**Witness Name:** Professor Carl Heneghan

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**UK COVID-19 INQUIRY**

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**FIRST WITNESS STATEMENT OF PROFESSOR CARL HENEGHAN**

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I, **PROFESSOR CARL HENEGHAN**, of the Centre for Evidence-Based Medicine, University of Oxford, Oxford, OX2 6GG, will say as follows:

**Introduction and Expertise**

1. I make this statement in response to the UK Covid-19 Inquiry's Rule 9 request sent on behalf of Module 2.

2. I am Professor Carl Heneghan, BM, BCH, MA, MRCGP, DPhil Oxon. I am Professor of Evidence Based Medicine at the University of Oxford, Director of the Centre for Evidence Based Medicine (www.cebm.ox.ac.uk/), and an active NHS Urgent Care General Practitioner (GMC no. 4731643) who undertook face-to-face visiting consultations throughout the pandemic. I have been an NHS doctor for 23 years and a qualified GP and NHS Honorary Academic Clinical Consultant for 18 years.

3. I am a clinical epidemiologist with expertise in evidence-based medicine, research methods, and evidence synthesis, with over 450 peer-reviewed publications, a current H Index of 87 and published over 100 systematic reviews. My work includes investigating the evidence for approval of drugs and devices, assessing health claims, and researching

common presenting conditions in the community. In addition, I have expertise in medical device regulation, diagnosis, medical screening and assessing avoidable harms. In the 2009 Pandemic, I co-led the Cochrane Neuraminidase reviews for preventing and treating influenza in adults and children (Exhibit CH/01 [INQ000268224]). In October 2014, I gave evidence to the Public Accounts Committee on access to clinical trial information and stockpiling of Tamiflu (CH/02 [INQ000268225]). I have been a Clinical Editor for the Cochrane Acute Respiratory Infection Group and editor-in-chief of the BMJ Evidence-Based Medicine Journal. During the pandemic, I led the Oxford Covid Evidence Service (www.cebm.net/oxford-covid-19-evidence-service/) and co-led research on the Transmission of SARs-CoV-2 (www.cebm.ox.ac.uk/research/transmission-of-sars-cov-2) partly funded by the World Health Organization.

4. I have been a clinical advisor to three UK All Parliamentary Party Groups, an adviser to governments, the WHO clinical trials registry platform and a founder of the AllTrials campaign. I have been twice voted one of the top 100 NHS clinical leaders by the HSJ. In 2018, I was awarded NIHR Senior Investigator status. In 2019, I received a lifetime achievement award from the University of Oxford's Medical Sciences Division for my sustained commitment to education and teaching. Throughout the pandemic, I have published widely with my co-author Tom Jefferson, who is a Senior Associate Tutor at the University of Oxford, a former researcher at the Nordic Cochrane Centre and a former scientific coordinator for the production of HTA reports on non-pharmaceuticals for Agenas, the Italian National Agency for Regional Healthcare. He is a member of the WHO Covid-19 Infection Prevention and Control Research Working Group. He has reviewed and contributed to this report. Since March 2020, we have produced over 200 scientific papers, MSM articles, blog posts and interviews on scientific aspects of the current pandemic, which have attracted millions of readers. These include modes of transmission of SARS-CoV-2, interventions to interrupt the spread of respiratory viruses, the impact of restrictions on nations and particularly the weakest members of our society, the impact of theft and criminal actions on economic measures to relieve the burden of restrictions and the coming together of established and new disciplines such as clinical medicine, epidemiology, molecular genetics and virology.

**Publications**

5. We took a decision early in the pandemic to make our work relevant to the pandemic freely and widely available, which includes 38 articles in the Spectator; 48 articles on the Oxford Covid Evidence Service; 27 articles in the Telegraph authored or quoted in; eight Collateral Global Reports and 22 Publication in Peer reviewed, and preprint Journals Exhibit (Exhibit

CH/03 [INQ000268226]).

**Governmental Interactions Throughout Covid-19**

6. On 16 April 2020 I was contacted by @cabinetoffice.gov.uk to 'put me in touch with the relevant CEBM team that developed the article Global Covid-19 Case Fatality Rates relating to how Covid-19 fatality rates are being calculated?' (Exhibit CH/04 [INQ000268227]).

7. On 27 April 2020 I was contacted by cabinetoffice.gov.uk. The email said: 'I am emailing from the Cabinet Office's Covid-19 assessment team, where we are currently undertaking scenario work on the Covid-19 pandemic. We are very keen to draw on your expertise as part of this work and would like to invite you to a virtual roundtable to discuss how health and societal factors will influence the course of the pandemic and the UK's response over the next 6 months.'

8. On 30 April 2020 I attended a virtual roundtable meeting on Zoom on 10 June. I am not aware of any feedback or minutes from this meeting.

9. On 10 June 2020 I was contacted by cabinetoffice.gov.uk. Following on from the Covid-19 6-month scenario work, the Cabinet Office's Covid-19 assessment team would like to invite you to a second roundtable on Thursday, 18 June. The focus of this second session will be to discuss how Covid-19 could impact the UK's Health and Economy sectors over the next 24 months. We will also provide an update on the 6-month scenarios and how the contributions to the previous roundtables were used.'

10. On 25 June 2020 I was contacted by no10 gov.uk cabinet adviser. This was a discussion on care homes. I set out more detail on care homes from paragraph 100 of this statement.

11. On 13 August 2020 I gave evidence to the Special Committee on Covid-19 Response debate -The houses of the Oireachtas. Dublin (Exhibit CH/05 [INQ000268228]).

12. On 17 September 2020 I gave evidence to the Science and Technology Committee to revisit its scrutiny of coronavirus testing and contact tracing as part of its inquiry into UK Science, Research and Technology Capability and Influence in Global Disease Outbreaks (Exhibit CH/06 [INQ000268229]).

13. On 18 September 2020 I had a phone call with the NHS England Medical Director regarding the re-publication of NHS hospital-acquired infection data.

14. On18 September 2020 I was contacted by cabinetoffice.gov.uk. The email said: 'Thank

you very much for confirming your availability for the meeting with the Prime Minister on Sunday afternoon at 5:30 pm (Exhibit CH/07 [INQ000268230]) and for submitting your one-pagers ahead of that discussion.' (one-pager Exhibit CH/08 **INQ000146607**

15. On 20 September 2020 I had a meeting with then Prime Minister, Boris Johnson. I exhibit the documents relating to that meeting (CH/09 [INQ000231003], CH/10 [INQ000146609]; CH/11 [INQ000268244] AND CH/12 [INQ000268255]).

16. On 21 September 2020, I sent an email to the Cabinet Office post-meeting. This was signed by Professor Sunetra Gupta and Professor Carl Heneghan (EXHIBIT CH/13 [INQ000268266].

17. On 21 September 2020 I, alongside a number of other authors, published an open letter to the Prime Minister. (Exhibit CH/14 **INQ000062668** The other authors to this open letter were: Professor Sunetra Gupta; *Professor of theoretical epidemiology, the University of Oxford*; Professor Carl Heneghan; *Director, Centre for Evidence Based Medicine, the University of Oxford*; Professor Karol Sikora; *Consultant oncologist and Professor of Medicine, University of Buckingham* and Sam Williams; *Director and co-founder of Economic Insight.*

18. On 25 September 2020 I sent an email to the Cabinet Office clarifying points on the misinterpretation of the Spanish data CH/15 [INQ000268274].

19. On 28 October 2020 Steve Baker MP submitted a series of written questions based on the Spectator article published on 25 October: The ten worst Covid data failures (exhibit CH/16 [INQ000268275]).

20. On 30 October 2020 I was contacted by Cabinet Office advisor Dr Ali Raghib.

21. On 31 October 2020 I attended a Zoom meeting at No 10 on Covid-19 data. On1 November 2020 I had telephone calls with Dr Ali Raghib, including then Prime Minister Boris Johnson.

22. The Lockdown Files revealed that Boris Johnson had told his WhatsApp group that I'd said, "the death modelling you have been shown is already very wrong", as it was out of date, having been drawn up three weeks previously (Exhibit CH/17 [INQ000268276]).

23. On 1 November 2020 an article published in the Telegraph described how death scenarios used to justify the second lockdown 'could be four times too high' (Exhibit CH/18 [INQ000268277]).

24. On 2 November 2020 I held a discussion with Theresa May, MP 'I am raising some of the

issues we discussed directly with the Prime Minister'.

25. In November/December 2020 I was part of a Covid-19 recovery strategy group that submitted: A sustainable Covid-19 recovery strategy. Response provided by the Prime Minister to the Recovery Group recommendations (Exhibit CH/19 [INQ000268278]). CRG letter to the Prime Minister (Exhibit CH/20 [INQ000268279]) and five key recommendations (Exhibit CH/21 INQ000268280]). I held discussions with Theresa May, MP and in October I acted as advisor to the Pandemic Response and Recovery APPG (https://appgpandemic.org/).

**Decision-Making Processes**

26. I set out here my views on issues with the decision-making process. As my background is primary care, clinical epidemiology, and evidence-based medicine, we have tried to analyse aspects relevant to public health. My previous experience researching the effects of antivirals, vaccines and non-pharmaceutical Interventions forms the backdrop to this expertise. I have also tried to look back at previous epidemics to see what lessons could be applied to current events. Working as part of a multidisciplinary team enriched our knowledge and understanding of recent events, but we also faced censorship, dogmatism and personal attacks. Our advice has remained consistent throughout the pandemic and has used evidence-based approaches to inform policy and public understanding. Instead of detailing individual meetings, I have set out the points made throughout the pandemic that highlight the weaknesses in the advice, the areas of poor understanding and the policies that were not informed by an evidence-based approach.

27. Evidence-based Medicine (EBM) is "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients" (Exhibit CH/22 [INQ000268281]). EBM recognises the need to use the best available evidence when making decisions about intervening and the importance of using accurate data to diagnose, prevent and manage disease. In determining the best evidence to inform treatment decisions, the Oxford CEBM levels of evidence provide a hierarchy of the likely best evidence. The OCEBM system covers the entire range of healthcare questions, allowing consideration of the best available evidence (Exhibit CH/23 [INQ000268282]).

28. EBM has evolved to influence healthcare using systematic reviews, the formation of NICE and its production of guidance to aid decision-making. It has also seen the advent of National Screening Committees to advise on mass screening and testing. Through the pandemic, we observed an evidence-based approach for assessing pharmaceuticals premised on randomized controlled trials. However, an evidence-based approach to policy

has been lacking for non-pharmaceutical intervention. The absence of high-quality evidence meant that opinions dominated the decision-making processes. Throughout the pandemic, my advice has sought to inform decisions by using the best available evidence, reflecting the biases and the uncertainties within the evidence and integrating it with my frontline healthcare experiences. What follows reflects an evidence-based approach to essential decision-making issues.

**Testing**

29. On 5 August 2020, we published an article titled: '*Are you infectious if you have a positive PCR test result for Covid-19*?' (Exhibit CH/24 [INQ000268283]).

30. PCR detection of viruses is helpful so long as its accuracy can be understood; it offers the capacity to detect RNA in minute quantities, but whether that RNA represents an infectious virus may not be clear. During our Open Evidence Review of oral-fecal transmission of Covid-19, we noticed how few studies had attempted or reported culturing live SARS-CoV-2 virus from human samples. Therefore, we reviewed the evidence from studies reporting data on viral culture or isolation and reverse transcriptase-polymerase chain reaction (RT-PCR) to understand more about how the PCR results reflect infectivity.

31. One of the influential studies that aided our thinking was published by Bullard et al., which investigated viral culture in samples from a group of patients and compared the results with PCR testing data and the time of their symptom onset (Exhibit CH/25 [INQ000268284]). This paper concluded that SARS-CoV-2 Vero cell infectivity of respiratory samples from SARS-CoV-2 positive individuals was only observed for RT-PCR Ct < 24 and symptom onset to test of < 8 days. The infectivity of patients with Ct >24 and duration of symptoms >8 days may be low.

32. On 12 August 2020 we published: Could mass testing for Covid-19 do more harm than good? (Exhibit CH/26 [INQ000268285]). We reported that a BMJ rapid response by doctors in Wales set out the problems when using the PCR test when there is low viral circulation in the population. Routine testing found 26 low-level positive results for SARS-CoV-2. The number of cycles required to reach the threshold in these patients ranged from 36 to 43. Nineteen of these weekly positive tests were repeated, and all 19 were negative on repeat testing. The difference in a threshold might not look like much, but samples can differ by more than a million more copies of viral RNA per millilitre. Some testing thresholds attempt to detect one viral copy in the sample, further exacerbating the problems. Why does this matter? Regarding Covid-19, insufficient attention has been paid to how PCR results relate

to disease.

33. On 21 August 2020 we published: It's a mistake to think all positive Covid tests are the same (Exhibit CH/27 [INQ000268286]). Understanding the role of 'weak positives' and their threat is vital to answering the question of what happens next. Unpublished Italian evidence suggested less than three per cent were infectious. Fourteen other studies of the relationship between infectivity and PCR results pointed in the same direction.

34. On 11 September 2020 we published: When is covid covid? (Exhibit CH/28 [INQ000268287]). Some diseases can be diagnosed based on a test alone; most diseases, however, are defined by the cluster of symptoms and signs in addition to test results. Covid-19 was first identified as a severe disease-causing atypical pneumonia, accompanied by fever, cough and sometimes a range of other symptoms. The clinical features of the 41 patients infected with the 2019 novel coronavirus in Wuhan included pneumonia with abnormal findings on chest CT (Exhibit CH/29 [INQ000268288]). A Cochrane review found that a single symptom or sign could not accurately diagnose COVID-19 (Exhibit CH/30 [INQ000268289]).

35. The definition of a suspected case should resemble what we would typically expect to make a diagnosis based on a set of clinical criteria. However, this was discarded when it came to a confirmatory diagnosis and replaced by a single PCR test result. However, there was no guidance providing details on the specific RNA sequences required by testing, a threshold for the test result and the need for confirmatory testing. Therefore, it was unclear to us what constituted a positive result and what a covid case constitutes requires clarification.

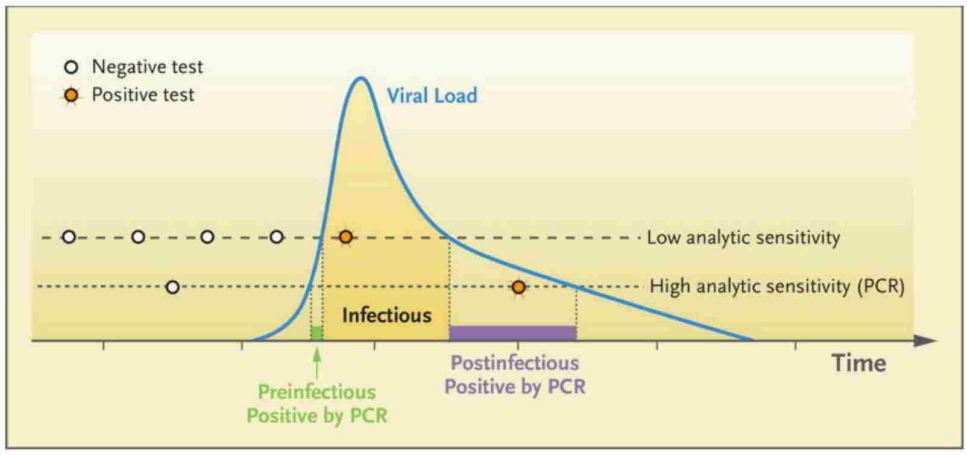
36. On 17 September 2020, Norwegian colleagues published the following article on CEBM: PCR positives: What do they mean? (Exhibit CH/31 [INQ000268290]). They suggest that the hypothesis of CEBM, i.e., that viral culture is required as a reference to test for infectivity, and other similar ones such as that by Jared Bullard et al., i.e., search for relations between cycle threshold (Ct), symptom onset and infectivity in cell culture, should be explored to increase the predictive power of tests.

37. In August 2020, we reviewed the evidence from studies comparing SARS CoV-2 culture, the best indicator of current infection and infectiousness, with reverse transcriptase polymerase chain reaction (RT-PCR) results. The preprint review was updated four times and is now published in Clinical Infectious Diseases doi: 10.1093/cid/ciaa1764 (Exhibit CH/32 [INQ000268291]). We included 29 studies reporting attempts at culturing or observing tissue infection by SARS-CoV-2 in sputum, nasopharyngeal or oropharyngeal,

urine, stool, blood, and environmental specimens. We found that the quality of the studies was moderate, with a lack of standardised reporting. The data suggested a relationship between the time from the onset of symptoms to the timing of the specimen test, cycle threshold (Ct), and symptom severity. Twelve studies reported that Ct values were significantly lower and log copies higher in specimens producing live virus culture. Two studies reported that the odds of live virus culture were reduced by approximately 33% for every 1-unit increase in Ct. Six of 8 studies reported detectable RNA for >14 days, but infectious potential declined after day 8, even among cases with ongoing high viral loads.

38. The importance of the Ct cut-off is explained in the UKHSA guidance first published in June 2021 (Exhibit CH/33 [INQ000268292]). 'Selection of samples for this exercise is based on their real-time, reverse transcriptase PCR result known as a Ct (Cycle threshold) value, where samples with Ct<25 are considered to have a high amount of virus, those with Ct>25<30 are considered to have a medium amount of virus, and those with Ct>30 are considered to have a low amount of virus.' 'When considering lower sensitivity tests, use of only samples containing a high amount of virus could lead to an overestimate of test sensitivity, whereas the use of only samples with a low amount of virus present could lead to an underestimate in test sensitivity; hence, this careful balancing of samples used for the validation process is paramount.'

39. In November 2020, the New England Journal of Medicine published an article on Rethinking Covid-19 Test Sensitivity (Exhibit CH/34 [INQ000268293]). The test can detect single gene fragments when the Ct is set at 45. It can be reported as a positive result even though these fragments themselves are not infectious and can linger in the patient long after the infection has passed but still be detectable. 'The window during which polymerase chain reaction (PCR) detects infections before infectivity (green) is short, whereas the corresponding postinfectious but PCR-detectable window (purple) is long.'



40. Does the Inquiry know what cycle threshold (Ct) values were used? Thresholds are an essential part of the diagnostic process. For example, if you have your blood pressure measured, then there is a level above which a diagnosis of hypertension is made. This threshold is usually above 140mmHg for systolic blood pressure and indicates the level above which your risk increases and is amenable to treatment. Therefore, the rationale for this question is that Cts are the best proxy of infectivity, short of culturing the virus in a laboratory. However, the information from a PCR result cannot be interpreted without a threshold. Laboratories had a statutory duty to report positive cases to PHE (presumably now to its successor UKHSA). Still, they do not have to advise which tests they use or submit Ct values.

41. In February 2022, we published the CG REPORT 7: PCR Testing in the UK during the SARS-CoV-2 Pandemic. Evidence from FOI requests to address the issue of what thresholds were used in the pandemic (Exhibit CH/35 [INQ000268294].

42. The number of validated tests used in the UK and who is responsible for their oversight is currently unclear. In the FOI responses, Public Health England (PHE) reported that it may be 80 or 85 at the time. DHSC had approved 16 tests based on regulations which state that those supplying Covid-19 tests must apply to DHSC for approval. Analysis of European CE-marked test kits revealed many more tests (over 141 and possibly over 400) that might be available for use. There is no central holder of the list of tests, their validation, or their accuracy. The responsibility lies with the individual laboratories to oversee which tests they use, only a few responded by naming the tests in use (Exhibit CH/35 [INQ000268294]).

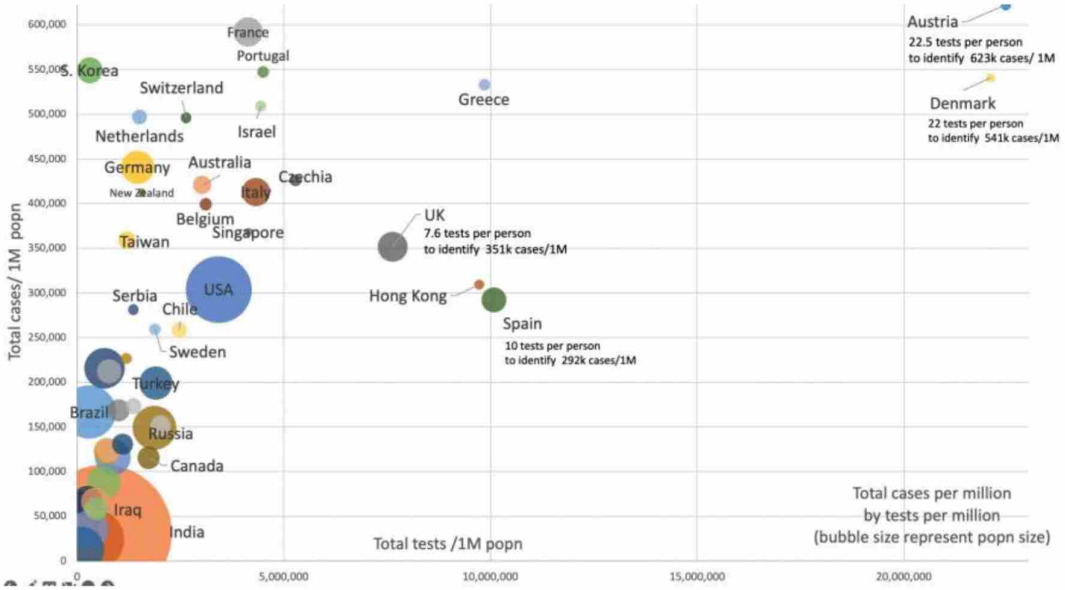
43. The cycle threshold (Ct) of the PCR test is the number of amplification cycles at which a sample yields a positive result. Laboratories have a statutory duty to report positive cases to PHE, but they do not have to advise which tests they are using nor submit Ct values. There is also no duty by individual laboratories to report what is meant by a "positive," and all tests may perform differently (especially across laboratories). Only two FOI responses provided answers on Ct values, indicating that 24–38% of the Ct values were over 30 in a set time span. The most common FOI request asked if there was a cycle threshold for positivity. In those that responded, the Ct for a positive result varied from 30 to 45.

