March 31, 2020 COVID-19 Update

Compiled by Katherine Salciccioli MD

Contents include:

Brief summary:

- COVID-19 and Congenital Heart Disease from the Congenital Heart Public Health Consortium

Articles reviewed:

- Estimates of the severity of coronavirus disease 2019: a model-based analysis (Lancet)
- The Effects of Social Support on Sleep Quality of Medical Staff Treating Patients with Coronavirus Disease 2019 in January and February 2020 in China (Medical Science Monitor)

Information on COVID-19 and Congenital Heart Disease from the Congenital Heart Public Health Consortium

- No data exists regarding the effects of COVID-19 on either children or adults with CHD
  - Do not anticipate that CHD increases risk of becoming infected
  - Anticipate that certain types of CHD may increase risk of severe disease once expected
- Anticipate that older adults, those with more severe CHD would have higher risk of severe illness with COVID-19
- Other comorbidities like heart failure, coronary disease, diabetes increase risk
- Call primary care for mild flu-like symptoms, go to ER for difficulty breathing or cyanosis (beyond any normally at baseline)

Article Title:	Estimates of the severity of coronavirus disease 2019: a model-based analysis
Authors:	Verity R, Okell LC, Dorigatti I et al
Full Citation:	Verity R, Okell LC, Dorigatti I et al (2020). Estimates of the severity of coronavirus disease 2019: a model-based analysis. *Lancet*. Available online 30 March 2020 at www.thelancet.com/infection. https://doi.org/10.1016/S1473-3099(20)30243-7

Study Question:

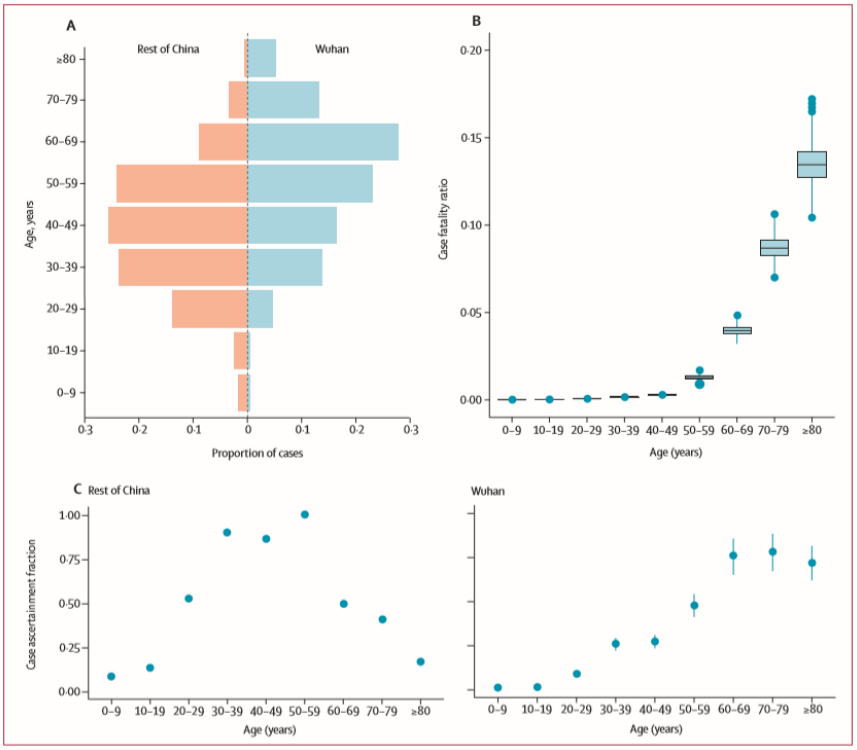
When accounting for censoring and ascertainment biases, what are the best estimates for case fatality rate of COVID-19 in China and around the world? For infection hospitalization rate? For infection fatality rate?

Methods:

Individual-case data for patients diagnosed with and who died from COVID-19 in Hubei, mainland China, and internationally through 2/25/2020 was collected. Attack rate by age was adjusted for demographic and location-based under-ascertainment. Data on age-stratified severity on subset of Chinese cases were used to estimate total infected population in order to estimate the total number of infected patients to use as a denominator for those who required hospitalization and those who died.

Results:

- Over 70,000 lab-confirmed COVID cases from China, over 2,000 intl cases were included for comparison, analysis
- The age distribution of recorded COVID+ cases was significantly different in Wuhan compared to the rest of China
- Overall, adjusted case fatality ratio (CFR - deaths per diagnosed case) was 1.38% (1.23-1.53%) and infection fatality ratio (IFR - deaths per total number of infections including asymptomatic cases) 0.657% (0.389–1.33) with significant age variation
- Young children have extremely low case and infection fatality ratios while those over 60 are estimated to be 6.38% (CFR) and 3.82% (IFR), respectively with even higher estimates for much older patients
- Similarly, the risk of requiring hospitalization if infected increases significantly with age, from effectively zero to infants and young children up to nearly 20% for those over 80y



