1. A brief overview of your qualifications, career history, professional expertise and major publications.

I have an MMath from the University of Warwick and a PhD in Applied Mathematics from the University of Cambridge. During 2012-13 I was a research associate at Imperial College London, then an MRC strategic skills fellow at London School of Hygiene & Tropical Medicine (LSHTM, 2013–17) and a Wellcome Sir Henry Dale Fellow at LSHTM (2017–23) as well as Professor of Infectious Disease Epidemiology (2022–).

My research focuses on the dynamics of epidemic-prone infectious diseases, including influenza, dengue, Zika, Ebola, and COVID-19. This work involves a combination of statistical analysis, mathematical modelling and primary data generation (e.g. social contact surveys and antibody prevalence studies). I am particularly interested in how human behaviour and immunity shapes epidemic dynamics, and how this can inform preparedness and response. I have authored 98 peer-reviewed publications, which have been cited over 19,000 times (Google Scholar). I have also reviewed COVID-19 research papers for a range of major journals, including Nature, Science, Lancet, BMJ, New England Journal of Medicine and PNAS.

Most relevant pre-COVID publications:

Kucharski AJ, Kwok KO, Wei VWI, Cowling BJ, Read JM et al (2014) The contribution of social behaviour to the transmission of influenza A in a human population. PLOS Path

Kucharski AJ, Althaus CL. (2015) The role of superspreading in Middle East respiratory syndrome coronavirus (MERS-CoV) transmission. Eurosurveillance

Gostic KM, Kucharski AJ, Lloyd-Smith JO (2015) Effectiveness of traveller screening for emerging pathogens is shaped by epidemiology and natural history of infection. eLife

Kucharski AJ, Camacho A, Flasche S, Glover RE, Edmunds WJ et al (2015) Measuring the impact of Ebola control measures in Sierra Leone. PNAS

Kucharski AJ, Andreasen V, Gog JR (2016) Capturing the dynamics of pathogens with many strains. J Math Biol

Kucharski AJ, Wenham C, Brownlee P, Racon L, Widmer N et al (2018) Structure and consistency of self-reported social contact networks in British secondary schools

Most relevant COVID publications:

Kucharski AJ, Russell TW, Diamond C et al (2020) Early dynamics of transmission and control of COVID-19: a mathematical modelling study. Lancet Infect Dis.

Russell TW, Diamond C, Jarvis C, ..., Kucharski AJ (2020) Estimating the infection and case fatality ratio for COVID-19 using age-adjusted data from the outbreak on the Diamond Princess cruise ship. Eurosurveillance.

Davies NG, Kucharski AJ, Eggo RM et al (2020) The effect of non-pharmaceutical interventions on COVID-19 cases, deaths and demand for hospital services in the UK: a modelling study. Lancet Public Health.

Russell TW, Golding N, Hellewell J, ..., Kucharski AJ (2020) Reconstructing the early global dynamics of under-ascertained COVID-19 cases and infections. BMC Medicine

Kucharski AJ, Klepac P, Conlan AJK et al (2020) Effectiveness of isolation, testing, contact tracing and physical distancing on reducing transmission of SARS-CoV-2 in different settings: a mathematical modelling study. Lancet Infect Dis.

Endo A, ..., Funk S, Kucharski AJ (2020) Implication of backward contact tracing in the presence of overdispersed transmission in COVID-19 outbreaks. Wellcome Open Research.

Davies NG, Abbott S, Barnard RC, Jarvis CI, Kucharski AJ et al (2021) Estimated transmissibility and severity of novel SARS-CoV-2 Variant of Concern 202012/01 in England. Science.

Hodgson D, Flasche S, Jit M, Kucharski AJ (2021) The potential for vaccination-induced herd immunity against the SARS-CoV-2 B.1.1.7 variant. Eurosurveillance.

