Questionnaire
UK COVID-19 Inquiry: Module 2 - Rule 9 Request to Dr Daren Austin - Reference: M2/SAGE/01/DJA
Please provide the following information:

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

I am now Vice President, Global Quantitative Consultant at GSK, having been an employee at GSK for more than 22 years. I specialise in the Clinical Pharmacology of new treatments for multiple therapeutic areas including Infectious Diseases. I am trained in Pharmacology, Statistics and Clinical Drug Development. Prior to joining GSK, I was a Wellcome Trust Senior Research Fellow in Infectious Disease Epidemiology at Oxford University, and prior to that a Research Fellow in Theoretical Physics at Sussex University. I have PhD and BSc Degrees in Theoretical Physics from Imperial College and over thirty years' experience as a practicing Research Scientist. I am a Fellow of the British Pharmacology Society. During the COVID19 pandemic, I helped develop sotrovimab, an anti-SARS-COV-2 monoclonal antibody approved for the treatment of COVID19. I was awarded an OBE for services to Emergency Response during Covid-19 in October 2020.

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. Since April 2020 to date, I have been an active member of SAGE/SPI-M. I have attended in excess of 95% of scheduled meetings and my attendance will be recorded in the minutes.

3. An overview of your involvement with those groups between January 2020 and February 2022, including:

a. Prior to March 2020 I was not a member of SAGE/SPI-M. On the weekend of March 12, 2020, I conducted a piece of independent research to estimate the doubling time of the SARS-COV-2 epidemic using a statistical methodology common to my work at GSK. This I sent to Neil Ferguson, a former colleague at Oxford. He presented this work to SAGE. I was subsequently asked to join SAGE/SPI-M in early April 2020 on the recommendation of Sir Patrick Vallance, the UK CSO who I had previously served whilst he was President of R&D at GSK.
b. I have been a member of SAGE/SPI-M and made regular contributions to the weekly meetings held. This has involved the generation and presentation of statistical and mechanistic model-based projections of the likely course of the epidemic. Significant contributions have included the impact of immunity from SARS-CoV-2 infection on the course of the epidemic through Winter 2020-21, a projection of the replacement of strains with new emergent strains, notably Delta in 2021, the evaluation of excess mortality comparing the UK with global and EU countries, identification of outlier regions, UTLAs and LTLAs by statistical analysis, and the emergence and delivery of new therapeutic agents (including monoclonal antibodies) for the treatment of COVID19.
c. My role in providing research, information and advice was one of independent researcher, although as a GSK Senior Fellow, contributions were made in part, during my daily work on evaluating the SARS-CoV-2 pandemic. All opinions were my own

and independent of GSK and my views are stated as such on the SAGE website. I was the only non-academic member of SAGE/SPI-M and tried to provide a more pragmatic and less academic viewpoint based on a mix of my previous academic research and skills, and my research role at GSK.

4. Documents were circulated either as brief technical notes, published on the SAGE/SPI-M shared workspace in minutes for meetings, or results circulated as email notes. All emails have been retained for reference for a period of 30 years. A paper comparing excess mortality in the UK and Europe using Euromomo mortality data was published on the SAGE materials website. Analysis of excess mortality was automated and published by ONS from mid-2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/928718/S0788_Evaluation_of_excess_mortality_in_European_all-cause_mortality_data.pdf
5. A preprint on the statistical methods used was published on medrxiv in 2020. I have not formally published other materials outside of SAGE/SPI-M as I do not consider them to be of sufficient intellectual novelty and the timeliness of results reporting does not match that of academic publishing. This high utility but absence of novelty is a negative for the academic process, but standard practice in Industry.
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.

Composition of SAGE/SPI-M was from a legacy group of academics in several UK universities with a relatively similar outlook on modelling of Epidemiology of Infectious Disease and past expertise in influenza modelling. Whilst understandable, I felt that the group would have benefited greatly from an additional statistical side that I helped provide. Expertise in the statistical field was lacking, with solutions provided by groups much reliant on conventional, but assumption-rich mathematical models subject to considerable uncertainty, rather than robust inferential methods (such as local log regression mixed-effects methods and time series analysis). A wider group of expertise in forecasting would have provided additional robustness to near-term projections.

Commissioning was by secretariat with direction from Ministers. Within the remit of policy intervention, this was appropriate. However, there was considerable reliance on mathematical models for what was a highly unpredictable setting, subject to error. Feedback on utility from Civil Servants was appropriate and helpful.

Groups were working at speed, and under high pressure. Working practices such as data robustness, reproducibility and archiving were not discussed. Standards of coding were also not discussed, and at one point subject to media comment for at least one contributing group. Working in a highly regulated environment, I on occasion was able to show my working practices, that I consider "best practice".

Advice was summarised in a collaborative approved joint statement on behalf of SAGE/SPI-M with collective responsibility. I was happy to have my work critiqued by the group to be included in this document which was approved by SAGE. I also felt that any critique I provided was listened to. Other work by individual groups, and myself, was communicated to the secretariat, chairs, CSO, CMO and key group members as results became available.

This parallel working made for rapid dissemination and cross-fertilisation of ideas. Emails of results will have been archived, and results incorporated into subsequent Joint Statements and then approved by SAGE/SPI-M.

I did not see much evidence of collaboration between groups. However, parallel efforts to make projections, that are then incorporated into a consensus made for robustness. This is an appropriate methodology for the means of projection. Robust statistical methods were employed by DSTL to combine results appropriately.

In general, the work of SAGE/SPI-M was well-received by policy makers. Comment on the unlocking for Christmas 2020 was not, however, taken onboard, and I consider this to be the single biggest mistake of the pandemic. An analysis of excess mortality by myself, and comparison of projections versus eventual mortality from all models with and without unlocking, showed approximately 30,000 excess deaths over the period December 2020 to end of January 2021. Other recommendations including the role of cohorting, school openings, vaccination rollouts etc. played a part in the formulation and implementation of policy. Retrospective comparison with projections has also been a mainstream and welcome feedback for the group.

7. Your views as to any lessons that can be learned from the UK's response to the Covid-19 pandemic, 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.

My overall recommendation would be that business of projection should not be left to reside within a relatively small group of highly skilled academic teams These academic teams who due to historic training in Epidemiology of Infectious Diseases in the 1990-2020 period, tended to view data in one way and produce largely similar projections of very uncertain events. Admission of other professional forecasters from other disciplines (such as finance, actuarial science etc.) using more Statistical methodologies, might have helped understand the early course of the epidemic. More persuasive arguments, notably regarding mortality, could have been generated using actuarial groups from industry working in collaboration with ONS.

8. A brief description of documentation relating to these matters that you hold (including soft copy material held electronically).

All computer code, data and outputs are retained for archiving. All emails have been archived in GSK systems for thirty years for retrieval.