44. We found limited information on the technical accuracy of the tests. Several responses stated there is no 'static', 'specific', or 'standard' cycle threshold. The false-positive and negative rates are related to the prevalence of the disease, but we found no information answering this question either. In those laboratories that responded to FOI requests, the cycle threshold for positivity varied from 30 to 45. It's unclear why these positivity thresholds varied so much, but they will have a massive impact on the numbers identified

as “positive”. This is because a very high Ct of 45 will identify one copy of RNA per ml, whereas a Ct of 30 will roughly identify 10,000 copies per ml. Yet, despite one of the results being on the threshold of infectivity and the other having no chance of infectiousness, both get the same result. Therefore, all patients are deemed “positive”, irrespective of the likelihood of transmissible infection.

45. On 5 April 2023, we published an article on Trust the Evidence: Progress is being made in some areas thanks to the pandemic (Exhibit CH/36 [INQ000268295]. ‘The closer the onset of symptoms to specimen taking, the older the patient, the more pre-existent problems such as metabolic syndrome, cardiovascular or malignant disease, the higher the likelihood of the use of steroids and contact with infectious people, the more likely the specimen (if properly managed) would turn out with a low PCR cycle threshold, credibly say between 10 and 27 and the more chances this person had of being contagious. This was without doing viral cultures. Please mark this because it is a breakthrough of the pandemic. PCR, far from being a shot in the dark, can accurately predict (if properly done) who matters in an epidemic and who does not, seen with a public health scope.’ Common wisdom has it that kits are different, and they test different viral genes, so you cannot compare Cts from A to B to C because you get different answers. This view is beginning to be undermined by new evidence, which shows that it is possible to harmonise kits if you have the will to do so (Exhibit CH/37 [INQ000268296]).

46. Problems occurred because the UK rapidly deployed test without thinking the strategy through and ended up with an approach that meant there was too much testing. I say




this because we assessed the relationship between the number of tests to detect a case,

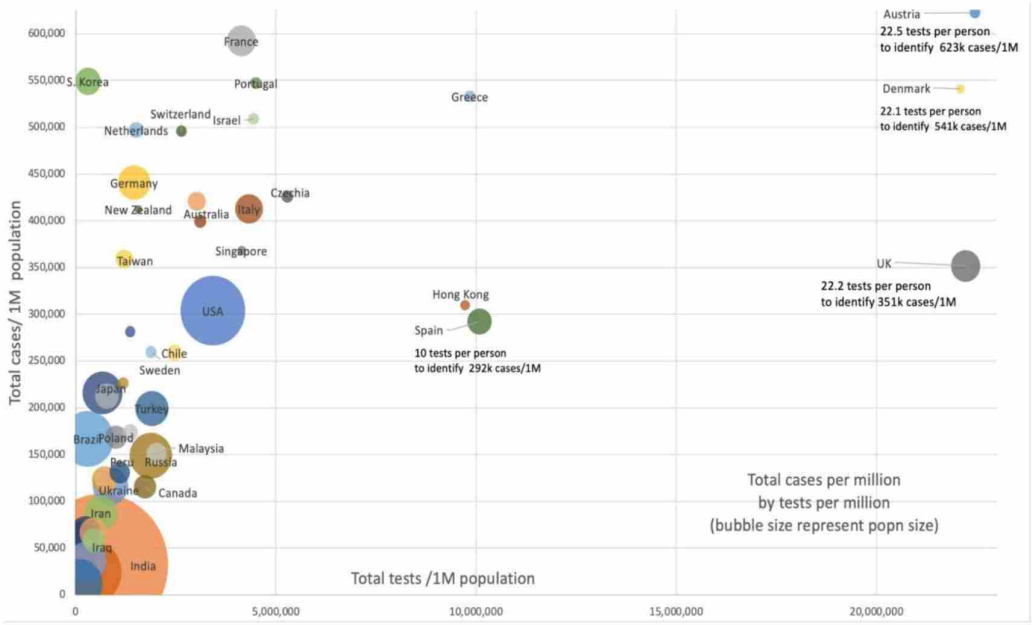
we used Worldometer data to compare the total cases per million population to the tests used for the same population. The plot shows the high-test rates in Austria, Denmark, Hong Kong, Spain and the UK (those further to the right in the graph).

47. How many tests did it take to detect one case? It took 22 tests to detect one case of covid in the UK. We call this the number needed to detect (NND). To calculate the NND, divide the number of tests per million population by the numbers detected per million population. For example, in the UK: 7,628,357/351,676 = 21.7 (rounded up to 22).

48. In Spain, the NND=35; in Austria, NND=36 and Denmark, the NND=41. Therefore, at first glance, they did more tests than the UK to detect a single case. Whereas, in Italy, the NND=11 and in Germany, the NND=3.3, show they did less testing than the UK to detect a case. From this, we can glean that the indications for testing varied substantially by country. If you set out to test massive numbers of asymptomatic people, then it stands to reason that you will require more tests to detect a case. Remember, I am not talking about infectious cases here, I am referring to a positive case based on PCR or Lateral Flow testing. However, this isn't all the story: many UK tests were not reported on the government's dashboard. On 25 June 2021, Bloomberg reported the UK had 'No Idea If Millions of Rapid Covid Tests Are Being Used,' with only 14% of 691 million tests registered by May 2021 (Exhibit CH/133 [INQ000272979].

49. So how many tests did the UK use? This is not easy to answer. In 2021, the UK's public accounts committee was informed that 384 million LFD test kits had been delivered, with a further 239 million due by February (Exhibit CH/134 [INQ000268271])

50. The UK was tendering for up to 200 million more LFD tests to be delivered by early March. In addition, the Independent reported in Jan 2022 that the UK made a final order for a further 780 million LFDs (Exhibit CH/135 [INQ000268272], taking the total to a possible 1,493 billion LFD tests bought. This figure (an estimate) was a billion more than the 319 million LFD reported on the covid dashboard for England (we have assumed all the PCR tests done have been reported). Therefore, if we add a billion unreported tests to the total, we get the following figure:




51. Therefore, the UK may have carried out as many as 22 tests per person, similar to Denmark and Austria. However, the UK identified fewer reported cases, meaning the NND may be as high as 62. This is one of the highest number of tests required to detect a single case worldwide. However, I cannot account for underreporting in other countries that might affect estimates and for the number of LFD positives that were not reported and verify the true number of tests bought in the UK and crucially used.

**Transmission**

52. Understanding transmission is crucial to determining when and how to intervene to reduce the spread of infection. A 2018 review predating the SARS CoV-2 pandemic indicated that the evidence of the mode of transmission of the primary respiratory viruses was mixed (droplets, contact, fomites, aerosol) and probably depended on the situation at the time (Exhibit CH/38 [INQ000268297]). Our work on transmission is unique as it represents the largest body of evidence on the transmission of a single agent (SARs-CoV-2) in a single place, following protocols which developed over time as our understanding did. We also proposed a hierarchical framework based on our experience of systematically reviewing and synthesising over 400 primary studies for an evidence-based update of the modes of transmission for SARS-CoV-2 (Exhibit CH/03 [INQ000268226]). These studies revealed significant methodological shortcomings with a lack of standardisation in the design, conduct, testing and reporting of SARS-CoV-2 transmission. While this situation is in part excusable at the outset of a pandemic, evidence rules of proof for assessing the

transmission of this virus are needed for this and future pandemics of viral respiratory pathogens. Evidence published on 6 April 2023 highlights that SARS-CoV-2 RNA was found on primary cases' and contacts' hands and on frequently touched household surfaces associated with the transmission, identifying these as potential vectors for the spread in households (Exhibit CH/39 [INQ000268298].

53. Further adding to this was a hospital-based study that sought to determine the detection and quantification of infectious severe acute respiratory coronavirus 2 in diverse clinical and environmental samples (Exhibit CH/40 [INQ000268299]. The findings offered compelling evidence that large respiratory droplets and contact (direct and indirect, i.e., fomites) are important modes of SARS-CoV-2 transmission.

**Test and Trace Program**

54. In public health, identifying symptomatic subjects and their subsequent isolation is proposed and used for infectious diseases to slow outbreaks and, in some instances, stop them. The conceptual nub of the issue is that in the vast majority of cases, an infectious disease is contagious for a short time. During that period, the source of infection (known as the index case) may infect other people (contacts). Therefore, if you stop contact from the index case and/or their secondary cases (family, acquaintances, colleagues), you will interrupt or disrupt the chain of transmission of the agent. Cases are only of interest if they are contagious, i.e., producing so-called replication-competent viruses that can be passed on from A to B and so on, which need to be identified and traced, then isolated to prevent onward transmission. In the explosive phase of an acute respiratory viral epidemic, testing, tracing, and isolation are incredibly labour intensive as cases multiply exponentially to then level out and fall as the contagion curve obeys Farr's law. In Lombardy, public health had given up testing and tracing by the second week in March as the number of supposed cases rapidly overwhelmed public health resources. Tracing needs to be done based on history taking. It is time-consuming, and the window of contagiousness is sometimes very short, lasting as little as two days. Enter PCR as a tool for diagnosis. If applied in large numbers in what amounts to mass testing of whole populations, it can quickly tell you who is "positive". So, in a very short time, PCR capacity went from niche testing in a few laboratories to a way out of the pandemic and then a presumed return to normal. Except, qualitative PCR (positive/negative) on its own without recourse to clinical history and an estimate of viral burden cannot distinguish between contagious, convalescent and spurious cases, i.e., due to environmental contamination. If you then set arbitrary cut-offs for positivity, as has been done in most UK laboratories, you increase the number of "cases" by an unknown factor. The consequence, apart from the cost of setting up a programme

not founded on science and clinical medicine, is the lengthy isolation of those who never encountered SARS-CoV-2 or those who are convalescing, regardless of whether they knew they had been infected. Convalescents can still test positive for PCR as the technique is so sensitive that in the presence of an arbitrary cut-off, the test is picking up viral debris, which is of little interest.

55. We ended up with an expensive programme with no clear, evidence-based objectives. The initial budget was £15 billion; by November 2020, this rose to £22bn; by the time the service was halted in February 2022, it cost £37bn. At its height, over 700 UK testing sites were open seven days a week, including Christmas and New Year's Day.

56. In the digital era, phone technologies were considered the answer. Yet again, interventions were untried and untested; however, this did not stop them from being rolled out at speed. But at any point, did anyone ask if there was evidence (for an approach that had never been tried before on such a scale) on whether it worked or, once rolled out, evaluated its effectiveness and/or the possible harms?

57. Although contact tracing has a clear logic, its effects depend on the organism's characteristics, how it is transmitted, the duration of the asymptomatic phase before symptoms manifest, the time the agent is transmissible, the size of the outbreak and the population's behaviour. By the time it shut down in February 2022, 16 million cases had been reported on the dashboard in England, whereas the ONS infection survey estimated 67.6 million had tested positive for Covid-19. Therefore, only about one in four “cases” were detected, and of those testing positive, there was no indication of whether they were infectious at the time. Given the scale of the outbreak and the nature of the SARs-COV-2 agent, it was clear early on that Test and Trace would be an expensive waste of resources. See: Could mass testing for Covid-19 do more harm than good? The Spectator. 12 August 2020 (Exhibit CH/26 [INQ000268285]).

58. One of the arguments is that Test and Trace was rolled out too late. Early on, Germany was praised for its Test and Trace strategy. Some advisors incorrectly extolled their strategy; however, Germany equally struggled and ended up gripped by panic. As a result, it was late in coming out of Covid-19 measures in 2022. The Test and Trace program ignored the basic rules of infectious disease epidemiology, leading to massive disruption of society. Models are not sufficient evidence to support £37bn of expenditures, no other area of healthcare would tolerate such waste. A simple question the Inquiry should ask is what the cost per QALY of this testing program was and how it matches the £30,000 threshold for willingness to pay (Exhibit CH/41 [INQ000268300]).

59. In October 2021, the House of Commons Committee of Public Accounts similarly considered the program a waste of resources in its Test and Trace update. 'In March this year, we reported NHS Test and Trace Service's (NHST&T) failure to deliver on its central promise of averting another lockdown.' and 'NHST&T's overall goal is to help break the chains of COVID-19 transmission and enable people to return to a more normal way of life, but there have been two national lockdowns since October 2020, and at the time of our evidence session, cases were increasing again.'

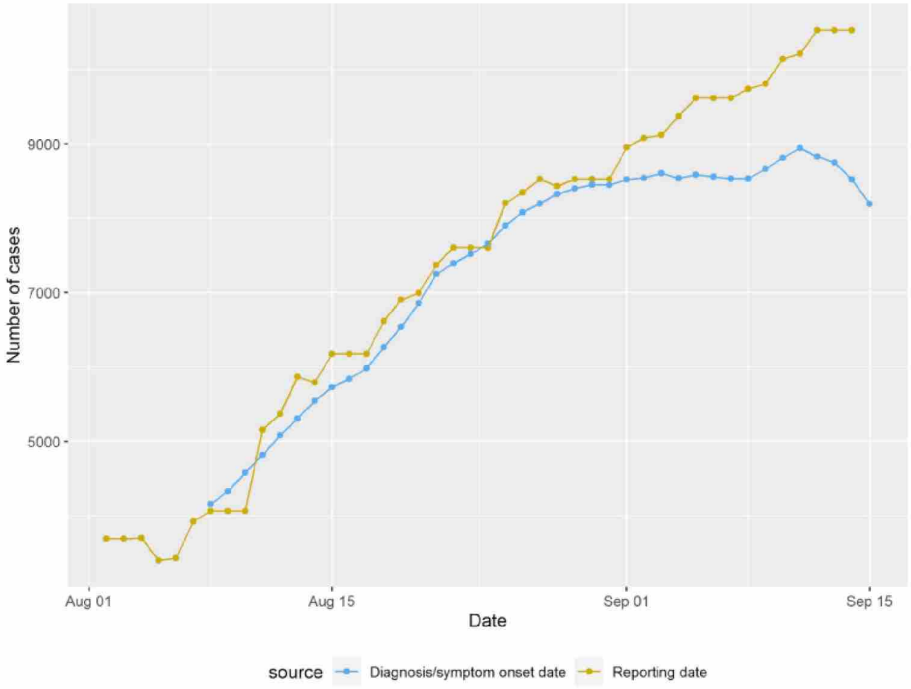
**Modelling**

60. An inquiry into the UK's response to swine flu, conducted by Dame Deirdre Hine, questioned the wisdom of communicating the most pessimistic outcome, explaining: *'Given the uncertainty inherent in the unpredictability of the influenza virus, there is a tendency, in an emergency and in the absence of information, to assume the worst-case scenario and resource the response accordingly.* The Commons Select Committee and the Inquiry highlighted flaws in communicating the modelling results. In 2010/11, they fully appreciated that the worst-case figure would likely stick in the public conscience.

61. On 21 September 2020, in an email shared with the cabinet office and an article published in the Spectator (Exhibit CH/42 [INQ000268301]) and on CEBM (Exhibit CH/43 [INQ000268302]), we showed how the presentation of data by the government was overly pessimistic and therefore, often incorrect. In a press briefing on 21 September, Professors Chris Whitty and Patrick Vallance showed epidemic curves for Spain and France demonstrating how case numbers had been growing rapidly, possibly exponentially, since August (Exhibit CH/44 [INQ000268303]). *'We had shown that (accounting for a potential two-week lag in reporting) as of 3 September, case numbers based on positive PCR tests appear to be flat in Spain. It depends, however, on which method of analysis you choose.'* While we identified a two-week phase of sustained exponential growth in early to mid-July, the last two months have exhibited a steady fall in the rate of growth of cases. As of September 3, case numbers appeared to be flat. Providing accurate data to inform decisions is essential, a point made in the meeting with the Prime Minister.

62. Epidemic curves for Covid-19 can be constructed with numbers of cases by published date or case numbers by the date that the specimen was taken or, in some cases, by the date of symptom onset. When there are delays in publishing test results, the two curves can look different and lead to different interpretations. As is often done when using case numbers by publishing date, the raw numbers are smoothed with a seven-day moving average. Drawn this way, the data shows a continued upward trend. However, drawing the

epidemic curve for Spain using cases by symptom onset produced a different result. We put these two methods together on a single graph to compare them.




63. Based on the symptom onset date, the epidemic curve does not show the same continued growth and appears to showcase stalling starting in late August. As most of the lag between the publishing date and symptom onset is between 1 day and two weeks, but in some cases longer, the most current data for the blue line will be revised upwards. We repeated this for the UK data. We had previously shown that as of September 3, case numbers appeared flat in Spain. However, the interpretation depends on which method of analysis you choose (Exhibit CH/43 [INQ000268302). We considered the date of onset of symptoms availability to be crucial to interpreting the data. That is because, in most cases, the shedding of infectious virus is all but over after 7-10 days from infection and 5-7 days from the onset of symptoms. In the most vulnerable, shedding lasts a lot longer (weeks). In addition, we reported that Spain has three case definitions, one of which did not involve laboratory confirmation. We were unclear on which definitions were used in the Government's brief and how comparable they were with the UK.

64. On 30 September 2020, I published an article on the Chief Scientist Officer's predictions (Exhibit CH/45 [INQ000268304]). Sir Patrick Vallance, the Chief Scientific Adviser, said last week: *'At the moment, we think that the epidemic is doubling roughly every seven days…If,*

*and that's quite a big if, but if that continues unabated, and this grows, doubling every seven days… if that continued, you would end up with something like 50,000 cases in the middle of October per day'.* Covid-19 cases would hit 50,000 a day by October 13 without further action (Exhibit CH/44 [ INQ000268303]). None was forthcoming, cases peaked at 19,452 on this day. The CSO was at pains to explain that the estimates were not predictions but were projections adding even more confusion as to the purpose of modelling. This point of confusion and the lack of plausibility of the modelling estimates was further illustrated in communications between Fraser Nelson and Graham Medley in December 2021. 'I was struck by how he found my question odd. I wanted to know why, if it's quite plausible that Omicron is mild and doesn't threaten the NHS, what would be the point of including that as a 'scenario'? His replies suggest he has been given a very limited brief and asked to churn out worse-case scenarios without being asked to comment on how plausible they are.'

65. On 1 November 2020, after meeting with the Prime Minister and having shared the inaccuracies of the modelled estimates, we published the following article: SAGE models overestimation of deaths (Exhibit CH/46 [INQ000268305]). 'Two SAGE model estimates have already proven to be invalid. We consider these analyses need checking with the raw data to verify the estimates against the actual death data and further verify whether the lower estimates reflect the actual data. The Telegraph published that the 'Death scenarios used by Government to justify a second national lockdown maybe four times too high' (Exhibit CH/18 [INQ000268277]). Saturday's Downing Street press conference had scientists present graphs suggesting England could see 4,000 daily deaths early next month.

66. The Lockdown Files reveal that the Prime Minister told his WhatsApp group that I had said, "the death modelling you have been shown is already very wrong", as it was out of date, having been drawn up three weeks previously (Exhibit CH/47 [INQ000268306]).

67. In December 2022, we published: Why Covid-19 Modelling of progression and prevention fails to translate to the real world in a peer-reviewed journal (Exhibit CH/48 [INQ000268307]). We used systematic review search methods to find early modelling studies that determined the reproduction number and analysed its use and application to interventions and policy in the UK. Up to March 2020, we found 42 reproduction number estimates (39 based on Chinese data: R0 range 2.1-6.47). Several biases affect the quality of modelling studies that are infrequently discussed, and many factors contribute to significant differences in the results of individual studies that go beyond chance. The sources of effect estimates incorporated into mathematical models are unclear or modelled

assumptions themselves. There is often a lack of a relationship between transmission estimates and the timing of imposed restrictions, which is further affected by the lag in reporting. We concluded that modelling studies lack basic evidence-based methods that aid their quality assessment, reporting, and critical appraisal. If used judiciously, models may be helpful, especially if they openly present the uncertainties and use sensitivity analyses extensively, which need to consider and explicitly discuss the limitations of the evidence.

68. Problems with the sources of evidence for the effectiveness estimate. The Imperial College report stated in the mitigation scenario that 'even if all patients were able to be treated, we predict there would still be in the order of 250,000 deaths in GB' (Ferguson et al., 2020). Imperial College's model predicted there would be between 8700 and 39,000 deaths with suppression, assuming an R0 of 2.4 (confidence interval 2.0 -- 2.6). This R0 was based on two studies cited in our review: Li et al. 2020 and Riou J. 2020. It is unclear why 2.4 was chosen as it is higher than these reports. The lower bound of the Imperial estimate does not reflect their estimates: Li Qun reports an estimate of 2.2 (95% CI, 1.4 to 3.9), and Riou J reports an R0 around 2.2 (median value, with 90% high-density interval: 1.4 -- 3.8). The report profoundly impacted what happened in the UK, concluding that suppression was the only viable strategy. The numbers presented were so alluring that they were impossible to ignore, but they were not grounded in evidence. Five days after the UK lockdown began, advisors reported the UK would 'do well to keep deaths under 20,000' (Exhibit CH/49 [INQ000268308]). However, it is still unclear what the sources of the effect estimates incorporated into the Imperial College model were.

