



Department
of Health &
Social Care

*From the Rt Hon Sajid Javid MP
Secretary of State for Health and Social Care*

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Rt Hon Greg Clark MP and Rt Hon Jeremy Hunt MP
Chairs, Science and Technology Committee and
Health and Social Care Committee
House of Commons
Westminster
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28 September 2021

Dear Greg and Jeremy,

Secretary of State for Health and Social Care letter to the Science and Technology Committee and Health and Social Care Committee: Coronavirus: Lessons learnt

I am writing in response to your letter of 22 June, following the evidence session held by the Science and Technology Committee and the Health and Social Care Committee as part of the Inquiry on 'Coronavirus: Lessons Learnt' on Thursday 10 June and further to my subsequent letter on 26 July which sought an extension to enable a detailed response. I hope that you will accept my sincere apologies for the extended delay in sending you a full response as well as my thanks for your patience in this matter.

Please find enclosed responses to your requests for further information at Annex A prepared by Department officials, as well as a bundle of supporting documents (listed at Annex B), which I trust will be helpful to you and members of the Committees.

Please do not hesitate to ask if you have any further questions.

Yours ever,

RT HON SAJID JAVID MP

Q1281: The clinical prioritisation for testing before testing capacity was expanded in May 2020

The 'Priority of SARS-CoV-2 (COVID-19) testing during periods of significant demand' was developed by NHS England and NHS Improvement and Public Health England (PHE) with input from the Chief Medical Officer (CMO), and subsequently published on 11 March 2020 on GOV.UK.

It was updated on 26 March 2020 to advise that, where capacity allowed, testing should be prioritised for: (a) those who were severely immunocompromised and who were being stepped-down to a setting where isolation was not possible; (b) patients being discharged to a residential or care facility; and, (c) patients who required multiple admissions and attendances (such as those with cancer). Copies of both documents are provided. (**Attachments 1 and 2** in the bundle of documents provided)

Q1284/Q1287/Q1289/Q1398: Internal advice and communications between the Department of Health and Social Care, Public Health England and your ministerial team on hospital discharge and care home testing

The previous Secretary of State agreed to provide you with the clinical advice related to testing and discharge to care homes and testing in the period January to April 2020. However, this touches upon matters which may be relevant to on-going litigation. Additional time is required to consider the interaction between our obligations to Parliament and to the court, in particular to avoid any prejudice to the court proceedings. Officials are working to prepare relevant information to share with you in confidence and an update will be provided shortly when this information is available to share.

Q1302: A copy of the note of your meeting with the WHO at the end of January regarding asymptomatic transmission

Please find enclosed a copy of the note of the phone call between the previous Secretary of State, the Rt. Hon. Matt Hancock MP with Dr Tedros Adhanom Ghebreyesus, Director General of the World Health Organization on 29 January 2020. Professor Chris Whitty, the Chief Medical Officer, and Dr Jonathan Van Tam, Deputy Chief Medical Officer, also joined the call. The names of departmental officials from the private office have been redacted. (**Attachment 3**)

Q1308: Clinical and scientific advice relating to asymptomatic transmission

There is a huge body of evidence on this complex and technical subject – this is a summary of some of the key elements.

It is important to note the difference between asymptomatic cases (individuals with COVID-19 who display no symptoms) and asymptomatic transmission (the ability of those with

COVID-19 and no symptoms to transmit virus). From the start of the pandemic, scientists have grappled with the evidence on the important question of the extent to which individuals who have not exhibited symptoms posed a risk to others. Evidence has developed over time on the scale of the risks posed by people who never exhibit symptoms (“asymptomatic”) and by people who have not yet exhibited symptoms but later do so (“pre-symptomatic”).

Initially, the scientific view was based on known understanding of similar viruses. For decades, the only coronaviruses causing serious disease have been SARS and MERS. These viruses transmit when an infected person is symptomatic. Applying this knowledge, scientists took the view that whilst there was a possibility of asymptomatic infection, individuals were unlikely to be infectious or transmit to others until symptom onset. Over the course of April 2020, evidence evolved showing that the virus was being transmitted both by people who never developed symptoms at all and by individuals from around 48 hours before they became symptomatic (“virus shedding”).

It is also important to understand how difficult it was for scientists to record and study asymptomatic cases. This was for several reasons. First, this was partly because studying asymptomatic transmission requires significant testing capacity which was being increased rapidly worldwide in the early stages of the pandemic. Second, this is partly because the presence of virus does not necessarily infer transmissibility. Third, it is difficult to infer the initial source when studying outbreaks. In the UK, it was only when testing capacity allowed for community surveillance studies, genomic studies and surveillance in community settings from April/May onwards that it was possible to begin to trace the genesis and transmission of asymptomatic cases.

Due to the novel nature of the COVID-19 virus, there were no known data or evidence around the symptom and transmission profile of cases. Whilst evidence around the presence of asymptomatic or mildly symptomatic cases was present early in the pandemic, evidence around asymptomatic transmission did not emerge until mid-April 2020. As records show the rationale for asymptomatic testing evolved quickly, and the value of testing and identifying asymptomatic individuals, for example in relation to travel restrictions, formed part of scientific advice early on in the pandemic. A literature review of asymptomatic and pre-symptomatic spread was published by the Long-Term Care Policy Network in June 2020¹. This provides a review of the main studies and findings primarily from March and April 2020. It illustrates the scarcity of the evidence available at this time and shows that it was not until April 2020 that consensus started to emerge regarding the extent of asymptomatic transmission.

Key elements in the evolving picture are as follows:

- At the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) meeting on 21 January 2020 it was noted “that there are currently no data on infectiousness in relation to symptom onset and whether asymptomatic or subclinical patients are infectious”. There was further discussion on the issue at the meeting of NERVTAG on 28 January 2020; whilst the views of NERVTAG members were not unanimous, “the predominant view was that the force of infection from asymptomatic

¹ <https://ltccovid.org/wp-content/uploads/2020/06/Evidence-of-a-or-pre-symptomatic-spread-050620-1.pdf>

individuals, if present at all, is likely to be lower than symptomatic individuals”.
(Attachments 4 and 5)

- On asymptomatic testing, the Scientific Advisory Group for Emergencies (SAGE) reported on 28 January 2020 that, “Sensitivity of test unclear, particularly in early phases of illness or when symptoms are mild. Currently it would not be useful to test asymptomatic individuals, as a negative test result could not be interpreted with certainty².”
- Minutes from the SAGE meetings on 28 January 2020 and 4 February 2020 state that “early indications imply some is occurring” and that “asymptomatic transmission cannot be ruled out and transmission from mildly symptomatic individuals is likely.” In the annex to the SPI-M-O consensus view on 20 February 2020 it assumed “2/3 of all infections assumed to be symptomatic (at least mildly)”³ and the reasonable worst case scenario documents of 26 March 2020 assumed 33% of cases would be asymptomatic⁴.
- SAGE was, as minutes and public records show, consistently advising on the likelihood of asymptomatic transmission throughout February and March 2020. The issue was presented in a paper to SAGE on 4 February 2020, ‘Are asymptomatic people with 2019nCoV infectious?’⁵. The paper highlighted that “in many viral illnesses, virus shedding is greatest during the early symptomatic phase of illness around the onset of symptoms. However, some respiratory viruses are known to shed and transmit in the incubation period (prior to the onset of clinical symptoms) including influenza and rhinovirus”. The report went on to highlight that similarities with SARS-CoV and MERS-CoV and “given the genetic relatedness of the two viruses and the indication that 2019nCoV also uses the ACE 2 receptor (Zhou et al, 2020), there is a reasonable deduction that the two viruses will have a similar tissue tropism and pathway to disease progression, these data (Figure 2 & 3) indicate several strong similarities in the trajectory of the development of illness in 2019nCoV, compared to SARS, supporting a reasonable assumption that peak virus shedding will be later during the course of illness, and the early stages of illness may have lower viral load, similar to that observed in SARS”.
- On 24 February 2020, PHE discussed asymptomatic infection in the report ‘If there is evidence of a cluster of Covid-19 cases in the UK, what will the PHE proposal be?’⁶.

² <https://www.gov.uk/government/publications/sage-minutes-coronavirus-covid-19-response-28-january-2020>

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/891780/S0019_SAGE9_Effect_of_School_Closure_Annex_to_SPIMO_Consensus_view_on_the_impact_of_mass_school_closures.pdf

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904629/S0087_RWC_Planning_Scenario_-_26_March_2020_FINAL.pdf

⁵ <https://www.gov.uk/government/publications/phe-are-asymptomatic-people-with-2019ncov-infectious-28-january-2020>

⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/890005/s020-if-there-is-evidence-of-a-cluster-of-covid-19-cases-in-the-uk-what-will-PHE-proposal-be-240220-sage10.pdf

The report states: “Asymptomatic infection is now well documented, but there is very limited evidence of transmission from asymptomatic cases. It is assumed that the substantial majority of transmission is from symptomatic individuals with COVID-19.”

- On 6 March 2020 the World Health Organization’s (WHO) report, ‘A coordinated global research roadmap’ highlighted this as a knowledge gap and expressed the need for “cohort studies to clarify pre-symptomatic/asymptomatic transmission⁷. (including distinction between virus shedding in an asymptomatic individual and infectious virus transmission)”.
- On 20 March 2020, NERVTAG noted that, whilst there was data for people testing positive for SARS-CoV-2 without symptoms, there was very little information regarding transmission and the data from sporadic reports of asymptomatic transmission was not convincing. (**Attachment 6**)
- On 2 April 2020 WHO ‘Coronavirus disease 2019 (COVID-19) Situation Report – 73’⁸ reported the presence of pre-symptomatic spread, however it highlighted that there were however “few reports of laboratory-confirmed cases who are truly asymptomatic, and to date, there has been no documented asymptomatic transmission”.
- On 3 April 2020, the US Centre for Disease Control and Prevention (CDC) published a study⁹ based on outbreaks in care homes in Washington. This was the first reference to evidence of asymptomatic and pre-symptomatic transmission of the virus. The authors had published an earlier report (published 27 March 2020, pre-print 18 March 2020) on a care home outbreak and its effects on the care homes residents, but this did not mention asymptomatic and pre-symptomatic transmission of SARS-CoV-2 focusing on limitations in infection control and prevention and limitation of staff movement. The 3 April study concluded that, “Although these findings do not quantify the relative contributions of asymptomatic or pre symptomatic residents to SARS-CoV-2 transmission in facility A, they suggest that these residents have the potential for substantial viral shedding.” This study increased the impetus for PHE to conduct studies in care homes, as soon as testing capacity became available to support this work.
- During the period of the 15-24 April 2020, PHE undertook analysis of samples of care home residents to explore transmission in six care homes experiencing outbreaks of COVID-19. The study was the first UK study to provide evidence on the presence of asymptomatic cases and transmission. Data showed a high prevalence of SARS-CoV-2 positivity in care homes residents and staff, half of whom were asymptomatic and potential reservoirs for ongoing transmission. Full analysis of sample data was undertaken the week commencing 4 May 2020; preliminary findings of asymptomatic case rates were shared with the Incident Management Team and the CMO during 16-19 May 2020. Findings highlighted that across the six care homes, 105/264 (39.8%) residents were SARS CoV-2 positive. Of these 105 residents, 28 (26.7% of

⁷ <https://www.who.int/publications/m/item/a-coordinated-global-research-roadmap>

⁸ <https://apps.who.int/iris/handle/10665/331686>

⁹ <https://www.cdc.gov/mmwr/volumes/69/wr/mm6913e1.htm>

the 105 residents) were symptomatic, 10 (9.5%) were post-symptomatic, 21 (20.0%) were pre-symptomatic and 46 (43.8%) who remained asymptomatic¹⁰.

- Emerging data from the 'Easter6' analysis was submitted to NERVTAG on 24 April 2020, alongside PHE analysis of a military barracks outbreak. (**Attachment 7**). Data from PHE outlined the investigations which took place in a barracks in London, where there were a couple of reported cases and approximately 20 individuals in self-isolation. "300 individuals were sampled; the preliminary data are on detection from the swabs (nose and throat) and from antibody tests. 24/302 (7.9%) participants were positive on swab testing. 20/24 (83.3%) participants with positive swab results were asymptomatic until the day of swabbing. SL confirmed that the individuals who were sampled will be followed up and this work is in progress. Members discussed the CT values and viral loads in symptomatics and asymptomatics and whether the viral load in asymptomatics was high enough for them to be considered infectious. It was noted that infectious virus was recovered from some of the asymptomatic individuals". It was noted that screening of around 5,000 HCW individuals was being carried out over a selection of 11 hospitals, so there will be more data available shortly. "Members suggested that when quarantine is lifted, it will be very difficult to find asymptomatic PCR positive individuals. Asymptomatics are easier to find in institutional settings. Investigations in three homeless hostels have shown similar ratios of asymptomatics to symptomatics to that in the military barracks. There may be a need for whole population screening in institutional settings". At the subsequent meeting on 1 May 2020, PHE support was requested to further understand the issue through inclusion of asymptomatic transmission within the fortnightly PHE paper on pre-symptomatic clusters and for PHE to provide an update on hospital trust collated data on snapshot testing of staff. (**Attachment 8**)

Even with evidence of asymptomatic transmission, the scale of this phenomenon and transmission from people who had asymptomatic infection continued to be explored throughout the summer. An evidence synthesis of the proportion of infections which were asymptomatic was presented at NERVTAG on 4 September 2020. This paper noted a high degree of heterogeneity between studies, with a range from 6% to over 90% and a median estimate of 28%. This indicated continuing uncertainty about the contribution to overall transmission. (**Attachment 9**). This paper was discussed at SAGE on 10 September 2020¹¹.

Please find attached a copy of the briefing paper that was produced by the COVID SAGE secretariat on 13 April 2020. (**Attachment 10**). This followed a commission from the Government Chief Scientific Adviser for a summary of how effective viral testing was in people who were asymptomatic, including information on false negatives and true positives. The was passed to the CMO on 14 April to support a brief to the Secretary of State for Health and Social Care. This briefing paper did not go to SAGE at the time.

In addition, you will find five documents attached which are relevant to the discussion around possible asymptomatic transmission in early 2020. (**Attachments 11, 12, 13, 14 and 15**). The documents have been redacted in line with the Freedom of Information Act to remove the names of non-senior officials.

¹⁰ [https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(20\)30277-7/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30277-7/fulltext)

¹¹ <https://www.gov.uk/government/publications/nervtag-rapid-review-of-the-asymptomatic-proportion-of-pcr-confirmed-sars-cov-2-infections-in-community-settings-9-september-2020>

In relation to your correspondence query, please be assured that officials and the ministerial team take responding to correspondence very seriously. Throughout the pandemic we have received an extremely high volume of correspondence while the Department has been working at the heart of the COVID-19 global pandemic. The Department aims to reply to correspondence within 18 days of receipt and apologises for the fact that we have fallen short of this standard on this occasion, despite the huge effort of officials and the ministerial team. In order to minimise delays to responses being sent out, we temporarily nominated officials to reply on behalf of Ministers. The Department hopes that you can understand this decision in light of the unprecedented volumes of correspondence it has been handling.

Q1320: The number of people fully complying with isolation requests

The Office for National Statistics (ONS) has published experimental statistics on coronavirus and self-isolation since 26 March 2020. The latest data indicates high levels of reported adherence to the self-isolation requirements for positive cases and their contacts:

- **Positive Cases:** The data collected between 7 to 12 June 2021 (published on 28 June) shows that, for those required to self-isolate after testing positive for COVID-19, 79% of respondents reported fully adhering to the requirements throughout their self-isolation period¹².
- **Contacts of Positive Cases:** The data collected between 1 to 5 June 2021 (published on 18 June) shows that, for those required to self-isolate after being in contact with someone who has tested positive for COVID-19, 87% of respondents reported fully adhering to the requirements throughout their self-isolation period¹³.

These findings are for people who have tested positive for COVID-19 and their close contacts and for people with symptoms of COVID-19. They do not cover people quarantining following travel from amber list countries, for which there are separate arrangements to support compliance, overseen by the Isolation Assurance and Compliance Service.

For people with symptoms of coronavirus (including those who do not get a COVID-19 test and excluding those who report receiving a negative test result since having developed symptoms), BMG Research survey data for 2 March 2020 to 27 January 2021¹⁴ showed that 42.5% of respondents reported full adherence to guidance on self-isolation. The great majority of the people covered by this survey are those who have symptoms but do not get a COVID-19 test. The picture may have changed since January in the context of vaccine roll-out, changing restrictions and the universal asymptomatic testing offer.

¹²

<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/bulletins/coronavirusandselfisolationaftertestingpositiveinengland/previousReleases>

¹³

<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletin/coronavirusandselfisolationafterbeingincontactwithapositivecaseinengland/previousReleases>

¹⁴ Analysis of nationally representative Department of Health and Social Care and BMG survey data collected between 2 March 2020 and 27 January 2021 as part of the COVID-19 Rapid Survey of Adherence to Interventions and Responses (CORSAIR) study run by University College of London and King's College London at <https://www.bmj.com/content/372/bmj.n608>.

Taken together, these findings suggest that people with symptoms who take a test that confirms they have COVID-19 are significantly more likely to self-isolate than people with symptoms who do not take a test and therefore do not know if they have COVID-19.

Q1340: The Department's estimate of the number of people discharged from hospital to care homes before testing was available to them

The principle of discharging medically fit patients quickly is not a new concept. The decision to discharge is, and has been, a clinical decision at all times including through the pandemic. Discharging individuals as soon as they no longer meet the criteria to reside in hospital is recognised as the most effective way to support patient outcomes and has been promoted as good practice for several years. Indeed, the impacts of delayed or prolonged hospital admission, even in normal times, are well documented, particularly for those who are frail or elderly. Pandemic response planning has also included plans around the management of NHS capacity through the improvement of processes to enable more rapid discharge of individuals from hospital either home or into care settings.

On 17 March 2020, NHS England issued the "Next Steps on the NHS Response to COVID-19" letter to the NHS¹⁵. The letter identified the likely intense pressure on the NHS at the peak of the pandemic and highlighted the urgent need to free up the maximum possible in-patient and critical care capacity to prepare for patients who required respiratory support, and stated that all hospital in-patients who are medically fit to leave should be discharged. The 'COVID-19 Hospital Discharge Service Requirements' provided guidance to support the March 2020 discharge policy. These requirements stated that where a person had had symptoms of COVID-19 before or during their hospital stay that they should have been tested in line with the testing prioritisation criteria, subject to a clinician's view. They also set out how we would continue to support the safe and timely discharge of people who no longer clinically need to stay in hospital, using the 'Discharge to Assess' (D2A) model. Where a patient had shown symptoms and therefore been tested for COVID-19, we specified that results – whether negative or positive – should be included in a patient's discharge documents. On 15 April 2020, the Department published the "Adult Social Care Action Plan", which included a move to institute a policy of testing for all patients prior to discharge to a care home.

For this period of 17 March to 15 April 2020, data published by the NHS shows that there were 860k discharges from hospitals. Approximately 2.8% of these discharges (around 24.5k) – were to care homes. This was a reduction in volume of discharges compared to pre-pandemic norms; for the corresponding period in 2019 data published by the NHS shows that there were 1,567k discharges from hospital out of which approximately 34.7k (around 2.2%) were to care homes. Data on NHS hospital discharges to care homes for both the above periods are published online¹⁶. For the period of 26 March to 15 April 2020 for which data are available, 186,048 tests were processed in England.

¹⁵ <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/urgent-next-steps-on-nhs-response-to-covid-19-letter-simon-stevens.pdf>

¹⁶ <https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2020/06/Hospital-discharges-to-care-homes-2020-06-02-v1.0.xlsx>

Q1355: Peer-reviewed status of Public Health England's report on hospital-associated infection to care home outbreaks

The letter that Sir Chris Wormald sent to the Public Accounts Committee on this subject was debated with Sir Chris and Dr Jenny Harries at the hearing on Thursday 8 July, in which Mr Clark participated.

The PHE report "A data linkage approach to assessing the contribution of hospital-associated SARS-CoV-2 infection to care home outbreaks in England, 30 January to 12 October 2020" was published in May 2021¹⁷. The methods and results of the paper were reviewed on several occasions by the SAGE sub-group, the Social Care Working Group (SCWG), which include a number of leading academics in modelling, public health and care of the elderly¹⁸. The report was also reviewed internally at PHE.

This PHE investigation on discharge from hospital found that from 30 January to 12 October 2020, 1.6% (n=97) of outbreaks were identified as potentially seeded from hospital associated COVID-19 infection.

