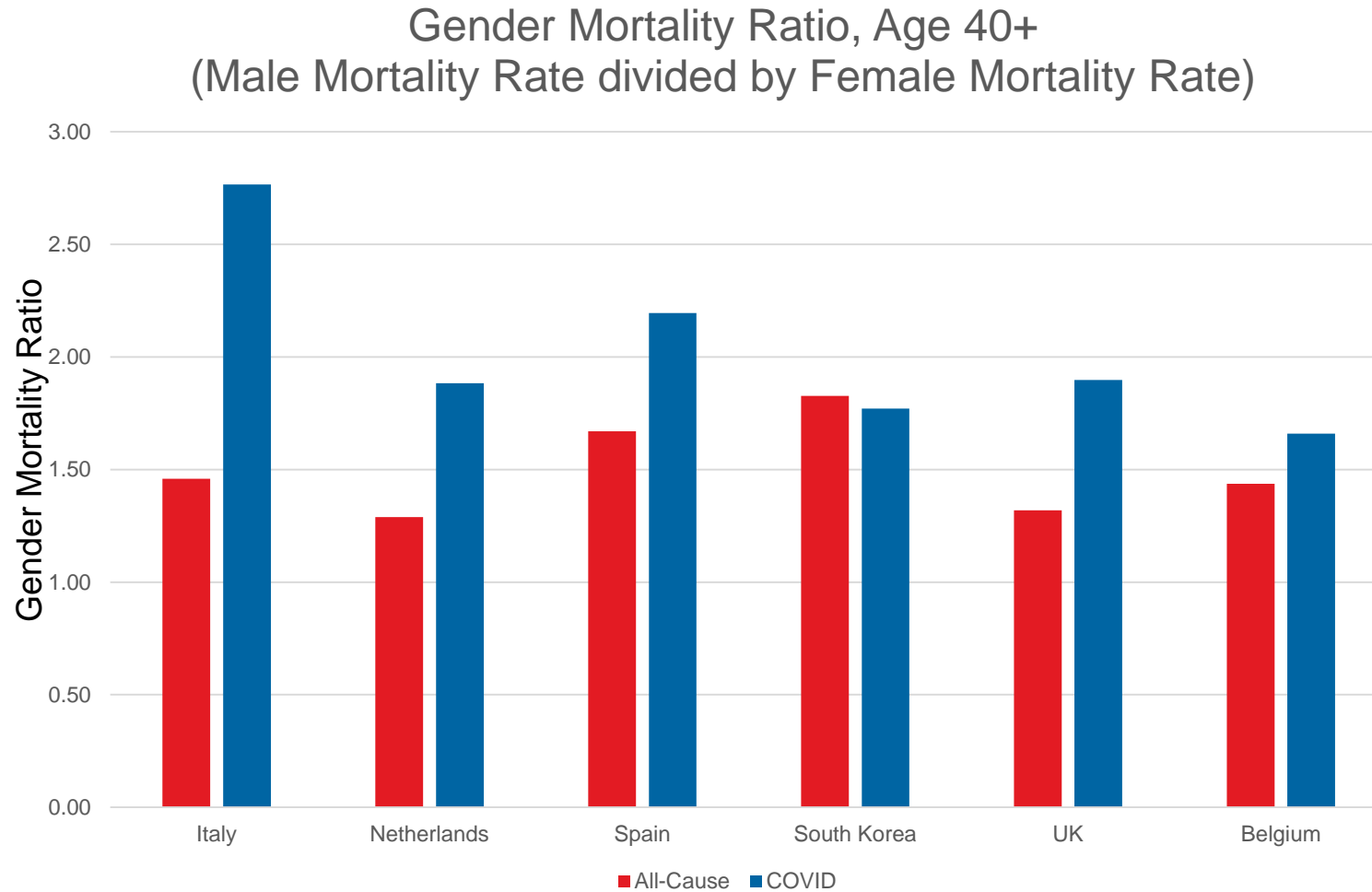
- Government data
- Academic institutions
- Scientific literature