69. Any model is only as good as the data put into it. Doubtless, the Imperial team did its best to make this data as accurate as possible, but they remain assumptions. Any one wrong assumption can skew the results dramatically. The same model, with slightly different data, might have recommended the diametric opposite policy. Modellers in a pandemic offer a worst-case scenario and it is always this worst-case scenario that will be seized upon by the press. But modellers have a track record of getting it wrong: BSE, foot and mouth reactions were all driven by overly pessimistic models. In September 2005, David Nabarro, a senior public health expert at the WHO, told the BBC that the "range of deaths could be anything between five and 150 million" for Bird flu. Ferguson told the Guardian 'that up to 200 million people could be killed.' Consequently, the UK government started stockpiling antivirals at a substantial cost. In 2009, Chief Medical Officer Liam Donaldson revealed that the NHS was planning for a 'worst case scenario' of 65,000 deaths for the swine flu pandemic if the IFR was as high as 0.35% and 19,000 deaths if it was a rate of 0.1%. The best-case scenario, where just five per cent of the population fell ill, led to 3,100 deaths.

The statistics were based on modelling by Imperial. The actual death toll was 457 in the UK, with the IFR just 0.026 per cent. In a 2011 select committee, Dr Justin McCracken, chief executive of the Health Protection Agency suggested giving a "most likely expectation" and a worst-case scenario to negate the medias fixation with the worst-case scenario. Mr Donaldson told the committee his personal view was that there would be no more than 1000 deaths, but he had felt obliged to share the complete data with the journalists. Neil Ferguson was also called to shed light upon the numbers. He told the hearing that as the situation was changing so rapidly, the data were often out of date by the time they were briefed to the public. An inquiry into the UK's response to swine flu, conducted by Dame Deirdre Hine, questioned the wisdom of communicating the most pessimistic outcome, explaining: Given the context of uncertainty inherent in the unpredictability of the influenza virus, there is a tendency, in an emergency and in the absence of information, to assume the worst-case scenario and resources the response accordingly. The Commons Select Committee and the Inquiry highlighted flaws in communicating the modelling results that were played out in the covid pandemic. No lessons from the previous experiences with modelling were applied to the current pandemic. In 2010/11, they fully appreciated that the worst-case figure would likely stick in the public conscience.

70. There is a poor understanding of the limitations of models, and little discussion or thought is given to how they influence decision-making. The sources and assumptions underpinning modelling are unclear. The biases and inherent limitations are often unaccounted for in policy decisions despite clear lessons from previous pandemics. There is a track record of modelling inaccuracy and negativity bias; however, government commentators did not consider this when communicating the results. As the pandemic evolved, robust data should have driven decision-making, and high-quality evidence should have been the mainstay for reducing uncertainties over whether to intervene.

**Errors in the interpretation of the Covid-19 data**

71. Throughout the pandemic, we observed consistent errors, misunderstandings over effects, too much certainty being reported by advisors and interpretation of the data lacking context. The fixation with modelling distracted from an evidence-based interpretation of the data.

72. On 25 October 2020, we published in the Spectator: The Ten Worst Covid Data Failures (Exhibit CH/50 [INQ000268309]).

73. Overstating the number of people who are going to die: 'Some will argue that Imperial

College's modelling may have come true if it had not been for the lockdown. But this does not explain what happened in Sweden. Imperial College's assumptions would mean 85,000 deaths if Sweden did not lockdown. Sweden did not go into a lockdown and deaths were just under 6,000 by October 2020. As of 11 April 2023, Covid-19 deaths totalled 23,912 in Sweden.'

74. Leaked SAGE papers: A print paper written by SAGE members to support a two-week 'circuit breaker' leaked to the press reported (Exhibit CH/51 [INQ000268310]). 'With no social distancing measures in place from now until January, the virus could potentially spiral out of control and kill 217,000 people, hospitalise 316,000 and infect 20.7 million. But with a strict two-week lockdown the number of deaths could be reduced by 100,000, admissions by 139,000 and infections by 6 million.' 'Understandably, this made headlines. But when the BBC interviewed the lead author, he said he wished he 'had not put these numbers in the study' because it was an extreme scenario only included 'for illustration' (Exhibit CH/52 [INQ000268311]).

**Miscategorisation of 'Covid-19 deaths'**

75. Under the original system, someone run over by a bus would be counted as a 'Covid-19 death' if they had tested positive for Covid but later recovered. On 16 July 2020, when this anomaly was pointed out by us at the Oxford Centre for Evidence-Based Medicine, it turned out even the Health Secretary was unaware of what the Covid-19 death data referred to. He ordered an immediate inquiry (Exhibit CH/53 [INQ000268312]). By the PHE definition, "Linking data on confirmed positive cases (identified through testing by NHS and PHE laboratories and commercial partners) to the NHS Demographic Batch Service: when a patient dies, the NHS central register of patients is notified (this is not limited to deaths in hospitals). The list of all lab-confirmed cases is checked against the NHS central register each day to check if any of the patients have died." A patient who has tested positive but was successfully treated and discharged from hospital will still be counted as a Covid-19 death even if they had a heart attack or were run over by a bus three months later. This is also why the PHE figures varied substantially from day to day. For example, 16 new deaths were announced on 6th July, but the following day, 152 were reported. This problem illustrated how poor-quality data from PHE was misleading the government itself. A new system was eventually set up: counting deaths within 28 days of a positive Covid-19 test. This removed 4,149 deaths from the 15 July death count.

76. On 16 September 2020, we published an article on death certificate data and COVID-19 as the underlying cause of death (Exhibit CH/54 [INQ000268313]). *'Overall, about one in*

*thirteen deaths with COVID-19 on the death certificate did not have the disease as the underlying cause of death; however, this proportion had risen substantially to nearly a third over the last eight weeks.'* It reported it was essential to distinguish between deaths where Covid-19 was a contributory cause from those where Covid-19 was the underlying cause of death.

77. On 19 March 2022, we extended our work on death certification and published: Collateral Global Report 8: Understanding Definitions and Reporting of Deaths Attributed to Covid-19 in the UK – Evidence from FOI Requests (Exhibit CH/54 [INQ000268313]). We found 800 requests from over 90 individuals. Our main findings included the following: There was no consistent definition of cause of death or contributory cause of death across national bodies and in different bodies within the same nation. We found 14 different ways of attributing the causes of death mentioned by respondents. In care homes in England, 1,304 out of 17,264 Covid-19 (7.6%, range 0% to 63%) mentioned Covid-19 without contributory or other factors in the death certificate, making it impossible to ascertain a chain of causality. Some responses indicate that SARS-CoV-2 negative individuals were classified as "Covid-19 deaths". According to the Care Quality Commission, nursing home providers and medical practitioners can assign a cause of death. Post-mortem examinations were uncommon; the ONS did not incorporate their results in the summary of deaths by cause during the pandemic. The inconsistencies already noted hinder the ascertainment of the role of each factor leading to death and the quantification of the importance of infection.

78. Overstating the effect of lockdown on reducing virus transmission. 'On 17 March, Patrick Vallance, the Chief Scientific Adviser, stated that keeping the coronavirus death toll in the UK to less than 20,000 would be 'a good outcome' yet on 16 July he had to admit the UK's coronavirus outcome had 'not been good' (Exhibit CH/56 [INQ000268315]). After the lockdown, Professor Neil Ferguson of Imperial College gave a range of 7,000 to 20,000 deaths (Exhibit CH/57 [INQ000268316]). UK Covid-19 deaths were approaching 45,000 by October 2020.'

79. Exaggerating Covid-19's impact on hospitals. 'A leaked NHS report written in April warned the UK would need 25,000 hospital beds to treat Covid-19 patients 'well into July' (Exhibit CH/58 [INQ000268317]). However, on 24 July, the daily count of confirmed Covid-19 patients in hospitals was 928 in England and 1,356 across the UK or just 5 per cent of the prediction.'

**Exaggerated Fears about lifting lockdown.**

80. 'Imperial College's 'Report 20' on 4 May contains a prediction of tens of thousands of

deaths in Italy within three weeks of reopening (Exhibit CH/59 [INQ000268318]). "We find that, in the absence of additional interventions, even a 20% return to pre-lockdown mobility could lead to a resurgence in the number of deaths far greater than experienced in the current wave in several regions." Under the 20% scenario, Imperial estimated the total number of excess deaths to be between 3,000 and 5,000 for eight weeks from 1st May. Yet by 30 June, just 23 daily deaths had been reported (lockdown officially ended on 4 May and internal travel restrictions on 3 June). On 29 May, SAGE advisors stated that 'Covid-19 was spreading too fast to lift lockdown in England'. The mobility index (based on the request for map indications from the web) in June was around 20 per cent over the norm for the month for the UK, yet cases continued to decline to a low of 624 on 30 June.' This fear of lockdown was reiterated in the press: 'Two British scientific advisers warn it's too soon to lift lockdown.' "But Jeremy Farrar, the director of the Wellcome Trust and a member of Britain's Scientific Advisory Group for Emergencies (SAGE), said he agreed with his colleague John Edmunds that "COVID-19 is spreading too fast to lift lockdown in England" (Exhibit CH/60 INQ000268319]).

**The Vallance graph**

81. 'On 21 September, Sir Patrick Vallance held a press conference where he sought to raise public support for further restrictions. The only graph he showed was one where cases doubled every seven days. This time, at least, the 'scenario' could be measured against reality. The Vallance chart showed infections hitting 50,000 cases daily by 13 October without action. His graph did not lead to any change in policy, and when this day arrived, the moving average was 16,228' (Exhibit CH/61 [INQ000268320]).

82. The Excel spreadsheet blunder. This was blamed on a Covid-19 testing problem that led to 16,000 missed cases and up to 50,000 untraced contacts who should otherwise have been self-isolating. In addition to this are grave errors about the overall quality of the data, further undermining confidence in the system (Exhibit CH/62 [INQ000268321]).

83. The reluctance to acknowledge uncertainties in the evidence. Sir Patrick Vallance told the Health and Social Care Committee on the 5 May that 'a minute at two metres contact is about the same risk as six seconds at one metre'. He added: 'That gives you some idea of why the two metres becomes important. The risk at one metre is about 10 to 30 times higher than at two metres, so the distancing is an important part of this.' However, on 4 June, SAGE gave a very different estimate: at one metre, it could be two to 10 times higher than at two metres, they reported. So, who got it right? However, a one size fits all two-metre social distancing rule was inconsistent with the underlying science of exhalations and indoor air. The problem arises because most existing evidence is observational and non-

peer reviewed, depending very much on populations, study settings, sample collection methods and primary outcomes. Such studies do not allow a definition of a specific relative risk of SARS-CoV-2 at different distances.

**Lack of access and transparency in data**

84. The Manchester Evening News asked for trust-by-trust Covid-19 admissions numbers as a proportion of overall capacity in Greater Manchester (Exhibit CH/63 [INQ000268322]). Six out of seven relevant trusts did not comply with the request. We were advised that a Freedom of Information request was required to obtain the data, and it would take up to 21 days for a response. We also had access to essential healthcare data blocked. However, we were aware there was significant data used to inform lockdown restrictions that were not in the public domain.

85. In August 2020, we also reported on The Flaw in reporting Welsh data on Covid-19 hospital admissions (Exhibit CH/64 [INQ000268323]). The gov.uk website stated that the "figures are not comparable as Wales include suspected Covid-19 patients while the other nations include only confirmed cases." This weakness in the data makes comparisons impossible; it also creates concerns about the overall accuracy of the data provided by the gov.uk website. The number of patients admitted in Wales with covid-19 is therefore inflated.

86. In September 2020, we published on whether Scotland was overcounting the number of patients in hospital beds (Exhibit CH/65 [INQ000268324]). 'According to the Scottish government's Coronavirus (COVID-19) definitions (Exhibit CH/66 [INQ000268325]), the number of patients in hospital with suspected Covid-19 "may include people who are in hospital for other reasons but have previously tested positive for Covid-19." While a count of new admissions to hospital only includes those who "tested positive for Covid-19 in the 14 days before hospital admission, on the day of their admission, or during their stay in hospital", no equivalent cut-off appears to be made for this count of individuals currently in hospital. The impact of this appears to be potentially substantial: the total number of individuals in hospitals in Scotland rose by 15, from 255 to 270 between the 31st of July and 4th of August, a period that saw a total of only four new admissions as defined by testing positive at or after admission or within the 14 days before hospitalisation. This is similar to the problem with the PHE issue with deaths in England, which previously meant that everyone who has ever had Covid-19 must die with Covid-19. The reason for the disparity in the Scottish data was not clear.

87. In October 2021, in our alternative proposals, we proposed to develop a better

interpretation of the Covid-19 data. Improve the interpretation and critical analysis of UK healthcare data during outbreaks. Increase the range of skills and expertise in interpreting and analysing government data. Improve the transparency of UK healthcare data through new legislation.

**Conclusions on the approach to the data:**

88. There was a poor understanding of the data throughout the pandemic, which hindered decision-making. Government reports lacked peer review input; therefore, estimates projected to the public went unchecked, leading to errors. Basic epidemiological methods were missing from definitions of deaths to the analysis of cases. Systematic errors were biased towards worst-case scenarios. The government lacked a dedicated red team to identify flaws in its data and assumptions and, therefore, lacked the ability to strengthen its plans and policies.

**Non-pharmaceutical pandemic interventions**

89. The evidence base for non-pharmaceutical pandemic interventions. On 13 September 2020, we warned that the imminent introduction of the rule of six, whereby in England only up to six people were allowed to mingle, including households, was not based on any evidence (Exhibit CH/67 [INQ000268326]). At the time, good quality scientific evidence for distancing was (and still is) almost non-existent (Exhibit CH/68 [INQ000268327]). There was and still is only one randomised controlled trial carried out in Japan during the 2009 influenza pandemic. In this trial, workers with influenza like symptoms were sent home. This had the effect of lowering the incidence of infection in the workplace and increasing it in families. However, based on the Telegraph's Lockdown Files, we now know that ministers knew there was no evidential basis for the policy (Exhibit CH/69 [INQ000268328]). Still, they decided to go ahead as it was easier to communicate (Exhibit CH/70 [INQ000268329]).

90. Most public health officials discarded or discouraged using masks at the start of the pandemic. See timeline (Exhibit CH/71 [INQ000268330] https://smilefree.org/timeline/). On 3 April 2020, England's Deputy Chief Medical Officer Jonathan Van Tam told a televised briefing: "we do not recommend face masks for general wearing." Professor Jason Leitch, Scotland's Clinical Director said, "The global evidence is that masks in the general population don't work." 16 April 2020: Transport Secretary Grant Shapps told ITV that wearing masks would be "counterproductive… the suggestions people would make their own masks; whether it's clothing and that sort of thing which doesn't really provide that

much protection. Secondly, the way people take it off can sometimes cause the reinfection. Thirdly, it can provide a false sense of security." 23 April 2020: UK Chief Scientific Officer Patrick Vallance tells televised briefing, "the evidence on masks has always been quite weak, quite variable… there's no real trials on it." 24 April 2020: Health Secretary Matt Hancock tells LBC, "the evidence for the use of masks by the general public, especially outdoors, is extremely weak." It is unclear why advisers changed their position, particularly in the face of no new high-quality evidence.

91. In April 2020, we first pointed out that society has choices: find out if they work or not, and in what circumstances, or recommend their use, with or without other measures, or use those non-pharmacological interventions where there is more evidence of benefit. Perhaps the most perplexing aspect of the pandemic response is the lack of will to develop high quality evidence for non-pharmaceutical interventions. The reason remains unclear, but we have consistently pointed out this lack of evidence. As a recent example, the effectiveness of N95 masks as wearer protection against Covid-19 in community settings in people at higher risk of becoming seriously ill from Covid-19. A rapid review by the UKHSA published in April 2023 reports the review did not identify any studies for inclusion and so could provide no evidence to answer the research question (Exhibit CH/72 [INQ000268331]).

92. In June 2020, we published on the lack of evidence for the 2-metre distancing rule (Exhibit CH/73 [INQ000268332]), which also appeared in the Telegraph (Exhibit CH/74 [INQ000268333]). We found that the evidence base was mainly derived from observational studies and was of poor quality. There was a need to undertake controlled studies to clarify the effectiveness of social distancing. At the time, the evidence showed that the risk of catching infections was higher in healthcare settings than in the community and higher indoors than outdoors. What the evidence could not say was that there was any measured distance that reduced risk.

93. In July 2020, we published on masking lack of evidence with politics. (Exhibit CH/75 [INQ000268334]). We pointed out that the 'small number of trials and lateness in the pandemic cycle is unlikely to give us reasonably clear answers and guide decision-makers. This abandonment of the scientific modus operandi and lack of foresight has left the field wide open for the play of opinions, radical views and political influence. Many countries mandated masks for the public in various settings. Several others, Denmark and Norway did not. Norway's Institute for Public Health reported that if masks did work, then any difference in infection rates would be small when infection rates are low: assuming 20% asymptomatics and a risk reduction of 40% for wearing masks, 200,000 people would need

to wear one to prevent one new infection per week.

94. In September 2020, the evidence set out in our alternative proposals as an extension to the plan submitted to the Prime Minister in late September, we proposed to develop a better interpretation of the Covid-19 data that included the following recommendations: To develop a robust evidence base for non-pharmaceutical interventions (NPIs) and outcome measures of NPI's effectiveness that define what works and refutes what doesn't work.

95. In November 2020, we published the following article: Landmark Danish study that found no significant effect for face mask wearers. (Exhibit CH/76 [INQ000268335]). 'Overall, there is a troubling lack of robust evidence on face masks and Covid-19. There have only been three community trials during the current pandemic comparing the use of masks with various alternatives, one in Guinea-Bissau, one in India and this latest trial in Denmark. The low number of studies into the effect different interventions have on the spread of Covid-19, a subject of global importance suggests there is a total lack of interest from governments in pursuing evidence-based medicine.'

96. In January 2022, we published an article on whether masks in schools work, asking how convincing the government's evidence is (Exhibit CH/77 [INQ000268336]). At the time, the government changed its mind and asked children to wear masks in school. When Plan B was announced in December 2021, there was no requirement. 'The government published an 'Evidence Summary' for the use of face coverings in education settings. The study compared schools where pupils wore masks with those that did not and found a difference in Covid absences of just 0.6 percentage points. Even the official report accepted that this is not a statistically significant difference (Exhibit CH/78 [INQ000268337]). The DfE report had all the hallmarks of retrofitting evidence to justify the policy. We considered the Education Secretary had been poorly briefed. There were clear concerns amongst students and teachers that wearing masks impacted learning. The DfE document does not meet the requirements for the high-quality evidence we would need before justifying the policy in schools.

97. In February 2023, we published an article on Do mask mandates work? (Exhibit CH/79 [INQ000268338]). The week saw the update of the Cochrane systematic review on the Physical interventions to interrupt or reduce the spread of respiratory viruses led by Tom Jefferson (Exhibit CH/80 [INQ000268339]). The review includes evidence from 78 randomised trials of over 610,000 participants. The review's fifth update included evidence from physical interventions ranging from handwashing to antiseptic use, distancing and barriers. The interventions aim to halt or delay the spread of respiratory viruses, no matter their origins and characteristics; this is why they are essential. This is the second update of

this review during the pandemic. The first was delayed seven months due to unexplained editorial decisions. It was too late when it came out on 20 November 2020; by then, low-quality observational evidence and government policy had set the agenda for mandates.

98. In April 2023, we reported on the UKHSA review on the effectiveness of face coverings to reduce community transmission of Covid-19, updated to 14 September 2021, including two randomised controlled trials and 23 observational studies, also known as non-randomised studies (Exhibit CH/81 [INQ000268340]). We summarised these reviews highlighting that our understanding of what works is not helped by the production of government reviews based on poor-quality articles (in some cases beyond poor), studies lacking the basics when it comes to the scientific method (where are the protocols and please don't include any more letters) and drawing conclusions based on cherry-picking and showcasing the data to suit the answer you want (retrofitting the evidence) (Exhibit CH/82 [INQ000268341]).