The scientific community continue to review and investigate factors which may have contributed to deaths in different communities in the first wave, to inform learning, and to more definitively draw conclusions for future planning. However, there have been other retrospective studies in Scotland and Wales which looked specifically at the impact of discharge policies. Whilst there was slight variation to the policies implemented across the four nations and the evidence is not conclusive, the various studies have indicated discharge policies were not responsible for a significant proportion of outbreaks in care homes in the UK.

The SCWG has reported¹⁹ that retrospective genomic analysis and seropositive studies in care homes find evidence for multiple routes of virus ingress to care homes but are not systematic enough to quantify the relative frequency of different routes of ingress. Furthermore, these studies do not definitively rule other modes of ingress so staff, visitors, visiting professionals, hospital discharges and new admissions and persistent infections may all contribute to the introduction of disease.

The weight of evidence is stronger in some areas than others. Evidence of staff-to-staff transmission has emerged in genomic analysis (high confidence). Weak evidence on hospital discharge and modelling the impact of visitors does not suggest a dominant causal link to outbreaks from these sources.

¹⁷ <https://www.gov.uk/government/publications/covid-19-assessment-of-hospital-associated-sars-cov-2-infection-and-care-home-outbreaks>

¹⁸ Membership of the SCWG is published online at:
<https://www.gov.uk/government/publications/scientific-advisory-group-for-emergencies-sage-coronavirus-covid-19-response-membership/list-of-participants-of-sage-and-related-sub-groups#social-care-working-group-scwg>

¹⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/925141/S0780_Social_Care_Working_Group_update_paper.pdf

The SCWG has kept this issue under regular review, for example via the Vivaldi studies on how care home infections are affected by size of care home and type of care home, i.e. whether it is a nursing home or a residential home.

Q1423/Q1424: A suggestion to provide the evidence behind your point that there is no evidence that a shortage of PPE provision led to anybody dying of covid-19

The Department hugely regret the deaths from COVID-19 of our outstanding and committed frontline workers, and the Government is committed to ensuring that lessons are learned and implemented. There is currently no proven link between these deaths and the supply of personal protective equipment (PPE). However, mechanisms are in place to investigate the deaths of health and care workers which involve medical examiners, coroners and the Health and Safety Executive (HSE).

The HSE is currently investigating COVID-19 work-related deaths, which includes those reported by the health and care sector. As part of those investigations, the organisations arrangements for the provision, use and wearing of PPE are examined. As many of these investigations are still on-going, the HSE is not currently in a position to share any common findings, but will share lessons with relevant stakeholders in due course.

Our frontline workers do a great job and they rightly deserve the most appropriate PPE. The 2020 National Audit Office report 'The supply of Personal Protective Equipment (PPE) during the COVID 19 pandemic' recognised that all of the NHS providers they spoke to were always able to get what they needed in time²⁰.

Q1445: Details of the Department of Health and Social Care's estimate of risk of fraud and approach to risk with regard to procurement of PPE

Whilst the Department cannot comment directly on individual allegations of fraud, it takes all allegations seriously, exploring every available option to bring those who commit fraud to account. In terms of general fraud figures, it is known that fraud in the public sector costs an estimated 0.5-5% of spend, which would be between £75m and £750m of the £15bn PPE procurement budget. As result of controls and extra checks undertaken, we identified transactions with high risk indicators of fraud. Where appropriate, action was taken to prevent payments being made or recover funds totalling an overall £157m. Around 1% of transactions had the hallmarks of fraud but action was taken to prevent any loss. The NHS Counter Fraud Authority (NHSCFA) produce an annual statement estimating fraud losses in their Strategic Intelligence Assessment (SIA). In the SIA, the NHSCFA estimates that 1% of the procurement budget is lost to fraud.

In relation to PPE procurement in the Department, the COVID-19 pandemic required Government to work at pace and develop its approach simultaneously to procure large quantities of PPE, frequently from suppliers it had not previously worked with, in a highly competitive international market. New processes were developed rapidly to provide the required resilience.

²⁰ <https://www.nao.org.uk/report/supplying-the-nhs-and-adult-social-care-sector-with-personal-protective-equipment-ppe/>

PPE procurement was viewed as a high fraud risk area due to high levels of spend coupled with new procurement processes and supply lines. Despite this, it was necessary to operate in this manner in responding to the crisis and the approach required a dynamic but inherently higher risk appetite in decision-making and managing transactions, while maintaining reasonable controls in context and ensuring transparency. In May 2020, the government agreed that Post Event Assurance (PEA) activity should be undertaken by departments in COVID-19 schemes. The Department is undertaking PEA activity across high risk areas of COVID-19 spend, including PPE. This activity includes fraud loss measurement activity to help estimate levels of fraud and error.

Given this unique situation and the fact PPE procurement is ongoing, estimated fraud levels relating to COVID-19 are not yet available for the Department. The Department does not expect to get a formal estimate of COVID-19 related fraud and error until the end of 2021, at the earliest. This is consistent with other departments that have had to respond quickly and on a large scale to the pandemic. We will write to the Committees with an update when the information is available.

Q1493: The number of ICU beds that will be retained permanently

The number of intensive care beds is not fixed and has been flexed locally to meet demand. Longer term decisions about NHS bed capacity will be taken in future including through the Spending Review.

Additional information

Please also find attached four further documents as evidence of statements the previous Secretary of State made for the Committees to review in relation to vaccine development and engagement with NHS England in January 2020. (**Attachments 16, 17, 18 and 19**)

ANNEX B

Question	Ref	Document
1281	1	Priority of SARS-CoV-2 (COVID-19) testing during periods of significant demand, 11 March 2020
1281	2	Priority of SARS-CoV-2 (COVID-19) testing during periods of significant demand, updated 26 March 2020
1302	3	Note of phone call between the Matt Hancock MP and Dr Tedros Adhanom Ghebreyesus, Director General of the World Health Organization, 29 January 2020
1308	4	NERVTAG meeting 2 minutes, 21 January 2020
1308	5	NERVTAG meeting 3 minutes, 28 January 2020
1308	6	NERVTAG meeting 10 minutes, 20 March 2020
1308	7	NERVTAG meeting 15 minutes, 24 April 2020
1308	8	NERVTAG meeting 16 minutes, 1 May 2020
1308	9	NERVTAG meeting 31 minutes, 4 September 2020
1308	10	Antigen screening for asymptomatic individuals, 13 April 2021
1308	11	CMO views on Lancet study, 25 January 2020
1308	12	Coronavirus meeting readout 29 January 2020
1308	13	Coronavirus meeting readout 27 January 2020
1308	14	SofS questions to Perm Sec, 29 January 2020
1308	15	Coronavirus – advice on isolation, 24 January 2020
	16	Further advice 26 January 2020
	17	Vaccine acceleration, 26 January 2020
	18	Prioritising SofS advice requests, 25 January 2020
	19	Readout QUAD meeting, 27 January 2020



11 March 2020

Priority of SARS-CoV-2 (COVID-19) testing during periods of significant demand

To: SARS-CoV-2 (COVID-19) testing laboratories

From: National Incident Director, COVID-19 response

This letter provides an order of testing for periods when demand for diagnostic testing may exceed local laboratory capacities and triaging of requests is required. This priority order has been agreed by PHE, NHS England and DHSC.

Group 1 (test first): patient requiring critical care for the management of pneumonia, ARDS or influenza like illness (ILI)[†], or an alternative indication of severe illness has been provided e.g. severe pneumonia or ARDS

Group 2: all other patients requiring admission to hospital* for management of pneumonia, ARDS or ILI

Group 3: clusters of disease in residential or care settings e.g. long term care facility, prisons, boarding schools

Group 4: community patient meeting the case definition and not requiring admission to hospital - over 60 years or risk factors for severe disease (recognising that this is challenging); over 60s should be prioritised over other risk factors

Group 5: community patient meeting the case definition and not requiring admission to hospital – under 60 years and no risk factors for complications

Group 6 (test last): contacts of cases

[†] ILI is defined as Oral or tympanic temperature $\geq 37.8^{\circ}\text{C}$ AND one of the following: acute onset of at least one of the following respiratory symptoms: cough (with or without sputum), hoarseness, nasal discharge or congestion, shortness of breath, sore throat, wheezing, sneezing

* admission to hospital is defined as a practitioner having decided to admit the patient and the patient will stay in hospital for at least one night.

Current case definitions: <https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigation-and-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection>

Dr Susan Hopkins, National Incident Director

Priority of SARS-CoV-2 (COVID-19) testing during periods of significant demand

Updated 26 March 2020

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This guidance provides a priority order of testing for periods when demand for diagnostic testing may exceed local laboratory capacities and triaging of requests is required. **It also advises on priorities for repeat testing given demand for testing**

Group 1 (test first): patient requiring critical care for the management of pneumonia, acute respiratory distress syndrome (ARDS) or influenza like illness (ILI)†, or an alternative indication of severe illness has been provided, for example severe pneumonia or ARDS

Group 2: all other patients requiring admission to hospital* for management of pneumonia, ARDS or ILI

Group 3: clusters of disease in residential or care settings, for example long term care facilities and prisons **(usually samples from five cases are sufficient in these settings)**

† ILI: fever $\geq 37.8^{\circ}\text{C}$ and at least one of the following respiratory symptoms, which must be of acute onset: persistent cough (with or without sputum), hoarseness, nasal discharge or congestion, shortness of breath, sore throat, wheezing, sneezing)

*admission to hospital: a hospital practitioner has decided that admission to hospital is required with an expectation that the patient will need to stay at least one night

Priority 1: Step down testing (see discharge guidance for more detail)

Priority testing for viral clearance should focus on:-

- severely immunocompromised patients being stepped down to a setting where isolation is not possible (repeated 2 weekly)
- patients being discharged to a residential or care facility
- patients who require multiple admissions and attendances (such as those with cancer)

Priority 1: Repeat testing

If the patient is producing sputum or is intubated, lower respiratory tract samples should be tested in addition to upper respiratory tract samples as SARS-CoV-2 can be present in the lower respiratory tract despite being undetectable in the upper respiratory tract.

If a suitable lower respiratory tract sputum sample is negative repeat tests are not needed.

If positive sites can be resampled after 3 days.

From: [REDACTED]
To: [Reed, Emma](#); [Van Tam, Jonathan](#); [Whitty, Chris](#); [REDACTED]
Cc: [Senior Copylist](#); [REDACTED]
Subject: Readout: SofS call with Tedros Adhanom
Date: 29 January 2020 21:48:00
Attachments: [image001.png](#)

All,
Quick readout below from today's call with Tedros Adhanom.
Any questions, let me know.
Thanks,

Phone call with Tedros Adhanom 29/01/20

Attendees: SofS, Jonathan Van Tam (JVT), Chris Whitty, [REDACTED]
[REDACTED]

- SofS asked Tedros for an update on the situation in China. Tedros outlined that China were severely committed to gripping the issue and were taking serious measures to support diagnosis in other countries.
- Tedros commented that there were 6065 confirmed cases of Coronavirus, 99% of which were in china with no deaths elsewhere. Monitoring this epicentre is key to limiting the spread outwards. Tedros commented that he was impressed with Chinese transparency and relatively confident with the accuracy of Chinese cases.
- SofS asked about whether it was the right time to declare a PHEIC and commented that the Chinese government must be pre-warned of any decision. Tedros agreed.
- CMO asked for any evidence in relation to the change in the force of transmission. Tedros commented that there was an increase and was not sure whether the measures implemented by the Chinese would be sufficient in bringing this figure down.
- JVT asked about intelligence on healthcare worker infection and any internal work on vaccines, Tedros confirmed that there were plans in place but was unsure of any significant breakthroughs. SofS commented on the need to diligently consider offers to make vaccines in the UK.
- SofS asked about the Chinese statement on pre-symptomatic transmission, Tedros commented that it was highly likely that the message may have been confused via translation issues but that this is unclear and the German case remains worrisome.
- SofS commented that in his view, the human to human transmission outside china signifies a need for a PHEIC.
- JVT asked Tedros whether the WHO's committee TOR allows for a proportion of members to be absent to make a decision on a PHEIC. Tedros said he would look into this.
- SofS urged Tedros to ensure that the WHO continue to fully grip this, CMO and JVT offered to push if diplomatically that would be helpful.



[REDACTED]
Private Secretary to the Secretary of State for Health and Social Care
Department of Health and Social Care (DHSC)

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For all submissions, please factor in Junior Minister clearance. SofS Office box times are 3pm Monday-Wednesday and 12pm Thursday.



Minutes of the NERVTAG Wuhan Novel Coronavirus Second Meeting: 21 January 2020

Date & Location:	13:00 – 14:00, 21 January 2020 Via telecon only
In attendance:	Peter Horby (Chair), Chris Lucas (Temporary Secretariat) NERVTAG Members: Wendy Barclay (WB), Ben Killingley (BK), Peter Openshaw (PO), James Rubin (JR), Calum Semple (CS), Jim McMenamin (JM), Neil Ferguson (NF), Ian Brown (IB), Cariad Evans (CE), John Edmunds (JE), Robert Dingwall (RD), Andrew Hayward (AH). NHSEI: Chloe Sellwood (CS). PHE Observers: Gavin Dabrera (GD), Andrew Earnshaw (AE), Mary Ramsay (MR), Maria Zambon (MZ) DHSC Observers: Jonathan Van-Tam (JVT), [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] Chris Whitty (CW). ACDP: Tom Evans (TE) Go Science Observers: [REDACTED] [REDACTED] [REDACTED]
Apologies:	[REDACTED] [REDACTED] Wei Shen Lim, [REDACTED] [REDACTED] [REDACTED] [REDACTED]

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NERVTAG WUHAN NOVEL CORONAVIRUS SECOND MEETING

1 Introductions

- 1.1 As above.
- 1.2 The Chair noted that the expectation is that minutes of this second extraordinary meeting would be made public in line with NERVTAG policies.
- 1.3 The Chair reminded members that the papers and discussion may be confidential and/or sensitive and that media approaches about NERVTAG business or the meeting should be sent to the secretariat (GD). Members remain free to talk to the media in their personal capacity.
- 1.4 The Chair raised the minutes of the last extraordinary meeting on 2019-nCoV held on 13/02/2020. The Chair reiterated the decisions and actions from that meeting. The minutes were accepted as an accurate record of the meeting.

2 Wuhan Novel Coronavirus- Update on epidemiology

- 2.1 PHE outlined that the situation was rapidly changing since the written update was produced and circulated on 20/01/2020. Additional cases had been identified following a revised pneumonia diagnosis plan in Wuhan. The reported number of confirmed global cases had increased to 283, with 279 in mainland China (258 from Wuhan and 21 from other provinces). There was limited information on travel to Wuhan from the cases outside of the city, although some did have history of recent travel to Wuhan.
- 2.2 Human to human transmission had now been reported overnight, including 15 healthcare workers (HCWs). Members commented that these HCW cases are thought to be due to a single superspreading event in a neurosurgical unit, with no PPE worn by HCWs or other patients.
- 2.3 From the total number of global cases, 51 were severe, with 12 critical, and there had been 6 deaths reported from mainland China. This gave a crude Case Fatality Ratio (CFR) of 2.1%, but this cannot be interpreted as a reliable CFR due to incomplete follow up and bias in detection of severe cases.

- 2.4 Confirmation was awaited on an additional 12 cases in Hubei province and 2 confirmed cases in Tianjin (with travel to Wuhan). There was also an unconfirmed report of an imported case in Taiwan. The committee also noted media articles about unreported cases in Wuhan.
- 2.5 NERVTAG agreed that there was clear evidence of person to person transmission. However, at this stage the extent of transmissibility between people is not clear.
- 2.6 NERVTAG noted that it is not possible to make reliable inferences about the case fatality rate(CFR) at this time as many cases have not yet completed their illness (i.e. died or recovered) and there is inevitably a bias in the early stages of an outbreak towards ascertainment of more severe, hospitalised cases. However, JE commented that we can start to make relatively reliable statements about the CFR in patients hospitalised with pneumonia. Central estimates for this using data from resolved hospitalised cases have fairly consistently fallen in the range of 10-15%. At present the confidence intervals on these estimates are wide, but as more data emerges our confidence intervals are expected to shrink.
- 2.7 GD noted that the following changes had been proposed to the existing UK risk assessment undertaken by PHE, as follows:
- 2.8 Impact of the disease – raised to ‘moderate’ from ‘low/moderate’,
- 2.9 Risk to UK population – raised from ‘very low’ to ‘low’,
- 2.10 Risk to UK travellers to affected parts of China – raised from ‘low’ to ‘moderate’.
- 2.11 Members noted the need to communicate clearly the difference between ‘impact’, and ‘risk to UK population’, since there is a risk of perception of a mixed message by having impact rated ‘moderate’ and the risk to UK population as ‘low’. It was noted that there was a general risk to public health as the virus has shown some ability to transmit between humans with a significant CFR, but with no cases reported in the UK the current risk to the UK population was low. In relation to the difference between “risk to the UK” and “risk to UK travellers”, it was also commented that it was appropriate for there to be a difference between the risk in two different locations. These risk assessments would be continually reassessed as the situation developed.
- 2.12 The Chair summarised that NERVTAG agreed with the changes to the risk assessments as discussed. Consideration should be given to communicating the risk assessment to provide clarity on what the different categories mean. NERVTAG also agreed it was likely that cases would be seen in the UK, although the number of cases would depend on many factors including transmissibility and sensitivity of identification.

3 Modelling

- 3.1 NF outlined that a model estimating the potential total number of novel Coronavirus cases in Wuhan had been prepared by Imperial College London. An updated estimate based on current data will soon be available. Allowing for multiple uncertainties, this gives a lower confidence interval of around 600 cases, with a total estimate of 2.5 thousand cases up to the current time.
- 3.2 It was noted that the model did not include asymptomatic individuals. It did however include symptomatic individuals who would not necessarily seek healthcare.
- 3.3 It was noted that at a recent WHO modelling call discussion focussed on whether this was a zoonotic outbreak with some human to human transmission, or a seeded outbreak from zoonotic reservoir but with self-sustaining human transmission. It was concluded by the WHO modelling group that the currently available data did not make it possible to distinguish between the two scenarios.
- 3.4 Phylogenetic data had also been circulated. It was noted that at the current time the sequence diversity was very limited, suggesting either a homogenous source from a zoonotic reservoir or rapid human to human transmission. Due to the limited number of sequences and their limited genetic diversity it is not currently possible to infer epidemic size or growth rate from the genetic data.
- 3.5 It was noted that 4 out of the 5 cases detected outside China had been detected by border screening. AH commented that this should not to be taken as evidence that port health screening can identify the majority of cases as other cases may have been imported despite screening but not as yet identified by health services.
- 3.6 It was noted that there are currently no data on infectiousness in relation to symptom onset and whether asymptomatic or subclinical patients are infectious.

4 Port Health

- 4.1 JVT highlighted that NERVTAG had met on January 13th and the Committee has supported the position that port of entry screening for those travelling from Wuhan was not advised. NERVTAG had however supported additional information at port of entry e.g. posters. CW confirmed that as a minimum information leaflets, posters and announcements on flights would happen, as well as referral to appropriate services.
- 4.2 Based on the changing epidemiological picture, and with various Governments instigating port of entry screening, DHSC asked NERVTAG to reconsider the issue of port health screening.
- 4.3 NERVTAG considered the evidence base and the epidemiology and whether this impacted their previous recommendation.
- 4.4 NF noted that from the modelling perspective, with exit screening in place in China, effectiveness of port of entry screening in the UK would be low and potentially only detect those who were not sick before boarding but became sick during the flight. NERVTAG felt there was a lack of clarity on the exit screening process in Wuhan, although it was thought that this process would be robust, and statements had been released by Chinese authorities about stopping febrile passengers from travelling. However, as noted, there were no data on the implementation of this programme.
- 4.5 JR noted that while he was not aware of any evidence that port of entry screening provides public reassurance, there could be a negative outcome of stigma for those who were screened. This would need to be considered.
- 4.6 It was noted that port of entry screening in the UK would be a significant undertaking, especially as fever may not be a very sensitive method of identifying cases, and direct flights from Wuhan would not be the only way to travel out of the affected area, especially as the affected area appears to be expanding.
- 4.7 It was also noted that there has been no information about infection in children and there was a concern that they may be non-febrile but infectious, which screening would not identify.
- 4.8 NERVTAG summarised that the changing epidemiology did not change the fact that port of entry screening has low efficiency and could only detect a proportion of all cases entering the country. The Chair summarised that NERVTAG still supported the position that port of entry screening for those travelling from Wuhan was not advised.
- 4.9 NERVTAG felt that providing information to travellers and providing effective means for screening febrile travellers attending healthcare settings was likely to be a better option.