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

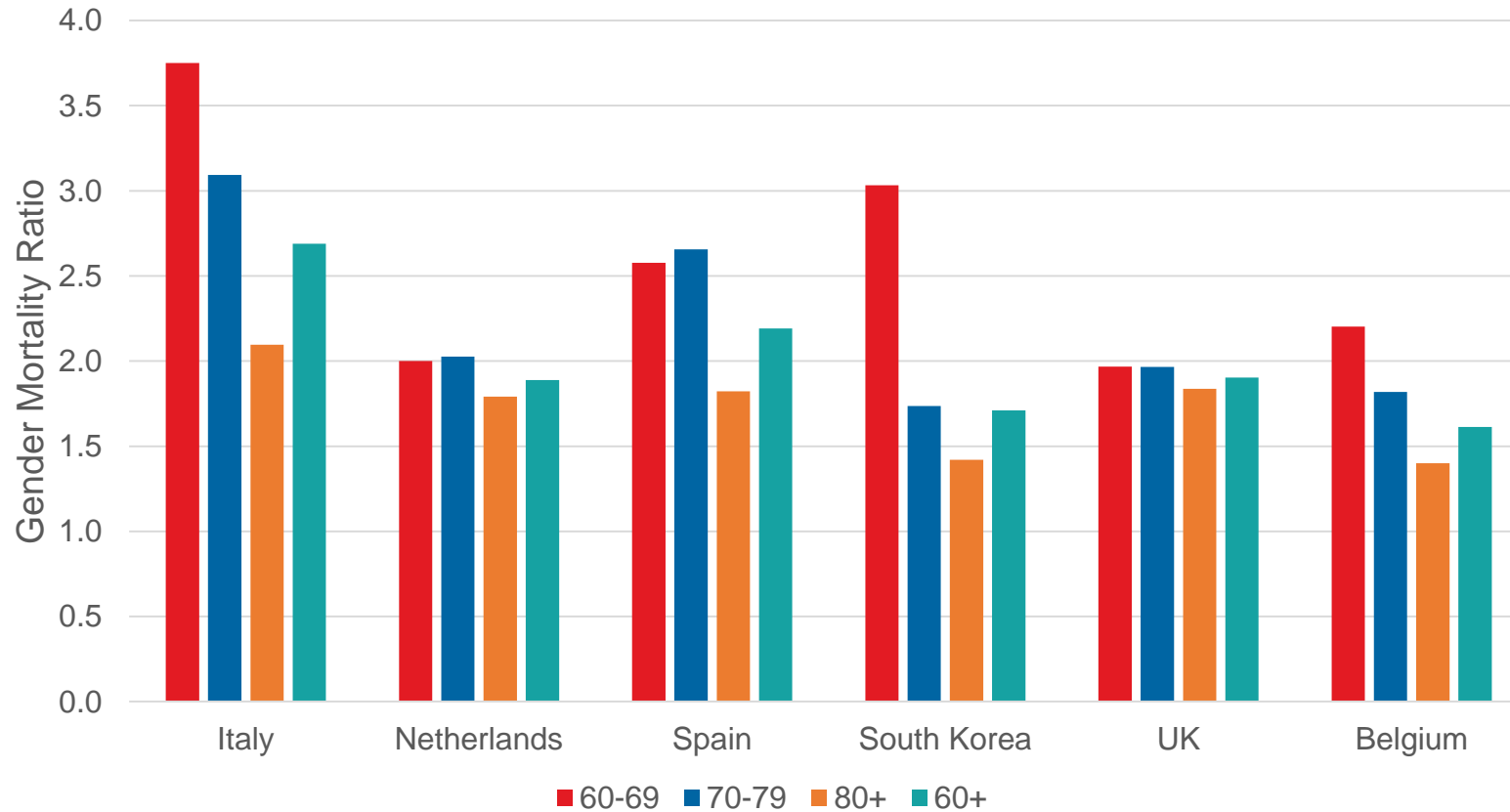
All-Cause and COVID-19 Mortality Differences by Gender



