

Imperial College London

MRC Centre for Global Infectious Disease Analysis School of Public Health Imperial College London St Mary's Campus, Norfolk Place London W2 1PG United Kingdom

[your name] [your e-mail] [your job title]

16<sup>th</sup> September 2022

#### 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/NI

Dear Mr Suter,

Thank you for your letter of 2 September on behalf of Baroness Hallett, Chair of the UK Covid-19 Inquiry. I understand similar requests have been made of academics within, or connected to, Imperial College and it would be helpful to consider my response alongside these to put my role and matters into context. Taking the questions in turn:

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

Qualifications:

2015 – 2018 PhD, Imperial College London (ICL).

2014 – 2015 MRes Epidemiology, Evolution and Control of Infectious Diseases (Distinction) ICL.

2009 – 2013 Fellow Institute and Faculty of Actuaries.

2005 – 2009 Msci (Hons) in Mathematics (First Class) University of Bristol.

Career History:

2021 – 2025 Sir Henry Wellcome Postdoctoral Fellow – ICL

2019 – 2021 Senior Infectious Disease Modeller – Public Health England

2018 – 2021 Research Associate- Infectious Disease Epidemiology, ICL

2009 - 2014 Consultant Actuary - Punter Southall Transaction Services, London

Professional Expertise:

- Authored 30 peer-reviewed publications, including 9 as lead, with over 3,300 citations, hindex 20, Full publication list

https://scholar.google.com/citations?user=gNKsozIAAAAJ&hl=en&authuser=1 - 7 years' experience in mathematical models of infectious disease, including multi-strain pathogens, vaccination, antimicrobial resistance, sexually transmitted pathogens and health economics.

- 13 years' experience in statistical modelling and model fitting using Bayesian methods

- Qualified actuary - former fellow of the Institute and Faculty of Actuaries

Major Publications

• Whittles LK, Didelot X, White PJ. Public health impact and cost-effectiveness of gonorrhoea vaccination: an integrated transmission-dynamic health-economic modelling analysis. Lancet Infectious Diseases. 2022;

• Sonabend R\*, Whittles LK\*, Imai N\*, Perez-Guzman PN, Knock ES, Rawson T, et al. Non-pharmaceutical interventions, vaccination, and the SARS-CoV-2 delta variant in England: a mathematical modelling study. Lancet 2021;6736(21).

• Knock ES\*, Whittles LK\*, Lees JÅ, Perez-Guzman PN, Verity R, FitzJohn RG. The 2020 SARS-CoV-2 epidemic in England: key epidemiological drivers and impact of interventions. Science Translational Medicine. 2021; 13(602).

• Andrejko K, Whittles LK, Lewnard JA. Health-Economic Value of Vaccination Against Group A Streptococcus in the United States. Clinical Infectious Diseases. 2021; ciab597.

• Northrup GR, Qian L, Bruxvoort K, Marx FM, Whittles LK, Lewnard JA. Inference of naturally acquired immunity using a self-matched negative control design. Epidemiology. 2021;32(2):168–78.

• Whittles LK, White PJ, Didelot X. Assessment of the potential of vaccination to combat antibiotic resistance in gonorrhea: a modeling analysis to determine Preferred Product Characteristics. Clinical Infectious Diseases. 2020;71(8):1912–1919.

• Lewnard JA, Whittles LK, Rick A-M, Martin JM. Naturally-acquired protection against upper respiratory symptoms involving group A Streptococcus in a longitudinal cohort study. Clinical Infectious Diseases. 2020; 71(8): e244–e254.

• Whittles LK, White PJ, Didelot X. A dynamic power-law sexual network model of gonorrhoea outbreaks. PloS Comput Biol. 2019;15(3):1–20.

• Whittles LK, Didelot X, Grad YH, White PJ. Testing for gonorrhoea should routinely include the pharynx. Lancet Infect Dis. 2018;18(7).

• Whittles LK, White PJ, Paul J, Didelot X. Epidemiological trends of antibiotic resistant gonorrhoea in the United Kingdom. Antibiotics. 2018 Jul 13;7(3):60.

• Whittles LK, White PJ, Didelot X. Estimating the fitness cost and benefit of cefixime resistance in Neisseria gonorrhoeae to inform prescription policy: A modelling study. PloS Medicine. 2017;14(10).

• Didelot X, Whittles LK, Hall I. Model-based analysis of an outbreak of bubonic plague in Cairo in 1801. J R Soc Interface. 2017;14(131).

• Whittles LK, Didelot X. Epidemiological analysis of the Eyam plague outbreak of 1665–1666. Proc R Soc B Biol Sci. 2016;283(1830).