- 4.10 WB raised the question of whether the NERVTAG recommendation would change if there were evidence that exit screening were not taking place. NERVTAG members felt that even in the absence of exit screening, port of entry screening would still have low efficiency and would miss a large proportion of all cases entering the country.
- 4.11 DHSC queried whether under a scenario of outbreaks in multiple Chinese cities would the recommendation change. NERVTAG noted that in this situation, as the R0 increases the efficiency of screening does not improve and it was unlikely that transmission to the UK could be prevented. If there was efficient transmission, even more stringent method, such as closing the borders to 50% of people, would only delay the UK outbreak, not prevent it.
- 4.12 DHSC asked if the UK introduced port of entry screening for those coming from Wuhan, at what point would NERVTAG advise discontinuing this policy. NERVTAG noted that one trigger would be the epidemic being brought under control and case numbers declining. The other would be self-sustaining transmission in either the UK, or cities outside of Wuhan, which would make screening redundant or unfeasible.
- 4.13 DHSC highlighted the other measures planned e.g. posters/leaflets and noted they planned to communicate that other types of screening e.g. identification in the healthcare services, would be more appropriate. DHSC asked NERVTAG to comment on the following interventions:
- i. ***Information leaflets on flights encouraging self-declaration and advice on what to do should travellers become unwell.***
NERVTAG thought this was worthwhile and the draft leaflets could be passed to psychologists and social scientists for views on how to encourage self-reporting to health care services.
 - ii. ***Displaying information posters at passport control, in both English and Mandarin as a minimum.***
NERVTAG agreed this was worthwhile.

iii. ***Manned airport booth where people can self-present.***

NERVTAG weren't clear of how this would operate. What would happen if large queues formed? How would they be directed and assessed? MZ reported that PHE were establishing a preliminary clinical pathway for travellers coming into Heathrow, including an operational pathway within the NHS. NERVTAG agreed that there should be a clinical assessment pathway for travellers self-reporting with symptoms, but the operational implications would need careful consideration.

iv. ***Screening questionnaire handed out on flights.***

NERVTAG did not think this would be particularly effective, especially as the initial symptoms remained ill defined. There were also questions around how the information would be processed and acted upon. It was noted that questionnaires were a form of entry screening but likely to be less efficient than fever screening. NERVTAG suggested that a symptom checklist should be part of the information leaflet.

v. ***Giving advice to airline and ground staff on identifying clinical symptoms.***

NERVTAG thought this would cause concern and difficulties for these staff members. NERVTAG noted that, again, this is a form of health screening, in which case it would be better to introduce port of entry screening rather than asking unqualified staff to do this on behalf of the authorities. This could also raise liability issues around these unqualified staff managing patients, stigmatisation and discrimination.

vi. ***Broadcasting messages to passengers pre-landing to encourage self-reporting.***

NERVTAG agreed this was worthwhile, alongside the leaflet.

RD observed that messages should probably be broadcast in both Mandarin and Cantonese, depending upon advice about the everyday language actually used in Wuhan.

vii. ***Insisting that each airline pilot makes a declaration that everyone is well onboard before landing.***

This is an existing provision and could be used with pilots reporting 1 hour before landing. NERVTAG agreed that the reporting of serious illness requiring urgent treatment was sensible but noted that cases of 2019-nCov appear to start with a mild febrile illness, with cough and fever. The Committee did not think a pilot would be in a position to declare that everyone on a flight was well or report all minor illnesses.

viii. ***Authorities at Heathrow seeking assurance from airline captain that exit screening has taken place in Wuhan.***

It is currently understood that exit screening is happening on the plane before take-off. If screening moves to the terminal, the pilot may not be able to make the declaration. It was noted that pilots are busy prior to take-off and may not be in a position to undertake this check. Also need to consider what would happen if pilot does not make declaration. NERVTAG noted that this proposal had many potential difficulties and would require further discussion with airport authorities and pilot organisations.

4.14 DHSC planned to review these issues using advice from NERVTAG alongside information from other organisations involved in port health/travel to finalise policy.

5 Progress on diagnostics

5.1 GD outlined on behalf of MZ that good progress was being made on diagnostics:

- PHE aware of the release of Chinese primers in the last hour, which had been ordered.
- The Japanese case had been detected through same diagnostic strategy used in the UK,
- PHE were anticipating a publication on diagnostic reagents this week and would assess performance.

5.2 There were no further questions from the members on diagnostics.

6 AOB and Next Meeting

- 6.1 It was noted that a precautionary Scientific Advisory Group for Emergencies (pre-SAGE) meeting would be held at 3:30pm tomorrow. NERVTAG input into this meeting would be essential with certain members to be issued invitations.
- 6.2 There was a query around gastrointestinal symptoms and it was noted it was low with a recent report showing less than 3% of roughly 40 patients having diarrhoea.
- 6.3 Question about progress on therapeutics including veterinary drugs. There was an ongoing trial in one hospital in Wuhan of an HIV drug which had showed efficacy in animal models of MERS-CoV. Also, remdesivir, a broad-spectrum antiviral, has shown potent viricidal activity to coronaviruses in vitro. It was noted that WHO are working to prioritise potential therapeutics for evaluation in 2019-nCoV.
- 6.4 It was noted that messages were being sent out by the NHS and PHE to primary and secondary healthcare workers to raise awareness. In confidence, a clinical letter will be going out across the UK signed off by the senior medics from the tripartite organisations shortly. GP advice would also be going on the PHE website this afternoon.
- 6.5 For information, the UK Rapid Research Studies for Clinical Categorisation Protocol can be activated in the event of an imported case and NIHR funding would be made available.
- 6.6 Next meeting will be required, but no confirmed date yet.
- 6.7 DHSC thanked the committee for their time.

Minutes of the NERVTAG Wuhan Novel Coronavirus Third Meeting: 28 January 2020

Date & Location:	10:30 – 12:00, 28 January 2020 Via telecon only
In attendance:	Peter Horby (Chair), Camille Tsang (Secretariat). NERVTAG Members: Wendy Barclay (WB), Andrew Hayward (AH), Ben Killingley (BK), Peter Openshaw (PO), Calum Semple (CSm), Jim McMenamin (JMM), Cariad Evans (CE), Neil Ferguson (NF), Ian Brown (IB), Wei Shen Lim (WSL), James Rubin (JR), Robert Dingwall (RD), James Rubin (JR) PHE Observers: Gavin Dabrera (GD), Meera Chand (MC), Jake Dunning (JD), Megan Akodu (MA) DHSC Observers: Chris Witty (CW), Jonathan Van-Tam (JVT), Jennie Harries (JH), [REDACTED] [REDACTED] NHS-E: Chloe Sellwood (CSw) Keith Willet HPS: Lisa Ritchie (LR) Co-opted clinicians: David Connell (DC), Kevin Rooney (KR)
Apologies:	John Edmunds (JE)

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NERVTAG WUHAN NOVEL CORONAVIRUS THIRD MEETING

1 Introductions

- 1.1 The Chair welcomed everyone to the meeting and apologies were received from John Edmunds.

Current Epidemiology and Case Definition

2 Epi-update

- 2.1 GD summarised the current epidemiology and background paper that was circulated to members. Updated figures as of this morning were also verbally given to the committee. Key points below:
- 2.2 As of 09:00 27th January 2020 there were 2,800 cases globally, 2,744 of these have been reported in 30 provinces of China. There has been an increase in the number of cases outside of China and person- to - person transmission has been identified in Viet Nam.
- 2.3 GD gave the committee an update on the current case numbers. 4,585 cases have been reported in mainland China, with 70 reported outside the country. A case was confirmed overnight by Germany, this is the first case confirmed in Germany. The German national may have had contact with a confirmed Shanghai contact. It was clarified that the contact was made in Germany and the Shanghai contact then flew back to China where it was confirmed that they had WN-CoV.
- 2.4 PH asked if there were any reports of asymptomatic transmission of the WN-CoV. PHE confirmed that no official or published evidence has yet been obtained regarding asymptomatic transmission.

- 2.5 There are media reports of a Wuhan resident who had travelled to a conference outside of the city and was reportedly asymptomatic at the time and then on return to Wuhan, developed symptoms and was confirmed with WN-CoV. It was reported that contacts of this case at the conference also developed symptoms and later were confirmed to have WN-CoV infection. The details of this case should be treated with caution as nothing has been documented officially.
- 2.6 An asymptomatic child as part of a family cluster was reported in the Huang, C. et al. 2020 Lancet publication. The child underwent a computed tomography scan (CT scan) of the chest because of family concern as other members of the family were symptomatic and confirmed with WN-CoV. The CT scan of the chest showed bilateral consolidation at the bases despite a lack of symptoms. Although reported as an asymptomatic child, they were also able to obtain a sputum sample but It is not clear how the sputum sample was obtained if the child was asymptomatic. That sputum sample had an RT-PCR cycle threshold (ct) value of 26 and the upper respiratory tract sample had a ct value of about 40. The lower the ct number, the more virus RNA is present.
- 2.7 Members commented that there was evidence that the child was sub-clinical but not that the child transmitted infection to anyone else. Members thought it was strange to CT scan a child who is asymptomatic and then also be able to obtain a sputum sample. Members commented that there is a difference between a patient who has mild-symptoms and one who is asymptomatic.
- 2.8 CW asked NERVTAG if they agree with the working assumption that asymptomatic people are likely to be less infectious than symptomatic persons, and highly symptomatic people are likely to be more infectious than mildly symptomatic people.
- 2.9 CS commented that we cannot make that assumption safely, given our past experience with other respiratory viruses where children with robust but naïve immune systems have been shown to be mildly affected but very effective spreaders. However, a highly symptomatic child who is coughing everywhere will likely be more infectious than a child who is mildly symptomatic. This is based on prior experience of respiratory viruses in school age children.
- 2.10 AH commented that with influenza, we know that potentially we shed virus prior symptoms starting and even after decades of research there is uncertainty about the importance of asymptomatic transmission. AH asked whether we know of any cases that are very minimally symptomatic. The Committee members felt there were insufficient data of the spectrum of severity at this stage.

- 2.11 PH asked the committee again if people agree with the working assumption that asymptomatic people are likely to be less infectious than symptomatic people.
- 2.12 WB did not agree with this assumption as we do not know that this is the case. WB commented that WN-CoV seems to be behaving very differently to SARS.
- 2.13 Following further scientific discussion, views of NERVTAG members were not unanimous but the predominant view was that the force of infection from asymptomatic individuals, if present at all, is likely to be lower than symptomatic individuals.
- 2.14 The epi-update included the estimated reproduction number from a WHO Emergency Committee meeting on 22 January 2020 where they stated that “Human-to-human transmission is occurring and a preliminary R_0 estimate of 1.4-2.5 was presented. Amplification has occurred in one health care facility. Of confirmed cases, 25% are reported to be severe. The source is still unknown (most likely an animal reservoir) and the extent of human-to-human transmission is still not clear.”
- 2.15 SPI-M group met yesterday and TI reported that the literature that was reviewed by SPI-M was of data from earlier in the epidemic and the R_0 ranged from 2.2 to 3.1. The impact of the recent interventions by the Chinese Government on the R_0 is not yet known. However, there seems to be a broad consensus across modelling groups worldwide that R_0 seems to be ranging from 2.5 – 3.0 based on the most up to date data.
- 2.16 The committee noted that China had use the term “accelerating” in relation to the R_0 but members noted that this was likely to be just a description of the method used in the calculation rather than an acceleration of the disease’s transmissibility.
- 2.17 NF noted that the case numbers seem to be doubling every three to four days. There is no evidence of it slowing so far but it is hard to tell given the delay in the incubation period and how long it is taking to confirm cases at the moment.

- 2.18 NF noted that we are witnessing much greater variability in transmissibility between people than we would expect with influenza but this is expected with these types of virus. Although extensive person-to-person transmission outside of China has not yet been seen, in the early days of the influenza pandemic in 2009 it was difficult to detect onward transmission and it is likely that more information on nCoV person-to-person transmission outside of China will come out in the next few weeks.

3 Case Definition

- 3.1 DHSC explained that this agenda item relates to the current advice for the NHS in terms of the possible case management algorithm and flow diagram issued by PHE.
- 3.2 GD outlined the current possible case definition as follows:
*in the 14 days before the onset of illness: travel to Wuhan, Hubei Province, China
OR contact with confirmed cases of WN-CoV*
- The geographical element of the case definition is currently Wuhan city or contact with a known case.*
- 3.3 The clinical criteria of the case definition is fairly broad covering upper and lower respiratory tract infections, from relatively mild symptoms through to pneumonic symptoms.
- 3.4 Following the review of the geographical distribution of the provisional province level data from China, there is emerging evidence of an increasing geographical distribution of confirmed WN-CoV cases both within mainland China and Hubei Province.
- 3.5 GD explained that PHE has reviewed the official information at a provincial level but there was a large amount of data where province was not available. Therefore, the PHE Guidance Cell reviewed additional sources¹ of data to compile daily case counts of confirmed case in mainland China by province. Please note that the following proportions should be should be interpreted with caution.

¹ All calculations are based on the latest publicly available data and may not be wholly accurate of the epidemiology of WN-CoV in mainland China. The following should be taken as an approximation of the provincial distribution of cases until an official source of these data is identified.

- 3.6 The proportion of confirmed WN-CoV cases in mainland China that were from Hubei Province decreased from 57% (729/1,287) on 24 January 2020 to 53% (1,052/1,975) on 25 January 2020
- 3.7 Within Hubei Province, the proportion of cases from Wuhan City decreased from 90% (495/549) on 23 January 2020, to 79% (572/729) of 24 January 2020 to 59% (618/1,052) on 25 January 2020
- 3.8 There are now at least 30 provinces with confirmed WN-CoV cases.
- 3.9 NERVTAG was asked to discuss the information and to recommend whether the geographical aspect of the case definition should be expanded to include either the whole of Hubei Province or alternatively, mainland China.
- 3.10 JVT outlined the problem that DHSC have with remaining with the current definition. Although direct flights from Wuhan were stopped about 5 days ago, we are now coming up to a typical end of incubation period since the last people came off a direct flight from Wuhan to the UK. Therefore, there is no longer a direct route from Wuhan to the UK as long as flights from Wuhan don't resume. Now that direct routes from Wuhan are no longer a risk, keeping Wuhan in the definition seems to be inconsistent with reality of the changing geographical spread of the virus.
- 3.11 JMM asked whether DHSC wanted to identify individuals who are potentially infectious or, because international travel will continue to occur, there was an alternative objective in mind. Was there a more rational approach whereby we focus our attention on those who present at a hospital? The reason that JMM brought this up is to highlight the known issues about the limited laboratory detection capability to make diagnosis and the large increase of travellers from a wider geographical area.
- 3.12 NF asked DHSC whether the rational of the aim is to attempt to control the spread and limit it, in which case it would be logical to extend the definition to the whole of China regardless of testing capability. If it is for surveillance purposes then it is fine to keep it more limited.

- 3.13 CMO and DCMO commented that there would need to be a pragmatic balance between the sensitivity of the case definition and the capacity of the health system under the winter pressures. CW added that at this point in the epidemic the purpose of the case definition is to identify individuals so that they do not transmit the virus.
- 3.14 PH expanded on this further and summarised that the purpose is to identify all symptomatic cases if possible and to interrupt transmission.
- 3.15 The committee contemplated the prospect of broadening the geographical area of the case definition to Hubei province or the whole of mainland China. NERVTAG agreed that expanding the case definition to the whole of mainland China at this moment in time was not feasible and did not seem appropriate with the information at hand.
- 3.16 The consensus by NERVTAG was to expand the case definition beyond Wuhan and Hubei province to a wider number of provinces. This could be based on incidence of confirmed infections by provinces. Additional data on traveller volumes from provinces would assist with judging the volume of screening that would arise. NF and his team at Imperial College London are able to calculate this information for the next meeting for consideration. Then it will be for DHSC and PHE to take the decision on which provinces will be used in the case definition.
- 3.17 NERVTAG acknowledged that the expansion of the case definition to those geographical provinces based on risk could change over time and that this should be kept under review.
- 3.18 WB commented that this was a very elaborate solution and the list of confirmed numbers of the provinces is a very long. DC commented that this may not be that feasible for clinicians on the ground to look up the provinces.
- 3.19 JH commented that a similar thing was done for Zika virus but it was hugely complex and there were issues from airlines about where they're flying and the risk of transmission and insurance.
- 3.20 JH also commented that any information and any update to the case definition will need wider coordination in DHSC for example with the Foreign Commonwealth Office. KW also noted that NHS 111 would also benefit from this information.

3.21 The clinical aspects of the case definition were briefly discussed. PH noted that there may be scope for increasing the specificity of the clinical component of the case definition. This will be taken up by DHSC outside of this meeting.

Action 1: PHE to send daily provincial level numbers to NF and his team for the risk calculations.

Action 2: NF and his team to calculate the risk of the provinces, weighted by travel information. This will be distributed to DHSC and PHE to incorporate directly into a new algorithm.

Action 3: PHE to add a link on the GOV.UK page on Wuhan Novel Coronavirus to either a list or map of the provinces affected.

Action 4: NF and PHE to share figures with DHSC and NHS-E for wider coordination and dissemination of updated case definitions.

PPE

4 Respiratory PPE in a variety of settings

Specific Questions for NERVTAG to provide comment and/or recommendation:

In a circumstance where the UK experiences sustained P2P transmission, the extant advice to UK Govt (for pandemic flu) is that face mask wearing by the general public is NOT recommended. Does NERVTAG see any reason why this advice should change?

4.1 Despite China making it mandatory in some cities for the public to wear face masks, this recommendation is not in place in the UK. NERVTAG discussed whether face masks reduce transmission within the community or within households. The Committee reported that there is no evidence to support that the wearing of face masks by the general public reduces transmission. It was also noted that this may add to fear and anxiety.

4.2 NERVTAG endorses PHE advice that no changes to this recommendation should be made. Instead the emphasis on hand hygiene should continue.

- 4.3 PHE clarified that, this recommendation is for the public and is separate to the guidance on symptomatic patients wearing facemasks when they are being moved within a healthcare environment. In England, there is also guidance specific for people with mild symptoms and are self-isolated to wear facemasks however this should be considered on a case by case basis.

At present the plan is for the first cases of 2019-nCoV is that these patients will be managed on airborne HCID wards cared for by staff using high-level PPE. In the event of an escalation the next stage of surge for places of care for cases would be across the broader IDU network, again using high-level PPE. If sustained community transmission became established it is likely that IDU capacity would be exceeded and cases would then need to be managed on standard medical or respiratory wards for potentially a sustained period of time. This would entail deployment and use of the UK's pandemic influenza PPE stockpiles. NERVTAG has previously opined that high-level PPE (FFP3 respirators) would be reserved for ICU settings and AGPs and SFMs for normal ward settings; this is for a pandemic influenza virus.

What is NERVTAG's opinion about the suitability of these PPE recommendations in the event of sustained community transmission and prolonged HC surge for 2019-nCoV?

- 4.4 NERVTAG concluded that the current PPE recommendations for pandemic flu are acceptable for use should there be evidence of sustained community transmission of WN-CoV.

5 Adoption of new airborne HCID PPE and potential risks

- 5.1 JD presented a paper on the new HCID PPE ensemble versus the current MERS PPE recommendation. The current MERS recommended PPE leaves areas of the head and neck exposed and does not provide total skin coverage unlike the PPE images coming from China.