	Severe cases	All cases	Proportion of infected individuals hospitalised
0–9 years	0	13	0·00% (0·00–0·00)
10–19 years	1	50	0·0408% (0·0243–0·0832)
20–29 years	49	437	1·04% (0·622–2·13)
30–39 years	124	733	3·43% (2·04–7·00)
40–49 years	154	743	4·25% (2·53–8·68)
50–59 years	222	790	8·16% (4·86–16·7)
60–69 years	201	560	11·8% (7·01–24·0)
70–79 years	133	263	16·6% (9·87–33·8)
≥80 years	51	76	18·4% (11·0–37·6)

Proportions of infected individuals hospitalised are presented as posterior mode (95% credible interval) and are adjusted for under-ascertainment and corrected for demography. Estimates are shown to three signficant figures. We assumed, based on severity classification from a UK context, that cases defined as severe would be hospitalised.

***Table 3*: Estimates of the proportion of all infections that would lead to hospitalisation, obtained from a subset of cases reported in mainland China[22]**

Conclusions:

- The estimated case fatality rate of 1.38% is much lower than MERS or SARS but much higher than previous pandemic influenza (1918 or H1N1)
- Differences in testing within Wuhan compared to elsewhere account for how much variability in CFR/IFR are reported, but the modeling adjustments aimed to account for these differences
- Risk of severe illness (as defined by need for hospitalization) and mortality increase significantly with age
- It remains unclear if there is a difference in susceptibility to infection over time, which would affect these estimates which are based on uniform susceptibility to infection
- These estimates including age distributions may be helpful in allowing countries and regions to predict health system needs as the pandemic continues to spread around the world

Perspective:

The authors take great care to build a model that accounts for and explains the majority of variability in the different CFR/IFR between Wuhan, China, and elsewhere. One key factor is accounting for a population's overall age-distribution as well as tested for and reported cases. For example, if there are many more middle-aged people in a given location, even at lower rates of severe infection there may be similar crude numbers of severe illness (though with different age-stratified % affected). Differences in population age-distribution may help explain why more younger adults appear to be affected in the US compared to reports in Wuhan (see above graph comparing Wuhan age distribution compared to the rest of China) and Italy. Widespread testing to truly know the number of infected people, including those without symptoms, will allow for this model's estimates to be better used to predict the anticipated health care system needs moving forward here in the US and abroad.

Summary written by: Katherine B. Salciccioli

Topic Areas: COVID-19, modeling, fatality rate

Article Title:	The Effects of Social Support on Sleep Quality of Medical Staff Treating Patients with Coronavirus Disease 2019 (COVID-19) in January and February 2020 in China
Authors:	Xiao H, Zhang Y, Kong D, Li S, Yang N.
Full Citation:	Xiao H, Zhang Y, Kong D, Li S, Yang N, (2020). The Effects of Social Support on Sleep Quality of Medical Staff Treating Patients with Coronavirus Disease 2019 (COVID-19) in January and February 2020 in China. *Med Sci Monit*. 5 Mar 2020

Study Question:

What were the effects of social support on sleep quality and function of medical staff who treated patients with COVID-19 in January and February 2020 in Wuhan, China?

Methods:

One-month cross sectional observational study of medical staff who treated patients with COVID-19. Levels of anxiety, self-efficacy, stress, sleep quality, and social support were measured using quantitative scales.

Results:

- 180 health care providers caring for COVID-19 patients participated
- Staff anxiety significantly affected their levels of stress and significantly reduced their self-efficacy and sleep quality
- Social support given to the medical staff reduced their anxiety and stress levels, and positively affected their self-efficacy, but did not directly affect their sleep quality
- Social support affected sleep quality by reducing anxiety, stress and by increasing self-efficacy

Conclusions:

- Social support of the medical staff did not directly affect their sleep quality, but had an indirect benefit
- Increased stress can increase the levels of vigilance regarding the environment, which will reduce sleep quality
- Self-efficacy is a positive mental stat that may enhance sleep quality and counteract constant vigilance
- Structural equation modeling showed that medical staff had increased levels of anxiety, stress, and self-efficacy that were dependent on sleep quality and social support.

Perspective:

Social support contributes to improving self-efficacy (being able to complete a task efficiently), leading to more understanding, respect, encouragement, courage, and a sense of professional achievement. Self-efficacy results in increased confidence to do the job well, and when combined with social support, members of the medical profession suffered less from stress. Providing medical staff with the necessary tools to confidently complete a required task, and providing social support may contribute to less stress, anxiety, and interrupted sleep patterns.

This social support is critical during the pandemic, as other data out of China showed that significant morbidity and mortality amount healthcare workers was due to stress and overwork, not simply due to COVID-19 infection. Adequate sleep is key in maintaining health, and further work is needed to identify specific types of support structures which can help facilitate it.

Summary written by: Jaclyn Foster, RN, BSN

Topic Areas: COVID-19, stress, social support