SPI-M-O: Consensus Statement on 2019 Novel Coronavirus (COVID-19)

Date: 2nd March 2020.

Incidence

1. It is highly likely that there is sustained transmission of COVID-19 in the UK at present. It is almost certain that there will be sustained transmission in the UK in the coming weeks.

Reproduction number and doubling time

2. The basic reproduction number (R_0) is the average number of secondary infections produced by a single infected individual in an otherwise entirely susceptible population. This is a measure of the epidemic potential of an infection. The critical issue is whether R_0 is greater than one. The doubling time is the time it takes for the number of new infections to double in size.

3. Both the reproduction number and doubling time are dependent on the characteristics of the population so may be different in the UK, and may be different in different groupings within the UK.

4. The reproduction number seen in the city of Wuhan in the early stages of the outbreak is estimated to have been in the region of 2 – 3.

5. If a reproduction number in the region of 2 – 3 occurred in the UK it would correspond to around 80% of the population becoming infected. Not all of them would be symptomatic.

6. Our best estimate for the doubling time seen in Wuhan is 4 – 6 days.

Transmission and control

7. Population-wide reduction in contact rates will impact transmission. The effectiveness of any non-pharmaceutical interventions will depend on adherence rates, the extent of reduction in contact, and the role of asymptomatic cases and children in transmission.

8. Measures which reduced contact rates would be expected to flatten the peak of a UK epidemic and extend it to some extent. They are unlikely to greatly reduce the overall clinical attack rate.

9. More stringent measures, or a combination of measures would be expected to have a greater impact. Were they to have such a large impact on transmission that the reproduction number could be reduced to somewhere in the region of 1, a large increase in cases would be expected once they were lifted.

10. Analysis of the epidemic pattern in Wuhan is inconsistent with no transmission from/to children, i.e. children are likely an important group in the epidemic even if they directly experience little disease. Consequently, school closures are likely to impact transmission, although significantly less than with flu. If it were similar to that of influenza, for R_0 around range 1.9 – 2.3 and school closures of 6 – 12 weeks, different models estimate that peak incidence could be reduced by 7.5% – 25%. Mass school closures are unlikely to reduce the final size of the epidemic and are unlikely to delay the peak by more than 3 weeks. Up to a certain point, longer school closures are likely to be more effective then shorter ones and are less sensitive to timing relative to the epidemic peak. Further details of SPI-M-O's view on school closures are given in "200219 SPI-M-O consensus view on school closures.docx".

Epidemic timescales

11. The overall duration of epidemics within countries are likely to be longer than for a typical influenza pandemic given the current estimates of a higher reproduction number and longer serial interval.

12. Modelling predicts that it is highly likely that the epidemic in Wuhan has peaked.

13. If the epidemiological parameters in the UK are comparable to China, then a peak in case numbers might be expected approximately 3 – 5 months after the establishment of widespread sustained transmission. All else being equal, the higher the reproduction number, the shorter the time until epidemic peak.

14. Peak timings in different parts of the UK would be expected to vary by around 4 – 6 weeks in an unmitigated reasonable worst case scenario. They would vary by a greater amount if non-pharmaceutical countermeasures were undertaken.

Fatality Ratio

15. The Infection Fatality Ratio (IFR) is the proportion of people infected by COVID-19 who die.
    The Case Fatality Ratio (CFR) is the proportion of people with clinical symptoms who die.
    The Hospitalised Case Fatality Ratio (HFR) is the proportion of people hospitalised due to severe symptoms who die.

16. Our best estimate of the infection fatality rate is in the range of 0.5% to 1%, ranging from 0.01% in the under 20s to 8% in the over 80s.

17. Precise estimates of the CFR are much harder, as the proportion of cases who are asymptomatic is difficult to estimate. Current estimates of the average CFR seen to date are in the range 0.25% – 4%.

18. Current estimates are that mortality rates are 12% for hospitalised people, from 4% in the under 50s to 20% of over 80s, with 50% mortality in those hospitalised who require invasive ventilation.

Hospitalisation rate

19. Our best estimate of the hospitalisation rate of those infected is from 2% in the under 50s to 44% of over 80s. This is equivalent to 8% of those infected overall.

Serial interval

20. The serial interval is the average time between symptom onset in primary and secondary infections. Current estimates of the average serial interval vary from 3 – 8 days.

Incubation period

21. The incubation period is the delay between an individual becoming infected and developing symptoms. Current estimates give an average incubation period of 5 days (range 1 – 11 days). This is approximately twice as long as for influenza. The maximum incubation period is used to define the period required for isolation, currently believed to be 14 days.

22. The long incubation period means isolation of contacts of cases would need to be lengthy and that entry screening is likely to be ineffective.

Seasonality

23. It is currently unclear whether any seasonality in transmission can be expected with COVID-19. If there is a seasonal element in COVID-19, it may be lower than other respiratory infections due to the longer serial interval. The seasonality in extant coronaviruses may be partly driven by mixing patterns (i.e. school holidays) as well as environmental factors.

Operational considerations

24. Real-time forecasting models rely on deriving information on the epidemic from surveillance. If transmission is established in the UK there will necessarily be a delay before sufficiently accurate forecasts in the UK are available.

25. Decisions being made on whether to modify or lift non-pharmaceutical interventions require accurate understanding of the state of the epidemic. Large-scale serological data would be ideal, especially combined with direct monitoring of contact behaviour.

26. Preliminary forecasts and accurate estimates of epidemiological parameters will likely be available in the order of weeks and not days following widespread outbreaks in the UK (or a similar country). While some estimates may be available before this time their accuracy will be much more limited.

27. The UK hospitalisation rate and CFR will be very important for operational planning and will be estimated over a similar timeframe. They may take longer depending on the availability of data.

Reasonable Worst Case

28. The most recent Reasonable Worst Case planning assumptions were adopted by SAGE, following SPI-M-O's recommendation on 3rd and are given in an accompanying document.