- 5.2 The new HCID PPE ensemble has been developed based on the scientific evidence and has been commented by academic and clinical experts over the past year. The aim of this new HCID PPE is to standardise the PPE recommendations across the all HCIDs and PHE would like to ask NERVTAG if the new HCID ensemble should be activated. This would be an acceleration of the roll out of the new HCID PPE guidance rather than singling out WN-CoV over other viruses or HCIDs. *The new HCID PPE ensemble would apply to HCWs in secondary care who would reasonably expect to encounter suspected HCID cases, including (but not limited to) emergency department clinical staff, acute medical teams, infection specialists and critical care staff.*
- 5.3 The new HCID PPE ensemble is more complicated and some components are not currently available within the NHS e.g. the hood. It was noted that WN-CoV is considered an interim airborne HCID.
- 5.4 Accelerating the roll of the HCIDs was proposed at this time as people are aware of the PPE images coming from China and other countries; it is an improvement on the current PPE recommendations; and maybe able to overcome the availability of the hood specific to the new ensemble.
- 5.5 Members noted that this may be the wrong time to bring in this new HCID PPE recommendation as it may create more problems and risks especially where staff may need to be conduct complex medical procedures in this new HCID PPE. Members noted the value of familiarity of NHS staff with the current PPE standards and that roll out of a more complex system at a time of potentially intense NHS activity could be counterproductive. However, all HCID units are trained appropriately to use this kind of equipment. It was also noted that the hoods are being brought up globally and should a decision be made later this could pose a risk in terms of availability.
- 5.6 PH asked DHSC if it was possible to purchase the hoods without NERVTAG recommending them at this time? DHSC asked if there was any scientific basis for accelerating introduction of the new HCID PPE guidance at present? There was not any clear evidence at this time that would suggest that hoods may be needed now or in the future of this incident.
- 5.7 At present NERVTAG do not support an accelerated roll out of the new HCID PPE ensemble.

6 PPE in primary care

At present, there is no recommendation for PPE to be worn in primary care, as it assumed that patients will be isolated. However, it may be necessary for GP/Community staff to carry out emergency/essential review treatment. Many GPs will not have respiratory PPE so a solution is required. Does NERVTAG have a view on this?

- 6.1 LR reported that in Scotland, there is clear guidance for those in primary care where staff are able to identify and isolate patients and then inform the local health protection team. If needed primary care in Scotland is equipped with appropriate PPE for this scenario as per standard infection control guidance in Scotland.
- 6.2 NHS-E were not aware of any similar recommendations in England.
- 6.3 NERVTAG recommended that NHS-E review the Scottish guidance and consider applicability in primary care in England.

7 PPE advice for border force staff and FCO/Embassy staff in China

- 7.1 Another query from across government asked whether PPE should be in place for airline staff, border force staff and any FCO personnel in China. DHSC explained that staff in China who may be involved in the repatriation of British citizens from China will also have been exposed to the same level of community threat. JVT expressed the view that any symptomatic persons should not board the flight.
- 7.2 PH summarised the query as: What is the PPE recommendation for professional staff exposed to healthy individuals from at-risk areas?
- 7.3 Members commented that if those who are symptomatic are not boarding the planes, there is very little justification for PPE unless passengers develop symptoms in the flight but passengers can become unwell in flight for various reasons.
- 7.4 NERVTAG does not recommend PPE for professional staff exposed to healthy individuals from at-risk areas.

8 AOB: Next meeting

- 8.1 6.1 The meeting has overrun and the items listed for this meeting namely the items in relation to clinical management of severe cases and novel therapeutics will continue at another full NERVTAG meeting to be convened this Thursday.

Action 5 Secretariat to arrange another meeting for Thursday.

9 Summary of Actions

Action 1: PHE to send daily provincial level numbers to NF and his team for the risk calculations.

Action 2: NF and his team to calculate the risk of the provinces, weighted by travel information. This will be distributed to DHSC and PHE to incorporate directly into a new algorithm.

Action 3: PHE to add a link on the GOV.UK page on Wuhan Novel Coronavirus to either a list or map of the provinces affected.

Action 4: NF and PHE to share figures with DHSC and NHS-E for wider coordination and dissemination of updated case definitions.

Action 5 Secretariat to arrange another meeting for Thursday.

Minutes of the NERVTAG COVID-19 Tenth Meeting: 20 March 2020

Date & Location:	11:00 – 12:30, 20 March 2020 Via telecon only
In attendance:	Peter Horby (Chair), Camille Tsang (Secretariat), Emma Petty (Temporary Secretariat) NERVTAG Members: Wendy Barclay (WB), Ben Killingley (BK), Calum Semple (CS), Jim McMenamin (JM), Ian Brown (IB), Robert Dingwall (RD), Wei Shen Lim (WL). Andrew Hayward (AH), Cariad Evans (CE) NHSEI: Chloe Sellwood (CS) PHE: Maria Zambon (MZ), Gavin Dabrera (GD), Meera Chand (MC) DHSC Observers: Jonathan Van-Tam (JVT), [REDACTED], [REDACTED], [REDACTED] SAGE: [REDACTED]
Apologies:	Neil Ferguson, David Connell, [REDACTED]

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4	Review of evidence for asymptomatic or subclinical transmission	3
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NERVTAG TENTH MEETING

1 Welcome

- 1.1 The Chair welcomed members and thanked them for joining the meeting.
- 1.2 The Chair noted that there were three items for discussion at the meeting. Although the spokesperson for the last item was not present.

2 Brief Epi update

- 2.1 GD gave an update on numbers for England, with 3269 positive tests, a daily increase of 643 cases and a total of 144 deaths. He also provided an update on surveillance, with 10 positives from 561 tested by RCGP swabbing (1.8%) and 2.8% positives from HDU / ICU testing. It was noted that the RCGP data were from swabs received from mid-February to 15th March. Globally the impact assessment is set at high, with over 211000 cases worldwide on 19th March.
- 2.2 JM added that 3 out of 88 primary care tests in Scotland were positive.
- 2.3 The Chair suggested that members should be kept up to date on UK epi data on a weekly basis, with figures provided in advance of the weekly meeting. JVT noted that the CO-CIN database could also provide regular updates on hospital cases to the committee. It was agreed that PHE would provide a weekly surveillance summary for England, which would be collated with Scottish data and the CO-CIN update, to be circulated in advance of Friday's meeting. The documents would be classified as to their sensitive nature.

[Action: GD, JM & CS to co-ordinate weekly surveillance updates on UK numbers for distribution prior to Friday's meeting]

[Action: Secretariat to label summary documents 'official sensitive']

- 2.4 The Chair suggested to have a brief weekly meeting on Wednesdays with JVT to review the priority points for the weekly Friday meeting.

[Action: Chair & JVT to discuss on Wednesdays the agenda for the Friday meetings]

3 Review of data on the role of children in transmission

- 3.1 CS introduced the paper on the role of children in the transmission of SARS-CoV-2 in the COVID-19, which had been written by Karl Holden. There was little data on transmission by children of SARS-CoV-2. The review was broadened to encompass SARS-CoV-1 and MERS. There were no specific data on respiratory transmission. There was evidence of positive rectal swabs with negative respiratory samples, but this was considered to be of limited transmission risk. There were three case reports identifying a child as the source of SARS

transmission. Based on the available evidence it is not possible to say if children pose a greater or lesser risk of onward transmission than infected adults.

- 3.2 JVT noted that a similar paper by CMO's registrars had been submitted to Lancet Infectious Diseases, with essentially the same conclusions. This would be circulated to NERVTAG.

[Action: JVT to provide Lancet submission to the committee]

- 3.3 Members discussed the need for ongoing work on this issue and the requirement for serological assays. It was noted that a series of work has been planned by PHE. The use of the FF100 study was discussed and analysis of household transmission.

- 3.4 MZ discussed the details of one case with members which demonstrated proven vertical transmission during pregnancy. Once the timeline for the case had been laid out, a note would be sent to DHSC and CMO for consideration with guidance for pregnant women. Members questioned whether this would be considered an exceptional case due to the level of viral load. It was noted that there appeared to be no development issues with the child.

- 3.5 Members discussed the value of 'top and tail' style studies on children (swabbing of throat and anus). Currently samples are being taken in hospitals, but there are few children hospitalised. Sampling in a school or nursery environment would be useful to determine how much virus is present in children and on what surfaces within the school/nursery. It would not show the role of children in transmission; however, a household study may provide more information. With schools now being closed, it would be difficult to undertake such a study. Consideration could be given to schools open to the children of key workers. A potential pressure point for such a study would be the testing of samples. This would probably need to be undertaken in academic laboratories. The question of how to deal with positive samples, in terms of duty of care, should be considered separately. The Chair proposed that a recommendation be made for a 'top and tail' style study to be undertaken in a school/nursery environment if possible, with testing carried out in academic laboratories.

[Recommendation: Proposal for a study to be undertaken in children]

4 Review of evidence for asymptomatic or subclinical transmission

- 4.1 JVT noted that the previously circulated paper by MZ presented the evidence position well. There is plenty of information on asymptomatic people testing positive for SARS-CoV-2 but very little information regarding transmission. There is an ongoing process at PHE to track new information. There are sporadic reports, but the data are not convincing. The Chair requested that the paper be updated by WB & PHE Virology Cell.

[Action: PHE to update previous paper on asymptomatic transmission and pass to WB for additional input]

5 AOB and Next Meeting

5.1 The Chair noted that PHE had raised the following questions for NERVTAG to consider under AOB:

1. To inform discussion and planning of potential antibody testing in the community:
 - a. How quickly does NERVTAG consider that IgG could be detectable after onset of symptoms?
 - b. What might be the likely duration of IgG detection in COVID-19 cases following acute illness?
 - c. Whether NERVTAG consider that a clinically recovered case can be re-infected? – based on any early intelligence from clinical / neutralising antibodies studies, for instance.
2. What is the NERVTAG position on whether coughing produces an infectious aerosol risk and, whether a coughing confirmed patient be treated the same as an APG in terms of PPE?

5.2 MZ provided an overview of serological strategies. It was noted that there was an explosion of information on serology, but that some of this was confused. There was good potential for innovation with the current outbreak.

5.3 Members discussed access to specimens and active studies undertaking biological sampling.

5.4 Members discussed answers for question 1. It was agreed that there is likely to be considerable variability between individuals in IgG dynamics and that more data are needed. The paper by WB circulated for the ninth meeting provided some information on question 1c; however more evidence was now available. The Chair requested that the paper be updated and circulated to members.

[Action: WB to update paper on the potential for reinfection]

5.5 Members discussed the issue of the COVID-19 aerosol risk from coughing. It was noted that the infectious dose from aerosols was not known for this virus. For SARS, AGP are recognised as a greater risk than coughing. Caution was suggested with the concept that aerosols from coughs may not be as infectious, based on SARS information. Recommendations from the committee should have a scientific basis, but also consider the priorities for the availability of PPE in the UK, particularly with FFP3 masks.

5.6 The Chair proposed that the responses to the questions were:

1a. More data are needed but the best-guess is 14-21 days based on what is known from other viral infections.

1b. More data are needed.

1c. The updated paper will provide more information.

2. There is no change to the current guidance, but a further meeting is needed to review this.

- 5.7 JVT noted a separate group was considering supplies of PPE, both for the NHS and for other groups, such as social care and prisons. It was agreed that a joint meeting would be useful in determining a strategy which considered the scientific evidence and how to prioritise the available stock. The Chair suggested that BK, WB, LR and AH should be involved with this meeting for NERVTAG. JVT would organise the meeting arrangements.
- 5.8 The Chair confirmed that the meetings would continue on a weekly basis. The minutes of these would be condensed to provide the key discussion points and the actions. The next meeting would take place on Friday 27th March.
- 5.9 The Chair closed the meeting at 12.38pm.

Minutes of the NERVTAG Fifteenth Meeting: 24 April 2020

Date & Location:	11:00 – 12:30, 24 April 2020 - Via telecon only
In attendance:	Peter Horby (Chair), Fran ParryFord (Secretariat), Elaine Stanford (admin support), Emma Petty (minute taker). <i>NERVTAG Members:</i> Peter Openshaw (PO), Ben Killingley (BK), Calum Semple (CSm), Wei Shen Lim (WSL), Andrew Hayward (AH), Robert Dingwall (RD), John Edmunds (JE), Wendy Barclay (WB), Ian Brown (IB), Cariad Evans (CE), Chloe Sellwood (CSw), James Rubin (JR), Jim McMenamin (JM), Julian Hiscox (JH) <i>Invited Experts:</i> Kevin Rooney (KR), Sharmani Bernard (SB), Paul Burton (PB), Allan Baker (AB), Seb Fox (SF), Nick Andrews (NA), Tim Crayford (TC), David Bonsall (DB), Christophe Fraser (CF), Emily James (EJ) <i>PHE Observers:</i> Gavin Dabrera (GD), Maria Zambon (MZ), Meera Chand (MC), Mary Ramsay (MR), John Watson (JW), Isobel Oliver (IO), Shamez Ladhani (SL). <i>DHSC Observers:</i> [REDACTED] Jonathan van Tam (JVT), [REDACTED] <i>DFID:</i> Cathy Roth (CR)
Apologies:	None

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NERVTAG FIFTEENTH MEETING

1 Review of actions from the last meeting

1.1 The Chair welcomed members and thanked them for joining the 15th meeting. It was noted that members only had a short period of time to consider the large number of papers for the meeting. The Chair noted that the main issues for this meeting were pre-symptomatic transmission and contract tracing.

1.2 The actions from the last meeting were reviewed.

	Action	Comments
Item 1 – Matters arising	MZ to review WB paper on immunity and make any suggestions for inclusion.	Complete
	Secretariat to include antibody tests on the agenda for the next meeting if required	No issues flagged by members
	Secretariat to add the military barracks paper to the agenda for next meeting, MZ to assist	On the agenda – item 2c
Item 2 – Surveillance updates	Secretariat to add ARI outbreaks in care homes to the agenda for next meeting	On the agenda – item 2b
	JLB to provide and analysis of the all-cause mortality data that separates non-COVID mortality	On the agenda – item 2a
Item 3 – CO-CIN Update	CC to pass on NERVTAG's recommendation to communicate the CO-CIN data on nosocomial infections to hospital trust CEOs to DHSC data cell	Complete
	CC to follow-up with CMOs office to identify what action is being taken on the obesity signal	Complete
	Secretariat to ensure the minutes note the observation from CO-CIN that some patients present with gastro symptoms only, but test positive via respiratory swabs	Noted in the minutes as a recommendation
	MZ to provide an update on the infectiousness of faeces at the next meeting	Postponed until next meeting
Item 4 – Facemasks and SAGE	All to feed comments in on the facemasks paper which will be circulated at the weekend to go to SAGE w/c 20 April	Complete
Item 5 – AGPs review	All to review the paper on AGPs and send comments to the secretariat by midday Monday	Complete
	Secretariat to collate comments from members summarising the NERVTAG consensus view	In progress
Item 6 - Anosmia	Secretariat to add an item on anosmia to the agenda for next week	Postponed until next meeting following SAGE tasking
	MC/CB/JD/GD to produce an update on PHE's work regarding anosmia	Complete – to circulate ahead of next meeting
	All to review the anosmia paper on the symptom tracker ap (attached) and send any comments to the secretariat by midday Monday to report back to SAGE w/c 20 April	Complete

Item 8 – DHSC Questions	Secretariat to task the DHSC questions to the Virology experts within NERVTAG, and send response back to DHSC	Complete
Item 9 – Pre-symptomatic transmission	GD to prepare a paper on pre-symptomatic transmission as observed from clusters	On the agenda – Item 3

1.3 CC advised that NERVTAG's recommendation to communicate the CO-CIN data on nosocomial infections to hospital trust CEOs had been discussed with JVT. A request for confirmation to proceed has been emailed to NHS-EI. It is hoped this will be taken forward on 27th April.

1.4 It was noted that the level of over 40 BMI used for obesity in the high-risk conditions for enhanced social distancing related to morbid obesity. The obesity signal in the CO-CIN data is for clinician determined obesity, and probably captures BMI ≥ 30 . A revision to a BMI of over 30 in the guidance was requested. SD confirmed that this had been raised with CMO and will be taken forward. According to Health Survey for England data about 28-30% of the UK population has a BMI over 30. Different categories will be considered by CMO with regards to updating the risk groups.

1.5 The Chair informed members that the NERVTAG paper on facemasks was discussed at SAGE on 21st April and a summary of evidence has gone to ministers for a decision. There were differing views of the likely effectiveness of different types of masks and in different settings.

1.6 The NERVTAG consensus view on AGPs has been prepared and is awaiting the publication of the Health Protection Scotland paper. The secretariat will update on this at the next meeting

[Action: Secretariat to update on the consensus view on AGPs at the next meeting]

1.7 The PHE paper on anosmia actioned at the last meeting will be reviewed at the next meeting; however, the Chair requested sight of the paper, with AH. The Chair noted a request from SAGE to review the circulated anosmia paper on symptom clusters for contact tracing, which will be discussed at this meeting.

[Action: Secretariat to send PHE anosmia paper to the Chair & AH]

1.8 The draft minutes of the last meeting had been circulated to members. The secretariat requested comments by the end of today. These will be signed off, sent to DHSC and be made publicly available.

[Action: ALL to send comments to the secretariat on the draft minutes of the last meeting by COP 24th April]

2 Brief updates:

a. Excess mortality data breakdown

- 2.1 PB provided the background to the PHE presentation on the excess mortality data breakdown. The work of the team is to contribute additional methods and systems to help in exploring the changing pattern of deaths across England as the COVID epidemic evolves. The models predict the number of death registrations expected on a daily basis in a normal year and are used to explore the pattern of excess deaths. The excess deaths can be divided into COVID-independent and COVID-related. The mathematical tools used have been specifically tailored for this work.
- 2.2 SB presented the PHE data on excess deaths over the COVID outbreak to members. It was noted that the methodology used was developed to be flexible and robust. PHE has made specific requests for analyses. The daily deaths from 20th March 2020 to 17th April 2020 have been compared to a baseline of expected deaths. The baseline is produced using five years of historical data. Adjustments are made for specific bank holiday effects. Components on geographical region, age and sex are also included. Excess deaths are estimated for specific causes of death and place of death.
- 2.3 Data were presented on deaths from all causes at all ages. The excess deaths started to increase around 30th March and steadily increased over the time period analysed. The data for cumulative excess deaths distinguished those deaths which include a mention of COVID on the death certificate or with COVID as an underlying cause.
- 2.4 Members discussed the relationship between this data on COVID related deaths and the data released to the public. It was clarified that this work used ONS data but employed a different model for excess deaths, employing a different baseline estimation. The data are from all places of death, not just hospitals. The use of date of death registration vs. the date of death was also discussed. Modelling using date of death on all cause mortality shows approximately double excess deaths compared with the hospital deaths data from NHS England. The interpretation of the ONS data and PHE data is effectively the same.
- 2.5 A more detailed breakdown of the data was presented. There is an increase in the cumulative excess deaths with increasing age and there are more excess deaths in males than females. There is also an increase in non-COVID related deaths in the oldest age group. Data were provided on regions and deaths by underlying cause. Alternative presentations of data could be performed if there were specific requests. It was questioned what information is available on the ICD chapters, with consideration of causes such as suicides, homicides etc. It was noted that there was a separate program to consider those causes as most of those deaths would go to coroners and the data are only provided after the inquest. Alternative data sources are being considered.
- 2.6 Data were presented on deaths with a mention of specific causes, including dementia and diabetes, deaths by place of death. Future analyses will consider ethnic groups. The methodology is flexible to respond to specific requests. Members discussed the level of granularity available on rapidly released data for hospital related deaths, which could be misleading for some interpretations. It was understood that a detailed ethnicity report from PHE, commissioned by CMO, would be released at the beginning of May; however, earlier release of simplified data may be useful. It was recognised that data available for analysis would differ from the numbers produced by NHS England. Members discussed the need for openness on the reporting of data and using further breakdowns of the data, such as

regionality with ethnicity. CSM noted that the CO-CIN data had been adjusted for deprivation. There is a strong ethnicity effect observed, particularly for the black population. Information was not available on exactly when the PHE report would be published. It was noted that PHE are prioritising the analysis on ethnic groups, but there are issues to resolve for this.

- 2.7 Members discussed the public availability of excess mortality data and it was noted that ONS publish aggregate data. It was hoped that the PHE dashboard of the data presented to NERVTAG could be made publicly available, but no plan is in place for this currently. Members agreed that the information was very useful and should be made available.