**Identification of the vulnerable and risk communication strategies.**

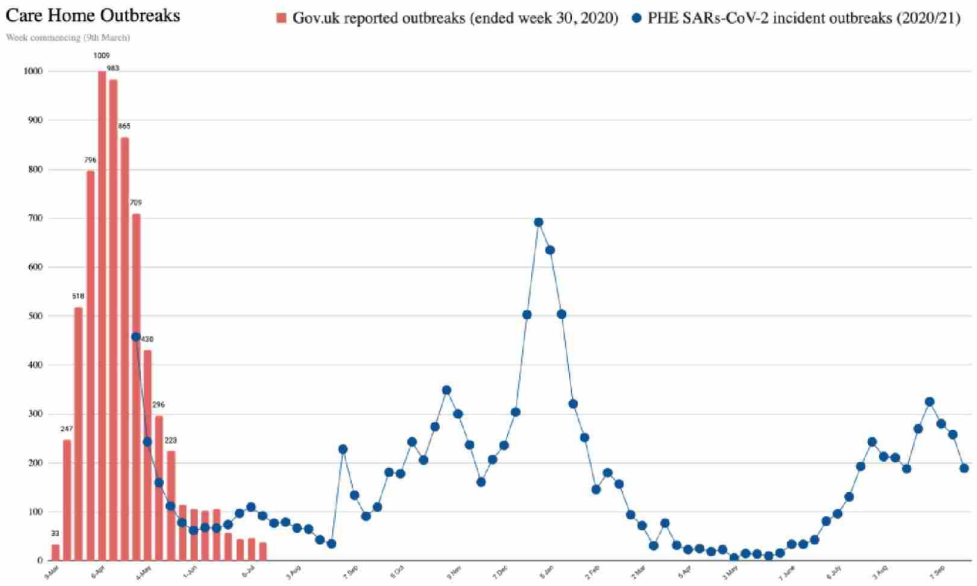
99. On 9 April 2020, we published Covid-19 deaths compared with "Swine Flu", highlighting that the age affected structure doesn't fit with the pandemic theory (Exhibit CH/83 [INQ000268342]). An analysis of countries and US states or major cities with at least 250 Covid-19 deaths as of 4th April reported that individuals aged <65 account for less than 10% of all Covid-19 deaths. People < 65 years old had 34 to 73 fold lower risk than those ≥ 65 years old in European countries. People aged < 65 had 13-to-15-fold lower risk in New York City, Louisiana and Michigan. The WHO further stated that older people are at the highest risk: over 95% of deaths occurred in those > 60 years. More than 50% of all deaths were people > 80 years or older.

100. In July 2020, along with Tracy Brown of Sense About Science, we published an article on the need to be more open about the Covid-19 risks. (Exhibit CH/84 [INQ000268343]). We wrote to government ministers asking them to embark on a better conversation with the public about Covid-19 risks. This should include frankness about low-risk age groups and settings and honesty about where the government has calculated trade-offs and what information it has and doesn't have about these. Government communications seem to avoid telling people where risks are low or correcting over-estimation of the risk (The full letter, Exhibit CH/85 [INQ000268344]).

**Care Home Neglect**

101. According to the ONS, nearly 50,000 care home deaths were registered in the 11 weeks up to 22 May 2020 in England and Wales, 25,000 more than expected. Two out of five care homes in England had a coronavirus outbreak in the first wave; in the north-east it was half. I therefore think it is fair to say that the lockdown strategy failed to prevent infection in care homes. Care home outbreaks peaked in the week commencing 6 April when gov.uk reported 1,009 outbreaks.

102. On 6 June 2020, we published Dying of Neglect: the other Covid care home scandal (Exhibit CH/86 [INQ000268345]). In the first wave of the pandemic, not all the deaths were attributable to Covid-19. 'Even when death certificates did mention it was not always clear that it was covid that was the ultimate cause of death. We highlighted at the time that a recent study in the southern Île-de-France region suggests confinement itself has had catastrophic consequences. In long-term care facilities with excess Covid-19 deaths, researchers found that acute respiratory distress was not the primary problem, deaths were mainly due to hypovolemic shock or fluid loss. Confined to their rooms in lockdown, with staff absences running at 40 per cent and with a consequent reduction in the usual support, residents were dying of thirst.'




103. 'In old age, people tend to lose their sensation of thirst, which makes them susceptible to dehydration unless they are reminded and encouraged to drink by staff or family. Dementia further exacerbates the problem, as sufferers can forget to eat and drink altogether and often cannot communicate their needs. Dehydration leads to worsening delirium and

confusion, which further limits communication. For such people, having carers around is a matter of life and death.'

104. In September 2020, evidence given to the Prime Minister and set out in our alternative proposals to the plan submitted to the Prime Minister in late September, we proposed to identify the vulnerable and reduce their risk whilst enhancing supportive measures that included an increase in staffing in care homes by a minimum of 20% and provide intensive clinical care home teams in the community. No moving of staff between care homes to be allowed (SARS-CoV-2 positivity identified as 3- fold higher in staff working across different care homes). Reduce the number of individuals that a single carer attends to in the home setting and ensure that the carer has regular testing. The issue of funding and intervening in care homes was also raised. The government had announced a new care homes support package backed by a £600 million adult social care infection control fund. That worked out at about £39,000 per care home. I considered this wholly inadequate, particularly given the scale of the problem in care homes, which accounted for 1/3rd of the deaths.

105. In December 2021, we published Collateral Global report 6:Effects of Covid-19 in Care Homes – A Mixed Methods Review and reviewed the impact of the pandemic in care homes. We assessed excess mortality among the older adults who lived in homes compared to their peers in the community (Exhibit CH/87 [INQ000268346]). Analysis of national datasets for 25 countries showed that care home deaths were, on average, 30% of the total Covid-19 deaths (range: 9-64%). The 17 cohort studies also point to excess mortality worsening during the pandemic, with excess mortality reported for both Covid-19-positive and negative patients. Several reported interventions or factors suggest the potential to substantially mitigate the risk in care homes. Interventions that could reduce mortality include improving the care home quality; increasing staffing levels; reducing the number of beds in the facility; employing staff confinement strategies with residents and improving clinical care such as implementing daily examinations. I am not aware of any attempts to test any of these interventions. Some care home solutions like US 'Green House' homes, which usually have fewer than 12 beds, may provide crucial insights into the care home problem compared with larger homes. Furthermore, care home residents faced barriers to accessing emergency treatments during the pandemic waves.

106. In April 2022, we further published our work on a care home in MedXriv: Effects of COVID-19 in Care Homes - A Mixed Methods Review (Exhibit CH/88 [INQ000268347]).

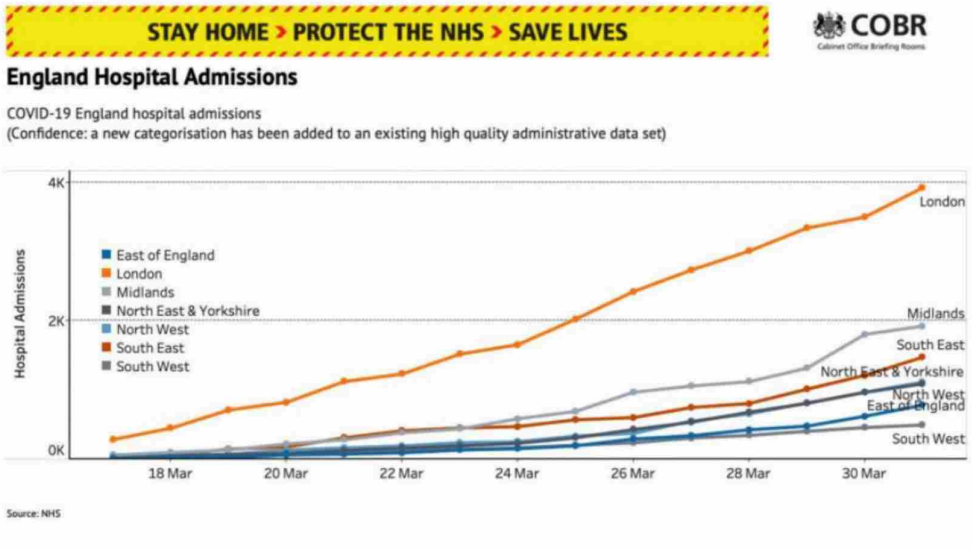
**Care homes conclusions:**

107. It took a global pandemic to realise what has been going on in care homes. Underfunded, under-resourced and understaffed, many were destined to fail. In addition to numerous publications highlighting this issue, my clinical experience as an urgent GP who visited many care homes during the pandemic highlighted the lack of resources and the mistake of abandoning vulnerable individuals. The measures taken as consequences of the pandemic disproportionately impacted those living in care homes at the highest risk for severe outcomes. However, the pandemic only highlighted and exacerbated a long-running problem: underfunding, poor structural layout, undertraining, under-skilling, under-equipping and finally, lack of humanity in dealing with the most vulnerable members of society. Closing care homes to visitors affected the well-being of residents who experienced more depression, loneliness and increased behavioural disturbance. Home closures also prevent the substantial care provided by the army of unpaid carers who improve the quality of life for those who can least look after themselves. In April this year, Lord Justice Bean and Mr Justice Garnham in the High Court of Justice, Queen's Bench Division declared government decisions were unlawful because they failed to account for the risk to care-home residents from the asymptomatic transmission of Covid-19 (Exhibit CH/89 [INQ000268348]). Homes were also not advised to isolate patients discharged from hospital from other residents. By seeding COVID-19 into care homes, government policy vastly increased the risk for the most vulnerable despite the known risk. In April 2021, the House of Commons and House of Lords Joint Committee on Human Rights considered care home visiting restrictions contravened residents' human rights (Exhibit CH/90 [INQ000272977]). Reporting that 'it is unacceptable to place draconian restrictions on the right to family life of those in residential care and their families for over a year.' We think many would agree. Mistakes have been made, and it is time to rectify them. Legislation should prevent this from happening in the future. In Scotland, those in care homes have secured the right to have visits, even during outbreaks. Reports highlighted that some families still did not have regular contact more than two years after the pandemic's start. The Scottish government put "Anne's law" into national standards, which means that care home residents are allowed a named visitor even when restrictions exist. Simple restoration of fluids, nutrition, a little oxygen therapy and good supportive care could have saved the lives of the frailest and most vulnerable. Medical attention was focused on slowing the spread of Covid-19 in the community at large; consequently, care home residents were denied basic care. Lockdown did not impede deaths in the place where they were most likely to happen. The human cost of the visiting restrictions has been immense. The scars from dying alone are too great a burden for a family to shoulder. The law needs

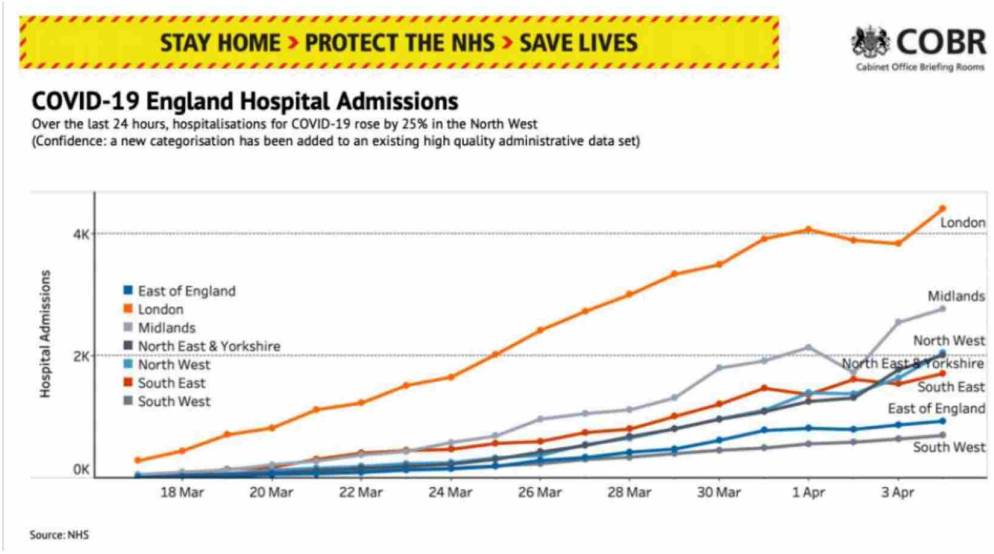
to prevent this from happening again.

**Hospital-Acquired Infections**

108. In April 2020, we first asked questions about whether Covid-19 patients were in hospital or admitted to hospital (Exhibit CH/91 [INQ000268350]). It had become common for the UK government's daily briefings to include one slide that shows data relating to Covid-19 patients in hospitals. Three recent slides included the following different descriptions of the presented data: The April 1st briefing definition 'COVID-19 hospital admissions' could be interpreted in different ways (Exhibit CH/92 [INQ000268351]). Does the definition include only those who tested positive or people already in hospital for other reasons? Does it include people who had Covid-19 prior to admission and were admitted for reasons other than Covid-19? We did not know the answers to these questions.

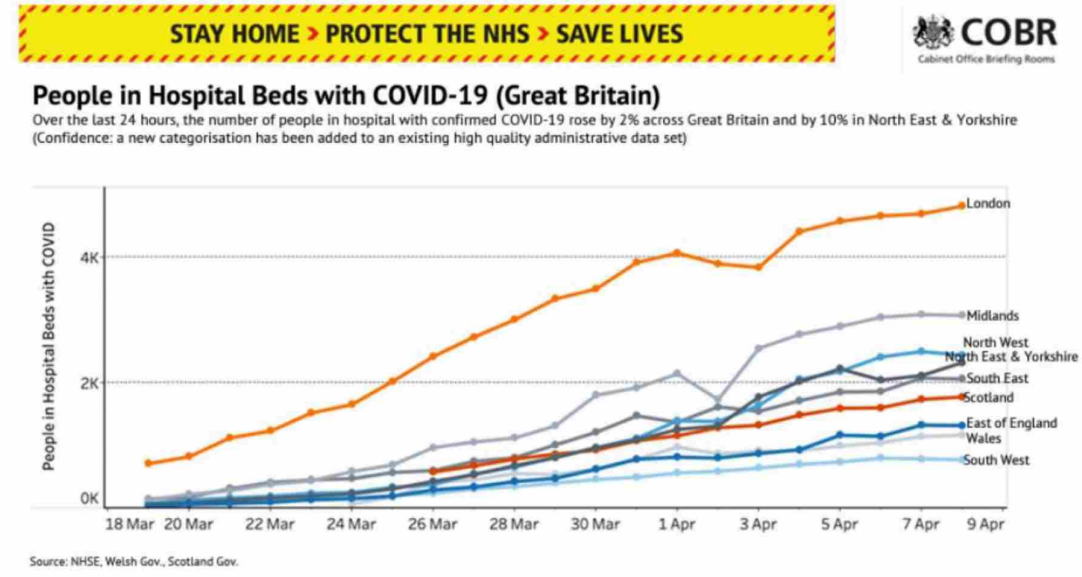



109. The April 5th briefing definition 'Hospitalisations for COVID-19' was a different definition than that used on April 1st (Exhibit CH/93 [INQ000268352]).




110. 'Hospitalisations' implies the numbers were those admitted to hospital at the time of infection, although there is some ambiguity as to whether some (or all) were already in hospital. The word 'for' indicates that the patients are only in hospital due to Covid-19; it implies causality.

111. The April 9th briefing definition changed to 'People in hospital beds with Covid-19' and included 'number of people in hospital with confirmed Covid-19.' None of this mentioned hospitalisation or admission or infers that the numbers only relate to patients in hospital because of Covid-19 (Exhibit CH/94 [INQ000268353]).



112. The definition of people in hospital due to (or with) Covid-19 needed to be clear to understand the following: How and where Covid-19 is being spread, if a large percentage of Covid-19 cases in hospital originated in hospital then this has implications for hospital infection management strategies, as well as understanding the impact of the lockdown on community transmission.

113. In September 2020, CH discussed in a phone call with NHS England Medical Director the publication of NHS hospital-acquired infection data.

114. In September/October 2021: In our alternative proposals as an extension to the plan submitted to the Prime Minister in late September, we proposed the need to enhance hospital infection detection and control measures. Transparency around hospital acquired infections. Separate potentially infectious admissions from other admissions, especially the frail and those with pre-existing morbidities. Places which are separate from the community and staffed by specialists.

115. In November 2020, we published a report on how many people were catching Covid 19 in hospitals (Exhibit CH/94 [INQ000268353]). In this first phase of the pandemic, at least one in eight patients contracted the virus while already in hospital. These patients tended to be older and frailer, and if they survived, they ended up staying in hospital on average for more than a month. By November, we were concerned as the current rate of infections in a healthcare setting was hovering at around 20 per cent, up from 12 per cent in October. An in-depth report of an outbreak at St. Augustine's Hospital, Durban, South Africa, identified a lack of separation of Covid infected patients from other patients, likely stemming from the emergency room resulted in 15 patients dying. A lack of suspicion and awareness of the threat, together with the frequent movement of patients inside the hospital contributed to the swift spread of the virus. [4] We considered the UK should similarly produce such reports for outbreaks and make them available for more comprehensive systems learning. We considered the causes of hospital acquired infection to be complex and not easy to sort.

116. In October 2020, our concerns were further enhanced when we reported on 11 news stories on Healthcare Associated Infections (HAIs) (Exhibit CH/95 [INQ000268354]). For example, on 28 October Nation Cymru reported: Transmission of Covid-19 in Welsh hospitals reaches levels last seen in April. Over the week ending 25 October, there have been 192 cases linked to hospital outbreaks, with the largest number of new cases in Swansea Bay where numbers have more than doubled in a week to 59 "probable" and "definite" cases. ONS confirmed another 12 deaths linked to hospital infections in the Cwm Taf Morgannwg health board area, bringing the total to 69 at its three general hospitals in Llantrisant,

Merthyr Tydfil and Bridgend. The Scotsman reported 17 Greater Glasgow and Clyde hospital wards closed due to Covid outbreaks, with 21 significant incidents of healthcare-acquired infections to Public Health Scotland. The Lincolnite reported three wards at Ninewells Hospital closed after Covid outbreaks. The BBC reported that hospital covid infections rose in Wales by 50% in a week. Nottingham University Hospitals Trust NHS hospital was forced to postpone cancer operations as Covid spreads on wards. A report on the numbers of outbreaks in the northeast and Yorkshire region, seen by The Independent, reported 70 separate Covid-19 outbreaks in hospitals and care homes. The report said South Tees Hospital Trust had seven separate outbreaks of Covid-19, with Newcastle upon Tyne Hospitals Trust and Tees, Esk and Wear Valley Trust each having six separate outbreaks.

117. In July 2021, leaked data to the Telegraph reported that over half of Covid 19 hospitalisations tested positive after admission (Exhibit CH/96 [INQ000268355]). 'Prof Heneghan urged the Government to publish clearer data, including whether or not the virus was the primary cause of hospital admission. "This needs to be fixed as a matter of urgency," he said, adding that the published data could lead the public "towards false conclusions", exaggerating the true levels of pressure on hospitals. Sir Graham Brady, the chairman of the 1922 Committee of Tory MPs, said: "Nearly 18 months into the Covid-19 crisis, it is absurd that data breaking down hospital admissions still isn't publicly available on a regular basis.'

118. The Telegraph also reported that Hospital figures for Covid-19 cases were 'misleading' (Exhibit CH/97 [INQ000268356]). 'For the first time, the NHS national stocktake establishes how many patients categorised as Covid-19 hospitalisations had another primary cause of admission. The data shows that of 5,021 patients this week classed as hospitalised by Covid, 1,166 were admitted for other reasons....The disclosures will also put officials under pressure to revise previous statistics on Covid-19 hospitalisations and, in future to use "primary" diagnosis with the virus as the key daily statistic....Prof Carl Heneghan, the director of the Centre for Evidence-Based Medicine at the University of Oxford, said: "This data is incredibly important, and this is the information we should have had a very long time ago. We have been crying out for it for nearly 18 months." "The Government might have made very different decisions about restrictions if it had access to data which actually measured the situation accurately." Prof Heneghan said the trends suggested tens of thousands of patients may have been inaccurately counted as Covid-19 hospitalisations, adding: "This data shows that, for the last month, around one in four Covid-19 hospital cases were admitted primarily for another reason.'

119. In August 2022, we published six articles on why data on how many people acquired COVID 19 in hospitals is essential. COVID 19 acquired in UK hospitals - an introduction [Exhibit CH/98 [INQ000268357]); COVID 19 acquired in Welsh hospitals - data from FOI requests [Exhibit CH/99 [INQ000268358]); COVID 19 acquired in Scottish hospitals - data from FOI requests [Exhibit CH/100 [INQ000268234]); COVID 19 acquired in Northern Irish hospitals - data from FOI requests; [Exhibit CH/101 [INQ000268235]); COVID 19 acquired in English hospitals - no data from FOI requests [Exhibit CH/102 [INQ000268236]) and COVID 19 acquired in UK hospitals what does it all mean? [Exhibit CH/103 [INQ000268237]).

120. Based on the data provided by the public health bodies, in Wales, nearly half (45%) of the COVID-19 tests in hospital were positive after day 8 of admission (18% were beyond 30 days of admission). In Scotland, 24% of those testing positive in a hospital were on day eight or thereafter. In Northern Ireland, one-third (33%) occurred on day eight or thereafter. NHS England were unable to answer our questions, we were redirected to websites and had to do complex estimations of the prevalence. Our estimates suggest 112,628 HAIs occurred in English hospitals in England from 12 August 2020 to 14 August 2022.

121. The "hospital pressures" concept is based on an aggregate total of cases admitted in a defined time frame. Underpinning the pressure has been the daily and cumulative numbers of COVID-19 patients based on the assumption that all hospital PCR-positive cases are admissions. A variable but high proportion of "new admissions" in the devolved nations were infected in hospitals. The variations correlate with community viral circulation and seasonality, as seen in the figures and bear little relationship with the imposition of restrictions.

122. There was considerable variation in the proportion of infections acquired in hospitals where we received responses. In Northern Ireland, one-third were PCR positive from day eight onwards; in Scotland, roughly a quarter (24%), and in Wales, the proportion was approaching half (45%). Variation also occurred over the year, and there was no evidence that the proportion of those infected in hospitals reduced over time. Scotland and Northern Ireland provided the data we requested, albeit after assigning analysts to the task. The implication is that both bodies do not routinely monitor the burden of COVID 19 Hospital Acquired Infections. This is problematic given the high burden of hospitalised people infected post-admission. Scotland's analysis was helpful as it categorised the data into five categories. It provided additional data on community-onset (days -1 to 14), methods and data by clinical speciality Lateral Flow Device or PCR.

