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Science

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Module 2 of the UK Covid-19 Public Inquiry

Request for Evidence under Rule 9 of the Inquiry Rules 2006

Reference for Request - M2/SAGE/01/CR

FAO: Tim Suter, Module Lead Solicitor

Dear Tim,

Please find my response to the questions.

Best Wishes

Personal Data

UK COVID-19 Inquiry: Module 2 - Rule 9 Request to Professor Chris Robertson - Reference: M2/SAGE/01/CR

Please provide the following information:

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

Qualifications

1972-76 Edinburgh University. B.Sc. Honours (I) Mathematics and Statistics.
1976-77 Kent University, Canterbury. M.Sc. Statistics.
1977-80 Kent University, Canterbury. Ph.D. Statistics. Statistical applications in memory studies.

Career History

Chris Robertson is a statistician whose long term research interests have focussed on the application and development of statistical modelling in epidemiology and environmental health. Since 2002 he has had a joint appointment as Professor of Public Health Epidemiology in the Department of Mathematics and Statistics at the University of Strathclyde, Glasgow, and also at Health Protection Scotland (HPS), now part of Public Health Scotland, Glasgow. From 1995 to 2001, he was Head of Biostatistics and Vice Director in Epidemiology and Biostatistics in the European Institute of Oncology, Milano. Prior to that, he was a lecturer and senior lecturer in Mathematics and Statistics and Modelling Science at Strathclyde University. Presently his main research interest is in statistical modelling of infectious diseases and environmental health and in designing epidemiological studies for disease surveillance systems. The focus is on the application and development of statistical models to support the function of Public Health Scotland in protecting the population of Scotland from the effects of infectious diseases and environmental exposures including atmospheric pollution.

Major Recent Publications

Vasileiou, E., C. R. Simpson, T. Shi, S. Kerr, U. Agrawal, A. Akbari, S. Bedston, ..., C Robertson, A Sheikh (2021). "Interim findings from first-dose mass COVID-19 vaccination roll-out and COVID-19 hospital admissions in Scotland: a national prospective cohort study." *The Lancet* 397(10285): 1646-1657

Lee, D., C. Robertson, C. Ramsay, C. Gillespie and G. Napier (2019). "Estimating the health impact of air pollution in Scotland, and the resulting benefits of reducing concentrations in city centres." *Spatial and spatio-temporal epidemiology* 29: 85-96

A Sheikh, J McMenamin, B Taylor, C Robertson (2021) SARS-CoV-2 Delta VOC in Scotland: demographics, risk of hospital admission, and vaccine effectiveness. *The Lancet* 397 (10293), 2461-246.

T Palmer, L Wallace, KG Pollock, K Cuschieri, C Robertson, K Kavanagh , M Cruikshank (2019) Prevalence of cervical disease at age 20 after immunisation with bivalent HPV vaccine at age 12-13 in Scotland: retrospective population study. *BMJ*. 365.

K Kavanagh, KG Pollock, K Cuschieri, T Palmer, RL Cameron, C Watt, R Bhatia, C Moore, H Cubie, M Cruikshank, C Robertson (2017) Changes in the prevalence of human papillomavirus following a national bivalent human papillomavirus vaccination programme in Scotland: a 7-year cross-sectional study. *The Lancet Infectious Diseases* 17 (12), 1293-1302

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 from about 2010 until present, initially as an observer, representing Public Health Scotland, Health Protection Scotland then as a member

I also was a member of Scottish Chief Medical Officer's Advisory Group – April 2020 to summer 2022; Scottish Chief Nursing Officer's COVID-19 Nosocomial Review Group. – April 2020 to summer 2022; MHRA Covid Vaccine Benefit and Risk Spring 2020 to present. I have also presented to JVCI at various meetings.

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;

I was a participant throughout this period. I am primarily on SPI-M to represent Public Health Scotland and to provide information from Scotland.

b. The number of meetings you attended, and your contributions to those meetings;

I attended pretty well all of the meetings apart from handful.

c. Your role in providing research, information and advice.

My advice was related to my areas of expertise – vaccine effects and disease surveillance. I provided no advice on transmission dynamic modelling of epidemics. Largely my contributions highlighted the situation in Scotland.

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.

I provided information from Scotland on hospital acquired covid infections, initially. Then descriptions of spatial surveillance systems developed for use in Scotland. Once the EAVE-II study was underway I presented on forecasting hospitalisations and deaths; severity of the delta and omicron variants and vaccine effects.

All of these documents are in the SPI-M repository. I do not have links to the presentations. Work which was first presented to SPI-M and then published is in section 5, below. I did not present any information directly to SAGE. Or any other SAGE sub committee.

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.

I have written no articles, nor given any interviews, commenting on the work of SPI-M or SAGE. I list the interviews and publications I have been involved in which the results of the publications had been previously presented to SPI-M.

Interviews

I have given no interviews apart from 3 presentations to the Science Media Centre relating to the publication of research results. (22 Feb 2021 on the vaccine effect results from Scotland, 9 June 2021 on vaccine safety results from Scotland, and 23 Dec 2021 on data from Scotland showing that omicron was less severe than delta). I also gave one presentation, with Mark Woolhouse and Roger Halliday on behalf of the Scottish CMO advisory group on epidemiological modelling principles (summer 2020 I think).