[Recommendation: NERVTAG recommends that PHE's excess mortality data should be made publicly available]

- 2.8 Members discussed the marked increase in deaths linked with diabetes. The data did not show if this was from increased ketoacidosis or from COVID, but this could be explored further if required.

b. Military barracks

- 2.9 MZ presented the information on the military barracks outbreak. The investigation took place in a barracks in London, where there were a couple of reported cases and approximately 20 individuals in self-isolation. It was agreed to undertake a snapshot investigation for ~440 individuals within the barracks (including civilians and households of actively serving individuals) to present on a single day for swabs and/or blood samples and to complete a questionnaire. On a single day in March approximately 300 people were sampled. The preliminary data are on detection from the swabs (nose and throat) and from antibody tests. 24/302 (7.9%) participants were positive on swab testing. 20/24 (83.3%) participants with positive swab results were asymptomatic until the day of swabbing. SL confirmed that the individuals who were sampled will be followed up and this work is in progress.
- 2.9 Members discussed the CT values and viral loads in symptomatics and asymptomatics and whether the viral load in asymptomatics was high enough for them to be considered infectious. It was noted that infectious virus was recovered from some of the asymptomatic individuals. Numbers were not available. CB noted that screening of ~5000 individuals was being carried out over a selection of 11 hospitals, so there will be more data available shortly. Members suggested that when quarantine is lifted, it will be very difficult to find asymptomatic PCR+ve individuals. Asymptomatics are easier to find in institutional settings. Investigations in three homeless hostels have shown similar ratios of asymptomatics to symptomatics to that in the military barracks. There may be a need for whole population screening in institutional settings.
- 2.10 Members asked about the quality control for the virology. It was confirmed that individuals in the military barracks self-swabbed under observation. In the care homes investigation it was different staff who swabbed the residents and self-swabbed themselves. A human genomic control was not used in the laboratory assays.
- 2.11 The military barracks was a self-contained unit which showed that a regimented system of self-isolation and the implementation of simple infection control measures can control

outbreaks.

- 2.12 Members discussed the implications for contact tracing of the findings from the military barracks of a large proportion of asymptomatics. However, evidence from countries who have introduced intensive tracing appear to show some success with case-based contact tracing. It was noted that the stage of the epidemic at the point contact tracing is introduced should also be considered.

c. Care homes

- 2.13 SL presented the information on the care homes investigation. Swabs were taken in six care homes in London over the Easter weekend. All residents and staff were sampled and a total of approximately 500 swabs were collected. The six care homes were at different stages of outbreak. One of the homes had only identified two cases and had very few symptomatics. It was found that 75% of the residents carried the virus and only 25-33% were symptomatic. Approximately 45% of the healthcare workers were also carrying the virus, with 25-33% symptomatic. For two care homes, with registered deaths of 11 and 19 residents respectively, approximately 50% of residents were still positive for the virus and most of these were asymptomatic. It was noted that symptomatic staff were self-isolating and being replaced by bank staff, who moved through multiple care homes. The individuals who were sampled will be followed up over the next two weeks.
- 2.14 Members discussed how the symptoms were classified in the care homes, whether they considered just respiratory symptoms or included other symptoms such as loss of appetite. It was clarified that all symptoms were recorded and a clinical judgment was made. The control measures inside the homes were discussed. It was noted that some homes struggled with the implementation of infection control measures. Even with the use of full PPE, there was still a high rate of infection once a case had been reported.
- 2.15 It was noted that the data presented to members showed that of the staff from the six care homes who tested positive, the majority were asymptomatic.
- 2.16 SL noted an investigation of five care homes, where swabs were taken immediately that the first case is reported. For one of the homes, the preliminary results show that 40% of the residents tested positive and 30% of the staff were also positive.
- 2.17 Members commented on the difference in numbers of positives between the two types of institutions (military barracks and care homes) investigated.
- 2.18 Members questioned whether for care homes who had not been affected by the virus a potential control measure could be the self-isolation of staff within that environment. It was recognised that there would be practical implications for this.
- 2.19 It was noted that at present NERVTAG has not been asked to comment on care home measures.

3 Pre-symptomatic transmission

- 3.1 GD presented the paper on pre-symptomatic transmission. Two questions were posed for

NERVTAG regarding the evidence for pre-symptomatic transmission and the considerations of this for contact tracing. Published evidence of pre-symptomatic transmission was presented, having been assessed for temporal relationship, route of exposure, evidence of infection and exclusion of alternative sources. One report from Singapore, one from Germany and three from China were reviewed. It was noted that there were reports of secondary cases presenting with symptoms at the same time as the index case. There also tended not to be exclusion of alternative sources of infection in the reports.

- 3.2 Members discussed the papers from He et al¹ from Hong Kong and from Ferreti et al² which estimated the proportion of infectiousness based on the serial interval between infections in chains of transmission. Members agreed that the limited evidence suggest that pre-symptomatic transmission does occur. The importance of pre-symptomatic transmission is unclear but may account for up to 40% of transmission. AH was asked to review the proportion of household-based clusters in the two modelling papers, since (pre-symptomatic) transmission may be more common in this setting compared to the others. The Chair to provide AH with the papers.

[Decision – members agreed that the phenomenon of pre-symptomatic transmission exists]

[Action - PH to send AH the two modelling papers]

[Action - AH to review the proportion of household-based clusters in the two papers]

- 3.3 Members discussed pre-symptomatic transmission and asymptomatic transmission in the context of isolating contacts. The period of time prior to symptom onset for tracing the contacts was discussed. The evidence in the He paper suggests two days; however, the review of the five reports suggests a wider range, up to seven days, with the strongest evidence being for two days. MZ noted that statistical modelling had been requested on an observed virus detection data set with a reasonable estimate of days post illness onset of when the sample is taken for approximately 300 individuals. The preliminary results suggest three days prior to the onset of symptoms as being a practical cut-off period. The Chair requested that the information come to NERVTAG when it is available.

[Action - MZ to provide details of the statistical modelling on observed virus detection when it is available]

4 Contact tracing recommendations

- 4.1 It was noted that issues with pre-symptomatic transmission would be considered with contact tracing, as this concerns who is traced and when their contacts are captured.
- 4.2 IO provided an introduction to the issue. This discussion would help PHE move forward with the implementation of the new contact tracing programme. NERVTAG was asked to consider two points. The first was to provide comments on the proposed categorisation of

¹ He, X., Lau, E.H.Y., Wu, P. et al. Temporal dynamics in viral shedding and transmissibility of COVID-19. Nat Med (2020). <https://doi.org/10.1038/s41591-020-0869-5>

² Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing Luca Ferretti et al. (2020) DOI: 10.1126/science.abb6936

contacts and advice provided to contacts, and the second was consideration of the key questions circulated to members to help finalise the pathway in contact tracings (covered in item 5b). It was noted that the deadlines for the implementation of contact tracing were very tight.

- 4.3 GD clarified that the documentation on contact tracing categorisations provided the general approach used in contact tracing regardless of whether it was carried out by PHE or NHSx. Comments made on this approach would be useful to both PHE and NHSx.
- 4.4 Members raised strong concerns about the amount of complex information on contact tracing being delivered only shortly before the meeting and requests for NERVTAG to comment on and/or endorse the strategy very rapidly, without sufficient time to consider the information in any detail. Members were informed that the NHSx app was about to enter its first phase of release very shortly and it will not be possible to release the technology without a steer from NERVTAG. It was proposed that NERVTAG should consider the information over the weekend and hold an extraordinary meeting at the beginning of next week to consider this issue.

5 NHSx COVID App

a. NHSx position – overview of app

b. PHE paper – key questions for NERVTAG

- 5.1 TC introduced the documentation from NHSx and noted that there was one specific question that required NERVTAG's advice. The request for NERVTAG was to consider whether smartphone-based contact notification should be initiated upon the basis of symptoms or upon the basis of confirmed PCR testing
- 5.2 TC noted that the app will be employed as part of the relaxation of the lockdown. The technology will assist other strategies in reducing incidence rates during the next phase, following lockdown. The app will issue a warning if the phone comes in close range of a phone (with the app) of an individual who becomes symptomatic. The warning will advise the contact to quarantine for 14 days. If the symptomatic individual tests PCR negative, a notice advising release from quarantine of the contact will be given by the app. The core concepts for the app were presented. TC reported that national polling has suggested that ~70% of the population would download the app. The app uses an algorithm to determine interactions, using information on how long ago it occurred, how close the interaction was and how long the interaction lasted. This allows a risk threshold to be set for a transmission event. It was noted there was very little modelling for this type of work which deals with real world scenarios.
- 5.3 Several potential scenarios were presented and two were focused on specifically. One was for the app to alert contacts once an individual has tested PCR positive, with no alert for contacts in the timing between the onset of symptoms and receiving a positive test result. The other was for warning to be issued to contacts when an individual becomes symptomatic, in advance of a test result being received. Arguments were presented for each scenario.
- 5.4 It was confirmed that NERVTAG were not being asked to endorse the app itself but were

being asked to consider the science of whether the app should alert based on symptoms alone or following a positive PCR test. IO informed members that NERVTAG were being asked to consider two points. The first being the revised public health guidance by PHE on contact tracing, which takes into account the existence of the app. The second was to address the questions posed by PHE on the contract tracing pathway to finalise the strategy.

- 5.5 JW noted that PHE believe that use of the app can greatly support contact tracing; although there were some differences of view as to its deployment. Members' attention was directed to three key papers from PHE, which include key issues and concerns. PHE recognised that contact tracing has the potential ability to assist in the reduction of transmission; however, it was also recognised that contact tracing was an imperfect tool and needs to be part of a package. JW noted that there should be rapid testing of symptomatic individuals and the quarantine of individuals confirmed as positive. JW also recognised that there may be transmission before the onset of symptoms and there should be prompt diagnosis in symptomatic cases so that non-household contacts can be alerted. A concern was raised by JW that the use of a self-reported clinical diagnosis tool can introduce problems of sensitivity and specificity. JW recognised that the app will serve a useful purpose, however PHE believe that contact tracing should be linked with a firm diagnosis, that rapid testing is a key component and that sensible risk-based advice should be given to all categories of contact. Contact tracing will only form part of a raft of strategies for reducing transmission.
- 5.6 The Chair summarised that the fundamental question was whether to recommend quarantine of contacts when there is only a diagnosis based on symptoms and not a PCR positive test. It was noted that as only one model was currently available, additional models would be helpful. Members raised the issue of presentation of cough and fever symptoms which are not COVID-19-related, particularly over the winter period and having the testing capacity to cope with these additional requirements. The likelihood of individuals quarantining themselves prior to a positive test was questioned. The issue was also raised of individuals having to serially quarantine due to members of the household (particularly children) being symptomatic, which could have an impact for the working population.
- 5.7 The Chair proposed that an extraordinary ad hoc meeting to discuss this was taken forward, with the involvement of SPI-M. Consideration would need to be given to the proportions of individuals who are symptomatic and of those how many are likely to be COVID-19-related under different scenarios, and what this means for those isolating or for the number of tests that need to be performed. It was proposed that the NHSx modelling should go to SPI-M for review and additional modelling be produced to provide information on the robustness of the arguments.
- 5.8 IO clarified that the contact tracing programme was being run by DHSC, and PHE are only leading on a component. PHE welcomed the prompt consideration of the questions posed by NERVTAG via the extraordinary meeting. TC added that NHSx would be supportive of SPI-M being involved and for more time to be given in the consideration of the issues. Details of two critiques of the model would be sent to the secretariat for circulation.

[Action – Secretariat to arrange an extraordinary meeting (date to be determined from 25th to 27th) to discuss the issues on timings for contact tracing.]

[Action – SPI-M to review the NHSx model and produce an additional model for

consideration on contact tracing]

[Action – NHSx to send critiques of the contact tracing app model to the secretariat for circulation]

6 Weekly surveillance update

- 6.1 This item was not covered at the meeting due to time constraints.

7 Thematic updates

- a. Antibody response / immunity (WB/PO)*
- b. Virology (CE)*
- c. Clinical (WSL/PO)*
- d. Therapeutics (PH)*
- e. IPC measures (LR)*

- 7.1 This item was not covered at the meeting due to time constraints.

8 AOB

- 8.1 This item was not covered at the meeting due to time constraints.

- 8.2 The Chair thanked members for their attendance and their contributions. The meeting closed at 1.30 pm.

Minutes of the NERVTAG Sixteenth Meeting: 01 May 2020

Date & Location:	12:30 – 14:30, 01 May 2020 - Via telecon only
In attendance:	Peter Horby (Chair), Fran ParryFord (Secretariat), Elaine Stanford (admin support), Emma Petty (minute taker). <i>NERVTAG Members:</i> Peter Openshaw (PO), Ben Killingley (BK), Calum Semple (CSm), Wei Shen Lim (WSL), Andrew Hayward (AH), Robert Dingwall (RD), John Edmunds (JE), Wendy Barclay (WB), Ian Brown (IB), Cariad Evans (CE), James Rubin (JR), Jim McMenamin (JM), Julian Hiscox (JH), David Connell (DC), Lisa Ritchie (LR) <i>Invited Experts:</i> Kevin Rooney (KR) <i>PHE Observers:</i> Gavin Dabrera (GD), Maria Zambon (MZ), Meera Chand (MC), Jamie Lopez-Bernal (JLB), Jake Dunning (JD), Colin Brown (CB), Shamez Ladhani (SL) <i>DHSC Observers:</i> [REDACTED], [REDACTED] Jonathan van Tam (JVT), [REDACTED] [REDACTED]
Apologies:	None recorded

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NERVTAG SIXTEENTH MEETING

SUMMARY OF NEW DECISIONS AND ACTIONS

Actions from the last meeting were reviewed and agreed progress was updated.

- A working group led by AH was convened to review and summarise available information on the proportion of COVID-19 infections that are asymptomatic from literature, for NERVTAG review prior to SAGE on 12th May. PHE agreed to provide additional data updates on asymptomatic transmission and collated hospital trust data on snapshot testing of staff.
- NERVTAG was asked to consider the potential for asymptomatic transmission from test-positive individuals, with specific consideration for closed environments, such as care homes and concluded that PCR-positive asymptomatic individuals may be infectious; but the level of infectiousness compared to symptomatic individuals is uncertain. Furthermore, PCR-positive asymptomatic staff should not provide care or have contact with susceptible vulnerable individuals.
- In response to a request from DHSC to assist with plans for rapid contact tracing, members agreed to review an analysis of data (produced by AH) on potential weighting of symptoms and submit a consensus to DHSC.
- Members considered recent reports of a paediatric hyper-inflammatory syndrome and recommended that appropriate studies, such as a case control study, are conducted to provide a better understanding of the natural history and aetiology of the paediatric hyper-inflammatory syndrome.
- Thematic updates were received and discussed, including a systematic review which reported ~7% co-infection, NICE guidelines on use of antibiotics, isolated anosmia, use of remdesivir and the start of a UK trial on therapeutic use of convalescent plasma.

1 Review of actions from the last meeting

- 1.1 The Chair welcomed members and thanked them for joining the 16th meeting. The minutes of the last meeting had been circulated. Members were asked to provide comments to the secretariat by 4th May 2020. It was noted that minutes of previous meetings will be made publicly available. The accessibility of the webpage containing the minutes would be checked.

[Action: ALL to send comments on 15th meeting draft minutes to secretariat by COP 4th May 2020]

[Action: Secretariat to check on access to online minutes]

- 1.2 The actions from the last meeting were discussed.

	Action	Status
Item 1 – Matters arising	Action: ALL to send comments on 14 th meeting draft minutes to secretariat by COP 24 th April 2020	Complete
	Action: CC to update on the action around passing on NERVTAG's recommendation to communicate the CO-CIN data on nosocomial infections to hospital trust CEOs to DHSC data cell.	Complete
	Action: Secretariat to update on when the wider review of AGPs is published.	Ongoing
	Action: Secretariat to send PHE Anosmia paper to PH & AH	Complete
Item 2a – Excess mortality breakdown.	Action: ALL to send suggestions to the secretariat for further analyses regarding excess mortality.	Ongoing
	Action: Secretariat to note in the minutes that the excess mortality breakdown data should be made publicly available.	Complete
Item 3 – Pre-symptomatic transmission	Action: PH to send AH the two modelling papers (Hong Kong distribution and Ferati paper)	Complete
	Action: AH to review the proportion of household-based clusters in the two papers	Ongoing
	Action: MZ to provide details of the statistical modelling on observed virus detection, which suggests a pre-symptomatic period of 3 days, when it is available	Ongoing
Item 4 – Contact tracing recommendations	Action: Secretariat to arrange an extraordinary meeting (date to be determined from 25 th to 27 th) to discuss the issues on timings for contact tracing.	Complete – meeting held on 26 th April.
	Action: SPI-M to be asked to produce an additional model for consideration on contact tracing	Complete

1.3 Members were advised that NERVTAG's recommendation to communicate the CO-CIN data on nosocomial infections to hospital trust CEOs had been taken forward.

1.4 LR confirmed the review of AGPs would be published on the Health Protection Scotland website. The secretariat would collate the comments on AGPs in post-mortems to be reviewed by the Chair, prior to submission to PHE. The review of AGPs will provide definition on procedures for PHE. NERVTAG will not respond to new questions on individual procedures unless new evidence is available.

[Action: Secretariat to collate comments on AGPs in post-mortems for review by the Chair]

1.5 AH reported that the two modelling papers covered a range of settings and were wider than just household-based clusters. The conclusion is that asymptomatic transmission may be part of clusters both outside and inside the household.

[Action: AH to provide a conclusion sentence on the review of the two modelling

papers]

- 1.6 MZ reported that the statistical modelling data are not yet available.
- 1.7 The secretariat noted that the extraordinary meeting had been held on 26th April and all members will have received a copy of the draft minutes of that meeting. JE confirmed that the SPI-M model had been produced and submitted to NERVTAG and SAGE.
- 1.8 The Chair provided an update on the presentation to SAGE of NERVTAG's recommendation from the extraordinary meeting. SAGE had not accepted all of the recommendations in full and will further consider the issues in a separate meeting. The conclusions from SAGE should be communicated to DHSC as soon as possible, to assist with programme planning.

2 Anosmia & symptom clusters critical to contact tracing, to address the SAGE action: "NERVTAG and DCMO to finalise assessment of anosmia and consider other symptom clusters which might be critical to contract rapid contact tracing after release of distancing measures"

- 2.1 The Chair noted the importance of the question being asked of NERVTAG. Two papers had been circulated for members' consideration.
- 2.2 AH introduced the review and meta-analysis of the sensitivity and specificity of different symptoms for case detection in community settings. A range of studies were included. It was not always clear if a case definition was used for case detection. Estimates of specificity and sensitivity were produced for each symptom. In general, none of the symptoms individually had a high level of sensitivity for laboratory confirmed COVID-19. The specificity results were higher than expected and will be reviewed further. The paper also presented data from Kings from the symptom tracker app work. There may be an issue on inconsistent symptom reporting over time. It appears that no single symptom will be a sufficiently sensitive and specific trigger for testing and a combination of symptoms will need to be considered.
- 2.3 The circulated PHE paper contained summaries of the FF100, CO-CIN and anosmia data. The paper puts forward two options for case definition changes, considering symptoms on the basis of frequency or by clusters. The issue of symptom reporting in the elderly was considered, with the inclusion of unusual presentations in the elderly.
- 2.4 Members discussed the biases in reported symptoms in index cases detected using a case definition vs. secondary cases detected through contact tracing. The latter are a more reliable representation of presenting symptoms. It was noted that the FF100 data was only from index cases, but that it would be possible to supply data for secondary cases. Members were informed that there is a household contact study underway, with all contacts of the households being tested.

- 2.5 The urgency for comments from NERVTAG on this issue was recognised. Members questioned what metric should be considered for case definition for the app. It was noted that if there was a high false positive rate, it could result in multiple false alarms and could reduce public confidence in the app. A range of options could be considered. Members suggested a scoring system based on clusters of symptoms could be used. For example, the most common symptoms appear to be headache; fever; sore throat; cough and fatigue, and a combination of 3 of the 5 could trigger a requirement for a test. The app could be programmed on a weighted score basis for symptoms. The balance between sensitivity and specificity would need to be considered. Members questioned if there were recognised groupings of symptoms. It was suggested there should be detailed epidemiological work on cases in the community to provide data for this. Use of a weighted scoring system for symptoms may need to consider adjustments for different settings, such as in care homes, although it was recognised that the initial requirement was for the general public. The weighting could be adjusted depending on the results emerging from use of the app.
- 2.6 Members discussed the production of a weighted scoring system but acknowledged that analysis of the raw data was required to achieve this. AH agreed to request the data from the Kings group and analyse both this data and the FF100 data, in particular the day 1 data. On completion of the analysis (by 3rd May), the secretariat would circulate the results to members for comment and the Chair would provide DHSC with the NERVTAG consensus on 3rd May. It was requested that the consensus be provided as soon as possible to DHSC, to aid with initial roll out of the app, but this would be dependent on completing the analysis of the data.

[Action: AH to request data from Kings on symptoms, with support from JVT]

[Action: AH to analyse available data for potential weighting of symptoms and provide results to the secretariat to circulate to members]

[Action: ALL to review analysis on symptom weighting to produce a consensus view on 3rd May 2020]

[Action: NERVTAG to submit consensus on symptom weighting to DHSC ASAP on 3rd May]

3 Asymptomatic transmission in children and adults, to address the question: What proportion of infected people are asymptomatic?