Hellewell J, Russell TW, Beale R, ..., Kucharski AJ (2021) Estimating the effectiveness of routine asymptomatic PCR testing at different frequencies for the detection of SARS-CoV- 2 infections. BMC Medicine.

Finch E, ..., Kucharski AJ (2022) SARS-CoV-2 infection and reinfection in a seroepidemiological workplace cohort in the United States. PLOS Biol.

Pung R, ..., Kucharski AJ (2022) Using high-resolution contact networks to evaluate SARS-CoV-2 transmission and control in large-scale multi-day events. Nature Communications.

2. A list of the groups (i.e. SAGE and/or any of its sub-groups) in which you have been a participant, and the relevant time periods.

SPI-M-O: I attended SPI-M-O meetings on 26th February 2020, 16th March 2020 and 20th April 2020. I participated more regularly between June 2020 and February 2022. I was on parental leave for all of November and December 2021, and did not attend any meetings during this period.

SAGE: I attended on 18th June 2020 and 13th May 2021.

Other SAGE subgroups: I contributed to a SAGE Task and Finish Group on Mass Testing (August 2020) as well as a DCMS Commission on a science framework for opening up group events (March 2021).

Other UK advisory groups: I was also a member of the International Best Practice Advisory Group, and attended meetings regularly between May 2020 and Jan 2022: https://www.gov.uk/government/groups/international-best-practice-advisory-group

3. An overview of your involvement with those groups between January 2020 and February 2022, including:
a. When and how you came to be a participant;
b. The number of meetings you attended, and your contributions to those meetings;
c. Your role in providing research, information and advice.

SPI-M-O: My initial involvement in SPI-M-O was via colleagues at LSHTM, who had pre-COVID involvement in SPI-M as well as with SPI-M-O/SAGE for COVID. As the scope of my contributions grew, I participated in meetings more regularly from June 2020 onwards. Overall I attended 69 main meetings between Feb 2020 and February 2022, as well as a number of ad-hoc discussions and subgroup meetings.

I made three main types of contributions as a participant:
- Submitted reports in response to specific questions from the Secretariat.
- Submitted reports or preliminary results detailing broader epidemiological insights about COVID-19 my colleagues and I thought were noteworthy.
- Contributed to discussions during meetings, including sharing recent insights and literature from wider sources.

The above was all informed by ongoing background research to improve the evidence base around COVID-19. For example, our research included early estimates of features such as infection fatality risk, extent of under-reporting, potential for superspreading.

SAGE: I attended on 18th June 2020 (presenting analysis of superspreading) and 13th May 2021 (presenting analysis of the Delta variant).

Other SAGE subgroups: I was invited to join the Task and Finish Group on Mass Testing by the SAGE Secretariat. I attended around three meetings and co-ordinated the drafting of the epidemiological component of the report to SAGE.

I was invited to join the DCMS Commission by the SAGE Secretariat. I attended one meeting and made some comments on the draft report.

Other UK advisory groups: I was invited to join the IBPAG by the Cabinet Office and attended at least 30 meetings.

4. A summary of any documents to which you contributed for the purpose of advising SAGE and/or its related subgroups on the Covid-19 pandemic. Please include links to those documents where possible.

02-Feb-20   Paper for SPI-M-O.   Feasibility of controlling 2019-nCoV outbreaks by isolation of cases and contacts.   Later published: https://www.thelancet.com/article/S2214-109X(20)30074-7/fulltext

25-Feb-20   Paper for SPI-M-O.   COVID meta analysis - pneumonia and ARDS.

25-Feb-20   Paper for SPI-M-O.   Covid-19 Reasonable worst case predictions.

