**Addendum to the sixth SAGE meeting on Covid-19, 11 February 2020**
**Held in 10 Victoria Street, London, SW1H 0NN**

This addendum clarifies the roles of the SAGE attendees listed in the minute. There are three categories of attendee. Scientific experts provide evidence and advice as part of the SAGE process. HMG attendees listen to this discussion, to help inform policy work, and are able to provide the scientific experts with context on the work of government where appropriate. The secretariat attends in an organisational capacity. The list of attendees is split into these groups below.

**<u>Attendees</u>**
***Scientific experts:*** *Patrick Vallance (GCSA), Chris Whitty (CMO), Sharon Peacock (PHE), James Rubin (King's College), Neil Ferguson (Imperial), John Edmunds (LSHTM), Graham Medley (LSHTM), Angela McLean (CSA MoD),  Charlotte Watts (CSA DfID), Phil Blythe (CSA DfT), John Aston (CSA HO), Maria Zambon (PHE), Wendy Barclay (Imperial), Alaster Smith (dCSA DfE).*

***Observers and Government Officials:*** *Kate Thomas (DHSC), Samantha Harris (GoS).*

***Secretariat:*** [redacted]

Names of junior officials and the secretariat are redacted.

Participants who were Observers and Government Officials were not consistently recorded therefore this may not be the complete list.

**Sixth SAGE meeting on Wuhan Coronavirus (Covid-19), 11 February 2020**
**Held in 10 Victoria Street**

**Summary**
1. SAGE agreed that HMG should continue to plan using influenza pandemic assumptions.
2. SAGE advised it is essential that the maximum amount of information is derived from confirmed cases in the UK.
3. Assuming the reproduction number and doubling time are similar in the UK to the early stages of the outbreak in Wuhan, an epidemic in the UK could be expected to peak around 2 to 3 months following the establishment of widespread transmission, but there is low confidence around this. It is predicted to have a lower peak but broader duration than a pan flu outbreak.

**Situation update**
4. SAGE was updated on rough case numbers and fatalities for China and other countries.
5. The UK has 8 confirmed cases, all of whom acquired the virus overseas.
6. Swabbing is taking place of individuals quarantined at Arrow Park and Milton Keynes.
7. It is not possible for the UK to accelerate diagnostic capability to include Covid-19 alongside regular flu testing in time for the onset of winter flu season 2020-21.
8. Validated serology for clinical use in the UK is around 4 to 6 weeks away. Singapore and Hong Kong are close to validated serological capability.

**ACTION: DCMO** and **PHE** to understand what swabbing and subsequent testing of returning travellers has been undertaken globally, and to review results, how often swabs need to be taken to be reliable, and which tests are being used.

**Understanding Covid-19**
*Key variables*
9. <u>Case fatality rate</u>: uncertain but planning on the assumption 2-3%.
10. <u>Reproduction number (R0)</u>: unchanged at 2-3 in Wuhan in the early stages of the epidemic.
11. <u>Doubling time</u>: unchanged at 4-5 days.
12. <u>Incubation period</u>: 4-5 days average, with range of 1-14 days.
13. <u>Serial interval</u> (i.e. the time between successive cases in a chain of transmission): 6 days, but uncertain.
14. <u>Duration of infectivity</u>: 14 days as upper limit (advice to self-isolate for 14 days still stands). Peak infectivity is probably around the start of symptom onset, average 2-6 days.
15. SAGE will not discuss these key variables again unless and until there is a material reason to do so (i.e. significant new data), following advice from SPI-M.

16. A lack of data from China continues to hamper understanding of Covid-19. Cases outside Wuhan are not well reported. It is possible China has changed its case definition.
17. Beyond China, surveillance is focused on travellers from Hubei, providing only a partial understanding of spread.
18. Data (including serological) from the cruise ship quarantined off Japan will be informative.
19. Virus shedding may reach significant levels just before onset of symptoms and continues for 1-2 days after (wide uncertainty).
20. Information about children remains limited. There is no clear modelling evidence that children are either protected or less susceptible, but clinical reports suggest that severity of disease may be less.
21. In China, unpublished data suggests 90% of cases are among those over 30, with incidence approximately independent of age above this.

**ACTION: Neil Ferguson** to share summary paper on vulnerable groups with SAGE secretariat.

22. Seasonality could be a factor in the spread of Covid-19 in the UK, but there is no current evidence for this. Seasonality of endemic UK coronaviruses is not well understood.
23. No new information available on virology: most data still quite speculative, but it doesn't appear that the virus is currently mutating.
24. Sequencing of UK cases is taking place.
25. SAGE advised it is essential that the maximum amount of clinical and biological information is derived from confirmed cases in the UK.
26. Confirmed cases in the UK need to be tested daily for stool, urine and respiratory secretions.