123. I am at a loss to explain the unwillingness in England to release the granular data they

hold. Our estimates suggest that 112,628 episodes of HAIs occurred in English hospitals. However, the proportion of HAIs at 16.4% is likely a gross underestimate and is at the lower end compared with the devolved nations that provided the data we requested. The discrepancy in data availability between England and the devolved nations is difficult to interpret. NHS England figures expressed as rates underestimate the proportion of COVID-19 HAIs. The denominator can include cases that might be admitted with COVID, and I could not account for those who tested positive before admission and, therefore, calculate the proportions for in-hospital positives. The proper denominator would be just those diagnosed after admission - I do not know this figure, and it is currently impossible to calculate.

124. I consider Scotland's approach by providing data before admission and Northern Ireland's granular data as the way forward. Furthermore, we consider Wales' approach to transparency exemplary in responding to our questions when the information on their site was unclear. The use of aggregate data of "cases of Covid" in hospitals should not be used to inform policy of decision makers until coordination and proper interpretation of the dataset are instigated. Without it, the British public and politicians will continue to be misled.

125. Data on the relationship of the day of admission to PCR Positivity should be routinely available, especially if the information is used to guide societal restrictions. The data from Northern Ireland, Wales and Scotland suggests somewhere between 25 and 50% of patients test positive on day 8 of admission or thereafter, suggesting the need for further investigations to determine what works in what settings to reduce the burden of infection. Those who stay in hospital longer are at risk of infection, probably because they are sufferers of chronic and debilitating pathologies with weaker immune systems. Given its importance, the outcome of COVID 19 Hospital Acquired Infections (or those caused by any other agent) should be the subject of further investigations.

**Excess deaths**

126. The excess deaths noticeably increased in week 17 of 2022 when fatalities rose to 21 per 100k, they had been higher for 12 of the last 14 weeks compared to any of the previous seven years. In these 14 weeks, there were 17,233 excess deaths compared to the 5-year average of 2016 to 2019 and 2021 (the ONS reports 4,716 deaths were due to Covid-19 in the period). The data suggested variations in the excess death rates going back decades. Such variations are sometimes easier to identify than during other periods. The strong point of all-cause mortality is that there can be little doubt of the outcome: death. However, we are not aware that the causes for the variations identified have been investigated, nor that there is a recognised threshold to trigger such an investigation. This suggests a lack

of interest and begs the question of why such data are collected in the first place. Nevertheless, the signals in the data suggest something is not correct. Sustained rises in deaths, as seen in 2017/18, should trigger an investigation that may involve accessing the raw data on death certificates, a random sample of medical notes or analysing autopsies.

127. We have written about estimating excess mortality from COVID-19 as there are no agreed methods, and the excess can be calculated in different ways. Taking a simple average does not account for changes in the structure of the population as well as the variations from year to year [Exhibit CH/104 [INQ000268238]).

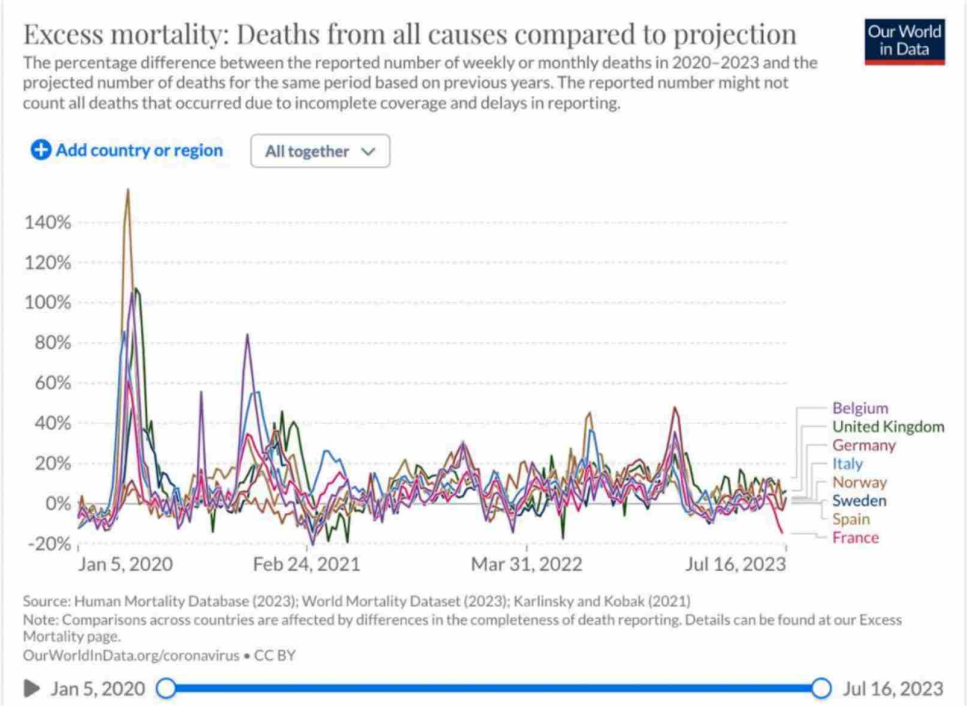
128. In August 2022, we wrote about why it's time to Investigate Excess Deaths in England and Wales. The excess deaths noticeably increased in week 17 of 2022, when fatalities rose to 21 per 100k; they have been higher for 12 of the last 14 weeks compared to any of the previous seven years. In these 14 weeks, there have been 17,233 excess deaths compared to the 5-year average of 2016 to 2019 and 2021 (the ONS reports 4,716 deaths were due to COVID-19 in the period) [Exhibit CH/105 **INQ000268239** ). The current signal suggested we had reached the point for triggering a causal investigation. However, the recent ONS statistics do nothing to identify and trigger when such an investigation is needed. In the meantime, speculation will continue about what may have given rise to the current excess in deaths. Because of comments on the possible causes of excess mortality, we assembled a list of non-mutually exclusive causes: a) Consequences of inadequate treatment and care received during periods of restrictions, b) Consequences of inadequate treatment and care received during periods of restrictions, especially for chronic conditions or evolving serious diseases such as cancer with a natural history of fatality; c) Increased cardiovascular risk due to sedentary lifestyles and increased food and alcohol consumption, d) Impact of the pandemic on NHS staffing levels, fatigue and other structural consequences emerging during the summer months, e) Lack of access to emergency services' f) Lack of timely access to emergency services (we wrote in Spiked about delays in urgent care causing needless deaths), g) Lack of access to primary, community and preventive care (the UK's DHSC reports the pandemic led to 'missing' primary care appointments and referrals) and h) an unknown or unforeseen cause.

129. The government requires a dedicated unit to analyse and investigate the causes of excess deaths, Because it doesn't have such a unit it limits its ability to understand the drivers of preventable deaths and subsequently intervene to reduce them.

**Lockdown timings**

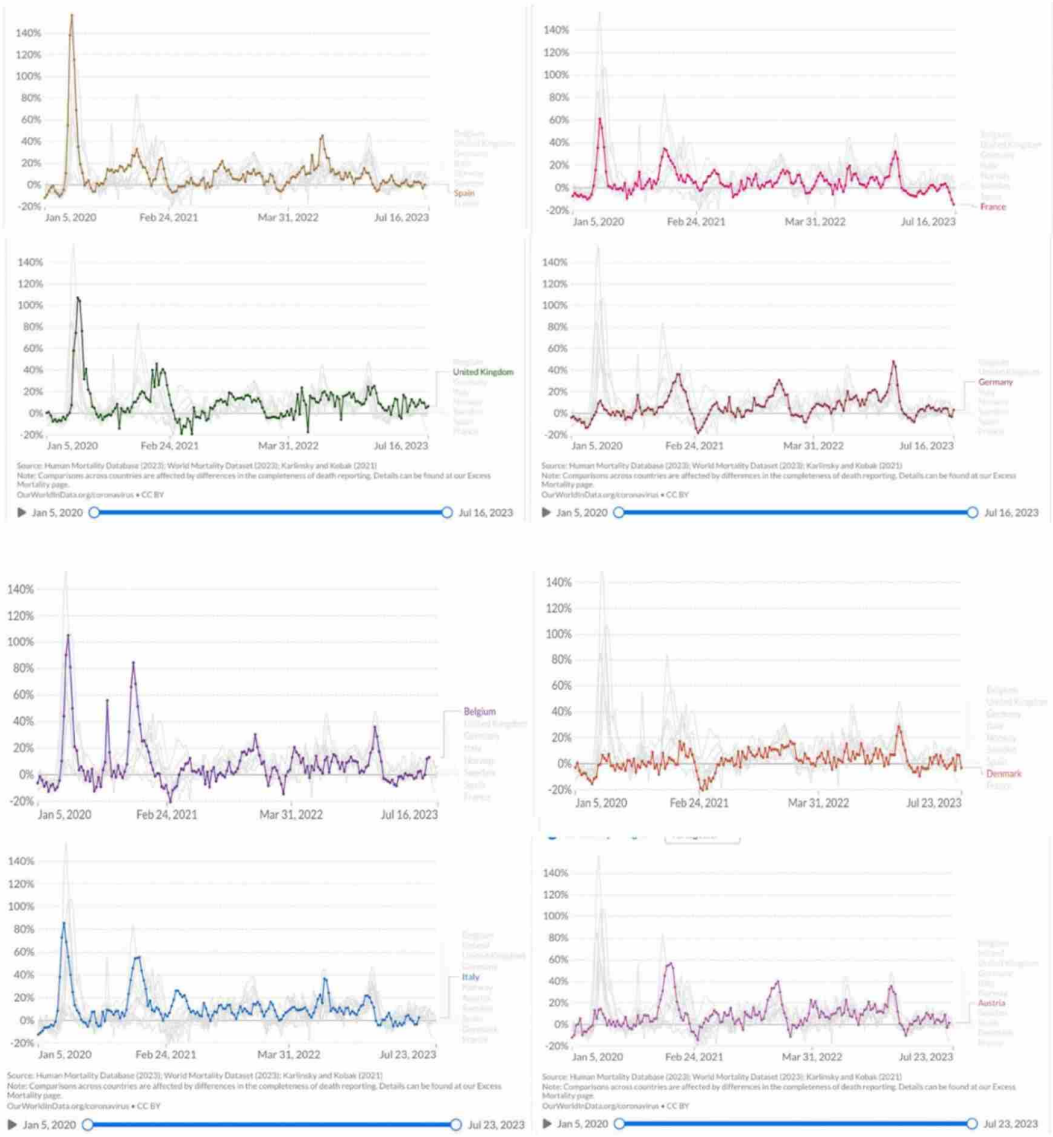
130. A lot was said about how the UK should have locked down earlier. Jeremy Hunt was one

of those ardent supporters of lockdown. He told the inquiry quarantining people sooner 'might have avoided' the first lockdown. In his failed Tory leadership bid, Jeremy Hunt faced claims he was a 'lockdown fanatic' who would have shut down the UK economy to emulate China's zero Covid policy. Jeremy Hunt "very much" agreed that the UK should have aimed "for zero infection and elimination of the disease" because those countries that adopted that approach 'have overwhelmingly been the most successful in tackling coronavirus'. Excess mortality refers to the number of deaths from all causes above and beyond what we would have expected under 'normal' conditions. So, in the pandemic, we should be interested in the number of deaths compared to what we would have expected had the pandemic not occurred. This quantity cannot be known, but we can try and estimate it.




131. One way to do this is to measure the difference between the reported number of deaths in a month or a year and estimate the expected number based on an average of the previous years. We can also calculate the number of deaths observed minus a five-year average (for example, 2015 to 2019) and divide this number by the five-year average (the expected mortality) to give a percentage difference (We call this the p score). For example, if there were 15,000 deaths in a week, 5,000 more than the expected 10,000 deaths, there would be (5000/10,000) 50% more. We see different patterns in the percentage difference across several European countries. Belgium, Spain and the UK had high excess deaths at the outset of the pandemic, which then

fell and oscillated around the zero line. Austria, Denmark, and Germany had low excess at the outset; however, those countries with lower excess at the start still had oscillations in excess mortality over the period. In the middle, we have Italy and France, which had excess mortality at the beginning and had further peaks in 2021 and 2022.



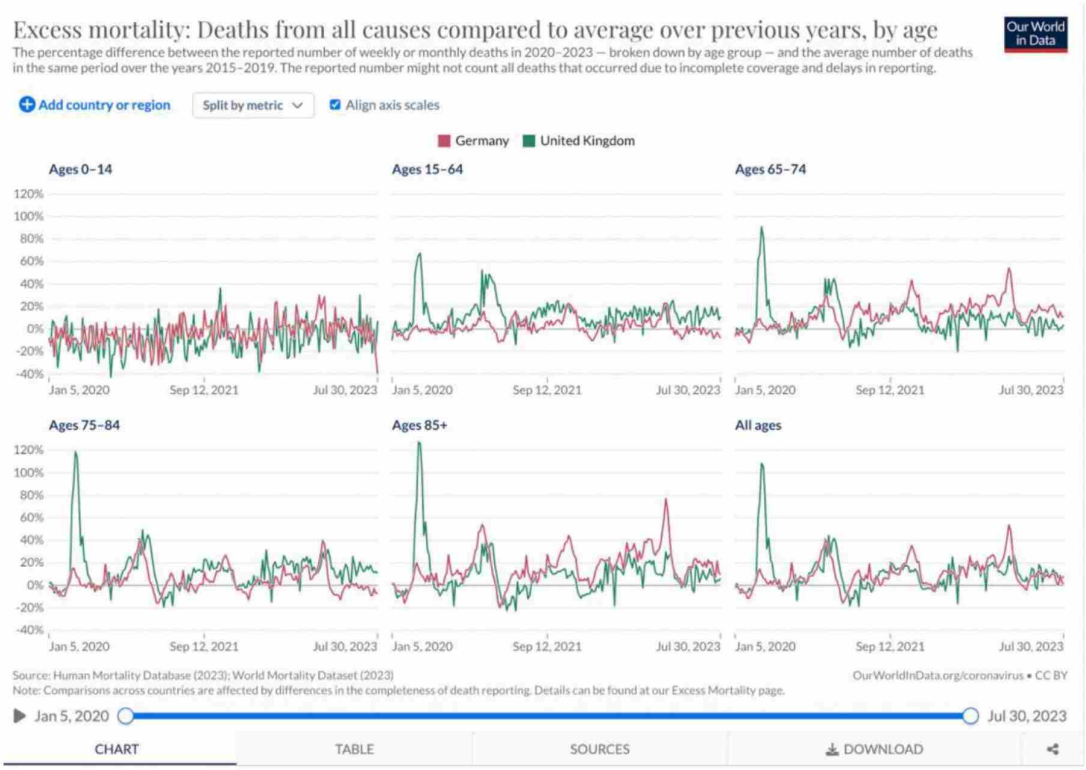

132. The question is what the excess looks like over the three years. You might think the UK would have a higher excess for the period. However, the UK drops down the table. At the top are Belgium, Italy and Austria. In the first wave, Belgium had high mortality in nursing homes, with two-thirds of deaths occurring in this setting, 89% of nursing homes reported at least one possible or confirmed COVID-19 case by June 2020 (Exhibit CH/106 [INQ000268240]. In

Spain, the deaths in 2020 were clustered in a very short time, and hospitalisation during the first wave was an independent risk factor for non-COVID mortality. From 17 March to 20 April, the in-hospital non-COVID mortality was nearly 60% higher than in pre pandemic years. These patients were older with severe disease and, therefore, particularly vulnerable to poor quality care (Exhibit CH/107 [INQ000268241]. In Italy, 165 thousand excess deaths were estimated to have occurred by January 2022. Of these, roughly 92% occurred in the non-working age population. Italy has the third oldest population in the world. Nearly one in four of the Italian population was 65 years and older, only Monaco and Japan have a higher proportion of over 65s.

Excess mortality P-scores, projected baseline, all ages

| | | percent | |
|---|---|---|---|
| **Country or region** | Jan 5, 2020 | Jul 23, 2023 | Absolute Change |
| **Belgium** | -6% | Jun 18, 13% | +19 % |
| **Italy** | -12% | May 28, 3% | +15 % |
| **Austria** | -12% | Jul 9, 2% | +14 % |
| **Spain** | -12% | Jul 2, 0% | +12 % |
| **Norway** | -7% | Jul 16, 2% | +8 % |
| **Ireland** | -1% | Jun 4, 7% | +8 % |
| **Sweden** | -6% | Apr 16, 1% | +7 % |
| **Germany** | -4% | Jul 16, 3% | +7 % |
| **United Kingdom** | 1% | Jul 16, 7% | +6 % |
| **Netherlands** | -8% | Jul 9, -5% | +2 % |
| **Denmark** | -3% | -3% | -0 % |
| **France** | -7% | Jul 9, -15% | -8 % |

133. While the UK had a high excess in April 2020, Germany trended above the UK in 2021 and 2022. You can see this effect more clearly in the over 85s. Germany which looked like it did well at the pandemic's outset, had higher excess mortality over the three years. You can see this effect in the following graph.




We call this effect mortality displacement, meaning deaths occurred earlier than they would have otherwise occurred, they were displaced from some point in the future into the present, resulting in a change in life expectancy.

134. The question everyone wants to know the answer to is whether restrictions made a difference early on in terms of mortality displacement because, as we have shown throughout the pandemic, countries initially doing well subsequently did not. Again, we might look at the UK-German comparisons, which show little difference in the timing of restrictions, two days in terms of ordering lockdown. Furthermore, Belgium and Spain's lockdowns were earlier than the UK, but they both fared worse in the initial outbreak.

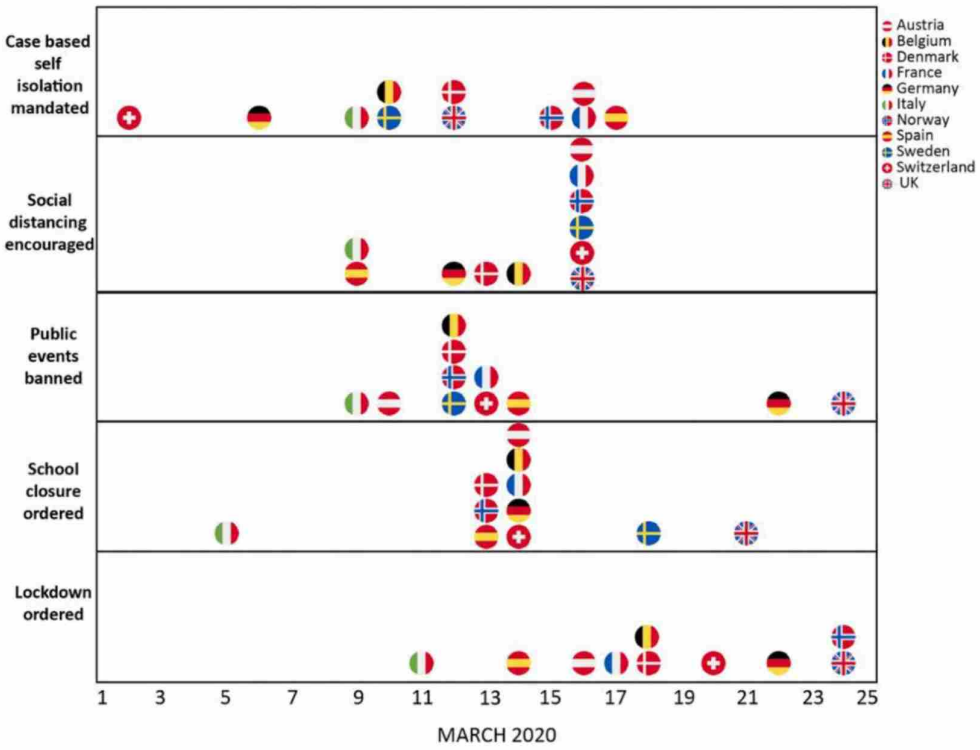


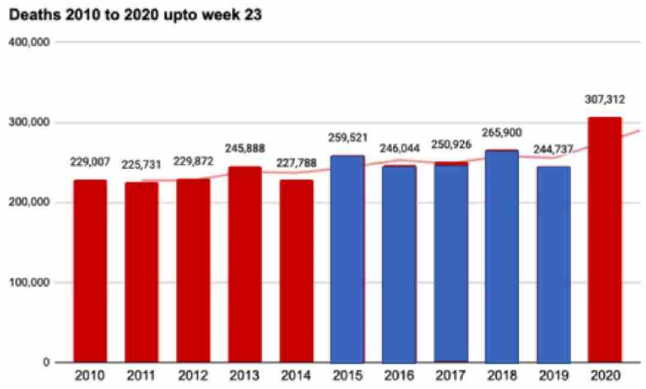

*Figure 1: Intervention timings for the 11 European countries included in the analysis. For further details see Appendix 8.6.*

Source: Imperial College Report 13 - Estimating the number of infections and the impact of non-pharmaceutical interventions on COVID-19 in 11 European countries (Exhibit CH/108 [INQ000268242].

135. Many factors could explain the differences in mortality. These include the population's age structure, density, deprivation, and healthcare quality, particularly how it responds to extreme panic. Germany, for example, has many more beds per head of population - 8 per 1000 compared to the UK's 2.5 per 1000 population. Indeed, the only country with lower numbers per population than the UK is Sweden. For years, politicians in Germany complained the country had too many hospitals; however, the pandemic turned the oversupply into an asset. Germany had more than twice as many vacant critical care beds as the UK and did not need to flail around building Nightingale hospitals as Germany could get on with the business of delivering high-quality care. The proportion who died after a PCR test was much lower than in Italy, Spain or the UK. More capacity means isolating people more easily and reducing hospital acquired infections and non-covid mortality in hospitals.