02-Mar-20   Paper for SPI-M-O.   Secondary attack rate and superspreading events for 2019-nCoV.   Later published: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30462-1/fulltext

03-Mar-20   Paper for SPI-M-O.   Effect of social distancing measures on deaths & peak demand for hospitals in England.   https://www.gov.uk/government/publications/the-effect-of-social-distance-measures-on-deaths-and-peak-demand-for-hospital-services-in-england-3-march-2020

08-Mar-20   Paper for SPI-M-O.   Estimating the impact of regional triggers for COVID-19 non-pharmaceutical interventions.   Expanded version of the analysis: https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(20)30133-X/fulltext

11-Mar-20   Paper for SPI-M-O.   Some results from BBC project on contact rates by context and age.   Expanded version of the analysis: https://www.medrxiv.org/content/10.1101/2020.02.16.20023754v2

11-Mar-20   Paper for SPI-M-O.   Impact of agressively managing peak incidence.   https://www.gov.uk/government/publications/the-impact-of-aggressively-managing-peak-incidence-11-march-2020

11-Mar-20   Paper for SPI-M-O.   Impact of banning sporting events and other leisure activities on Covid-19 epidemic.   https://www.gov.uk/government/publications/the-impact-of-banning-sporting-events-and-other-leisure-activities-on-the-covid-19-epidemic-11-march-2020

17-Mar-20   Paper for SPI-M-O.   Impact of adding school closure to other social distance measures.   https://www.gov.uk/government/publications/the-impact-of-adding-school-closure-to-other-social-distance-measures-17-march-2020

01-Apr-20   Paper for SPI-M-O.   Impact of relaxing lockdown measures: 2.   https://www.gov.uk/government/publications/the-impact-of-relaxing-lockdown-measures-2-1-april-2020

16-Apr-20   Paper for SPI-M-O.   Using BBC Pandemic data to model the impact of isolation, testing, contact tracing and physical distancing on reducing transmission of COVID-19 in different settings.   https://www.gov.uk/government/publications/using-bbc-pandemic-data-to-model-the-impact-of-isolation-testing-contact-tracing-and-physical-distancing-on-reducing-transmission-of-covid-19-in-dif

20-Apr-20   Paper for SPI-M-O.   Effectiveness of isolation, testing, contact tracing and physical distancing on reducing transmission of COVID-19 in different settings.   https://www.gov.uk/government/publications/effectiveness-of-isolation-testing-

contact-tracing-and-physical-distancing-on-reducing-transmission-of-covid-19-in-different-settings-draft-for-spi

21-Apr-20   Paper for SPI-M-O.   The possible impact of mask wearing outside the home on the transmission of COVID-19.   https://www.gov.uk/government/publications/lshtm-the-possible-impact-of-mask-wearing-outside-the-home-on-the-transmission-of-covid-19-21-april-2020

26-Apr-20   Paper for SPI-M-O.   Estimated impact of delay from isolation of symptomatic case to test result and quarantine of contacts.   https://www.gov.uk/government/publications/estimated-impact-of-delay-from-isolation-of-symptomatic-case-to-test-result-and-quarantine-of-contacts-26-april-2020

30-Apr-20   Paper for SPI-M-O.   Estimated impact of testing quarantined contacts at different points in time.   https://www.gov.uk/government/publications/estimated-impact-of-testing-quarantined-contacts-at-different-points-in-time-30-april-2020

03-May-20   Paper for SPI-M-O.   Modelling scenarios for relaxation of lockdown in England.   https://www.gov.uk/government/publications/lshtm-modelling-scenarios-for-relaxation-of-lockdown-in-england-3-may-2020

03-Jun-20   Paper for SPI-M-O.   Analysis of SARS-CoV-2 transmission clusters and superspreading events.   https://www.gov.uk/government/publications/analysis-of-sars-cov-2-transmission-clusters-and-superspreading-events-3-june-2020

10-Jun-20   Paper for SPI-M-O.   Branching process modelling of effectiveness of forward and backward tracing for SARS-CoV-2 control.   Later published: https://wellcomeopenresearch.org/articles/5-239

15-Jun-20   Paper for SAGE.   Superspreading Events Research Brief – ICJU(20)012 (IBPAG DRAFT).