**ACTION: PHE** to ensure there are plans in place to collect the maximum amount of information from returning UK travellers who are testing positive for Covid-19, including daily swabbing and collection of blood samples. Data and samples need to be made available for analysis and use by research groups.

**ACTION: PHE** to work with **SPI-M** to develop criteria for when contact tracing is no longer worthwhile. This should include consideration of any limiting factors on testing and alternative methods of identifying epidemic evolution and characteristics.

### Modelling the outbreak in China and internationally
27. There is an apparent slowing of the epidemic in Wuhan, where case numbers seem to have flattened (uncertainty remains).
28. UK modellers are in agreement that the epidemic is close to peaking in Wuhan – potentially in the next 1 to 3 weeks, around 2.5 months after it began in early December 2020.
29. The peak in the rest of China could be around 1 to 2 months behind Wuhan, but uncertain.
30. Outside China, case numbers correlate with air travel volumes from China, suggesting limited on-going transmission has yet to be detected outside China.

**ACTION: DfID** to share flight data with **SPI-M** secretariat ▇▇▇▇▇▇▇▇▇▇▇▇▇▇, to facilitate modelling of global spread of WN-CoV.

**ACTION: FCO** and **DfID** to work with **SPI-M** secretariat to finalise the detailed break-down of data required from Chinese and other national authorities, and the routes through which this data should be shared. This request to be issued to all UK Heads of Mission in affected countries to pass to their host governments, with priority given to data from Japanese and Singaporean governments.

**ACTION: SPI-M** to review emerging papers on global spread, and provide conclusions on plausible scenarios at a future SAGE meeting (next week, timing TBC). These will be used to inform HMG international planning.

### Modelling for the UK
31. Assuming the reproduction number and doubling time are similar in the UK to the early stages of the outbreak in Wuhan, an epidemic in the UK could be expected to peak around 2 to 3 months following the establishment of widespread transmission, but there is low confidence around this. It would be expected to have a lower peak but broader duration than pan flu.
32. It is expected that the all parts of the UK would be impacted at about the same time, with only small delays between regions.

33. It is important to understand hospital bed requirements, particularly requirements for respiratory support.

**ACTION: SPI-M** to report how their estimates of the time from widespread transmission to peak incidence would vary with different reproduction numbers and doubling times.

**ACTION: SPI-M** to work with NHSE and others on modelling the impact of the pandemic influenza reasonable worst case on the NHS, including the number of people requiring respiratory support.

### Review of reasonable worst-case scenario and planning
34. SAGE agreed that HMG should continue to plan using influenza pandemic assumptions.
35. Epidemiological terms need to be made clearer in the planning documents to avoid ambiguity.
36. SAGE advised that HMG should plan for impacts on the NHS and also on the wider UK workforce.

### For discussion at future meetings
37. SAGE: Measures to limit spread (including review of school options); public behaviour; public gatherings; advice on absenteeism.
38. NERVTAG: advice to frontline workers (only revising this advice if substantive changes occur); cleaning of surfaces.

**SAGE** and **NERVTAG secretariats** to agree clear division of responsibilities. **SAGE secretariat** to ensure that all approved science advice is readily accessible across HMG.

### List of actions
**DCMO and PHE** to understand what swabbing and subsequent testing of returning travellers has been undertaken globally and to review how often swabs need to be taken to be reliable and which tests are being used.

**Neil Ferguson** to share summary paper on vulnerable groups with **SAGE secretariat**.

**PHE** to ensure there are plans in place to collect the maximum amount of information from returning UK travellers who are testing positive for Covid-19, including daily swabbing and collection of blood samples. Data and samples need to be made available for analysis and use by research groups.

**PHE** to work with **SPI-M** to develop criteria for when contact tracing is no longer worthwhile. This should include consideration of any limiting factors on testing and alternative methods of identifying epidemic evolution and characteristics.

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**SPI-M** to report how their estimates of the time from widespread transmission to peak incidence would vary with different reproduction numbers and doubling times.

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### Attendees

*SAGE participants*: Patrick Vallance, Chris Whitty, Sharon Peacock, James Rubin, Neil Ferguson, John Edmunds, Graham Medley, Angela McLean, ███████████ Charlotte Watts, Phil Blythe, John Aston, Kate Thomas
*By phone:* Maria Zambon, Wendy Barclay, Alaster Smith

*Secretariat:* ███████████████████████████████████ Samantha Harris