UK COVID-19 INQUIRY

WITNESS STATEMENT OF KARL FRISTON

I, Karl Friston, will say as follows: -

1. I am a clinical academic, theoretical neuroscientist and authority on mathematical modelling. I invented statistical parametric mapping (SPM) and dynamic causal modelling (DCM). Technical contributions include variational Laplacian procedures and generalized filtering for model inversion (i.e., fitting models to data). My main contribution to theoretical biology is a free-energy principle for action and perception (active inference). Markers of esteem include the first Young Investigators Award in Human Brain Mapping (1996) and election as a Fellow of the Academy of Medical Sciences (1999). In 2000 I was President of the international Organization of Human Brain Mapping. In 2003 I received the Minerva Golden Brain Award and was elected a Fellow of the Royal Society in 2006. In 2008 I received a Medal, Collège de France, became a Fellow of the Royal Society of Biology in 2012, received the Weldon Memorial prize and Medal in 2013 for contributions to mathematical biology and was elected as a member of EMBO (excellence in the life sciences) in 2014 and the Academia Europaea in (2015). I was the 2016 recipient of the Charles Branch Award for breakthroughs in Brain Research and the Glass Brain Award. I hold Honorary Doctorates from the universities of York, Zurich, Liège and Radboud University. I received the Donald O Hebb Award from the International Neural Network Society in 2022. I have published over 600 articles and am a highly cited academic, particularly in behaviour and neurosciences. Specific peer-reviewed publications—pertaining to test trace and isolate (TTI)—include:

Friston KJ, Parr T, Zeidman P, et al. Second waves, social distancing, and the spread of COVID-19 across America. Wellcome Open Research 2020; 5(103): 103.

Friston KJ, Parr T, Zeidman P, et al. Dynamic causal modelling of COVID-19. Wellcome Open Res 2020; 5(89): 89.

Friston K, Costello A, Pillay D. 'Dark matter', second waves and epidemiological modelling. BMJ Glob Health 2020; 5(12): e003978.

Gandolfi D, Pagnoni G, Filippini T, et al. Modelling Early Phases of COVID-19 Pandemic in Northern Italy and Its Implication for Outbreak Diffusion. Front Public Health 2021; 9(1946): 724362.

Friston KJ, Flandin G, Razi A. Dynamic causal modelling of COVID-19 and its mitigations. Scientific Reports 2022; 12(1): 12419.

Bowie C, Friston K. A 12-month projection to September 2022 of the COVID-19 epidemic in the UK using a dynamic causal model. Front Public Health 2022; 10: 999210.

2. I participated in Independent SAGE from its inception in 2020 until February 2022, when I stood down on sabbatical. I attended weekly meetings, *ad hoc* meetings and weekly briefings on YouTube. My specific expertise was in (i) behavioural and epidemiological modelling and (ii) specific issues relating to the neuropsychiatry of COVID-19. Please see the Independent SAGE website for archived reports.

3. During this time, I maintained and updated the DCM COVID website that provided an academic resource; describing modelling procedures and their application to forecasting and scenario modelling of the pandemic. This website included long-term forecasts that was—and remains—Google rank #1 for "COVID long-term forecasting " searches. The conclusions of this kind of modelling were summarised in several BMJ op-eds [i].

4. I was asked to prepare a number of reports for various media outlets (including BBC Newsnight, Channel 4 News, UnHerd, i-news, et cetera). One report for Channel 4 (Dispatches), focused on TTI; using the (dynamic causal) modelling above. In addition, I served on a Scientific Advisory Board convened by Dr Raghib Ali OBE—Special Adviser to the Cabinet Office. This entailed weekly meetings and occasional scenario modelling reports that were forwarded to the Cabinet Office. These reports are archived at the following site: Scenario Modelling - Dynamic Causal Modelling, UCL, UK.

5. My views on TTI are limited to my expertise in complex system modelling and medical timeseries analysis. Clearly, testing, tracing and various forms of isolation are key

interventions that mitigate the spread of infection. Making the right decision at the right time rests upon the quality and predictive validity of scenario modelling—and, crucially, uncertainty quantification. From my perspective, there were missed opportunities to use state-of-the-art modelling, particularly in relation to (Bayesian) model comparison. In other words, instead of basing recommendations on a basket of different modelling initiatives, it would have been, in principle, possible to assess the evidence for different models and weight their predictions in proportion to model evidence. However, to realise this approach to real time estimation (nowcasting) and forecasting, it would have been necessary to consider (variational) Bayesian model comparison procedures with members of the SPI-M (i.e., members of SAGE). Although there was an initial (and visionary) enthusiasm for discussions *(see KF/01* **INQ000587663** *)*, there was no mechanism in place—or time—to pursue them.

6. One mechanism—that could underwrite discussions of the sort—would be to adopt the standard procedure in science; namely, peer review. Practically, this could involve regular (online) peer-review sessions under the auspices of the Royal Society. These would provide an opportunity for members of SAGE to present their assumptions and procedures to a broader church of expertise, to ensure best practice and eclectic scientific consensus. This could be gracefully implemented by re-purposing the RAMP initiative: instead of reviewing scientific papers as a triage exercise for the members of SPI-M, the contributors to RAMP could be invited to review and comment upon the work of SAGE *per se.*

Statement of Truth

I believe that the facts stated in this witness statement are true. I understand that proceedings may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief of its truth.

PD

Signed: _____

Dated: 22/05/2025

Exhibits:

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[i] Karl Friston: How should we respond to an upsurge in covid-19 cases?
September 24, 2020
Karl Friston: New covid-19 restrictions can only work as a prelude to a restructured find, test, trace, isolate and support system
October 15, 2020
Modelling the pandemic—time is of the essence
November 9, 2020
Karl Friston and Anthony Costello: What we have learned from the second covid-19 surge?
December 8, 2020
We should shift our focus from covid-19 mortality to morbidity, particularly in children
July 6, 2021
Karl Friston and Anthony Costello: A measured approach to zero covid
February 25, 2021