- 3.1 This item related to a specific question from CMO's group on the proportion of infected people who are asymptomatic. The circulated paper for this item was prepared for the CMO Scientific Advisory Group.
- 3.2 JE noted that SPI-M and Imperial use an estimated figure of 50% infectiousness for asymptomatic compared with symptomatic infections. The proportion of asymptomatic infections is age-dependent in the SPI-M model, from approximately 75% in children to <20% in the over 70s. Snap shot data may be misleading as some individuals may be pre-

symptomatic not asymptomatic. JE referenced the Bi et al paper¹ and the analysis of different symptoms by age group. SPI-M have reviewed the fraction asymptomatic by age. JE would provide details of the Bi et al paper and details of the SPI-M model. Members discussed an analysis of age stratification of proportion asymptomatic and symptomatic from the Diamond Princess cruise ship. The follow-up of the military investigation and care homes investigation, discussed at the last meeting, will also provide data on proportion asymptomatic.

[Action: JE to send the paper on the details of the model and the Bi et al paper to the secretariat for circulation]

- 3.3 The Chair proposed that a subgroup of members could cross check available data against the age stratified asymptomatic proportion in the SPI-M model. AH noted that there are data on the asymptomatic proportion from the literature review carried out for symptoms, which could be extracted. Members discussed specific points in the paper for the CMO Scientific Advisory Group, including the timing of the pre-symptomatic transmission peak. Careful consideration should be made of the difference between observed data and modelled data. MZ noted there was a body of UK data available (now and more in the near future) that could be used to refine the review of the proportion of infections that are asymptomatic. A working group of the Chair, AH, MZ and JE agreed to review the available data on the proportion of infections that are asymptomatic and cross check against the current model assumptions. AH agreed to take the lead on this work.

[Action: AH to extract information on proportion of infections that are asymptomatic from literature]

[Action: Working group (Chair, AH, MZ and JE) to review and summarise the available information on the proportion of infections that are asymptomatic. This should be completed and reviewed by NERVTAG prior to SAGE on 12 May]

- 3.4 GD noted an action from the extraordinary meeting on 26th April for a fortnightly update on the pre-symptomatic clusters paper. It was agreed that this paper would be included with updates on asymptomatic transmission.

[Action: PHE's fortnightly updated paper on pre-symptomatic clusters to include with updates on asymptomatic transmission (GD)]

- 3.5 It was mentioned that there is a central national request for snap-shot testing of hospital staff to be undertaken by trusts and the data may be helpful for analysing the proportion of infections that are asymptomatic. CB confirmed that the data are being collated through the SAGE nosocomial subgroup and could be shared with NERVTAG when available. It was noted that Imperial are undertaking a large study in the community with self-swabbing of 100,000 individuals. This was separate to the ONS study. Virus watch will be starting soon, but swabs are only taken when individuals are symptomatic.

[Action: PHE to provide update on hospital trust collated data on snap shot testing of staff (CB)]

¹ Epidemiology and transmission of COVID-19 in 391 cases and 1286 of their close contacts in Shenzhen, China: a retrospective cohort study. Bi, Qifang et al. The Lancet Infectious Diseases 2020

4 Interim management of positive people in care homes

- 4.1 CB introduced the circulated paper. PHE are swabbing staff and residents in care homes. It was noted that swabbing would detect a mixture of asymptomatic, pre-symptomatic, symptomatic and post-symptomatic individuals. NERVTAG was asked to consider the potential for asymptomatic transmission from test-positive individuals, with specific consideration for closed environments, such as care homes.
- 4.2 Members discussed the strength of the evidence of infectiousness of asymptomatic individuals. The assumption used for modelling is asymptomatics are 50% as infectious as symptomatics. JE referenced work from Vietnam and Germany² which appears to show asymptomatic transmission but acknowledged the difficulty in distinguishing asymptomatic from pre-symptomatic infection.
- 4.3 Members questioned whether asymptomatic PCR-positive individuals seroconvert. SL confirmed that in the military investigation, 10% of asymptomatic individuals did seroconvert. Four individuals were simultaneously sero-positive and PCR-positive. Infectious virus was recovered in one individual who was antibody-positive but had no neutralising antibody. SL added that more information on the care homes investigation would be available in the coming week. Sequencing is being carried out as part of the investigation. Members queried whether the mutation rate in coronaviruses could be too low for sequencing to be useful for tracing chains of transmission.
- 4.4 It was noted that there are very few data on proven transmission from asymptomatic PCR+ve individuals. WSL reported on work in Guangzhou province which found the risk of transmission from asymptomatic cases was 0.33%, using a cohort of 4,950.³ MZ reported figures for infectious virus isolation from asymptomatic individuals in both the military and care home investigations. Members discussed whether PCR cycle threshold (Ct) levels in asymptomatic individuals may prove a useful correlate of infectiousness. It was agreed that individuals with no symptoms who are PCR positive can be infectious.

[Decision: NERVTAG agrees that PCR-positive asymptomatic individuals may be infectious; but the level of infectiousness compared to symptomatic individuals is uncertain]

- 4.5 Members discussed what approaches should be employed in closed settings, such as care homes, with vulnerable residents. A variety of approaches have been used in hospitals following swabbing of staff and determination of PCR-positive asymptomatic infection. Members agreed that more stringent measures are needed for nursing homes to improve shielding of highly vulnerable individuals. PCR+ve asymptomatic staff should not provide care or have contact with susceptible vulnerable individuals. The possibility of cohorting +ve staff and residents was discussed. It was noted that cohorting would need to be backed up with intense surveillance of staff and residents. The operational approaches should be decided by PHE & DHSC. CB would relay NERVTAG's comments to DHSC.

[Action: CB to report to DHSC/PHE on NERVTAG consensus that:

² <https://www.nejm.org/doi/full/10.1056/NEJMc2001468>

³ <https://www.medrxiv.org/content/10.1101/2020.03.24.20042606v1>

PCR-positive asymptomatic individuals may be infectious; but the level of infectiousness compared to symptomatic individuals is uncertain.

PCR-positive asymptomatic staff should not provide care or have contact with susceptible vulnerable individuals.]

5 Paediatric hyper-inflammatory syndrome

5.1 The Chair noted that there was significant activity on this with regards to case definitions and surveillance. CS noted that BPSU was well engaged. There may be an increase in numbers of children presenting with a multi-inflammatory state which appears similar to but distinct from Kawasaki syndrome; however only a small number of cases have been reported (~30). It is not clear if it is related to COVID disease, is a post-COVID or para-COVID syndrome, or is unrelated. Some members proposed that a case control study would be useful. Detailed serological information is needed on the cases, as they present with the multi-inflammatory state 2-3 weeks following a trivial respiratory tract infection. Members discussed the timing of presentation. It was suggested that historical data from fluwatch could be used to estimate the expected respiratory illness in children for this month. It was noted that the cases could be enrolled in one of the two existing studies (Diamond and CCP-UK study).

5.2 The Chair requested that this item was retained on the agenda for the next meeting as an item of concern and that NERVTAG would recommend that appropriate studies need to be undertaken.

[Action: Secretariat to add to the agenda for the next meeting]

[Recommendation: NERVTAG recommends that appropriate studies, such as a case control study, are conducted to provide a better understanding of the natural history and aetiology of the paediatric hyper-inflammatory syndrome]

7 Thematic updates

a. Antibody response / immunity (WB/PO)

7.1 WB informed members that there have been no significant new developments with regards to immunity and antibody response.

b. Virology (CE)

7.2 No update was available.

c. Clinical (WSL/PO)

7.3 WSL noted that a systematic review of co-infection in COVID-19 had been completed, particularly considering bacterial co-infection. Overall there was ~7% co-infection, most of which was found in ITU patients. Guidelines are being produced for NICE on the use of antibiotics for COVID cases.

7.4 A recent paper on anosmia noted that isolated anosmia was found in 3% of cases, and it preceded other symptoms in 12% of cases. WSL would forward the paper to AH.

[Action: WSL to send anosmia paper to AH]

d. Therapeutics (PH)

- 7.5 The Chair noted that the convalescent plasma trial has started in the UK and also the results of trials on the use of remdesivir in USA and China.

e. IPC measures (LR)

- 7.6 BK informed members that there were no updates on IPC measures.

6 Weekly surveillance update

- 6.1 CS confirmed that there were no new signals in the CO-CIN report. The formal report has been submitted to BMJ.

8 AOB

- 8.1 The Chair thanked members for their attendance and their contributions. The next meeting would be on the morning of Thursday 7th May due to the bank holiday. The meeting closed at 2.35 pm.

[Action: Secretariat to arrange the next meeting for 7th May 2020 due to the Friday bank holiday]

Minutes of the NERVTAG COVID-19 Thirty-first Meeting: 04 September 2020

Date & Location: 11:00 – 13.12, 04 September 2020 - Via telecon only

In attendance:

NERVTAG Chair: Peter Horby

NERVTAG Members: Peter Openshaw (PO), Andrew Hayward (AH), Cariad Evans (CE), Wei Shen Lim (WSL), Ian Brown (IB), Jim McMenamin (JM), Julian Hiscox (JH), Chloe Sellwood (CSw), David Connell (DC), Neil Ferguson (NF), James Rubin (JR), Wendy Barclay (WB), Ben Killingley (BK), John Edmunds (JE), Callum Semple (CSm)

NERVTAG Secretariat: Ruth Parry, Emma Petty, Elaine Stanford

PHE Observers: Gavin Dabrera (GD), Meera Chand (MC), Maria Zambon (MZ), Jake Dunning (JD), Jamie Lopez-Bernal (JLB), Susan Hopkins (SH), Meng Khaw (MK)

DHSC Observers: [REDACTED], [REDACTED], [REDACTED]
Jonathan Van Tam (JVT), Jenny Harries (JH)

NHSE Observer: Imogen Hudson (IH)

SAGE Secretariat: [REDACTED]

DfID: [REDACTED]

DAs: Rachel Jones (RJ), Catherine Moore (CM); Wales

Apologies: Robert Dingwall (RD), Paul Cosford (PC)

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Summary of 31st Meeting

- The committee heard a presentation on NHS Test and Trace and agreed to share with them requests for data streams which would be useful forming their advice to Government.
- The committee heard a paper authored by NERVTAG members; an update on immunity to SARS-CoV-2 that had been discussed at SAGE meeting 55 on 3 September 2020. It was noted that the paper had been well received and that the topic would be re-visited as more data on immunity accumulate.
- The committee reviewed Andrew Hayward and colleagues' paper on community case definitions for COVID-19. It was proposed that there was currently no evidence for changing the case definition for adults, but that further evidence would be sought of symptoms in children. Similarly, further evidence was required of symptoms in the elderly, but it seemed likely that there was a case for including 'delirium' as an indicator for testing in the elderly. Members will send their comments to AH with a view to submitting the paper to the Senior Clinicians group on 08 September and SAGE on 10 September 2020.
- The committee reviewed Andrew Hayward and colleagues' paper entitled "a rapid review of the asymptomatic proportion of PCR-confirmed SARS-CoV-2 infections in community settings". Members will send their comments to AH with a view to submitting the paper to SAGE on 10 September 2020.
- The committee were provided with an update on education surveillance in Scotland. It was noted that schools had been open for over two weeks and in that time, there had been a large number of tests carried out on children and families. Therefore, school opening had put a significant pressure on the testing system. The proportion of children positive was low.

List of actions:

	Item		Actions
3	<i>NHS Test and Trace</i>	31.1	All to provide Test and Trace data requirements/questions to PH
		31.2	PH to consult with Angela McLean to capture SPI-M data requirements for Test and Trace and then compile with responses from NERVTAG members into a formal request letter to Susan Hopkins from NERVTAG and SPI-M
5	<i>Review of asymptomatic proportion</i>	31.3	All to read the paper on the asymptomatic proportion and give comments to AH. AH to update and send to PH for presentation at SAGE w/c 07 September
		31.6	AH to contact Sarah Walker and Cristina Acheson re methods of ascertainment of symptoms data from ONS surveys and REACT study.
6	<i>Community case definitions</i>	31.4	All to comment on the case definitions paper directly to AH, so it can be updated for presentation to the Senior Clinicians/CMOs group and SAGE in the w/c 07 September
		31.5	AH to review data on delirium as a symptom in the over 60s
7	<i>Thematic updates</i>	31.7	PH to discuss with JVT whether advice from NERVTAG regarding 'long COVID' is required by Government/SAGE.

Minutes of the meeting

1 Address by Patrick Vallance

- 1.1 Patrick Vallance had given apologies, because of a meeting clash; he will attend a future meeting.

2 Review of actions from the last meeting

- 2.1 The Chair welcomed Members and thanked them for joining the 31st meeting. The actions from the last meeting were reviewed

Actions from 30th COVID meeting held on 20 August 2020

	Item		Actions	Status
2	Transmission in children	30.1	<i>PHE to check for data on the presentation of symptoms by children vs adults in the studies considering transmission in children</i>	Ongoing
		30.2	<i>SAGE secretariat to confirm if the PHE paper on transmission in children had been presented to the SAGE children's subgroup</i>	Will be followed up by SAGE secretariat
3	Update on protective immunity	30.3	<i>NERVTAG working group (WB, MZ, PO & JH) to update the paper on immunity and liaise with SPI-M in relation to updating the models</i>	<i>Paper completed and presented to SAGE on 03 September 2020, on agenda for 31st NERVTAG meeting</i>
6	AOB	30.4	<i>AH to provide the paper on the symptom clusters prior to the next meeting</i>	<i>Complete, on the agenda for the 31st meeting</i>
		30.5	<i>SD to circulate details for support for NERVTAG members</i>	Complete

2.2 Action 30.1 – GD to follow up

2.3 Action 30.2 – SAGE secretariat to follow up

2.4 Action 30.3 – complete, on the agenda for the 31st meeting.

2.5 Action 30.4 – complete, on the agenda for the 31st NERVTAG meeting.

2.6 Action 30.5 – complete. Some responses received from NERVTAG members which have been passed onto SAGE.

3 Presentation from Test and Trace Team

3.1 MK introduced a slide set on Test and Trace and noted that Paul Cosford sends his apologies.

3.2 Test and Trace was established within DHSC, led by Dido Harding. On 18 August it was announced that the Test and Trace programme would become part of the new National Institute for Health Protection.

3.3 There are links with Commissioners, local authorities, and regulators.

- 3.4 The high-level business plan was described; the main aim is to break chains of transmission enabling a return to a more normal way of life. This done through four Pillars and 10 objectives, some cross-cutting. The model is local by default; tailored to the needs of diverse users.
- 3.5 The timeline was described; established on 28 May 2020 with access to the diagnostic testing. The aim is for 1 million daily tests by the end of December 2020.
- 3.6 The patient journey for people with symptoms was described, noting that the period of isolation is now 10 days.
- 3.7 The journey for those who are deemed to be close contacts of people with coronavirus was described. Recommendations about hygiene and monitoring for symptoms are given and isolation is for 14 days.
- 3.8 A flow chart of how people are tested and move through the Test and Trace service was presented.
- 3.9 The weekly report was presented with historic data.
- 3.10 PH noted that data streams that would be useful to NERVTAG would be occupation, symptom clusters and how these may change over winter, and PCR Ct values.
- 3.11 Members raised issues of the timeliness of the test, background data on symptoms relevant to COVID, inequalities in testing; e.g. if the patient can't drive.
- 3.12 SH noted that the way in is through the online portal where questions are asked about symptoms or 'other' and occupation, but this is poorly filled out. Ct values are coming through to PHE from Lighthouse labs, but not NHS labs. Over time the number who have come in as 'other' and are positive has increased. People take an average of 2 days before they get a test. The turnaround time for postal sampling is longer than other routes.
- 3.13 Inequalities – there are 500 mobile testing units in the system. One eighth are flexible, there are pilots looking at how to get into GP practices and COVID hot hubs.
- 3.14 It was noted that information on onset dates for the index cases are critical, but they are not publicly available, as it is not a required field. The same applies to the reason for testing. Data on numbers linked to a case and clusters are also required.

Action 31.1 - *All to provide Test and Trace data requirements/questions to PH*

- 3.15 JVT noted the need to obtain data from Test and Trace sooner rather than later and suggested that PH consult with Dame Angela McLean to capture a joint minimum dataset including SPI-M data requirements for Test and Trace.

Action 31.2 - *PH to consult with Angela McLean to capture SPI-M data requirements for Test and Trace and then compile with responses from NERVTAG members into a formal request letter to Susan Hopkins from NERVTAG and SPI-M*

4 Update on Immunity to SARS-CoV-2

- 4.1 WB noted that this is an update paper requested by SAGE. The key points are:

Antibody production

- a) most people make antibody to both S and N protein after infection. Most tests being used measure antibody to the N protein (e.g. for sero-prevalence).

- b) Page 6 of the document considered a paper on a fishing boat that went out from Seattle, had an outbreak on board and returned. Antibody testing before it went out; 6 people were positive in an N antibody test; three were higher positives than the other three. In the outbreak 85% of the crew had been infected, but the three with high levels of N antibody and neutralising antibody against the RBD did not get infected. The three others that did not have neutralising and low N antibody did get infected. The Ct values for these individuals was as high as is found in naïve infected individuals. It was noted that they were very small numbers, but a significant finding in a real-world situation, particularly with regard to the presence of neutralising antibody in those who were not infected.

4.2 Concept of re-infection.

A published case of a 33-year-old healthy Hong Kong male was highlighted. He was infected in the first wave and travelled outside of Hong Kong in August and was found positive a second time. Sequencing found it to be a different virus. He had no antibody when he arrived, had no symptoms but shed detectable virus RNA at a high level. Five days later he had developed antibody. The SARS-CoV-2 PCR ct values in this individual were compatible with this individual being infectious.

- 4.3 It was noted that there are descriptions in the literature of re-infection, but some are not very robust (US paper). The conclusion is that reinfection is possible, but the frequency and the implications for disease transmission are uncertain.

4.4 Antibody waning/decline in antibody titre.

Most studies of sequential sera/saliva describe a decline in antibody titre over time. One study from Iceland found no decline in antibody concentrations after 4 months.

4.5 Discussion of antibody response:

MZ noted that national seroprevalence studies in the UK are being carried out using the EuroImmune assay, which is 'S' based. Internal observational data is that the N antibody test based on the Abbott assay shows a decline more easily than other N-based assays. This may be associated with the antigen used in that assay and which may detect a subset of antibody that has a short half-life.

- 4.6 WB noted that the Iceland study used 6 different tests including EuroImmune, none of which waned. Other studies, such as the one from Kings find waning of IgG.
- 4.7 JH noted that the results can depend on how the antigens are made, e.g. baculovirus or E. coli expression
- 4.8 AH noted that part of the explanation of the findings in Iceland might be which patients are in the study. This study includes mild cases, other studies may be hospitalised individuals.
- 4.9 MZ noted that neutralising antibody has been investigated in convalescent plasma donors. The observation has been that the longer the time is from diagnosis the lower the antibody level. Care homes studies should provide data in the elderly population. It was suggested that the term 'waning' is too strong; a decline and then plateauing of antibody levels is to be expected.
- 4.10 It was suggested that the SIREN study may be able to provide evidence of boosting of antibody responses following re-exposure or reinfection, but to date participants have had the baseline antibody concentrations measured in different assays. The plan is to test them all with the same 'N' and 'S' assay and then follow through.

4.11 T cells

PO noted a number of studies on the role of T cells. The Oxford study will be published soon. There are a number of dominant epitopes, particularly in CD8 cells, some of which are cytotoxic. CD4 cells are important in supporting memory, including B cell memory, so it is important that any vaccine induces good CD4 T-cell support.

4.12 It is crucial how the T-cell response is measured. Cells in peripheral blood may not reflect what is going on in the mucosa.

4.13 There is concern that very strong T cell memory in the presence of non-neutralising antibody may be associated with enhanced disease but is something for which there has been no direct evidence.

4.14 Discussion of T Cell immunity:

WB noted the Karolinska study in which there was a good deal of T cell cross-reactivity with seasonal coronavirus; around 30% of samples collected in 2019 had responses to SARS-CoV-2 peptides. There were also those in households that had been exposed but not infected, did not produce antibody, but had T-cell responses. It was noted that using high throughput assays to measure T cell response is not feasible.

4.15 It was proposed that re-infection was the exception but recognised that it may be too early to be able to say more about re-infection, the role of antibody and individual susceptibility.