08-Jul-20   Paper for SPI-M-O.   Estimated impact of delay from isolation of symptomatic case to test result and quarantine of contacts.

28-Jul-20   Paper for SPI-M-O.   Spatial patterns in Facebook movement data in the UK: implications for local movement restrictions. Expanded version of the analysis: https://cmmid.github.io/topics/covid19/Facebook-Geographic-Scales.html

04-Aug-20   Paper for SPI-M-O.   Combining layered targeted screening with test & trace in order to lower the stringency of social distancing measures required for COVID-19 control.

04-Aug-20   Paper for SPI-M-O.   Alternative Tactics of controlling COVID transmission.

27-Aug-20   Paper for SAGE.   TFMS: Consensus statement on mass testing.   https://www.gov.uk/government/publications/tfms-consensus-statement-on-mass-testing-27-august-2020

15-Sept-20   Paper for SPI-M-O.   Recent dynamics of hospitalisations and age-stratified cases in France.

14-Oct-20   Paper for SPI-M-O.   Modelling effectiveness of TTI and physical distancing in controlling SARS-CoV-2 in high and low prevalence communities, based on UK contact network data.

21-Oct-20   Paper for SPI-M-O.   Modelling frequent testing using PCR and lateral flow based on detection probabilities estimated from regular testing of health care workers.
          Later published: https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-021-01982-x

04-Nov-20   Paper for SPI-M-O.   Effect of within and between household contacts on outbreak clusters and transmission.

02-Dec-20   Paper for SPI-M-O.   Estimating detection of infection among household gathering attendees based on one-off pre-gathering lateral flow tests.
          https://www.gov.uk/government/publications/lshtm-estimating-detection-of-infection-among-household-gathering-attendees-based-on-one-off-pre-gathering-lateral-flow-tests-2-december-2020

10-Feb-21   Paper for SPI-M-O.   Transmission advantage of immune escape variants against a background of increasing vaccination coverage.

09-Mar-21   Paper for SPI-M-O.   The potential for vaccination-induced herd immunity against SARS-CoV-2. Later published:
https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2021.26.20.2100428

16-Mar-21   Response to DCMS Commission.   Science framework for opening up group events. https://www.gov.uk/government/publications/emg-and-dcms-science-framework-for-opening-up-group-events-16-march-2021

12-May-21   Paper for SPI-M-O.   Modelling importations and local transmission of B.1.617.2 in the UK.   https://www.gov.uk/government/publications/cmmid-covid-19-working-group-modelling-importations-and-local-transmission-of-b16172-in-the-uk-12-may-2021

18-May-21   Paper for SPI-M-O.   Dynamics of B.1.617.2 in the UK from importations, traveller-linked and non-traveller-linked transmission, 18 May 2021.

25-May-21   Paper for SPI-M-O.   Dynamics of B.1.617.2 in the UK from importations, traveller-linked and non-traveller linked transmission, 25 May 2021.
          https://www.gov.uk/government/publications/lshtm-dynamics-of-delta-b16172-in-the-uk-from-importations-traveller-linked-and-non-traveller-linked-transmission-25-may-2021

01-Jun-21   Paper for SPI-M-O.   Dynamics of B.1.617.2 in England NHS regions from importations, traveller-linked and non-traveller-linked transmission.
          https://www.gov.uk/government/publications/lshtm-dynamics-of-delta-b16172-in-england-nhs-regions-from-importations-traveller-linked-and-non-traveller-linked-transmission-1-june-2021

01-Jun-21   Paper for SPI-M-O/SAGE.   Reconstructing the secondary case distribution of SARS-CoV-2 from heterogeneity in viral load trajectories and social contacts.
          https://www.gov.uk/government/publications/lshtm-and-kcl-reconstructing-the-secondary-case-distribution-of-sars-cov-2-from-heterogeneity-in-viral-load-trajectories-and-social-contacts-1-june

01-Jun-21   Paper for SPI-M-O/SAGE.   Analysis of individuals with a high number of contacts in the CoMix study. https://www.gov.uk/government/publications/cmmid-social-contacts-in-the-uk-from-the-comix-social-contact-survey

08-Jun-21   Paper for SPI-M-O.   Dynamics of Delta variant in England NHS regions from importations, traveller-linked and non-traveller-linked transmission.