- 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

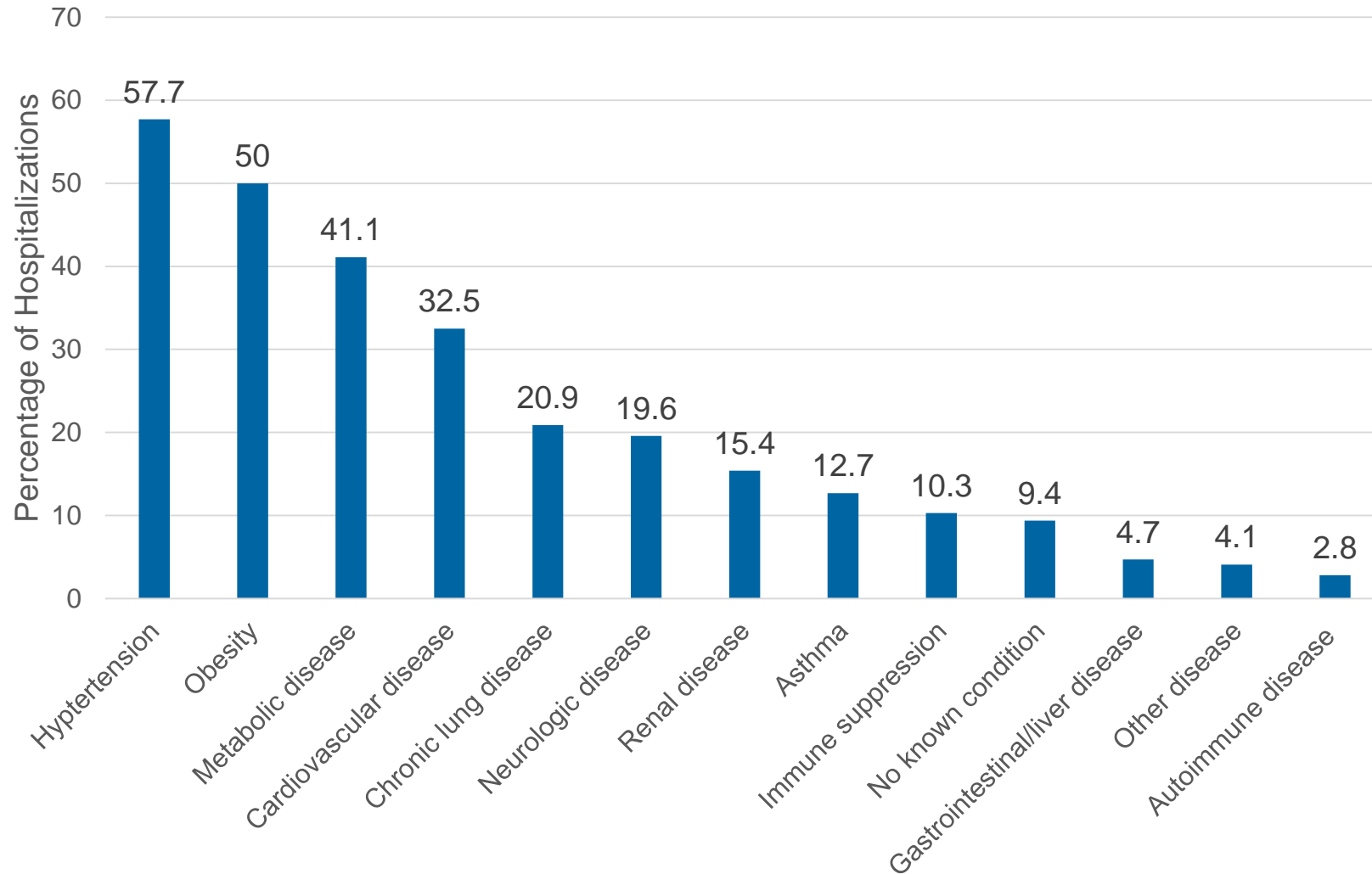
COVID-19 Gender Mortality Ratios by Age Group

COVID-19 Gender Mortality Ratios, Age 60+
(Male Mortality Rate divided by Female Mortality Rate)