136. However, there is a caveat to everything we have said so far. In 2020, we showed all these estimates depend on the method chosen to make the comparison. This is the sort of epidemiological concepts that the inquiry stuff should attempt to understand. Hopefully, it will

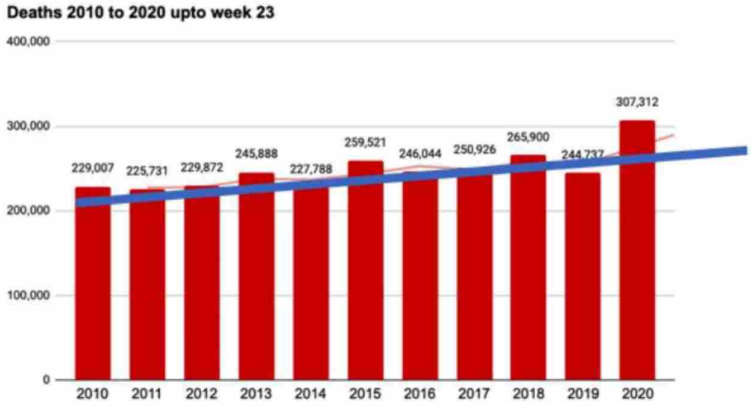
help the inquiry think more critically about reporting deaths and particularly, comparisons. We analysed three different approaches for the first 23 weeks of 2020, which show substantially different estimates of excess. The 5-year average doesn't consider any changes in the population over time.




**Calculating the excess**

- **5 year average predicts 253,425 deaths: Difference: 54,000 (Doesn't take account of changes in the population)**
- Linear Trend predicts 261,216 deaths: Difference: 46,096 (tries to fit the best average fit to all the past data,)
- Harmonic trend predicts 275,895 deaths: Difference 31,417 (examine patterns in disease occurrence)

The linear trend uses that data back to 2010 and tries to fit the best average fit to all the past data.

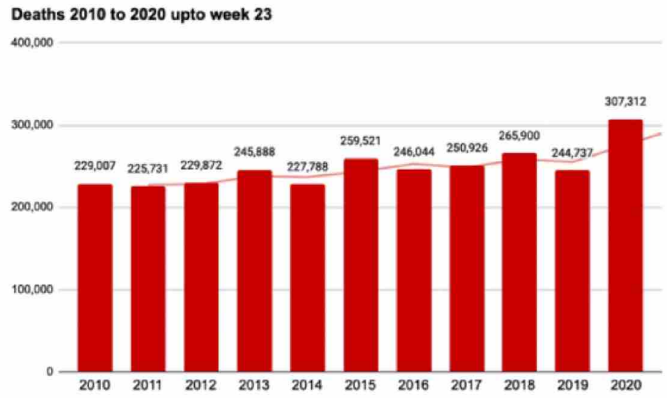



**Calculating the excess**

- 5 year average predicts 253,425 deaths: Difference: 54,000 (Doesn't take account of changes in the population)
- **Linear Trend predicts 261,216 deaths: Difference: 46,096 (tries to fit the best average fit to all the past data,)**

The harmonic trend back to 2010 tries to account for the patterns in disease occurrence over

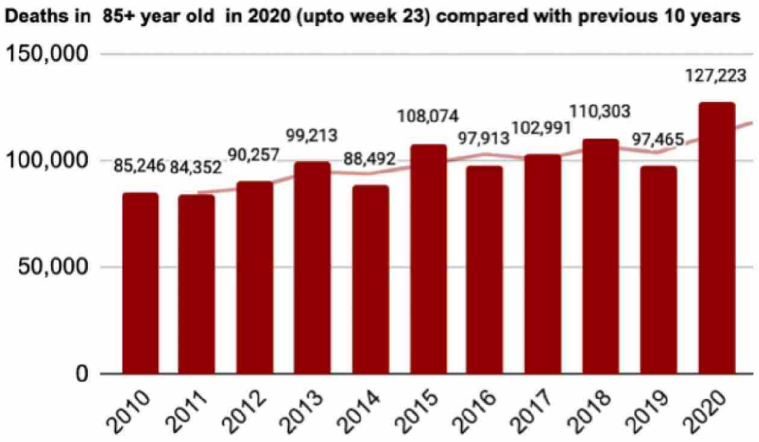
time.




**Calculating the excess**

- 5 year average predicts 253,425 deaths: Difference: 54,000 (Doesn't take account of changes in the population and age)
- Linear Trend predicts 261,216 deaths: Difference: 46,096 (tries to fit the best average fit to all the past data,)
- **Harmonic trend predicts 275,895 deaths: Difference 31,417 (examine patterns in disease occurrence)**

137. As you can see, there is a big difference in the excess depending on the chosen method; one reason for the discrepancy is the considerable variation from year to year that occurs mainly in the winter period. Some years have lower counts, followed by more deaths next year. This variation in excess deaths is most significant for those over 85.



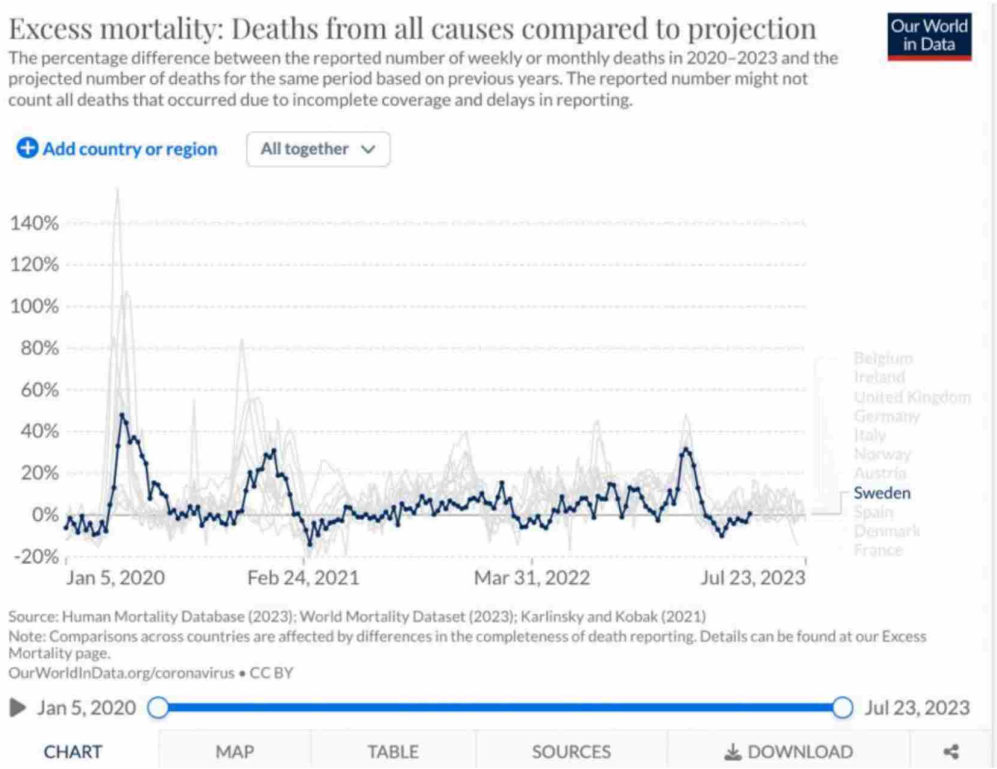

- 5 year average **103,349** deaths; Difference: 23,874
- Linear Trend : **108797** deaths; Difference:18,426
- Harmonic trend **118,115** deaths: Difference 9,108

2019 particularly low year – predicted deaths were 111,668, however, only 97,465 occurred (14,203 fewer than expected)

138. If only we had locked down earlier is the cry. Yet Sweden, which didn't lock down had an excess mortality of 7% using our world in data over three years. Sweden did not mandate a lockdown. Imperial College modelling in report 13 assumed a minor reduction in Sweden's reproduction number because no full lockdown was ordered. Sweden showed that the

modelling for non-lockdown countries was wrong. Sweden illustrates that individuals make risk-based assessment and reduce their contact activities in line with the risks. The concept in a pandemic that individuals will not change their behaviours is a misnomer. On the 24th of September, Dr Jenny Harries, was quoted in the Telegraph saying, "So much so that if we were to face another pandemic tomorrow the UK would take a more Swedish approach to social distancing, she suggests. Social contact fell broadly to the same extent in both countries during the pandemic but, while stay-at-home orders were legally mandated here, in Sweden they were voluntary for the most part. What we saw with omicron and later waves of the pandemic, and even now, is that people are good at watching the data and they will take action themselves," says Harries. "You can see it in footfall going down. People actually start to manage their own socialisation, and the [viral] waves flatten off and come down."

139. However, in the first wave, Sweden still showed excess mortality.




140. The comparison with its neighbour, Denmark, is noteworthy. During the first wave, deaths rose significantly for Swedish women aged >85 but only slightly for Danish women of a similar age. The difference related to how care and housing for older people were organised. Sweden has a lower number of hospital beds than the UK. The Swedish inquiry found there were systemic shortcomings in Sweden's elderly care pointing to poorly educated staff, low levels of nurses and doctors in elderly care and structural failings in the system.

141. As I have shown it is misleading to simply take the average of previous deaths (as the ONS does in its reports) as this does not consider changes in the population structure and year-to-year variations. Mortality rates vary over time and are expected to be highest among those over 85. A significant increase in mortality in one year is often followed by a decrease in the following year and vice versa. Therefore, looking at snapshots of deaths does not capture the impact of mortality displacement, which is the data we are interested in. Blaming COVID solely for the increase in mortality oversimplifies the complex issues at play. Where excess mortality occurs, the quality of care has much to answer for. Now and in the future, we need to ensure we have a better understanding of excess deaths, their drivers and the impact of poor-quality care, particularly in the elderly.

**Collateral damage of Covid-19.**

142. On 8 April 2020, we wrote: 'Lockdown is going to bankrupt all our descendants and us and is unlikely at this point to slow or halt viral circulation as the genie is out of the bottle. What the current situation boils down to is this: Is economic meltdown a price worth paying to halt or delay what is already amongst us?' The narrative in 2020 was dominated by suppression and the attainment of zero covid.

143. In August 2020, Boris Johnson was urged to adopt a 'zero-Covid' strategy to provide 'clarity and reassurance' (Exhibit CH/109 [INQ000268243]. In the September 2020 meeting with the PM, we submitted the following statement. Interchangeable terms of control, elimination and eradication are often used but poorly understood. The WHO: 'control is a reduction in the incidence, prevalence, morbidity or mortality of an infectious disease to a locally acceptable level; elimination as a reduction to zero of the incidences of disease or infection in a defined geographical area; and eradication as permanent reduction to zero of the worldwide incidence of infection.' In September 2020, we therefore pointed out that the current strategy required acknowledging the virus is endemic and the need to learn to live with COVID.

144. The five Key recommendations of the Covid-19 recovery group included that before a policy is adopted, there should be a transparent, multidisciplinary review of all suppression measures based on these criteria:

- The evidence for effectiveness in reducing cases, particularly in the over 60s (including the degree of adherence) and hospital admissions.
- Evidence that a mandatory approach produces better outcomes than a voluntary one.
- Evidence that a blanket approach produces better outcomes than a targeted one. e.g., on adherence, suppression.

- Evidence for broad public acceptability with high levels of sustainable adherence.
- Most importantly, the intervention has been shown through transparent impact-benefit analysis to produce less overall harm. (Health in QALYS, plus consideration given to cost per QALY saved)
- And where harms are certain but benefit uncertain, the intervention should not be used. (e.g., school closures)

145. We are not aware of any cost-benefit analysis undertaken during the Covid-19 pandemic. We were so concerned about the costs to the public purse that in March 2022, we analysed the fraud losses. We concluded that the UK government was unprepared to prevent or minimise the effects of theft from the funds it made available to protect its people from the financial impacts of the pandemic (Exhibit CH/110 [INQ000268245].

146. We were also very concerned about the identification and mitigation of the collateral damage of Covid-19. We highlighted at the time what we considered were the top ten known harms in our alternative plan:

147. Inequalities: Large increase in inequalities (including health) whose effect will last years, impacting predominantly females, ethnic minorities, and those with chronic illnesses. Food poverty has increased with the increasing usage of food banks.

148. Mental health: Huge and diverse increases in mental health issues, for example, increase in young people experiencing suicidal thoughts, more psychiatric urgent and emergency cases, fall in routine appointments meaning massive unmet mental illness treatment, and increase in lockdown loneliness, which is associated with later depression and anxiety, for up to a decade later. However, the lockdown saw a 50 per cent reduction in common mental health problems diagnosed. The mental health effects have affected young adults and women much more, groups that already had lower levels of mental health before Covid-19. Hence, inequalities in mental health have been increased by the pandemic.

149. Children's education: A general loss of learning time for all children, with children in the poorest families spending much less time learning than the wealthiest 20 per cent of households. Closing schools widened educational inequalities, especially among primary school students. Poorer families are much less able to access the tools for remote learning, for example, laptops. These effects can potentially last a lifetime.

150. Child protection: decreased alongside a reduction in health visiting, and a substantial decrease in children brought for emergency medical treatment occurred.

151. In the elderly, nearly three-quarters of people aged 70 and over were worried about the effect

that Covid-19 is having on their lives right now, with over 40% saying their mental health has been affected. Care homes have been particularly affected by excess deaths, heightened isolation, and stresses on staff.

152. Cancer services have been severely affected, with over two million people in the UK waiting for screening, tests, and treatments within ten weeks of the lockdown. There was a significant drop in two-week referrals, with 290,000 fewer people referred for further tests than expected. Roughly 130,000 people who would ordinarily be referred to a consultant had not been.

153. Cancer treatment: Around 12,750 people are waiting for cancer surgery across the UK, and operations fell to around 60 per cent of expected levels. There has also been a sharp drop in those receiving chemotherapy. Charities saw a considerable reduction in funding (30 to 50 percent), meaning reduced services at the same time as increasing demand for their services. The knock-on effect will see the NHS having to meet an unmet need. One in ten charities are facing bankruptcy.

154. Women's rights: Women have been hardest hit by redundancies. Young women were the hardest hit early on when female-dominated sectors such as retail, hotels and hairdressing salons shut overnight. Since then, mothers have been much more likely to have been fired, quit, or furloughed than fathers during the lockdown. Refuge saw a 950 per cent increase in visits to its website.

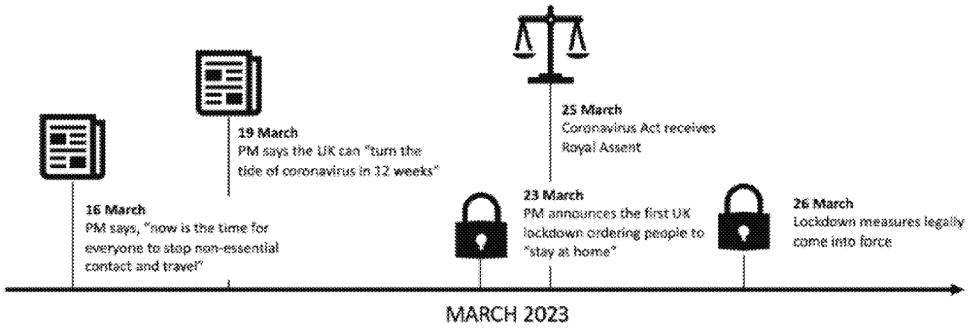
155. As for general medical diagnoses, compared with expected numbers, there were 456 fewer diagnoses of circulatory system diseases (43 per cent reduction), 135 fewer type 2 diabetes diagnoses (49 per cent reduction) and a 71 percent fall in the numbers of full blood counts performed from primary care in the four weeks since the lockdown was introduced.

156. In 2021, we published three Collateral Global reports on the harms: The Impact of Covid-19 First Wave Restrictions on Cancer Care. 1 June 2021 (Exhibit CH/111 [INQ000268246]. CG REPORT 2: The Impact of Interruptions in Childhood Vaccination. 28 June 2021 (Exhibit CH/112 [INQ000268247]. CG REPORT 3: The Impact of Pandemic Restrictions on Childhood Mental Health 2 Oct 2021 (Exhibit CH/113 [INQ000268248].

**Assessing the effects of restrictions**

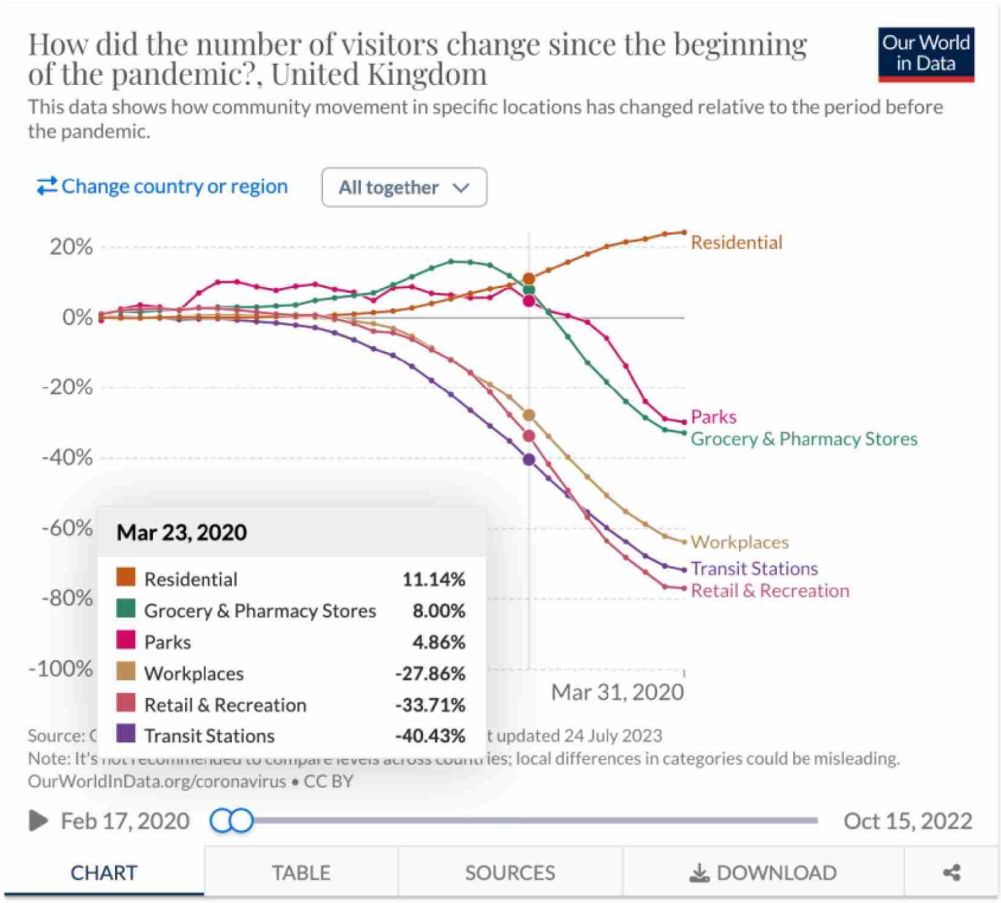
157. Restrictions, lockdowns and travel measures changed over 200 times in 2020. No one could keep up with the changes. By the time one step had come in, it was onto the next. For example, the rules on going out to a pub or a restaurant were changed 20 times up to September 2020. Many didn't know the rules. In the Covid Inquiry module 1, the former Health Secretary Matt Hancock's position was clear: we need to lock down harder and faster next time: *"but it is not*

*nearly as important as getting the doctrine right so in future, we're ready to suppress a pandemic, unless the costs of lockdown are greater than the costs that the pandemic would bring."* This is quite a scary thought, but the inquiry should ask whether lockdowns worked to reduce hospitalisations and most significantly, deaths.




Within ten days, the UK went from an advisory position to stop non-essential contact and travel to a mandatory lockdown to stay at home.

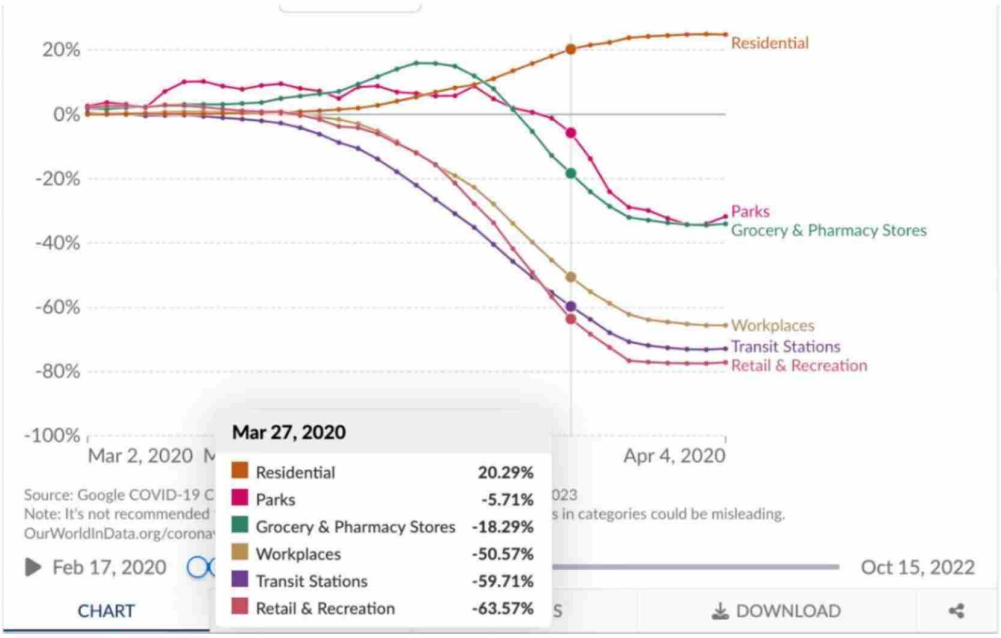
158. The first question to address is how the restrictions changed behaviour. Using Worldometer data, by 23 March, pre lockdown workplace mobility was down by 28%, retail by 33% and transport by 40%, and were still on a downward trajectory.