21-Jun-21   Paper for SPI-M-O.   Implications of UK reopening for the number of contacts potentially quarantined.

24-Nov-21   Paper for SPI-M-O.   Unexposed populations and potential COVID-19 burden in European countries   Later published: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2022.27.1.2101038

01-Dec-21   Paper for SPI-M-O.   Potential burden in European countries under Omicron

25-Jan-22   Paper for SPI-M-O.   How the rate of influx of new susceptibility could influence long-term SARS-CoV-2 dynamics.

5. A summary of any articles you have written, interviews and/or evidence you have given regarding the work of the above-mentioned groups and/or the UK's response to the Covid-19 pandemic. Please include links to those documents where possible.

Summary of articles written (in a personal capacity)

• Immunity is side-effect, containment is priority, Evening Standard, Mar 2020:
https://www.standard.co.uk/comment/letters/the-reader-immunity-is-sideeffect-containment-is-priority-a4388416.html

• Can we trust the Oxford study on Covid-19 infections? Guardian, Mar 2020:
https://www.theguardian.com/commentisfree/2020/mar/26/virus-infection-data-coronavirus-modelling

• Don't blow our transmission budget for Covid, Evening Standard, Aug 2020:
https://www.standard.co.uk/comment/letters/the-reader-don-t-blow-our-transmission-budget-for-covid-a4519246.html

• The COVID-19 response illustrates that traditional academic reward structures and metrics do not reflect crucial contributions to modern science, PLOS Bio, Oct 2020:
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000913

• Here's why we need Covid models, even if they are controversial, Guardian, Nov 2020:
https://www.theguardian.com/commentisfree/2020/nov/11/covid-data-imperfect-scientists-projections

• How modelling Covid has changed the way we think about epidemics, Guardian, Jan 2021:
https://www.theguardian.com/commentisfree/2021/jan/04/covid-model-epidemic-collaboration-experiment

• The importance of local context in COVID-19 models, Nature Comp Sci, Jan 2021:
https://www.nature.com/articles/s43588-020-00014-7

• The new Covid variants are a peril to us all, FT, Jan 2021:
https://www.ft.com/content/5691b1bb-0f9f-4410-9ade-84f4d55ea778

• Time to evaluate COVID-19 contact-tracing apps, Nature Med, Feb 2021:
https://www.nature.com/articles/s41591-021-01236-6

• Sharing, synthesis and sustainability of data analysis for epidemic preparedness in Europe, Lancet Regional Health Europe, Oct 2021:
https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(21)00192-7/fulltext

• What data can reveal and conceal, Lancet, Oct 2021:
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)02128-0/fulltext

• Travel measures in the SARS-CoV-2 variant era need clear objectives, Lancet, Mar 2022:
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)00366-X/fulltext

• Effective surveillance of variants, Science, Mar 2022:
https://www.science.org/doi/10.1126/science.abo4257

• Fragmented outbreak data will lead to a repeat of COVID-19, Nature, Aug 2022:
https://www.nature.com/articles/d41586-022-02268-9

Summary of major interviews (in a personal capacity)

• The TED Interview, Mar 2020:
https://www.ted.com/talks/the_ted_interview_adam_kucharski_on_what_should_and_shouldn_t_worry_us_about_the_coronavirus/

• Channel 4, Mar 2020: https://www.channel4.com/programmes/coronavirus-how-to-isolate-yourself-2020