4.16 Studies by PHE; looking at re-infection during the winter, the HPRU study (INSTINCT) on households, (looking at T cells) and sub-study of SIREN (Paul Klenerman) were noted. Some coordination of this is being carried out by Paul Moss who will be reporting back to SAGE next week. It was noted that the CIC / ISARIC4C study is doing serial cellular immunology and serology, 3 - 4 monthly on 400 cases.

4.17 It was noted that the paper was well received by SAGE, no actions, will be re-visited regularly as data emerge.

5 Review of asymptomatic proportion of PCR-confirmed SARS-CoV-2 infections in community settings

5.1 AH noted that this was an update and expansion of a previous paper. The challenge is to find studies that are not biased to people who have specific symptoms and have sufficient quality of follow up to distinguish between people who had mild symptoms either before or after their test.

5.2 Twenty-two studies met the criteria. The headline is around 28% asymptomatic in those studies, although there is a large amount of heterogeneity.

i. Ct values were examined; they were similar across symptomatic and asymptomatic patients. In one study viral culture positivity was higher in symptomatic and pre-symptomatic, compared to asymptomatics.

ii. Duration of viral PCR positivity appeared shorter in asymptomatics, but there are potential biases that have not been explored.

iii. Age – most studies did not have enough children. The one study that did include enough children found a higher asymptomatic proportion in children compared to adults. In other studies, there was a trend toward the asymptomatic proportion being higher in younger adults.

- 5.3 Forest plots showed heterogeneity. Forest plots showed that studies that mainly included older adults tended to have a slightly higher proportion of asymptomatics. This was in contrast to the finding that studies which examined the effect of age tended to show that younger people were more likely to have asymptomatic infection (see 5.2iii), this apparent contradiction may relate to point 5.4 because studies focussing on older adults were often nursing home studies.
- 5.4 In nursing homes there was slightly higher prevalence of asymptomatic infection, but some nursing home studies had excluded the symptomatic index cases.
- 5.5 In conclusion there is not a major change to the proportion of asymptomatics from the previous analysis; there is a substantial proportion, but it is still the minority; the proportion of asymptomatics may be different in children. There is not strong evidence to suggest differential infectiousness of symptomatic and asymptomatic cases, based on Ct value.

Action 31.3 – *All to read the paper on the asymptomatic proportion and give comments to AH, to update and send to PH for presentation at SAGE w/c 07 September.*

- 5.6 Members noted that to have an unbiased approach to symptom ascertainment, large studies like ONS and REACT are needed, but they do need adequate recording of symptoms.
- 5.7 It was suggested that AH contacts Sarah Walker and Cristina Acheson to clarify methods of ascertaining symptoms in the ONS and REACT studies.

Action 31.6 - *AH to contact Sarah Walker and Cristina Acheson re ascertainment of symptoms data from ONS surveys and REACT study*

- 5.8 In light of the rarity of disease in children it was suggested that Shamez Ladhani's study on outbreaks during the summer may enable better characterisation of symptoms in children, noting that other respiratory viruses may give more symptoms than COVID.

6 Community case definitions

- 6.1 AH noted that this was an update to a previous paper presented in May.
- 6.2 This was done at a time when NERVTAG were discussing isolating contacts on the basis of symptoms rather than a positive test. The conclusion was that there was no combination of symptoms sufficiently specific to allow that to happen.
- 6.3 At same time, data from the Zoe symptom tracker app was analysed. Many of those people have now been tested and data can be analysed. Some FF100 data were also included.
- 6.4 A key challenge within COVID is that there are few symptoms that are consistently present, particularly early in illness. These data look at early symptoms. It was noted that fatigue and headache are common in the general population anyway. The specificity of most individual symptoms is low, apart from loss of sense of taste and smell. The conclusion is that there is a need to use combinations of symptoms for a reasonable definition.
- 6.5 There is an increase in sensitivity by adding in symptoms, but a decrease in specificity.

- 6.6 The UK definition with three symptoms was compared to the UK definition plus fatigue, and the US definition, which includes eight or nine symptoms. The result is an increase in the number of people requiring testing by about 50%. The most important proviso is that it is based on people seeking testing.
 - 6.7 In the ZOE tracker app there were very few in which the symptoms could be linked with the test result. Media reports suggesting that in children from the ZOE group, symptoms such as nausea and vomiting and skipping meals are more common.
 - 6.8 In the over 85 group, there was a difference in symptoms; fatigue and delirium were the most commonly reported symptoms. There is a need to consider special case definitions in the elderly.
 - 6.9 The Iceland studies were useful because of the scale and the fact they included community cases, as well as the timing of cases.
 - 6.10 It was noted that there will not be high sensitivity unless there is a long list of symptoms.
 - 6.11 PH noted that these results suggest that there is no strong case for changing the definition for the main group of adults. However, more work is needed on symptoms in children. Studies from school settings would be particularly important, without the bias of asking for the symptoms we already look for. Better symptom profiles are needed from the 'other' group from Test and Trace.
 - 6.12 It was suggested that the ONS survey would be a good dataset, also household studies carried out by PHE.
 - 6.13 The proposition from the British Geriatric Society that confusion or delirium is a common symptom in the elderly was noted.
 - 6.14 It was noted that greater uptake of testing for the current symptom profile may be more beneficial than changing the case definition.
 - 6.15 It was noted that the Senior Clinicians and CMOs group will discuss on Tuesday 8 September and SAGE on Thursday 10 September.
- Action 31.4** - *NERVTAG members to send comments to AH, then prepare paper for senior clinicians' group and SAGE week commencing 7 September.*
- 6.16 There is a need to consider children and the elderly (AH will need to look at the age). Co-CIN data suggests confusion picks up at 60+.

Action 31.5 - *AH to review data on delirium as a symptom in the over 60s*

7 Surveillance reports

7.1 Scottish schools report

There has been a large increase in testing in children, up to the week including 30 August. The percentage positivity for SARS-CoV-2 has been falling off as the number of tests has increased.

- 7.2 Data on rhinovirus were presented, suggesting that symptoms are associated with an increase in rhinovirus detection.

- 7.3 The analysis of schools' data until Friday of last week - 42 schools were involved, mainly with single cases. The special circumstance is the challenge of transmission in staff; mainly teachers. In one large assisted learning team there was a large number of staff and a small number of pupils involved. In the main not much transmission has been documented. The challenges of complying with hygiene measures in assisted learning teams was noted.
- 7.4 Schools have been back for 2+ weeks and the tremendous strain on testing was noted. Overall there has been a very high initial presentation of children to schools.
- 7.5 It was noted that parents are concerned and getting tests, including the whole family. If a case is identified close contacts are traced and limited testing carried out particularly if symptoms have developed. JMM will update in two weeks' time.
- 7.6 **PHE**
- An increase in NHS111 contacts for 'cold and flu' was noted, which may be explained by an increase in rhinovirus detections. There may also be concerns from parents around starting schools.

8 Thematic updates

- 8.1 The issue of 'Long COVID' was raised; should NERVTAG look at this and have a view? This is people with chronic symptoms.
- 8.2 It was noted that this was likely to be controversial and suggested that a systematic review would be helpful. Is there anything known about the risk factors, with and without persistent shedding?
- 8.3 It was noted that there is a UK consortium funded to look at this. CSM is part of the group.

Action 31.7 - *PH to discuss with JVT whether advice from NERVTAG regarding 'long COVID' is required by Government/SAGE*

9 AOB

- 9.1 There were no AOB.
- 9.2 The meeting ended at 13:12.

*This brief was produced on **13 April 2020** by the **COVID SAGE secretariat**. This brief was a response to a request from GCSA, who commissioned a summary of how effective viral testing was in people who were asymptomatic, including information on false negatives and true positives. The brief was produced at pace during 13 April, and reflects the evidence that was available on that date. GCSA passed this brief to CMO early (07:19) on 14 April to support a brief to the Secretary of State for Health. This brief did not go to SAGE at the time.*

On RT-PCR testing and rates of SARS-CoV2 detection in asymptomatic individuals

Asymptomatic individuals testing positive for SARS-CoV2 by RT-PCR is common and represents a large proportion of disease transmission. Between 5 and 80% of people who do test positive for SARS-CoV2 are asymptomatic and symptomatic-only based screening will miss cases, as outlined by a consolidated review of evidence by the [University of Oxford's Centre for Evidence Based Medicine](#) [1]. This is consistent with [evidence consolidated by the CDC](#) [2]. These consolidations include a recent analysis of >2000 SARS-CoV2-infected children in China where 13% of RT-PCR confirmed cases were asymptomatic [3]. Rates of asymptomatic infection the elderly are also high, as shown during epidemiological investigation of an outbreak in a US nursing home where 50% of RT-PCR confirmed cases were asymptomatic [4]. One study across all age groups supported high rates of asymptomatic PCR-positives in young and elderly age groups (both ~30%), as well as showed equivalent rates for intermediate age groups of between 5 and 15% [5].

The contribution of asymptomatic transmission to the epidemic is likely significant as viral shedding (and thus risk of transmission) peaks at, or before, symptom onset [5,6]. A study combining molecular testing with detailed epidemiological contact information inferred that the proportion of transmission occurring before symptom onset was 44% [5]. This fits with larger modelling studies of the outbreak in China that suggest that 85% of infections are undocumented and that this has contributed to the rapid spread of the virus [7].

I could only find one study that attempted to estimate false negatives in asymptomatic individuals (as most are focused on the false negative rates in symptomatic individuals [e.g. 10, 6]). This study was a fitted statistical model that estimated higher rates of false negative tests in pre-symptomatic phases of disease. Specifically, the false negative rate was 100% on day 1 post exposure (95% Confidence Interval [CI] ranged between 69 – 100%) to a false negative rate on day 4 post exposure of 61% (95% CI 18 – 98%). Notably, the false negative rate during infection is also not ideal [10], decreasing from 39% (95%CI 16 – 77%) on day of symptom onset to 61% (95%CI 54 – 67%) on day 9 of symptom onset [9]. This is consistent with an Italian study that showed comparable viral loads in symptomatic and asymptomatic individuals [11] and with viral load peaking at symptom onset.

How is testing of asymptomatic individuals being used?

PCR screening of asymptomatic individuals is an important wing of testing for the control of COVID19. This was recommended at least as early as the 2nd of March 2020 in the World Health Organisation's [interim guidance](#) on Laboratory testing for COVID19 [8]. In other countries, antigen testing of asymptomatic individuals is being used extensively for: preventing reintroduction of the virus; contact tracing; and quarantine measures. For example, in China from the 1st of April all passengers entering the country through air, water and land board have nucleic acid testing; Shanghai and Beijing are also back-testing international arrivals that are still in the quarantine period; nucleic acid testing is also being used to determine the length of centralised quarantine (i.e. isolation) of asymptomatic cases (must have 2 consecutive negative PCRs separated by 24 hours -

this is similarly the case in Singapore). In fact, the role of pre-symptomatic and asymptomatic transmission is now firmly recognised in China such that the contact tracing guidelines have been extended to include close contacts that occurred in the two days prior to symptom onset or detection of an asymptomatic case (Francis Hooper, Foreign Office). Intensive track-and-trace testing efforts, including of asymptomatic individuals, are thought to be core to the successful disease control efforts in South Korea, Hong Kong and Singapore, particularly the latter where drive-through community testing is ubiquitous (Annex A, country summaries international comparators).

References

- [1] [University of Oxford's Centre for Evidence Based Medicine](#) Key take homes:
 - That between 5% and 80% of people testing positive for SARS-CoV-2 may be asymptomatic
 - That symptom-based screening will miss cases, perhaps a lot of them
 - That some asymptomatic cases will become symptomatic over the next week (sometimes known as "pre-symptomatics")
 - That children and young adults can be asymptomatic
- [2] [Evidence consolidation done by the CDC](#)
- [3] Dong Y, Mo X, Hu Y, et al. [Epidemiological Characteristics of 2143 Pediatric Patients With 2019 Coronavirus Disease in China](#). *Pediatrics*. 2020
- [4] [Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility — King County, Washington, March 2020](#) (Kimball et al) MMWR CDC 2020
- [5] [High incidence of asymptomatic SARS-CoV2 infection, Chongqing, China](#) (Tao et al) 16th March
- [6] [Temporal transmission dynamics in viral shedding and transmissibility of COVID-19](#) (He et al)
- [7] [Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus \(SARS-Cov2\)](#)
- [8] [Laboratory testing for coronavirus disease 2019 \(COVID-19\) in suspected human cases: interim guidance, 2 March 2020](#) World Health Organisation
- [9] [Variation in False Negative rate of RT-PCR based SARS-CoV2 Tests by time since exposure](#) (Kucikra et al 2020)
- [10] [Estimating false-negative detection rate of SARS-CoV-2 by RT-PCR](#) (Wikramaratna et al)
- [11] [The early phase of the COVID-19 outbreak in Lombardy, Italy](#) (Cereda et al)

From: [REDACTED]
To: [REDACTED]
Cc: [Price, Natasha](#); [REDACTED]; [Reed, Emma](#); [REDACTED]
Subject: RE: CMO views on Lancet study
Date: 25 January 2020 13:02:46
Attachments: [image001.png](#)

[REDACTED]

CMO's view on the paper:

- Reasonable paper
- It shows you can have the virus but not be symptomatic (like with many other things)
- Does not show clear evidence that there is significant (or currently any risk) of asymptomatic transmission.
- SAGE considered this issue and thought it was unlikely that there would be transfer from asymptomatic people. But it cannot be excluded at this stage
- We will continue to monitor and study the emerging evidence closely.

Best wishes

[REDACTED]

From: Tavakoli, Leila
Sent: 25 January 2020 12:16
To: [REDACTED]
Cc: Price, Natasha [REDACTED]
[REDACTED] Reed, Emma [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Subject: RE: CMO views on Lancet study

Just widening the copy list, so all are aware.

Thanks,

[REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

From: [REDACTED]
Sent: 25 January 2020 12:08
To: [REDACTED]

Cc: Price, Natasha [REDACTED]

[REDACTED] Reed, Emma [REDACTED]
[REDACTED]

Subject: CMO views on Lancet study

[REDACTED]

Jamie has shared this Lancet study and asked for CMO's comments. It implies the virus can be passed on even without symptoms. Please would you be able to ask CMO to share some initial views today (ideally in the next couple of hours) that we can share with Jamie?

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30183-5/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30183-5/fulltext)

Thanks,



[REDACTED]
Deputy Principal Private Secretary
Office of the Secretary of State for Health and Social Care
Department of Health & Social Care, 39 Victoria Street, SW1H 0EU
[REDACTED] [REDACTED] [REDACTED]

For all submissions, please factor in Junior Minister clearance.

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From: [REDACTED]
To: [REDACTED]
Subject: FW: Coronavirus meeting readout 29/01
Date: [REDACTED]
Attachments: [REDACTED]

[REDACTED]

[REDACTED]

From: [REDACTED]
Sent: 29 January 2020 09:42
To: Reed, Emma [REDACTED]
[REDACTED] Willett, Keith [REDACTED]
[REDACTED] Whitty, Chris [REDACTED] Reed, Emma
[REDACTED] yvonne doyle [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] Van Tam, Jonathan [REDACTED]
Swinson, Clara [REDACTED]
Permanent Secretary [REDACTED]
[REDACTED]
Cc: Senior Copylist [REDACTED]
[REDACTED]
[REDACTED]
Subject: Coronavirus meeting readout 29/01

All,

Please see the below for a readout from yesterday's meeting with SofS, PS(P) and PS(I) on Coronavirus. Actions are in red. Please forward on to those who I will have missed from the cc list (and let me know who needs to be added going forward), but v grateful if the note can be treated sensitively.

Coronavirus meeting: 27/01/2020

- Emma Reed provided an overview of the latest Sitrep data. SofS questioned the stats on Thailand and whether this was particularly worrisome. [REDACTED] commented that Thailand have an extensive laboratory service and are well equipped.
- CMO commented that today's data appears slightly less reassuring than yesterdays (27/01) but the positive is that that there has been no sustained transmission outside of China. CMO commented that we cannot yet fully understand whether the measures imposed by China have had any significant impact in delaying transmission. Officials are estimating that there will be a large proportion of infected persons in China that we are not currently aware of. If the course of transmission continues to spread outside of China,

we will be looking at flu pandemic rates.

- CMO commented that the reasonable worst case scenario would be similar to a medium flu pandemic (with the added challenge of no vaccine).
- SofS asked what this means for the Government's position on travel to China. CMO commented that the economic impact of stopping travel would be significant and whilst this could slow the spread of the virus, it would not affect it's inevitably.
- SofS asked about China stopping travel out of the country, CMO commented that this proposal might already be in traction. SofS asked for intel from FCO on the decision to stop travel. FCO SofS had flagged to DHSC SofS that he would be minded to advise against all travel to China.
 - **ACTION:** Policy to raise with FCO officials and with G7 counterparts call (and via other routes) and to flag cross-gov that DHSC SofS is seriously concerned and urging to move to all but essential travel to china.
- CMO flagged that WHO may call a PHEIC tomorrow (29/01). CMO advised that it would be beneficial for SofS to get in touch with [REDACTED], outlining his concern, requesting information on plans and to offer UK support (*SofS has actioned – call scheduled for 29/01*)
 - **ACTION:** Policy to provide some lines to take ahead of the call by **13.00**
- CMO commented that there is now credible evidence of asymptomatic transmission within Germany (resulting from the timings of the transmission). PHE reiterated that there is no test for asymptomatic patients and that this would not be possible without invasive tests (which could encourage spread).
- On contract tracing, [REDACTED] outlined that ten percent of passengers from Wuhan have been contacted (via email).
 - **ACTION:** SofS asked that persons on the 22nd January flight should be included in data calculations going forward and that comms should work up a plan on this.
- On the confirmed case protocol, SofS commented that he was concerned about the potential for a leak from Stage 1 onwards. Stage 1 - 6 would take place within a matter of hours and the plan was being disseminated to all clinical levels. SofS commented that a leak should not derail the plan.
- SofS agreed strongly that DHSC should communicate the plan to the system and the media in advance so that we outline how we will respond to a case and that we will commit to publishing case information as soon as reasonably possible.
 - **ACTION:** comms to finalise this plan (including time commitment with media) and share with ministers
- There was a discussion about the potential for rumours and the subsequent mitigating processes needed for stage 4, for contacting family and friends. [REDACTED] commented on the value of IPSO to protect the patient.
- CMO agreed to work out a rota for feeding the Science Media Forum robust information as part of the wider communications strategy.
- SofS commented that should we confirm a case he will need to make a statement to parliament when it next sits, or will call a [REDACTED] and clip on the steps.
- Keith Willett commented that we must be careful to not set a precedent for the how we manage the first patient. SofS agreed that the first case and transmission in the UK should be treated differently and must be held in hospital (in isolation, not necessarily in a special secure unit) but that this procedure should not be applied to all.
- Emma Reed outlined three options to meet the evacuated persons of the plane from China. 1. Self-isolation in their home (SofS ruled this option out) 2. UK provided

containment (in halls, barracks, hotel etc) which would be offered on a voluntary basis 3. Same option as 2 but made involuntary

- [REDACTED]
[REDACTED] SofS wanted further advice [REDACTED] and asked that we work up both options 2 and 3 to the best that we can but ensure that the persons are as comfortable as possible. SofS agreed that people should sign a “contract” agreeing to isolation before boarding the plane (there was discussion of the potential use of financial penalties rather than court orders)
 - **ACTION:** team to provide advice (including legal considerations) on options 2 and 3 in detail within the next 24 hours.
- SofS asked that tomorrow we discuss the reasonable worst case scenario tomorrow internally, before deciding whether this needs raising cross Gov.
 - **ACTION:** for this to be added on to the agenda for tomorrows meeting.

After the meeting, SofS commented that it would be useful for PS(P) to meet the Wuhan returners of the plane

- **ACTION:** comms to liaise with [REDACTED] from PS(P)’s office on the feasibility on this

Discussions around Coronavirus have been ongoing and SofS has also made the following decisions separately to the meeting.

- SofS is content (in principle) to offer assisted departure assistance to other countries by offering seats on the flight so long as isolation arrangements are respected.
- SofS agreed with the advice that we should look to return people to an military airfield rather than a commercial airport such as Heathrow (in order to safely isolate individuals)
[REDACTED]
[REDACTED]
- SofS has spoken to the Foreign Sec who has requested that any UK flight is equipped with appropriate PPE – officials confirmed this would be the case.
- [REDACTED]

Let me know if anyone has any questions on this. Happy to discuss.