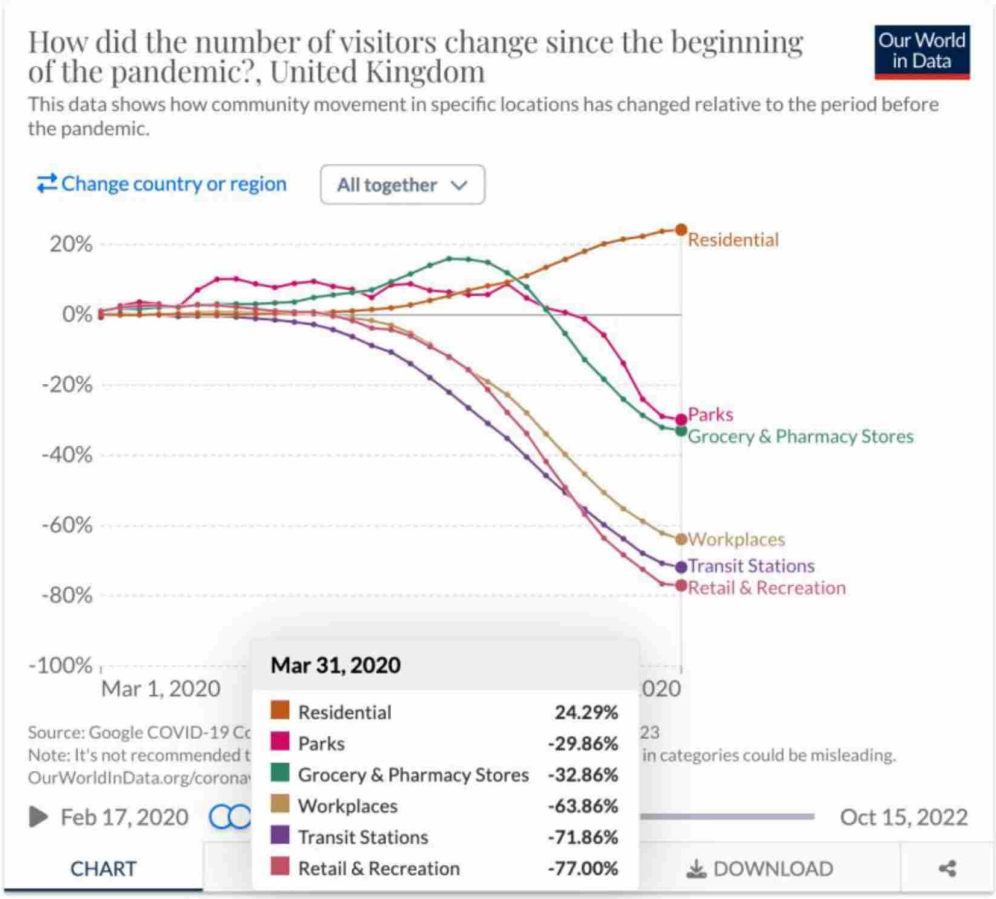

159. The increase in grocery sales was kicked off by panic buying, people flocked to supermarkets worldwide. It was rice and instant noodles in Singapore, in New Zealand, spending shot up 40 per cent despite no cases, and globally, hand sanitiser sales were up 800 per cent (Exhibit CH/114 [INQ000268249].

160. On 20 March, Matt Hancock commented that people should buy only "what they need and not more than what they need" following a highly shared video on social media from critical care nurse Dawn Bilbrough. She was in tears after coming off a 48-hour shift in intensive care and found that we were " just stripping the shelves bare of essential foods. In late March, even toilet paper became a coveted item. The anticipation of lockdown meant that visits to the grocery store were up by nearly 20% (lockdown anticipation has the opposite effect of what you want to achieve).

161. So, what did the data look like by March 27 the date of the lockdown? By this date workplace visits were now down by 51%, and transport usage was down to 60%. Visits to supermarkets, shops, and parks were also now on a downward trajectory.

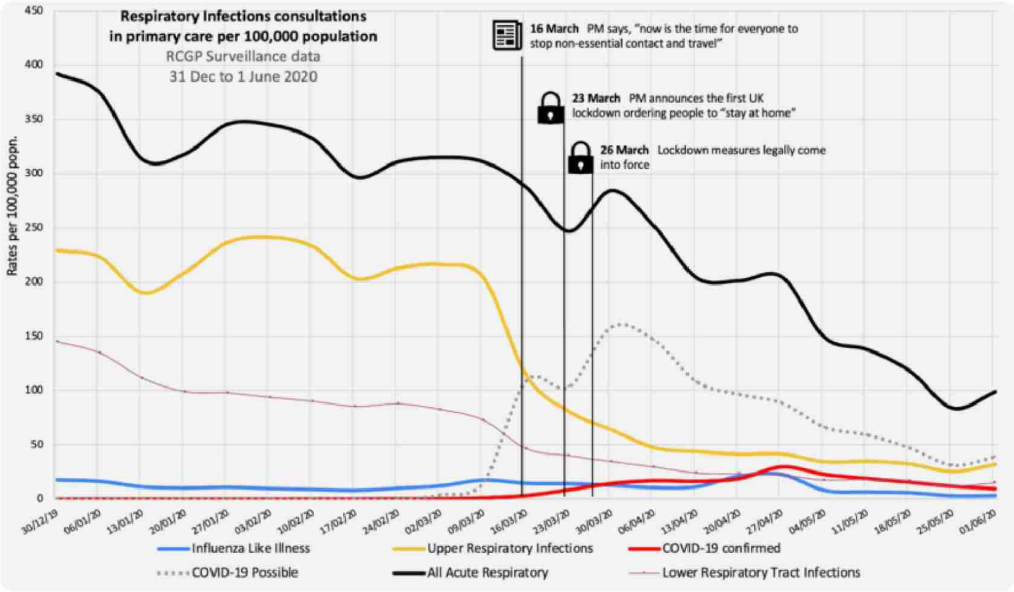



162. Four days after the lockdown workplace came into force workplace visits fell to 64% (down by a further 13% in the 4 days since lockdown began), transport to 71% (down by a further11%) and retail to 77% (down by a further 13%) . Lockdowns managed to change our habits most in terms of going to the park and going shopping (park visits went done by 24% in the 4 days since lockdown began). In terms of workplace behaviours and using transport substantial effects had already occurred with advice. Because there was still essential work to be done, roughly a third of folks were still at work. The residential figure doesn't quite add up: if roughly two-thirds were not at work, not on transport, and not shopping, then why did our residential activities only increase by 20%?



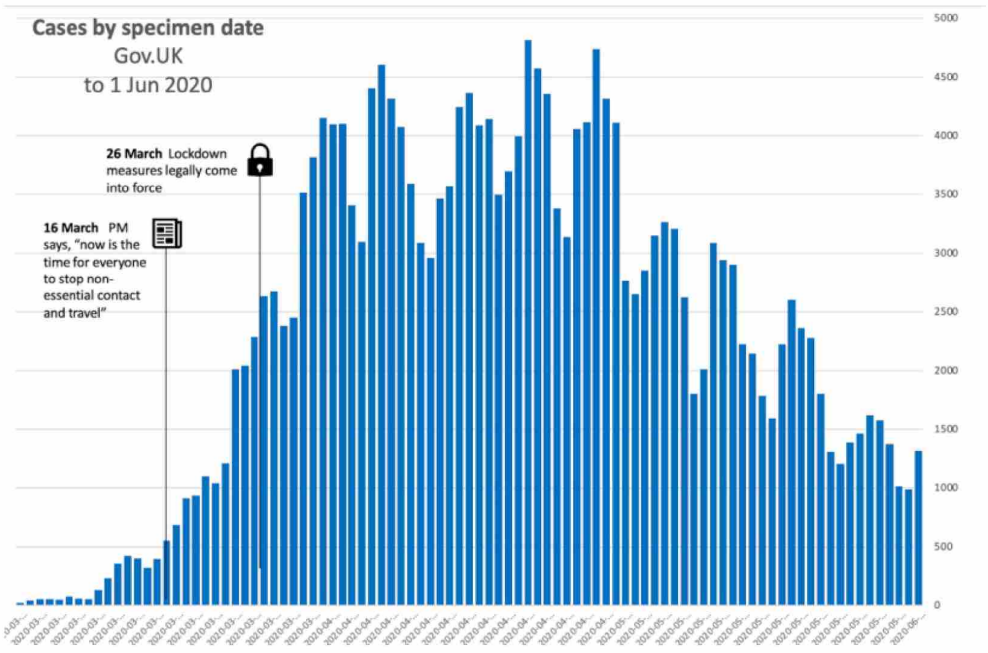

163. We are interested in the impact of lockdowns on infections and whether the timings changed hospital admissions and deaths.

164. What did lockdowns do to infections? The Royal College of General Practitioners surveillance data reports trends for Influenza-Like Illness (ILI), upper respiratory tract infections (URTIs) and lower respiratory tract infections (LRTI), along with weekly data on COVID-19 case investigations. The data come from over 4 million patients in a network of general practices across England and Wales.




165. Primary care's overall acute respiratory infection rate started to fall on 9 March 2020. By the time of the lockdown, there was little impact on this rate; however, the stay-at-home orders, the message to protect the NHS, and the virtual shutdown of General practice may have affected the true rates of infection. We cannot turn to the ONS infection survey as it wasn't yet running.

166. But we can look at the case data reported on the coronavirus dashboard, which reports the date the sample was taken from the person being tested.



This data shows infections didn't fall until 30 April, five weeks after the lockdowns. Not what you would expect if lockdowns were a swift, effective intervention, as they were purported to be, they were undoubtedly no hammer.

167. Several reasons might explain this. First, our systematic review of close contact showed the frequency of secondary attacks was highest in home/quarantine settings (Exhibit CH/115 [INQ000268250]. The policy that meant individuals could leave the house for 1 hour to exercise each day was a mistake: forcing everyone to stay home transiently increases infections and significantly impacts health and well-being. Over one in four people in England exercised less than usual in the first lockdown, those who were BAME, obese or city dwellers reported greater reductions (Exhibit CH/116 [INQ000268251]. There was also a marked decline in older adults, just the group you cannot afford to have reductions in exercise for, as it puts them at risk of deconditioning and developing more severe health problems and death. Unless you lived in a house with a big garden or near a nature reserve, the policy was a disaster regarding healthy lifestyles. We ate more, drank more, and stayed on the couch. Netflix subscribers surged, almost 16 million people created new accounts in the first quarter of 2020.

168. Second, we had an incomplete picture as testing was mainly focused on hospitals; there was no community testing and no ONS Survey data based on random infection. Third, the problem of hospital-acquired infections where the bulk of testing occurred may have led to a sustained increase in cases. However, we have an incomplete summary of the infections in the first wave since only data pertaining to lab-confirmed cases of COVID-19 were available, and they were far lower than the true number of infections.

169. Before we go further into the data, I will return to the Imperial College Report 9, which had such an impact on the need to lockdown. In the report, the proportion of infected requiring hospitalisation was obtained from an analysis of a subset of cases from China. These estimates result in 4.4% of infections being hospitalised. The figures suggest unmanageable demand levels, 44,000 admissions for every million infected, leading to a peak in ICU demand that would have been 30 times greater than the maximum supply.

**Table 1: Current estimates of the severity of cases. The IFR estimates from Verity et al.[12] have been adjusted to account for a non-uniform attack rate giving an overall IFR of 0.9% (95% credible interval 0.4%-1.4%). Hospitalisation estimates from Verity et al.[12] were also adjusted in this way and scaled to match expected rates in the oldest age-group (80+ years) in a GB/US context. These estimates will be updated as more data accrue.**

| Age-group (years) | % symptomatic cases requiring hospitalisation | % hospitalised cases requiring critical care | Infection Fatality Ratio |
|---|---|---|---|
| 0 to 9 | 0.1% | 5.0% | 0.002% |
| 10 to 19 | 0.3% | 5.0% | 0.006% |
| 20 to 29 | 1.2% | 5.0% | 0.03% |
| 30 to 39 | 3.2% | 5.0% | 0.08% |
| 40 to 49 | 4.9% | 6.3% | 0.15% |
| 50 to 59 | 10.2% | 12.2% | 0.60% |
| 60 to 69 | 16.6% | 27.4% | 2.2% |
| 70 to 79 | 24.3% | 43.2% | 5.1% |
| 80+ | 27.3% | 70.9% | 9.3% |

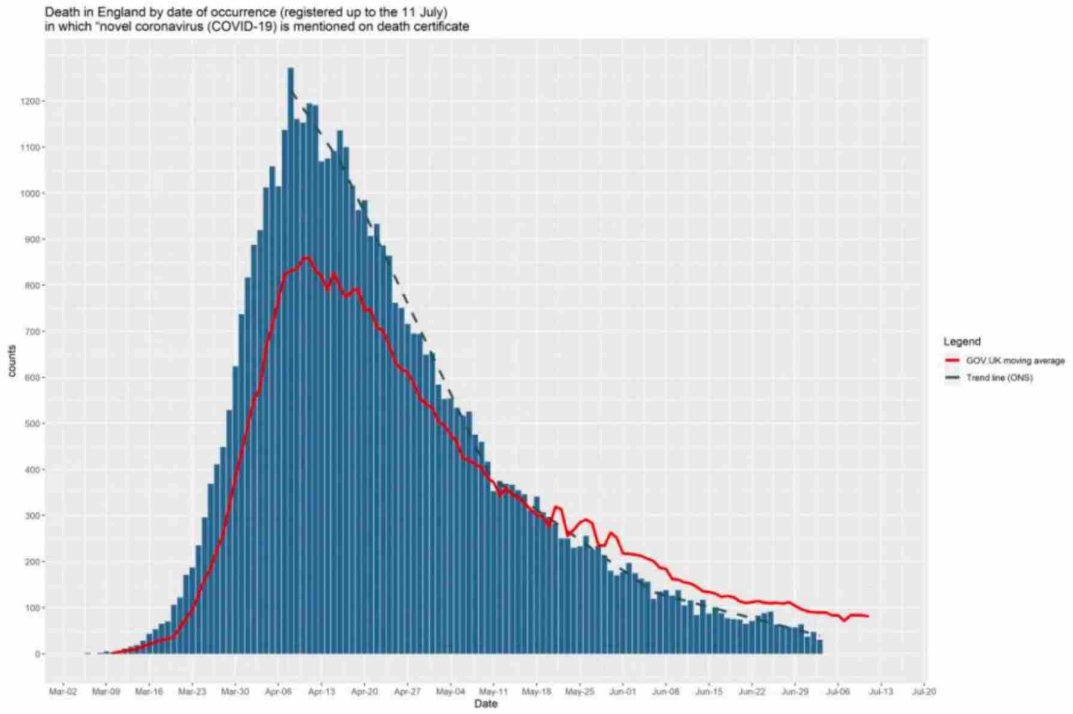
170. Admissions peaked in the week ending 10 April with 17,763 admissions in the week. If we back calculate using the 4.4% hospitalisation rate, we estimate over 400,000 infections weekly. However, from the week before to the 3rd of April, only 24,507 cases were recorded on the dashboard. From this number of cases, we would expect just over 1,000 admissions. So, either the number of infections in the community was vastly underestimated, or the number of hospital-acquired infections was very large, it's likely a combination of both.

171. The Telegraph got hold of minutes from SPI-M (Scientific Pandemic Influenza Group on Modelling) released under a Freedom of Information request, they show that by March 16, modellers were still "uncertain" of case numbers "due to data limitations" (Exhibit CH/117 [INQ000268252]. *"The minutes show that members were waiting for comprehensive mortality data from Public Health England (PHE) and said that current best estimates for the infection fatality rate, hospitalisation rates, and the number of people needing intensive care were still uncertain. They also believed that modelling only showed "proof of concept" that lockdowns could help and warned that "further work would be required". The team was also encouraged to look for collaborators and resources outside of the infectious diseases network."* They didn't.

172. What is clear, though, is hospital care for non-COVID diseases dropped off a cliff. Across the UK, admission fell for cancer (by 40%), cardiovascular disease (22%) and respiratory disease (19%). People were scared; they didn't turn up, as the message to protect the NHS worked too well.

173. Across the pandemic, the mean time to death was estimated as nine days from infection to hospitalisation and 21 days from infection to death. So, if you lockdown on the 26 March and allow for a week's worth of transient increase infections due to the household effect, you would assume that deaths would peak approximately four weeks after the lockdown started - 25 April.

174. However, our analysis showed that deaths where covid was mentioned on the certificate peaked on 8 April with 1,272 deaths and fell sharply after that. If we use deaths as the objective peak, we estimate that the peak of infections was at the beginning of March, which is in line with the drop off in acute respiratory infections reported by the RCGP surveillance.




175. A second national lockdown began in England on 5 November 2020 and ended on 26 November 2020, where it was replaced by local restrictions ("tiers"). Advisors had again misread the data. Positive tests were rising sharply in London and the Southeast before the end of lockdown, they had already peaked up North. The strategy in 2020 had managed to push the infection into mid-winter, just when you did not want a swathe of immune naive people. The third lockdown was just around the corner, along with the scaremongering concept of variants of concern. Lockdowns did not curtail the virus in 12 weeks, as the Prime Minister had said; suppression failed, didn't prevent future lockdowns, had no effect on hospital acquired infections and the data doesn't back up that it impacted deaths.

176. Lockdowns have the effect of normalising the risk across age groups ensuring those most at

risk of adverse events have the same risk as those with the least risk. They also meant that strategies were not deployed or trialled to protect those most at risk. Lockdowns are alluring because they offer a simple message: staying home will protect you. They failed to account for the medium to long-term consequences, did nothing for hospital-acquired infection rates and did not protect care homes.

177. The timing of lockdowns is also a big issue. Timing depends on sound knowledge of what is happening, something that didn't happen due to the focus on modelling. The table is part of a document the Lombardy Italian governments used to make decisions. We disregarded deaths with unclear attribution rules and ICU admissions that were confounded by the "just in case" approach in a proportion of early cases.

| Date | Cases | Increase% | Admitted | Increase % | Intensive care admissions | Increase % | Deaths | Increase % |
|---|---|---|---|---|---|---|---|---|
| FEBRUARY 2020 | | | | | | | | |
| 20 | 1 | | | | | | | |
| 21 | 33 | | | | | | | |
| 22 | | | | | | | | |
| 23 | 114 | | | | | | | |
| 24 | 172 | 51% | 77 | | 21 | | 6 | |
| 25 | 240 | 40% | 104 | 35% | 24 | 14% | 9 | 50% |
| 26 | 305 | 27% | 105 | 1% | 25 | 4% | | |
| 27 | 403 | 32% | 172 | 64% | 41 | 64% | 14 | |
| 28 | 531 | 32% | 235 | 37% | 57 | 39% | 17 | 21% |
| 29 | 615 | 16% | 256 | 9% | 80 | 40% | 23 | 35% |
| MARCH 2020 | | | | | | | | |
| 01 | 984 | 60% | | | 106 | 33% | | |
| 02 | 1245 | 27% | 478 | | 129 | 22% | 38 | |
| 03 | 1520 | 22% | 698 | 46% | 167 | 29% | 55 | 45% |
| 04 | 1820 | 20% | 877 | 26% | 209 | 25% | 73 | 33% |
| 05 | 2251 | 24% | 1169 | 33% | 244 | 17% | 98 | 34% |
| 06 | 2612 | 16% | 1622 | 39% | 309 | 27% | 135 | 38% |
| 07 | 3420 | 31% | 1661 | 2% | 359 | 16% | 154 | 14% |
| 08 | 4189 | 22% | 2217 | 33% | 399 | 11% | 267 | 73% |
| 09 | 5469 | 31% | 2802 | 26% | 440 | 10% | 333 | 25% |
| 10 | 5791 | 6% | 3319 | 18% | 466 | 6% | 468 | 41% |
| 11 | 7280 | 26% | 3852 | 16% | 560 | 20% | 617 | 32% |
| 12 | 8725 | 20% | 4247 | 10% | 605 | 8% | 744 | 21% |
| 13 | 9820 | 13% | 4435 | 4% | 650 | 7% | 890 | 20% |
| 14 | 11685 | 19% | 4898 | 10% | 732 | 13% | 966 | 9% |
| 15 | 13272 | 14% | 5500 | 12% | 767 | 5% | 1218 | 26% |
| 16 | 14649 | 10% | 6171 | 12% | 823 | 7% | 1420 | 17% |
| 17 | 16220 | 11% | 6953 | 13% | 879 | 7% | 1640 | 15% |
| 18 | 17713 | 9% | 7285 | 5% | 924 | 5% | 1959 | 19% |
| 19 | 19884 | 12% | 7387 | 1% | 1006 | 9% | 2168 | 11% |
| 20 | 22264 | 12% | 7735 | 5% | 1050 | 4% | 2549 | 18% |
| 21 | 25515 | 15% | 8258 | 7% | 1093 | 4% | 3095 | 21% |
| 22 | 27206 | 7% | 9439 | 14% | 1142 | 4% | 3456 | 12% |
| 23 | 28761 | 6% | 9266 | -2% | 1183 | 4% | 3776 | 9% |
| 24 | 30703 | 7% | 9711 | 5% | 1194 | 1% | 4178 | 11% |
| Average | | 22% | | 19% | | 17% | | 28% |

178. The epidemic peaked around the end of the first week in March, but a national lockdown was introduced on March 9. The situation in Lombardy and neighbouring Bergamo was the main reason for introducing national lockdowns, so unless we have an actual look at the data, we will draw the false inference that the lockdown in Italy worked.