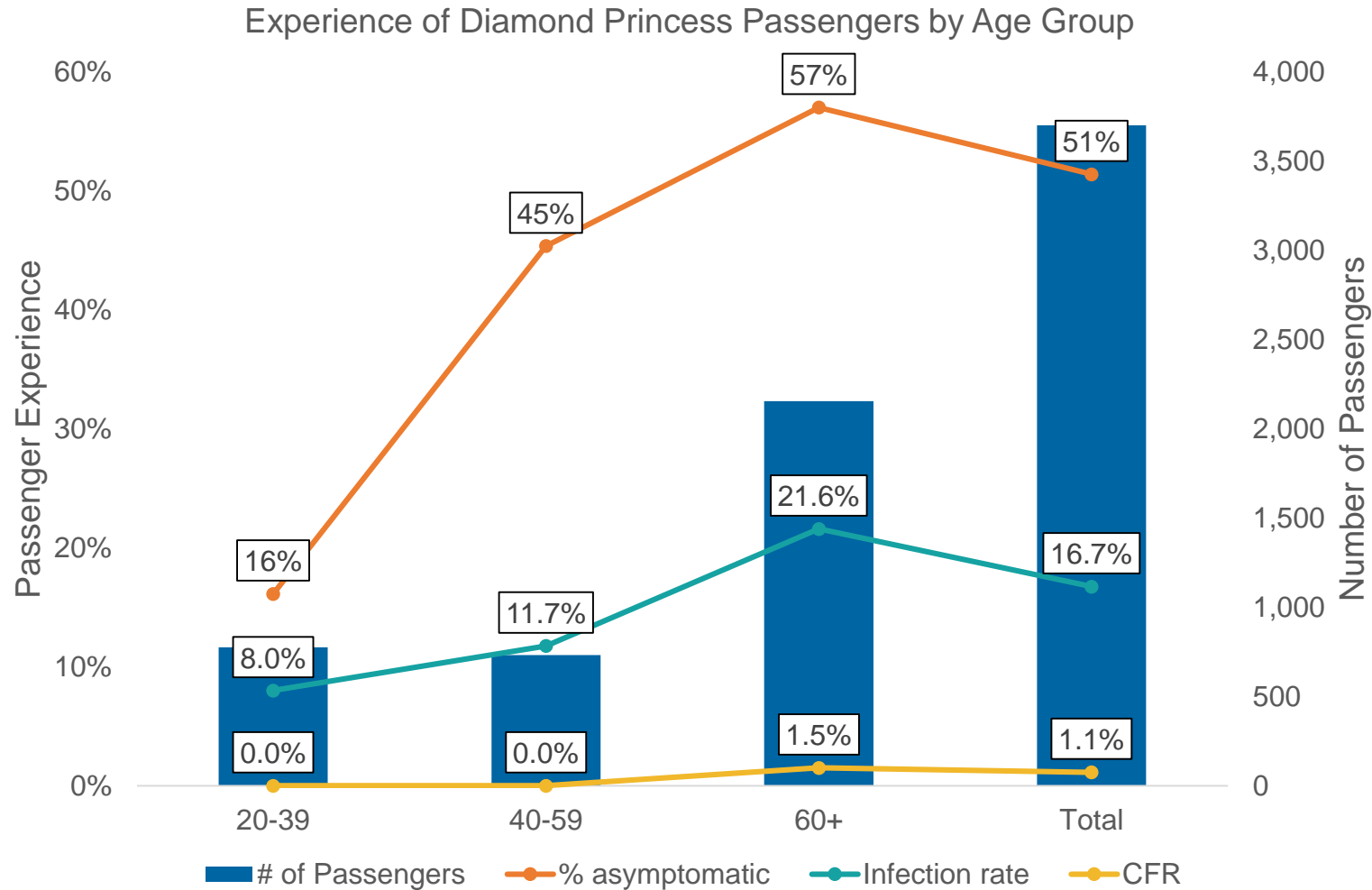
- Male COVID-19 mortality experience is typically about twice the COVID-19 mortality experience of females
- The differences are more pronounced at ages 60-69 than at older ages

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 |

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