Many thanks,

[REDACTED]



[REDACTED]

[REDACTED]

Department of Health and Social Care (DHSC)

E: [REDACTED] **T:** [REDACTED] **M:** [REDACTED]

39 Victoria St, Westminster, SW1H 0EU

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[REDACTED]

From: [REDACTED]
Sent: 27 January 2020 15:21
To: Whitty, Chris; Reed, Emma; Sharon Peacock; [REDACTED] yvonne doyle; [REDACTED]
[REDACTED] Van Tam, Jonathan; Swinson, Clara; [REDACTED]
[REDACTED]
Subject: Coronavirus meeting readout

All,

Please see the below for a readout from this morning's meeting with SofS on Coronavirus. Please note the actions and treat sensitively. SofS has asked for more frequent meetings on these, diary schedulers will be shared asap.

Coronavirus meeting: 27/01/2020

Attendees: SofS, CMO, JVT, Perm Sec, [REDACTED] Clara Swinson, Emma Reed, [REDACTED]
Natasha Price, [REDACTED] Yvonne Doyle, Sharon Peacock, [REDACTED]

- SofS opened the meeting by outlining his concern upon hearing the update from the Chinese government that the virus is transmissible when patients are asymptomatic and set out the need to plan for the reasonable worst based scenario.
- CMO commented that previously our best understanding was that the virus was unlikely to transmit whilst patients were asymptomatic (but this was/is unable to be definitive). There is still a lack of clarity over what the Chinese official position is. CMO would expect that very symptomatic persons would be more likely to transmit the virus. CMO commented that if transmission was occurring rapidly in the UK, it would be highly likely that this would have come from highly symptomatic persons. CMO was confident but could not guarantee that asymptomatic persons would be less contagious than heavily symptomatic persons.
- CMO commented that current intel suggests that the coronavirus is a moderately severe upper respiratory tract infection. The fact that mortality rates appear to be levelling out imply that our certainty on the gravity of the situation is improving, but this is caveated by our reliance on information from China.
- SofS asked the Department to gain clarification from China on whether asymptomatic transmission is occurring, and to scenario plan accordingly.
 - **ACTION:** Emma Reed's team to liaise with FCO on the above
- SofS reiterated his willingness to evacuate these persons. Perm Sec proposed that we can justify the case to prioritise isolation/public health measures for the 200 British Nationals currently in Wuhan if they are to be evacuated.
 - **ACTION:** SofS asked the department begin preparing immediately for their quarantine or self-isolation, and provide advice on either option.
- CMO commented that our approach must adjust accordingly if the virus spreads to the whole of China (stage 2), or if China is seen to lose the containment (stage 3). CMO commented that we should continue to prioritise work to contain any illness. Currently, cases confirmed outside China do not appear to be spreading uncontrollably but we should prepare for this eventuality.
 - **ACTION:** PHE to continue to prepare for containment of any case confirmed in the UK and NHS to prepare hospitals should containment be lost.
- SofS asked whether we should be implementing a travel ban for the whole of China under the understanding that the virus is no longer contained to Wuhan. CMO commented that this is not straightforward and would not stop the illness coming to this country if it is highly transmissible.
- CMO commented that current stats suggest that on average 1 person has passed the virus on to 3 people, but now that China is gripping the virus, there is potential that this will fall.
- PHE have clinical and epidemiological evidence to loosely suggest that it is only the oldest and most vulnerable who die of the illness (around 3% of those who contract it), but that we cannot be confident here. The reasonable worst case scenario is not too dissimilar to a flu pandemic, where we have significant plans in place.

- SofS and Perm Sec discussed the risk and benefits of quarantine measures, especially any public comms on this point.
 - o **ACTION:** SofS asked the Department to focus group this.
- SofS reiterated the importance of managing the public's perception of our response. Contact with the 2000 who travelled from Wuhan last week is critical. The airline has provided information on all passengers, a letter is being sent out with advice to contact 111 if any issues. SofS commented that these persons should be advised to self-isolate and to get the passport numbers to contact.
 - o **ACTION:** SofS asked for a daily update on how many of the 2000 from Wuhan have been contacted, and for the Dept to tell these persons to self-isolate.
- Jamie asked what are other countries doing commenting that Germany had advised non-essential travel.
- SofS agreed that we need to improve our communication about our approach to flights and to ensure that everybody on the flight is aware that they have been monitored. SofS asked that as part of enhanced monitoring we ensure that we get the contact details of anybody who is found to be ill, and ask them to sign that they have received advice.
 - o **ACTION:** CMO is to provide a background media briefing on the science behind Coronavirus.
- On tests/vaccines, SofS asked that we should pursue every option possible and asked that we do our best to boost test capacity.
- SofS asked to be kept aware of any resourcing problems are, so that the DHSC can fix this and increase resources accordingly.
- On vaccines, CMO commented that it is difficult to quickly develop a vaccine that can be deployed. JVT outlined that the typical timeline is 5 years, but we could hope for 12-18 months if all went well. JVT commented that no one has ever made a vaccine for coronavirus.
- SofS said that all future comms needs to be cleared by [REDACTED] then CMO and Perm Sec before himself.

Let me know if you have any questions.

Thanks,

[REDACTED]



[REDACTED]
 Private Secretary to the Secretary of State for Health and Social Care
 Department of Health and Social Care (DHSC)

[REDACTED]
 39 Victoria St, Westminster, SW1H 0EU

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From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED] [Reed, Emma](#) [REDACTED] [Van Tam](#),
[Jonathan](#); [REDACTED]
Subject: SofS questions to Perm Sec
Date: 30 January 2020 18:07:26
Attachments: [image001.jpg](#)

[REDACTED]
We spoke.

SofS asked Perm Sec about the impact of the G7 closing borders to China, including from an epidemiological perspective – whether it would make a difference - and from an economic one. We have made contact with HMT for a view on the economic front and will revert when we have a response. On the Epidemiological angle:

- We have commissioned the SPI-M modellers to look into the impact of different interventions, including restriction to entry of the UK. They are working on it and we may have quantitative estimates by Monday but they would only be crude, given how little we know about how the virus is transmitted.
- More broadly, modelling of pandemic flu suggests that very high levels of restrictions to travel into the UK from all countries with outbreaks (90% +), might be able delay the start of the epidemic in the UK by only 3-4 weeks. This would have to include indirect flights. We don't yet know how this would vary with nCoV.
- In crude terms, if 50% of potentially infected people were prevent from coming into the UK, the epidemic might be delayed by the amount of time it takes for the number of cases overseas to double. Our best estimate of this for nCoV is only 3-4 days.

SofS also asked about resilience of medicines and consumables in the light of the nCoV. There is a draft letter with SofS from Steve Oldfield's team in relation to EU exit, which refers to "the implications of the control measures that the Chinese Authorities have put in place to combat coronavirus" and DHSC advice to "consider the resilience of your supply chains when making decisions on how to manage stockpiles." The draft goes on, "If you are reducing your EU exit stockpiles of medicines and medical products and reverting to business as usual buffer stock levels, please do so in a controlled manner. Ensure that you are maintaining the integrity of markets and uninterrupted supplies for patients in the UK, whilst considering the implications of coronavirus and how this might impact your supply chains."

As discussed, I will come back to you once we have a response from HMT and further advice will be offered once the SPI-M modelling work is complete.

[REDACTED]



[REDACTED]
Deputy Director, Health Ethics
Department of Health and Social Care
39 Victoria St, Westminster, London SW1H 0EU
[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

From: [REDACTED]

Sent: Friday, January 24, 2020 12:57 pm

To: [REDACTED]

Cc: [REDACTED]

[REDACTED]

[REDACTED] Van Tam, Jonathan; [REDACTED]

[REDACTED] Whitty, Chris

Subject: RE: Coronavirus - advice on isolation

[REDACTED]

Please the advice from the DCMO, Jonathan Van Tam.

We do not have any data on whether patients who are well (but are infected with WN-CoV) would be infectious to others. Conventional wisdom and the working assumption at present is: no symptoms = no infectious risk to others. The point is that if someone is asymptomatic they are essentially well and could be well because they are well or (far less likely) well because they are infected but not yet symptomatic.

Therefore people who are well can travel, subject to Chinese Govt restrictions on travel out of Wuhan, and nothing needs to be disinfected. However all (drivers and passengers) should practice good (scrupulous) hand hygiene and as per previous emails individuals might choose to wear SFMs in the absence of good data on any protective effect. A driver with symptoms must NOT be accepted.

No one should travel if they have symptoms prior to departure. There are no special measure for beginning travelling with symptoms as you simply should not. Seek medical advice. Travelling in relation to a medivac or transport to a HC facility for treatment/care are out of scope of the advice I am giving.

What happens if a passenger departs well and develops symptoms during the journey? Answer in 3 parts. 1. Curtail journey to extent possible, 2. Open car windows to increase ventilation rate. 3. Passenger with symptoms wear mask (here the evidence is far stronger about using an SFM to contain infection). Continue with scrupulous hand hygiene. This would apply to the FCO passenger or the local driver.

[REDACTED]

[REDACTED] [Private Secretary to the Chief Scientific Adviser & Chief Medical Officer | Department of Health and Social Care](#) | [REDACTED]

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From: [REDACTED]

Sent: 24 January 2020 11:09

To: [REDACTED]

Cc: [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Subject: Coronavirus - advice on isolation

Dear [REDACTED]

I have a further issue which I am hoping PHE or CMO can advise on. Colleagues in the FCO are undertaking contingency planning for future scenarios, including looking at options for transporting and isolating the two UK staff based in Wuhan should a decision be taken to relocate them for welfare reasons. Working on the basis that both members of staff are displaying no symptoms, what would the public health advice be regarding:

- Transporting the staff by car. Would the vehicle need to be disinfected (if staff have no symptoms)? If a driver is required, would the driver need to take any precautionary measures?
- Accommodation in new location. Could you provide guidance on appropriate isolation measures? What level of contact could they safely have with other staff etc.

Of course, if the staff members begin to display symptoms we may need to take different protective measures (advice on this also welcome).

Thank you very much

[REDACTED]

[REDACTED] **Head of Chief Scientific Adviser's Office**

Room K2.53 | Foreign and Commonwealth Office | King Charles St | London | SW1A 2AH

[REDACTED]

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From: [REDACTED]
To: [REDACTED]
Cc: [Price, Natasha](#); [REDACTED]; [Reed, Emma](#); [REDACTED]; [Van Tam, Jonathan](#)
Subject: RE: Commission: Further advice for SofS re coronavirus
Date: 26 January 2020 20:20:24
Attachments: [image001.png](#)

[REDACTED]
Some bullets from CMO on point 1:

- This is science and technical issue rather than a money one at this stage. There is currently no proven coronavirus vaccine in humans, despite several years of trying due to the SARS and MERS outbreaks.
- The path from concept to vaccine is a long one, mostly in industry. Even if every shortcut is taken it is seldom less than years, and under one year is unheard of. We may be able to get human vaccines into humans (meaning the first few experimental doses) by mid-2020 if there is an especially promising candidate that passes proof-of-concept in an animal model, but some of the timescales being talked about in the media (often from scientists with an interest in being funded) are unrealistic.
- Shortcuts which were ethically appropriate for Ebola, a disease with (at that time) a 70% mortality would be less justifiable for one with a mortality that may be around 2% (although early days). Lower levels of side effects would be tolerable for at-risk people. Safety is very important.
- I have already discussed with Sir Mark Walport (head of UKRI), Sir Jeremy Farrar (head of Wellcome), Innovate UK and others. Jonathan Van Tam will tomorrow start a thorough science-led outline with the other major research funders and the Government Office for Science.

Best wishes

[REDACTED]
From: [REDACTED]
Sent: 25 January 2020 20:54

To: [REDACTED]
[REDACTED]
[REDACTED]

Cc: Price, Natasha [REDACTED]

[REDACTED] [Reed, Emma](#) [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Subject: Commission: Further advice for SofS re coronavirus

Hi [REDACTED]

SofS has asked for some further advice, having read the attached document. I've discussed with Emma Reed and agreed the following approach to try and minimise the burden on you all, as appreciate you're all very busy. It would be great to get some quick responses where possible tomorrow (with apologies and thanks for weekend working), and then where things will take longer/need a more considered view/input of others, to provide further advice on Monday.

SofS would like advice on the following:

- How can we accelerate vaccine discovery? To what extent is it a money issue? If there was more money available, how much faster could they go? He has asked for full advice on this. He has stressed that finding a vaccine is a top priority and, though he appreciates it's

hard, he does not want it to take a year. [REDACTED] **would CMO be able to give a quick view on this tomorrow please? Then, if needed, please could this be followed up with a more detailed view on Monday?**

- SofS would like to know some more information about CEPI, specifically if it needs more funding, and where it is based. [REDACTED] **please would you be able to give a quick response to this tomorrow? Again, if needed, happy for you to send more detailed on Monday.**
- SofS would like to know Professor Robin Shattock's views of our vaccine programme and whether it can be accelerated? [REDACTED] **do you think the CMO or the Deputy CMO knows Professor Shattock and could engage him about this please?**
- SofS would like to know if ISARIC has everything it needs? He would like advice on if he can visit it, and Porton Down to find out if they need anything? [REDACTED] **would you be able to pick this up with PHE on Monday please? I've also copied in [REDACTED] who should be able to help with logistics should these visits go ahead.**
- SofS would like advice on if UK Public Health Rapid Support Team is going into action? He has asked if we can formally offer this. From discussions with Emma, it's unlikely we would want to take the small team of 5 people from Africa for this incident, but if you could provide a few lines summarising that, that would be helpful. [REDACTED] **I'd be grateful if you're able to give a quick view on this tomorrow? Then, if we need more details on feasibility and practical steps, we can pick that up next week.**

If possible, where advice will follow on Monday, it would be great to receive it by 3pm, so we can get it in SofS' box that evening, but do say if that looks very difficult.

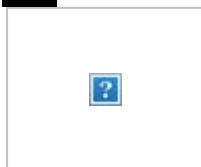
In slower time, he has also asked for the following:

- To see our reasonable worst case scenario assumptions in detail (to test them), and also the plans for managing the reasonable worst case scenario. He is really keen to test this over the next week. [REDACTED] **would you be best placed to lead on this?**

Please don't hesitate to get in touch if you would like to discuss (you can reach me on the mobile number below).

Thanks in advance,

[REDACTED]



[REDACTED]

Deputy Principal Private Secretary
Office of the Secretary of State for Health and Social Care
Department of Health & Social Care, 39 Victoria Street, SW1H 0EU

[REDACTED] [REDACTED] [REDACTED]

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From: [REDACTED]
To: [Matt Hancock](#)
Cc: [Price, Natasha](#); [REDACTED]
Subject: Vaccine acceleration
Date: 26 January 2020 21:12:00
Attachments: [image001.png](#)

Hi Matt,

Please find below an initial view on vaccine acceleration from the CMO.

- This is science and technical issue rather than a money one at this stage. There is currently no proven coronavirus vaccine in humans, despite several years of trying due to the SARS and MERS outbreaks.
- The path from concept to vaccine is a long one, mostly in industry. Even if every shortcut is taken it is seldom less than years, and under one year is unheard of. We may be able to get human vaccines into humans (meaning the first few experimental doses) by mid-2020 if there is an especially promising candidate that passes proof-of-concept in an animal model, but some of the timescales being talked about in the media (often from scientists with an interest in being funded) are unrealistic.
- Shortcuts which were ethically appropriate for Ebola, a disease with (at that time) a 70% mortality would be less justifiable for one with a mortality that may be around 2% (although early days). Lower levels of side effects would be tolerable for at-risk people. Safety is very important.
- I have already discussed with Sir Mark Walport (Head of UKRI), Sir Jeremy Farrar (Head of Wellcome), Innovate UK and others. Jonathan Van Tam will tomorrow start a thorough science-led outline with the other major research funders and the Government Office for Science.

Thanks,



[REDACTED]
Deputy Principal Private Secretary
Office of the Secretary of State for Health and Social Care
Department of Health & Social Care, 39 Victoria Street, SW1H 0EU
[REDACTED] [REDACTED] [REDACTED]

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From: [REDACTED]
To: [Reed, Emma](#)
Cc: [Price, Natasha](#); [REDACTED]
Subject: Prioritising SofS' advice requests
Date: 25 January 2020 20:03:48
Attachments: [image001.png](#)
[NPComms SoS 25 jan 2020_final.docx](#)

Hi Emma,

I know you've spoken to Natasha, and you're going to send us a prioritised list of SofS' advice requests. SofS has also agreed to prioritising. I thought it would be helpful to send you his list of requests in writing, so you can use that as a basis for prioritisation.

SofS would like to advice on the following:

- How can we accelerate vaccine discovery? To what extent is it a money issue? If there was more money available, how much faster could they go? He has asked for full advice on this. He has stressed that finding a vaccine is a top priority and, though he appreciates it's hard, he does not want it to take a year.
- He would like to know some more information about CEPI, specifically if it needs more funding, and where it is based.
- He would like to know Robin Shattock's views of our vaccine programme and whether it can be accelerated?
- He would like to know if ISARIC has everything it needs? He would like advice on if he can visit it, and Porton Down to find out if they need anything?
- He would like advice on if UK Public Health Rapid Support Team is going into action? He has asked if we can formally offer this. From what we discussed, it's unlikely we would want to take the small team of 5 people from Africa for this incident, but if you could just provide a few lines summarising that, that would be helpful.

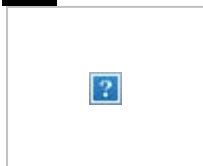
In slower time, he has also asked for the following:

- To see our reasonable worst case scenario assumptions in detail (to test them), and also the plans for managing the reasonable worst case scenario. He is really keen to test this over the next week.

As we discussed, he has also asked for more clarity on what the following sentence in the first paragraph of the attached document means, and which hospitals can't participate: "The NIHR clinical characterisation protocol has been activated for those NHS hospitals that are able to participate to help us better understand this disease should any case present in the UK." I'll go back to PHE about this directly now as I think they should be able to respond to that directly.

Thanks in advance as I know you have a lot on,

[REDACTED]



[REDACTED]
Deputy Principal Private Secretary
Office of the Secretary of State for Health and Social Care
Department of Health & Social Care, 39 Victoria Street, SW1H 0EU
[REDACTED] [REDACTED] [REDACTED]

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From: [Price, Natasha](#)
To: [Senior Copylist;](#) [REDACTED]
Cc: [REDACTED]
Subject: Readout: QUAD – 27/01/2020
Date: 28 January 2020 14:13:52
Attachments: [image001.png](#)

OFFICIAL SENSITIVE

Please see below a read-out of Monday's Quad meeting. Please treat as sensitive and grateful if DG offices could cascade relevant excerpts to their teams.

Many thanks,

Natasha

Quad – 27/01/2020

Attendees: SoS, Simon Stevens (SS), Chris Wormald (CW), [REDACTED]

Natasha Price, [REDACTED]

Coronavirus

- SoS firstly asked about coronavirus plans. He would like to do a call with the Chief Executives of the four response hospitals, with [REDACTED] as well. **Action:** [REDACTED] to arrange.
- SS asked about plans for assisted return and what the plans are for responding to returnees. SoS noted that he's already agree this morning to look at self-isolation options, including booking hotels etc. **Action:** [REDACTED] to action.
- SS also asked about the diagnostic tests. SoS noted that he has asked PHE to further develop this.
- SS also asked about advice to Chinese students. **Action:** [REDACTED] to commission an update on DFE communications.
- SS noted that [REDACTED] is the lead for response in NHSE. SoS noted that we need to ensure NHSE attend his meetings on this. SS needs PHE approved posters for GP surgeries and A&E to deal with any walk-ins. **Action:** [REDACTED] to take forward with response team.
- SS updated on the response plans should we move into full UK response. The current available capacity is 511. SS noted that they could look at converting other wards for infectious disease purposes. SS took away an action to look at planning in this area. **Action:** [REDACTED]
- CW ran through some worst-case scenario options including shutting schools and refusing admissions for untreatable people. CW noted that all hospitals have a pandemic plan. CW noted that there was a big pandemic test about 18m ago and a number of desk-top exercises since then. CW thought it would be sensible to check all hospitals have reviewed pandemic plans.

- [illegible]

- [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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Natasha Price
Principal Private Secretary
Secretary of State for Health and Social Care
9th Floor, 39 Victoria Street, SW1H 0EU
[REDACTED] [REDACTED]

**For all submissions, please factor in Junior Minister clearance. SofS
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