Publications

This is a list of the papers published where the work had previously been presented to SPI-M. Some of the presentation to SPI-M were not subsequently published. I also have additional publications of work presented to other committees – JVICI, NERVTAG, MHRA Vaccine Benefit and Risk. These are not listed here.

Interim findings from first-dose mass COVID-19 vaccination roll-out and COVID-19 hospital admissions in Scotland: a national prospective cohort study. E Vasileiou, CR Simpson, T Shi, S Kerr, U Agrawal, A Akbari, S Bedston, ...The Lancet 397 (10285), 1646-165

[https://doi.org/10.1016/S0140-6736\(21\)00677-2](https://doi.org/10.1016/S0140-6736(21)00677-2)

SARS-CoV-2 Delta VOC in Scotland: demographics, risk of hospital admission, and vaccine effectiveness. A Sheikh, J McMenamin, B Taylor, C Robertson The Lancet 397 (10293), 2461-2462

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8201647/>

Temporal trends and forecasting of COVID-19 hospitalisations and deaths in Scotland using a national real-time patient-level data platform: a statistical modelling study. CR Simpson, C Robertson, E Vasileiou, E Moore, C McCowan, U Agrawal, ...The Lancet Digital Health 3 (8), e517-e525

[https://doi.org/10.1016/S2589-7500\(21\)00105-9](https://doi.org/10.1016/S2589-7500(21)00105-9)

BNT162b2 and ChAdOx1 nCoV-19 vaccine effectiveness against death from the delta variant. A Sheikh, C Robertson, B Taylor. New England Journal of Medicine 385 (23), 2195-2197

<https://www.nejm.org/doi/full/10.1056/nEJmc2113864>

Severity of Omicron variant of concern and vaccine effectiveness against symptomatic disease: national cohort with nested test negative design study in Scotland

A Sheikh, S Kerr, M Woolhouse, J McMenamin, C Robertson

https://www.research.ed.ac.uk/en/publications/severity-of-omicron-variant-of-concern-and-vaccine-effectiveness-?fbclid=IwAR1qHNz_yVI6KVtg7oq0XESOX-j9o5m9i9cxIE1r11LYZ787xdHHwj8nF_Q

[https://doi.org/10.1016/S1473-3099\(22\)00141-4](https://doi.org/10.1016/S1473-3099(22)00141-4)

Quantifying the small-area spatio-temporal dynamics of the Covid-19 pandemic in Scotland during a period with limited testing capacity. D Lee, C Robertson, D Marques. Spatial statistics 49, 100508

10.1016/j.spasta.2021.100508

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8035810/>

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;*

SPI-M had representation from all the main infectious disease modelling groups in the UK all of which are international experts. They all know each other well and largely seem to have developed similar types of models. I do not know if there were other modelling groups in the UK with quite different approaches who were not on the committee.

There was a great deal of cross discussion about the model differences and this was one of the great strengths of the committee. Also, pooling of the results together for a synthesis was a great strength.

b. The way in which the groups were commissioned to work on the relevant issues;

The major commissions seemed to be largely from government.

c. The resources and support that were available;

I was not directly involved in using the data though did help to set up and supply the use of data from Scotland. There were certainly teething issues at the beginning with data supply and one of the main lessons from this would be setting up data repositories where real time data can easily be shared – possibly the data suppliers having their own data repositories so that analysts can easily access the data without waiting on emails.

Support from the secretariat was great and the secretariat did a fantastic job.

d. The advice given and/or recommendations that were made;

I was always comfortable with the advice from SPI-M which I thought was balanced.

e. The extent to which the groups worked effectively together;

It is my view that the modellers in SPI-M worked very effectively together and worked well with the secretariat and the joint chairs of the committee

f. The extent to which applicable structures and policies were utilised and/or complied with and their effectiveness.

No comment on this.

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 think that a major change, which is already taking place, is in making available all relevant data to the analysis groups. The permissions to access data need to be streamlined

Within SPI-M there was a great deal of discussion about the uncertainty in the models and the projections and, within the group, it was well understood that the models are based upon assumptions which were difficult to validate – particularly early on in the pandemic. This uncertainty does not always get conveyed when the models are reported externally to SPI-M. It is probably very difficult to take a great deal of uncertainty into account when balancing different decisions subsequent to the modelling. I have no idea how to do this but education among policy makers on model uncertainty and assumptions while emphasising that modelling is absolutely critical is probably necessary.

At the early stages, Jan/Feb 2020, there was a scarcity of data internationally and also in the UK. Investment in the UK disease surveillance systems needs to be made in preparation for future pandemics. High quality population based covid surveillance systems such as REACT/ONS covid infection survey are a great resource but the lack of such a system at the beginning of the pandemic was a problem. REACT/ONS are expensive and it is important to develop more cost effective population surveillance which runs continuously.

There are 4 nations in the UK but England dominates. It took a long time for the some of the modelling groups to provide a whole UK view. Part of this was due to different ways similar concepts were defined in the different nations.

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 have all the documents I submitted to SPI-M plus the analysis codes that I used. I still retain my emails.