• BBC Horizon Special, Apr 2020: https://www.bbc.co.uk/programmes/m000h3nm

• Telegraph, May 2020: https://www.telegraph.co.uk/global-health/science-and-disease/dont-need-model-know-health-workers-need-ppe-care-homes-should/

• Channel 4 News, May 2020: https://www.channel4.com/news/rapid-ability-to-identify-contacts-and-stringent-quarantine-are-lessons-uk-can-learn-from-asian-countries-epidemiologist

• BBC News, Jun 2020: https://www.bbc.co.uk/news/health-53113785

• Guardian, Jun 2020: https://www.theguardian.com/science/audio/2020/jun/30/covid-19-why-r-is-a-lot-more-complicated-than-you-think-podcast

• Channel 4, Aug 2020: https://www.channel4.com/programmes/how-to-avoid-a-second-wave

• Channel 4, Sep 2020: https://www.channel4.com/news/test-and-trace-currently-not-working-effectively-enough-epidemiologist-dr-adam-kucharski

• Times, Jan 2021: https://www.thetimes.co.uk/article/adam-kucharski-sage-interview-qzqnfbj6r

• BBC Horizon Special, Mar 2021: https://www.bbc.co.uk/programmes/m000slmx

• Guardian, Mar 2022: https://www.theguardian.com/science/audio/2022/mar/24/two-years-on-what-have-we-learned-about-lockdowns-podcast

Summary of evidence given

• Business, Energy and Industrial Strategy Committee, May 2020
https://committees.parliament.uk/oralevidence/372/html/

• House of Lords Science and Technology Committee, June 2020
https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notices/2020/may-20/covid19-the-role-of-modelling-in-uk-response-/

• RSS COVID-19 Evidence Session, May 2022: https://rss.org.uk/training-events/events/events-2022/rss-events/in-person-covid-19-evidence-session-statistical-re/#fulleventinfo

• Sense about Science Scoping Inquiry, May 2022: https://senseaboutscience.org/what-counts/

6. Your views as to whether the work of the above-mentioned groups in responding to the Covid-19 pandemic (or the UK's response more generally) succeeded in its aims. This may include, but is not limited to, your views on:
a. The composition of the groups and/or their diversity of expertise;
b. The way in which the groups were commissioned to work on the relevant issues;
c. The resources and support that were available;
d. The advice given and/or recommendations that were made;
e. The extent to which the groups worked effectively together;
f. The extent to which applicable structures and policies were utilised and/or complied with and their effectiveness.

I believe the epidemiological work conducted by myself and many of my UK colleagues during 2020-22 made a valuable contribution to understanding of COVID-19 transmission dynamics and implications for control, both in the UK and globally. Work I was involved in contributing to SPI-M-O and SAGE provided several early insights into the dynamics of the infection, including characteristics of novel variants of concern, estimates of disease severity, potential impact of vaccination on epidemic dynamics, and factors influencing the impact of testing, isolation and quarantine on transmission. Much of this work has since been published in peer-reviewed papers and widely cited internationally. Relevant analysis initially presented to SPI-M-O was in several instances also presented to wider advisory groups (e.g. WHO convened meetings).

Participants in SPI-M-O included specialists in epidemiology, modelling, statistics and infectious disease dynamics. Many participants also contributed to other global advisory groups throughout the pandemic, had a range of global collaborations, and were involved in data generation (e.g. CoMix, REACT), and so drew in perspectives from these. In the meetings I attended, there was typically discussion of multiple submitted SPI-M-O papers, which were mostly in response to specific questions commissioned for that week. There were also opportunities to debate interpretation of available evidence and communicate new independently generated insights (e.g. around wider aspects of epidemic dynamics).

In my view, the ability of SPI-M-O to answer specific epidemiological questions was stronger when multiple evidence streams were available. In particular, having multiple teams working on the same question with a range of datasets enabled 'triangulation' across different forms of evidence. For example, early analysis of the spread of variants of concern – such as Alpha and Delta – combined transmission models with data including symptomatic PCR testing, community testing (i.e. REACT-1 and ONS), reported social contacts, population mobility, and genomic sequencing.