• Didelot X, Dordel J, Whittles LK, Collins C, Bilek N, Bishop CJ, et al. Genomic Analysis and Comparison of Two Gonorrhea Outbreaks. Mbio 2016;7(3):1–8.

# 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.

Member of SPI-M April 2020 - Oct 2021

# 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 approached by Dr Marc Baguelin in April 2020 for assistance in building an algorithm to fit a model of Covid to data to inform SPI-M. I built a particle Markov Chain Monte Carlo sampler, which I had prior experience of implementing, and began to work on producing real-time estimates of the Covid pandemic in the UK, which were fed into SPI-M meetings weekly by Dr Baguelin and Prof Ferguson.

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

### b. meetings;

I focussed on the modelling analysis and attended SPI-M meetings irregularly (<5), standing in for Dr Baguelin when he was on leave of absence. My contributions consisted of reporting modelling results to the group from the Imperial team, and discussing others' modelling outputs, underlying assumptions, and the potential source of any differences between the models.

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

I provided, as standard, weekly estimates of R and medium-term projections of the epidemic for each of the UK NHS regions. I performed the analysis behind the 'reasonable worst case scenario' for NHS planning in summer of 2020. I then produced analysis for multiple 'special commissions' for SPI-M on behalf of Imperial, including the potential impact of a 'circuit breaker' lockdown in Autumn 2020, and the roadmap out of lockdown following the introduction of vaccination in early 2021.

# 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.

- 1. Input into SPI-M-O: COVID-19: Preparatory analysis long term scenarios https://www.gov.uk/government/publications/spi-m-o-covid-19-preparatory-analysis-longterm-scenarios-31-october-2020
- 2. Evaluating the roadmap out of lockdown (multiple inputs into SAGE)
  - a. <u>https://www.gov.uk/government/publications/imperial-college-london-potential-profile-of-the-covid-19-epidemic-in-the-uk-under-different-vaccination-roll-out-strategies-13-january-2021</u>
  - b. <u>https://www.gov.uk/government/publications/imperial-college-london-strategies-for-gradually-lifting-npis-in-parallel-to-covid-19-vaccine-roll-out-in-the-uk-4-february-2021</u>
  - c. <u>https://www.gov.uk/government/publications/imperial-college-london-unlocking-roadmap-scenarios-for-england-5-february-2021</u>
  - d. <u>https://www.gov.uk/government/publications/imperial-college-london-unlocking-roadmap-scenarios-for-england-18-february-2021</u>
  - e. https://www.gov.uk/government/publications/imperial-college-london-evaluatingenglands-roadmap-out-of-lockdown-30-march-2021
  - f. https://www.gov.uk/government/publications/imperial-college-london-evaluatingthe-roadmap-out-of-lockdown-step-3-5-may-2021
  - g. <u>https://www.gov.uk/government/publications/imperial-college-london-evaluating-the-roadmap-out-of-lockdown-modelling-step-4-of-the-roadmap-in-the-context-of-b16172-delta-9-june-2021</u>
  - h. <u>https://www.gov.uk/government/publications/imperial-college-london-evaluating-the-roadmap-out-of-lockdown-for-england-modelling-the-delayed-step-4-of-the-roadmap-in-the-context-of-the-delta-v</u>
- 3. Autumn/Winter 2021/22 scenarios: <u>https://www.gov.uk/government/publications/imperial-</u> <u>college-london-autumn-and-winter-2021-to-2022-potential-covid-19-epidemic-</u> <u>trajectories-13-october-2021</u>

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.

- Webinar for Royal Society of Medicine's COVID-19 Series https://www.youtube.com/watch?v=8Dm1Hd8kFmM
- Imperial College Q&A: Modelling Covid 19 <u>https://www.youtube.com/watch?v=HUKC8Wq2a0k</u>

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.

The aims of SPI-M evolved over time with the changing nature of the epidemic. As modellers we initially had to respond to an emerging outbreak being mitigated by non-pharmaceutical interventions, the disproportionate impact in vulnerable groups such as in care homes, the potential impact of mass vaccination, and the evolution of new variants causing successive pandemic waves.

The process of commissioning research reports from modelling groups improved over time, in large part due to the excellent work of the secretariat.

The diversity of views on SPI-M and robust discussion between modellers from different institutions, and within institutions, was crucial in broadening perspective. Similarly the diversity of models used was a vital component of the response.

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.

Provision of support for wellbeing and security in the event of an emergency turning researchers into public figures.

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.

Soft copy material, including draft reports relating to SPI-M work is held by Imperial College London.

The questions and answers above span almost 2-years of work which was undertaken at pace. The responses are as accurate and complete as possible but if you require further details or there are inadvertent omissions, please do not hesitate to let me know.

Yours sincerely,

Lilith Whittles