Current understanding of COVID-19 compared with NSRA Pandemic Influenza planning assumptions
SAGE secretariat

1st Order Assumptions	Pan Flu reasonable worst case, including confidence intervals where possible. Source: 2019 NSRA, which uses 2016 population estimate.	COVID-19 key conclusions of SAGE to date, based on a 2016 UK population Source: 2019 NSRA, which uses 2016 population estimate.
Basic Reproductive Rate (R_0)	No number included in planning assumptions	(Number of secondary cases generated on average by one primary case. Suppression of an outbreak requires R to be sustained below 1) Estimated 2-3 in Wuhan. Unknown in other Chinese regions and internationally
Doubling Time	No number included in planning assumptions	(Time required for the number of cases to double) 4-5 days in China
Incubation period	Short incubation period – 1-3 days	(Time between exposure to infection and symptom onset) Range remains 1 to 14 days, with average of 4-5 days
Duration of Illness	Assumes normal flu profile – most people back to normal activities in 7-10days	From symptom onset to hospitalisation: average of 7 days. From onset of illness to discharge from hospital: average of 23 days but may include avoidable delay in discharge. (From onset of illness to death). Average of 22 days for severe cases, but large variation around this. Longest time so far appears to be 41 days.
Duration of infectivity	Adults are infectious for up to five days from the onset of symptoms. Longer periods have been found, particularly in those who are immunosuppressed. Children may be infectious for up to seven days. Some people can be infected, develop immunity, and have minimal or no symptoms but may still be able to pass on the virus.	Duration of infectivity likely to vary depending on severity of individual cases. 14 days as upper limit. Peak infectivity is probably around the start of symptom onset, average 2-6 days, then falling off rapidly.
Transmission	Sustained human-to-human transmission. Around a third of infected people are asymptomatic.	Current understanding is that the transmission route is respiratory and via contact. This means that viruses are transmitted via touching an infected person and spray of droplets such as coughing and sneezing. Human-to-human transmission outside China has occurred but there is as yet no definitive evidence of a sustained outbreak/epidemic elsewhere. Asymptomatic transmission cannot be ruled out and transmission from mildly symptomatic individuals is likely.
Case Fatality Rate (CFR) (symptomatic cases)	2.5%	(The proportion of deaths within a designated population due to an epidemiological outbreak). Uncertain but planning on the assumption 2-3%

Infection Fatality Rate (both symptomatic and asymptomatic cases)	1.6%	1% (variable by age).

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Origin	N/A	Current evidence suggests single point zoonotic (i.e. animal to human) outbreak, now sustained entirely by human-to-human transmission. No evidence of ongoing zoonotic transmission.
Duration of outbreak and waves	The pandemic will come in multiple waves (upto3), each approximately 15weekslongwiththepeak at week6and 7 of each wave.	The most likely time to peak for a UK epidemic is 2-3 months after sustained human-to-human transmission within the UK. Total duration is unknown at this stage.
2nd Order Assumptions	**Pan Flu reasonable worst case, including confidence intervals where possible.** Source: 2019 NSRA, which uses 2016 population estimate.	**COVID-19 key conclusions of SAGE to date, based on a 2016 UK population** Source: 2019 NSRA, which uses 2016 population estimate.
Clinical attack rate (% population with symptomatic infections only)	50% (32,800,000) of population infected and experience symptoms during one or more waves (based on 1957 and 1968 flu pandemics).	50% (32,800,000) of population infected and experiencing symptoms during one or more waves.
Infection attack rate (% population with both symptomatic and asymptomatic infections)	85% (55,760,000) of population possibly infected, however not all of these will experience symptoms.	80% (52,480,000) of population possibly infected, however not all of these will experience symptoms. Population infected with symptoms is unclear and to be determined.
Workforce absences	17-20% nationally during peak weeks. This may vary for individual businesses. Anticipated that 50% of workforce may require time off at some stage over the entire period of a pandemic either due to illness or to care for others This would be higher were schools to be closed. An average absence duration of 7 (without complications) to 10 days (with complications).	To be derived separately by DHSC based on planning profile and absence duration. This will be at least 15% in the peak weeks. Average absence duration of 14 days based on current government advice. Most cases probably resolve 7 days after symptom start so may be lowered depending on government messaging.
Numbers requiring assessment at health services	9,840,000 wouldrequireassessment by health services. This is 30% of all those that are symptomatic.	Unknown, use pan flu planning assumptions.

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Hospital cases	1,312,000 would require hospital care, i.e. average six-day lengthofstay.This is4% of allthose thataresymptomatic.	Current estimate 3,608,000 would require hospital care. This is 11% of all those that are symptomatic.

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Hospital critical care	328,000require thehighest levelof criticalcare(require intensivecarefor10days).This is1% ofallthosethat are symptomatic.	Current estimate 541,200 require ventilation. This is 1.65% of all those who are symptomatic. Variable by age, c.f. 16.5% "critical" care bed usage for viral pneumoniaover last 3 years.
Average length ofstay in hospital	6 days standard. 10 days ICU.	8days forpeoplenot requiring ventilation. 16 days forpeople requiringventilation (of which 10daysare underventilation). Basedonbedusageforviralpneumoniafromlast3years.
Excess deaths	820,000 (calculated using the CFR of symptomatic cases)	Unknown, use pan flu planning assumptions.
Clinical Countermeasures	• Antivirals (AV) • Antibiotics (AB) • Pandemic specific vaccine (PSV)	None
Vaccine Development	It is likely totake at least six months afteranovel virus has been identified and isolated for an effective pandemic influenza vaccine to become available from manufacturers.	None likely to be available in a UK epidemic