SARS-CoV-2 Update – 5th March 2020

Date: Thursday the 5th March 2020
Sources: Several, see below.

ECDC risk assessment (1) (2nd March)
“The risk associated with COVID-19 infection for people in the EU/EEA and UK is currently considered to be moderate to high, based on the probability of transmission and the impact of the disease”.

WHO daily situation report (2)
The WHO is updating the number of cases worldwide and reporting for each country if there is local transmission. In the European region, Italy report 2502 cases with 80 deaths, France 212 cases with 4 deaths, Germany 196 cases with 0 deaths, Spain 151 cases with 0 deaths and the UK 51 cases with 0 deaths, with local transmission in all the listed countries.

ProMED update (3) (4th March)
The latest global update from yesterday provide a breakdown of the Italian numbers per region. Several countries are reporting cases, probably originating from Egypt. Other affected countries are Lebanon, Iraq, Morocco, Nigeria and Senegal. Local cases are increasingly being reported from the northern parts of the United States, in particular Washington state, California, Chicago and New York.

Phylogenetic analysis (4,5)
A study reported that “Population genetic analyses of 103 SARS-CoV-2 genomes indicated that these viruses evolved into two major types (designated L and S), that are well defined by two different SNPs that show nearly complete linkage across the viral strains sequenced to date. Although the L type (≈70%) is more prevalent than the S type (≈30%), the S type was found to be the ancestral version” (4). However, another report based on 129 genomes did not confirm the finding (5), and reported that “the genome sequence data shows no evidence that any non-human animal reservoir has been involved in generating new cases after the initial zoonotic event”.

Infections in children (6)
The study reports “a sharply increasing proportion of infected children (from 2% before January 24 to 13% for January 25–February 5; p<0.001), implying that increased exposure for children and intra-family transmission might contribute substantially to the epidemic”.

Serological cross reactivity between SARS-CoV and SARS-CoV-2 (7)
The study “found that antibodies against the SARS-CoV spike and nucleocapsid proteins recognize SARS-CoV-2. Similarly, the SARS-CoV spike antibody also recognized SARS-CoV-2 spike protein, indicating cross reactivity”.

Cross reactivity between SARS-CoV-2 and Coronavirus OC43 (8)
A five-year survey (9) of upper respiratory disease in Guangzhou, to the south of Hubei province in Guangdong province, focused on the principal upper respiratory coronavirus, OC43. Not only was OC43 circulating in four of the five years, but also throughout the year.
Other coronaviruses HXU1, 229E and NL63 were less prominent, but there was an outbreak of upper respiratory coronavirus infection every year, likely continuing to this day. Furthermore, the age distribution of those viruses was markedly skewed to the very young paediatric age group. Thus, infants in China are exposed to OC43 and other upper respiratory coronaviruses every year of their early life. It is likely that their surface immunity to these viral agents is regularly boosted.

**Serological test for anti-SARS-CoV-2 antibodies (10)**
Serosurveys are an important tool to estimate the population attack rates.

**Sources**

3. COVID-19 update (27): global, Egypt, USA, Taiwan, more countries.  
4. On the origin and continuing evolution of SARS-CoV-2  
   Xiaolu Tang et al. National Science Rev 3rd March 2020  
5. Andrew Rambaut. Phylodynamic Analysis | 129 genomes | 24 Feb 2020  
   https://wwwnc.cdc.gov/eid/article/26/6/20-0239_article
   Jennifer Harcourt et al.  
   https://www.biorxiv.org/content/10.1101/2020.03.02.972935v1.
EITaF comments
The SARS-CoV-2 continue to spread in Europe, especially in northern Italy. Yesterday, a total of 3,086 cases were reported, an increase of 500 from the previous day. As of the 3rd of March, Lombardia, with Milan as its main city, reported 1520 cases. Lombardia has a population of 10 million which is a population attack rate of 1:6579 or 0.015%. This is a low population attack rate and probably indicates that the outbreak is still evolving.

The genetic study indication that the SARS-CoV-2 clusters in two groups needs to be confirmed.

It is clear from the increasing number of cases infected by local transmission in many European countries, that Europe is approaching an epidemic. It is not possible to estimate the magnitude. In Hubei province, China, the epicentre with a population of 59,170,000 people reported 67,332 cases and 2,871 deaths. This is one case per 879 population or a population attack rate of 0.11%. The death rate reported is 4.8 deaths per 100,000 population.

These figures are probably an underestimation and it should be noted that the pandemic influenza in 2009 was estimated to have a population attack rate in Europe around 5%, so the attack rate reported from China for an infection with an $R_0$ around 2.5 and no immunity in the population is surprisingly low.

The study of CoV-OC43 in Chinese children may indicate that children exposed to CoV-OC43 may have a certain immune-protection against SARS-CoV-2, which will explain the low incidence reported so far in children in China.

Eskild Petersen, Antonino di Caro, Nicola Petrosillo
ESCMID Emerging Infections Task Force

In the literature:

Clinical Characteristics of Coronavirus Disease 2019 in China. Wei-jie Guan et al.
DOI: 10.1056/NEJMoa2002032


Positive RT-PCR Test Results in Patients Recovered From COVID-19. February 27, 2020
Lan Lan et al. JAMA. Published online February 27, 2020. doi:10.1001/jama.2020.2783
The RT-PCR tests were repeated 5 to 13 days later and all were positive. All patients had 3 repeat RT-PCR tests performed over the next 4 to 5 days and all were positive. An additional RT-PCR test was performed using a kit from a different manufacturer and the results were also positive for all patients.

Secondary attack rate and superspreading events for SARS-CoV-2
Yang Liu, Rosalind M Eggo, Adam J Kucharski
The Lancet, February 27, 2020DOI:https://doi.org/10.1016/S0140-6736(20)30462-1
https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2930462-1

High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa
https://doi.org/10.1038/s41368-020-0074-x