179. Lockdowns act to normalise the risk across age groups, ensuring those most at risk of adverse events have the same risk as those with the least risk. For some, lockdowns provide a simple tool for a highly complex problem. But they meant that strategies were not deployed or trialled to protect the most vulnerable. Lockdowns are alluring because they offer a simple message: staying home will protect you.

**Personal attacks and surveillance**

180. The publication of Matt Hancock's diaries meant we discovered the true extent of the government's suppression strategies and those behind them (Exhibit CH/118 [INQ000268253]. In July 2020, we wrote in the Spectator about whether face masks help. The article was motivated by the rollout of mask mandates at the end of the month. We expressed the uncertainty in the evidence base and policy setting based on *'opinions, radical views and political influence.'* (Exhibit CH/119 [INQ000268254]. This article went largely unchallenged. However, this all changed in November 2020, when we further published on the only European community trial of masks and the update of our Cochrane Review that found no significant effect for facemask wearers' (Exhibit CH/120 [INQ000268256]. The Danish trial during the pandemic joined 16 other trials carried out over the years at times of variable respiratory agents' circulation in showing no significant effect, either if compared to not wearing masks at all or wearing other types of face coverings, irrespective of setting. Despite hundreds of positive comments, the article was censored by Facebook. It led to a vitriolic campaign of denigration with sundry personal attacks, complaint procedures to our institutions, smear campaigns and the setting up of websites backed by ministers to attack dissenting academics and journalists (Exhibit CH/121 [INQ000268257].

181. But we learnt from Isobel Oakeshott's piece that the attacks were partly orchestrated by Matt Hancock, who harnessed the full power of the state to silence "dissenters". *"As far as Hancock was concerned, anyone who fundamentally disagreed with his approach was mad and dangerous and needed to be shut down."*

182. According to Oakeshott's piece, the origins of mask mandates in the community were Dominic Cummings's obsession with masks and a desire to please Ms Nicola Sturgeon. However, the

most important figures' Matt Hancock, Chris Whitty and Boris Johnson knew full well that non-medical masks do very little to prevent transmission of the virus. You could readily translate this to the lack of high-quality evidence to support mandates, as we pointed out in July 2020. The taking down of the Spectator article by Facebook was just the start of the campaign. You could say we were naive, but we didn't realise we were enemy number one, along with some of our academic and journalist colleagues within a democratic state that used all its powers to silence those seen to peddle "radioactive" views when in fact, all we were doing was looking at the available evidence, something we have done for decades across a range of healthcare interventions.

183. Fact checking sites appeared to critique our Spectator article (Exhibit CH/122 [INQ000268258]. What they did not tell you is that Facebook funded them (Exhibit CH/123 [INQ000268259].

184. Also, the government did not tell you they were cosying up to social media sites to harness their influence. *'Hancock reveals that his special adviser was speaking to Twitter about 'tweaking their algorithms'. Later, he personally texted his old coalition colleague Nick Clegg, now a big cheese at Facebook, to enlist his help.'*

185. Big Brother Watch launched the Ministry of Truth report on 30 Jan 2023 at the Houses of Parliament (Exhibit CH/124 [INQ000268260].

186. In 2022, I worked with Big Brother Watch to determine the extent of the government's spying activities. As a result, I sent Freedom of Information requests to The Rapid Response Unit and the Counter Disinformation Unit (see the report for context). The Rapid Response Unit (RRU) is part of the Cabinet Office and was tasked with "tackling a range of harmful narratives online" during the pandemic, "from purported 'experts' issuing dangerous misinformation to criminal fraudsters running phishing scams". The Counter Disinformation Unit (CDU) was tasked to monitor what it deems to be disinformation and flag content to social media companies, sitting inside the Department for Digital, Culture, Media and Sport.

187. The Big Brother Watch report and the information obtained in Freedom Of Information requests show the government was spying on many individuals, including myself. All along, the government was taking covert action to shout down what it considered was misinformation and disinformation: the government thought it owned the truth. It didn't like criticism of modelling and lockdown policies, particularly pointing out the collateral harms, any opposition to covid passes, vaccine passports and evidence underpinning the vaccines.

188. We had faced academic attacks more akin to witch hunts (Exhibit CH/125 [INQ000268261].

Attempts by the Guardian to paint us as agents of disinformation (Exhibit CH/126 [INQ000268262], and a Conservative MP who tried to humiliate us through his website was dubbed "witchfinder-general" by the Times. The government's experts and advisors claimed certainty when it didn't exist; creating policies overnight, it retrospectively used poor-quality evidence to justify the actions; it over-relied on modelling, opinions and poor science in doing so, it had to defend itself with covert surveillance operations.

189. Academics and journalists should be empowered to investigate and report on government activities in the public interest. We are aware that many academics wanted to speak out but were scared off by the intimidation and the threats: the silencing of science is not in the best interests of a functioning democratic society.

**Conclusions**

190. This report sets out the need for informed, evidence-based decision making. It is essential to recognise that pandemics are primarily a healthcare problem and, as such, should adhere to well-established frameworks for intervening. The ensuing panic meant that decisions were taken in haste, were not well thought through and did not consider a cost-benefit analysis. The fact over 200 different policy requirements were enacted in 2020 shows the utter confusion in the decision-making process. A lack of understanding of epidemiology, the spread of community respiratory pathogens and healthcare experience and expertise meant much of the advice was poor quality, overly confident and lacked rigour. The structure of advice provided by SAGE was excessively complex, and lacking experience in healthcare tended to overly promote lockdown and restrictions without thinking through the issues. When I was called to give advice, it was at short notice with little preparation. Furthermore, there was a lack of transparency with no minutes, and often, it wasn't clear who was in the room. Central to healthcare decision-making should be a transparent approach, particularly when making policy decisions that affect society. This report has only touched the surface of how to approach evidence in decision-making. Still, there are several areas where mistakes were made, and there needs to be a change in the approach to the data and evidence to improve pandemic decision-making.

Care Homes

191. A high burden of mortality occurred in care homes. The seeding of cases into homes was an error underpinned by a lack of understanding of the vital role care homes play in protecting the most vulnerable in society. Shutting out family when someone was dying was a decision

that is hard to justify. Having had first-hand experience of family members gathering at the window of someone dying should not be repeated. But more importantly, a family advocate has a vital role to play in a care home resident's wellbeing. When an elderly patient becomes unwell, they readily become confused and often cannot eat and drink for themselves. Confused, they will, therefore, literally die of thirst. A named advocate should ensure high-quality care personal needs are met and aid well-being by recognising further deterioration that requires clinical input. The evidence and my direct clinical experience show insufficient resources were directed to care homes during the pandemic. The staff-to-resident ratio is too low to ensure adequate care during a pandemic. Approximately one per cent of the global population resides in care homes. In contrast, care home residents account for nearly one-third of deaths attributed to COVID-19 in the 25 countries we studied in CG report 6 (Exhibit CH/87 [INQ000268346]). Reducing this ratio requires analysing current care home infrastructures, funding models, and incentives for providing high quality care. The scale of the problem in care homes requires robust evaluation and coordinated strategies to improve outcomes for those most vulnerable to COVID-19. Failure to address these systemic problems could mean global care home populations will be similarly affected by future crises and pandemics.

Hospital Acquired Infections:

192. The pandemic highlighted the substantial problem of the spread of SARs CoV-2 in hospitals. Those who stay in hospital longer are at risk of infection, probably because they are sufferers of chronic and debilitating pathologies with weaker immune systems. Given its importance, the outcome of COVID 19 Hospital Acquired Infections (or those caused by any other agent) should be the subject of further investigation. Data on the relationship of the day of admission to PCR Positivity should be routinely available, especially if the information is used to guide societal restrictions. The data from Northern Ireland, Wales and Scotland suggests somewhere between 25 and 50% of patients test positive on day 8 of admission or thereafter, suggesting the need for further investigations to determine what works in what settings to reduce the burden of infection. I also consider Scotland's approach by providing data before admission and Northern Ireland's granular data as the way forward.

Approach to evidence and data:

193. There is a clear need to improve the interpretation and critical analysis of UK healthcare data during outbreaks. The approach of retrofitting evidence to policy is unhelpful as the evidence

used often lacks rigour. While the need for high quality evidence has been well recognised for pharmaceutical interventions, the approach to non-pharmaceutical interventions has been the opposite. The pandemic saw an overreliance on modelling to underpin interventional decisions. No other area of healthcare would tolerate such an inaccurate approach. The advice was so fixated on trying to predict what would happen next it forgot to ask questions about what was happening on the ground and what the data meant. Therefore, we ended up with many poorly thought-through policies that were not thought through and were primarily based on the opinions of a few. There are also questions about the UKHSA approach to assessing the evidence for policy. Throughout the pandemic, the UKHSA published several rapid evidence reviews and a statement from an expert panel informed by review-level evidence (available at https://ukhsalibrary.koha-ptfs.co.uk/covid19rapidreviews/). The UKHSA review that forms the basis for government living with covid advice *'wearing a face covering in crowded and enclosed spaces'* (Exhibit CH/127 [INQ000268263] included observational study without protocols, analyst blinding, or gave a clear definition of Covid 19. The review consists of 25 studies, two of which are trials included in the 2023 Cochrane review. We have set out a series of issues on the type and quality of evidence required to assess the effectiveness of respiratory virus interventions (CH/128 [INQ000268264]. The evidence was given a confidence rating by combining the overview of evidence with expert knowledge and experience. This is expert-level spin, as expertise is at the bottom level of evidence for healthcare decision-making as it is opinion. A perusal of the panel report shows that it met three times: The panel met three times on 1 March 2021, 21 April 2021, and 12 May 2021. The conclusions are out of date, although the UKHSA website reports it was updated to 31 March 2023 (CH/129 [INQ000268265].

194. The approach of the UKHSA to assessing evidence deviates from what we would expect in usual healthcare. Concerning viral respiratory infections and whether interventions help, we must consider the substantial fluctuations in the outcome of interest - transmission - that make observational studies particularly prone to confounding. For example, in four weeks in February 2023, influenza went from 30 per cent PCR positivity down to 5 per cent. Observations that assess any intervention during this period would wrongly assume a sizeable causal effect. The large fluctuations in transmission are one reason the observational studies have a sizable effect that lies outside the 95 per cent confidence interval seen in the results of randomised trials. The Cochrane review on physical interventions to interrupt or reduce the spread of respiratory viruses included 12 trials (10 cluster-RCTs) comparing medical/surgical masks versus no masks to prevent the spread of viral respiratory illness (two trials with healthcare workers and 10 in the community). The review reported that wearing masks in the community probably makes little or no difference to the outcome of influenza-like illness

(ILI)/COVID-19 like illness compared to not wearing masks (risk ratio (RR) 0.95, 95% confidence interval (CI) 0.84 to 1.09; 9 trials 276,917 participants; moderate-certainty evidence. However, the review by Chu et al., published in 2020, is based on observational studies of SARS, MERS, or SARS-CoV-2 (Exhibit CH/130 [INQ000268267]) reported face mask use could result in a large reduction in risk of infection with an adjusted odds ratio of OR 0·15 (95% CI 0·07 to 0·34). Given the effect size, such a reduction is implausible as there would have been no need for any other interventions to reduce transmission. The evidence relating to covid interventions is limited because governments, public health bodies, and foundations refused to carry out good quality studies to answer the question. Consequently, the gap in evidence was filled by poor quality and, in some cases, the wrong evidence. Finally, throughout the pandemic, we highlighted multiple errors, inconsistencies, and misinterpretations of the data. The reasons for this are unclear, but effective policies cannot be based on misleading data.

Non-pharmaceutical interventions

195. Non-pharmaceutical policies were based on poor-quality observational evidence, and decisions were influenced by what people believed instead of what they could prove. There was a failure to develop high-quality evidence that is unexplainable given the impact non-pharmaceutical interventions had on the public. Government reviews of the evidence require a more robust methodology and should be subject to open peer review. Despite a lack of high-quality evidence, many advisors central to decision-making changed their views on interventions such as masks despite no new high-quality evidence. The reason for their policy change is unclear, but it wasn't an evidence-informed decision. The lack of high-quality evidence means that opinions dominated policy decisions. The years between pandemics offer the opportunity to evaluate policy decisions against seasonal pathogens that might generalise to pandemics.

196. As one example, the warnings of exponential growth of covid-19 cases, inevitably followed by a rise in hospital admissions, was one focus of the Government's Covid messaging. Jeremy Hunt described this spike in admissions as a 'wake-up call' for the Government. Yet, warnings of a winter crisis in the NHS occur annually. In 2017, in an answer to a Parliamentary Question, Philip Dunne MP, the then-minister of state at the Department of Health, provided the number of unplanned accident and emergency attendances resulting in an admission and a primary (main) diagnosis of respiratory condition between 2010-11 and 2016-17 (CH/131 [INQ000268268]. The data show that the worst month was December in six out of the seven years when approximately 1,000 respiratory admissions per day occur in the NHS in England.

A rise that starts in September and peaks in December-January and then tails off as we go into Spring, reaching the bottom in Summer. In a good year, we see admissions go below the 15,000 mark. Therefore, we are currently unprepared for the winter surge in infections, and consequently, we continue to see the recurring winter crises. We need to evaluate the extra capacity the health service requires in times of need. I consider that about 20 per cent flexible additional capacity is required, adding beds in the community for the elderly and vulnerable. The alternative is a rushed-through policy of Nightingale hospitals that cost hundreds of millions and went unused; the sequestering of 8000 private hospital beds made available to the NHS under contract, of which the highest number of private hospital beds occupied by COVID patients on any day was just 78. The disturbing policy of rushing infectious hospital patients into care homes and an infrastructure that cannot deal with separating the infectious from the non-infectious

Testing:

197. The identification of cases is needed to care for those with serious symptoms and/or the infectious (often overlapping, especially in older age groups). Aimless and indiscriminate mass testing was a waste of resources and proved hugely expensive. No breakdown in the data by severity or infectiousness has ever been reported in the case data, hampering progress. Not all cases of Covid are the same. Some cases that pass a low threshold for a 'positive' test are unlikely to be infectious- tiny levels of the virus can be detected if testers carry out multiple test cycles. But cases above a certain threshold of test cycles are less likely to be contagious because the virus, or fragments, are present only in very low quantities.

198. Tests on their own (with a binary infectious Yes/No) do not provide sufficient information to identify contagiousness or seriousness. Full test results, including cycle threshold, should be made available and presented by the risk of contagiousness. The importance of the Ct cut-off is explained in the UKHSA guidance: samples with Ct less than 25 have a high amount of virus, those with Ct greater than 25 but less than have a medium amount, and those with Ct greater than 30 have a low amount of virus. On October 2021, in our alternative proposals as an extension to the plan submitted for the attention of the PM, we proposed to improve the testing and detection of cases we recommended: a) Identify, contact, trace and isolate only INFECTIOUS symptomatic children; b) to switch off testing in primary schools (evidence children to adults' transmission is limited) and replace it with symptomatic isolation of this age group. For transmission in (adults) c) we recommended contact tracing and isolating only INFECTIOUS symptomatic adult cases; d) producing outline reports with results of tests and enough contextual information to interpret data (age, medical history, test results with cut-off

for positivity) to local authorities and local public health teams; e) isolating only the contagious in dedicated facilities if in an extended family with high-risk individuals.

199. The answers to the public FOI questions show PHE and DHSC did not know what tests were available; they "validated" only a small number of tests, and each laboratory, outside a small number, was doing their own thing and reporting positive/negative results with no apparent regard to the likelihood of infectiousness. Therefore, we recommended a national programme to coordinate quality control of all testing to ensure accuracy, precision, and consistency of results; g) routine checking against gold standard tests for infection/contagiousness of samples and coordination by PHE or its successor with powers to act for failing laboratories.

200. Each laboratory and each testing run may give different Ct values from testing the same specimen. However, this is precisely why an uncoordinated testing system will likely mislead the public and decision makers. A positive PCR is not predictive of infectiousness unless integrated with the clinical decision-making pathway of the individual being tested and reports an estimate of viral load to indicate the likelihood of being infectious. The Questions for the Inquiry are : a) Why was an uncontrolled testing system allowed? b) How many different tests were used? c) Why were the different PCT kits not harmonised (like in Belgium) to enable them to be compared and bundled with similar tests? d) Why did the cycle threshold for the limits of detection vary so much across laboratories? e) Why was the PHE document of cycle threshold interpretation ignored? And f) How can the Government prevent future waste of resources on ineffective interventions?

Test and trace:

201. The limitations of mass testing need to be acknowledged. The answers to FOI requests indicate that up to a third of those tested were a danger to no one and were presumably isolated for no reason. In the explosive phase of an acute respiratory viral epidemic, testing, tracing, and isolation are incredibly labour-intensive as cases multiply exponentially to then level out and fall as the contagion curve obeys Farr's law. In October 2021, The House of Commons Committee of Public Accounts similarly considered the program a waste of resources in its Test and Trace update. (CH/132 [INQ000272978]. *'In March this year, we reported NHS Test and Trace Service's (NHST&T) failure to deliver on its central promise of averting another lockdown. 'In addition, most of the testing and contact tracing capacity that NHST&T paid for has not been used, and despite previous commitments to reduce dependency on consultants, it employed more in April 2021 than in December 2020.'* Despite all the resources thrown at it, Test and Trace did not show one measurable difference in the

outcomes of the pandemic - it did not avoid further lockdowns as promised. Instead, the £37 Billion could have paid for roughly a million nurses for the year, or a year and a half of social care cost for everyone that needed it. The questions for the enquiry are: a)What was the Test and Trace program's aim?-What evidence was the Test and Trace built on? b) How was the quality of the evidence assessed? c) What were the metrics for effectiveness? d) These should not be process measures -such as number tested, as these do not measure the agent's spread. e)Why wasn't the Test and Trace program terminated after the damming PAC report? And f) How can the government prevent such a massive waste of resources on ineffective interventions in the future?

202. Deaths: The main recommendation based on our CG report 8 (Exhibit CH/55 [INQ000268314]) was that the overall lack of consistency had confused the public and likely led to erroneous conclusions. We could not separate the effects on deaths of SARS-CoV-2 from those of human interventions. Poor quality data leaves us unable to say who died because of Covid-19, who died with Covid-19 as a cofactor – and who died of Covid-19 after contracting the infection in hospital. Deaths outside hospitals are not subject to detailed analysis despite their importance. A coherent process based on consistent definitions across the devolved nations is required. Furthermore, to enhance the accuracy of causation in pandemics, a subset of deaths should have been verified using autopsies with full medical documentation.

203. Identification and mitigation of the collateral damage of Covid: Decisions for or against taking restrictive measures require harms to be incorporated into any decision models. There should be a separation of those who gather and synthesise the evidence from those who decide on the policy. This is essential to address uncertainties and prevent the retrofitting of evidence to policy decisions. Broader healthcare experience and expertise should feed into the healthcare evidence-gathering approach, and a more comprehensive range of society should be represented in decision-making. Red teaming of policy decisions should be the norm, adopting a practice that rigorously challenges plans, policies, and any assumptions. Too many government reports that lack rigour, precise methods and appropriate conclusions in line with the evidence are published. Transparency is essential to decision-making. Mainly, we need to ensure information is available in the public domain for who decides on specific policies, on whose advice and on what evidence. The Coronavirus Act placed decision-making into the hands of a few people at the centre of government. Lacking expertise, these people made decisions easily influenced by over-pessimistic approaches to the data and poor-quality advice. Legislation should firstly ensure citizens' freedom of movement, ruling out nationwide lockdowns, and second establish unique independence for public agencies to free them from the government agenda. The Public Health Act should also negate the need for a future

Coronavirus Act.

An evidence-based approach:

204. The pandemic has highlighted that the public has an appetite to be informed and participate in their own decisions. The draconian restrictions underpinned by fines were a mistake as they negated autonomy essential to healthcare decision-making. Mandates were a further error as they alienated those who wanted to make informed choices about their health. In the many dealings I have had with politicians throughout the pandemic, I have noted their desire to receive an unbiased interpretation of the research evidence; separating the functions of evidence gathering and its interpretation from the policy setting is crucial. The Inquiry should consider whether an independent evidence unit could provide robust summaries of the research evidence for ministers and politicians that reflect the quality of the evidence, interpretation of the benefits and the harms and the uncertainties about what is known and what isn't. When individuals participate in their own decisions and understand the benefits and the harms of intervening, they are more likely to adhere to the treatment as prescribed. It is, therefore, equally essential that the public is informed of the risks, and the benefits and harms of intervening so they can make informed decisions. To be better prepared in the future, we also require a program of research and evaluation that considers what works and what doesn't work relating to non-pharmaceutical interventions targeted to acute respiratory pathogens. Only then might we be better prepared next time?

Statement of Truth

I believe that the facts stated in this witness statement are true.

Signed: **Personal Data**

Dated: 24/09/2023