Analysis was more challenging when there were limited relevant data available to answer questions of interest. For example, the effectiveness of contact tracing can be tracked by calculating the proportion of newly diagnosed cases that have already been contact traced and quarantined (i.e. what fraction are already 'in the system'). However, such metrics for NHS Test and Trace were to my knowledge not routinely available for analysis, making independent evaluation very difficult.

There were also instances where the interaction between epidemiological evidence and policy questions was not clear to me. For example, in mid-September 2020, guidance was updated to introduce a 'rule of 6' limit on social contacts, in contrast to earlier restrictions relating to number of households. The potential epidemiological impact of this change could have been explored in modelling analysis, but I was not aware of any such analysis being commissioned before the policy announcement.

7. Your views as to any lessons that can be learned from the UK's response to the Covid-19 pandemic, in particular relating to the work of the above-mentioned groups. Please describe any changes that have already been made, and set out any recommendations for further changes that you think the Inquiry should consider making.

I have previously written articles that elaborate on my views around areas for improvement in epidemiological analysis during pandemics. For example:

• The role of data sharing and synthesis:
Sharing, synthesis and sustainability of data analysis for epidemic preparedness in Europe, Lancet Regional Health Europe, Oct 2021:
https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(21)00192-7/fulltext
and
Fragmented outbreak data will lead to a repeat of COVID-19, Nature, Aug 2022:
https://www.nature.com/articles/d41586-022-02268-9

• The value of specially designed studies for understanding disease dynamics:
How modelling Covid has changed the way we think about epidemics, Guardian, Jan 2021:
https://www.theguardian.com/commentisfree/2021/jan/04/covid-model-epidemic-collaboration-experiment

• The importance of sustainable analytical capacity:
The COVID-19 response illustrates that traditional academic reward structures and metrics do not reflect crucial contributions to modern science, PLOS Bio, Oct 2020:
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000913

In my view, public discourse around COVID-19 during 2020-221 also suggested that several key concepts were not widely understood during the pandemic, even if these ideas were well-established in the field of infectious disease dynamics, and hence well-known among members of groups like SPI-M-O. Some examples of my views on this:

• It is important to interpret modelling scenarios in conjunction with questions they are trying to answer. Perhaps the most prominent examples were when scenarios asking 'what could happen if no action is taken?' were interpreted in public discourse as 'this is what will happen', even when the scenario descriptions specifically stated otherwise.

• Even informal opinions about disease dynamics typically involve a conceptual model, because assumptions are being made and conclusions drawn based on those assumptions (although these assumptions may not be explicitly acknowledged). Any counterfactual statement such as 'if country X had done Y, then Z would have happened' will involve multiple assumptions. Part of the value of mathematical modelling comes from encouraging researchers to confront these underlying assumptions and uncertainties.

• It is important to define terminology. For example, in public discourse I have seen many different definitions for 'herd immunity' (many of which contrast with established definitions in the epidemiological literature) and 'lockdown' measures. In my view, constructive discussions about epidemic dynamics rely on having clear, agreed definitions.

• Despite my and my colleagues' efforts, public discourse often failed to acknowledge that epidemics are dynamic process, and severe disease outcomes such as deaths lag behind transmission. For example, if infections are rising in an unvaccinated population (as they were in early autumn 2020) but measured disease mortality is currently low, it is likely that mortality will eventually rise. It is therefore incorrect to presume that lagged indicators like low mortality represent the current state of the epidemic.

8. A brief description of documentation relating to these matters that you hold (including soft copy material held electronically). Please retain all such material. I am not asking for you to provide us with this material at this stage, but I may request that you do so in due course.

I hold copies of the non-public reports listed in (4), as well as accompanying computer code where I was the lead developer. I also have electronic correspondence relating to these reports and projects.