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PROPORTION OF ASYMPTOMATIC COVID-19 CASES

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Overall there is little evidence on the asymptomatic proportion of COVID-19 cases in the literature.

Mizumoto et al's (2020) paper reports both "true asymptomatic infections" and presymptomatic cases (defined as "cases who had not yet developed symptoms at the time of data collection but became symptomatic later") on the Diamond Princess cruise ship.

Nishiura et al (2020) estimate the asymptomatic ratio of COVID-19 infections among Japanese evacuees from Wuhan at 30.8% (95% confidence interval (CI): 7.7%, 53.8%). They define the asymptomatic ratio as "the percentage of carriers with no symptoms." However, it is unclear whether this sample includes those who had no symptoms at the time of data collection but developed symptoms after.

Other articles summarised below note the need for evidence on the prevalence and proportion of asymptomatic COVID-19 cases.

Summary of articles

Source: Mizumoto, K., et al. (2020). "Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020." Eurosurveillance **25**(10): 2000180.

Study summary: Conducted statistical modelling analyses on publicly available data to find the asymptomatic proportion, along with the time of infection among the COVID-19 cases on board the Diamond Princess cruise ship. Of the 634 confirmed cases, a total of 306 and 328 were reported to be symptomatic and asymptomatic, respectively. The proportion of asymptomatic individuals appears to be 16.1% (35/218) before 13 February, 25.6% (73/285) on 15 February, 31.2% (111/355) on 16 February, 39.9% (181/454) on 17 February, 45.4% (246/542) on 18 February, 50.6% (314/621) on 19 February and 50.5% (320/634) on 20 February (see Table).

The reported asymptomatic cases **consists of both true asymptomatic infections and cases who had not yet developed symptoms at the time of data collection but became symptomatic later**

Findings:

- The posterior median estimate of the true proportion of asymptomatic individuals among the reported asymptomatic cases is 0.35 (95% credible interval (CrI): 0.30– 0.39), with the estimated total number of the true asymptomatic cases at 113.3 (95%CrI: 98.2–128.3) and the estimated asymptomatic proportion (among all infected cases) at 17.9% (95%CrI: 15.5–20.2%).
- Findings overlap with a recently derived estimate of 33.3% (95% confidence interval: 8.3–58.3%) from data of Japanese citizens evacuated from Wuhan (Nishiura et al 2020, Estimation of the asymptomatic ratio of novel coronavirus infections, below)
- Authors note the need for further studies on the prevalence of asymptomatic COVID-19

Source: Nishiura, H., et al. (2020). "Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19)." International Journal of Infectious Diseases.

Study summary: Estimates the asymptomatic ratio of COVID-19 infections by using information on Japanese nationals that were evacuated from Wuhan, China on chartered flights.

Findings:

- Using a binomial distribution, the asymptomatic ratio is estimated at 30.8% (95% confidence interval (CI): 7.7%, 53.8%) among evacuees.
- Despite a small sample size, this estimation indicates that perhaps less than a half of COVID-19-infected individuals are asymptomatic.
- This ratio is slightly smaller than that of influenza, which was estimated at 56–80% (Hsieh et al., 2014) using similar definitions for symptomatic individuals.
- Authors note the need for further studies on the prevalence of asymptomatic COVID-19

Source: Nishiura, H., et al. (2020). "Serial interval of novel coronavirus (COVID-19) infections." International Journal of Infectious Diseases **93**: 284-286.

Study summary: estimates the serial interval of novel coronavirus (COVID-19) from information on 28 infector-infectee pairs.

Findings:

- The authors estimated the median serial interval of COVID-19 at 4.0 days, which is close to or shorter than the disease's median incubation period. This indicates that rapid cycles of transmission and substantial pre-symptomatic transmissions are occurring.
- When the serial interval is shorter than the incubation period, pre-symptomatic transmission is likely to have taken place and may even occur more frequently than symptomatic transmission.
- Many transmissions cannot be prevented solely through isolation of symptomatic cases, as by the time contacts are traced they may have already become infectious themselves and generated secondary cases

Source: Wu, J. T., et al. (2020). "Estimating clinical severity of COVID-19 from the transmission dynamics in Wuhan, China." Nature Medicine.

- Despite a lower symptomatic case fatality risk (sCFR), COVID-19 is likely to infect many more (given emerging evidence of pre-symptomatic transmission and growing evidence of extensive community spread in numerous countries, thus ultimately causing many more deaths than SARS and MERS.
- Study finds that risk of symptomatic infection also increases with age, although this may be in part due to preferential ascertainment of older and thus more severe cases.
- One largely unknown factor at present is the number of asymptomatic, undiagnosed infections. These do not enter study estimates of sCFR, but if such asymptomatic or clinically very mild cases existed and were not detected, the infection fatality risk would be lower than sCFR. Further clarifying this requires new data sources that are not yet available, specifically including age- stratified serologic studies.

Source: Rothe, C., et al. (2020). "Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany." New England Journal of Medicine **382**(10): 970-971.

Article summary: Provides a timeline of Exposure to Index Patient with Asymptomatic 2019-CoV Infection in Germany.

Findings/conclusions: The fact that asymptomatic persons are potential sources of 2019-nCoV infection may warrant a reassessment of transmission dynamics of the current outbreak. In this

context, the detection of 2019-nCoV and a high sputum viral load in a convalescent patient (Patient 1) arouse concern about prolonged shedding of 2019-nCoV after recovery.