

Questionnaire

UK COVID-19 Inquiry: Module 2 - Rule 9 Request to Professor Derek Smith - Reference: M2/SAGE/01/DS

Please provide the following information:

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

Research Interests

- Evolution and population dynamics of antigenically variable pathogens, particularly influenza viruses but also malaria, HIV, and HCV
- Vaccine strain selection
- Cross-reactive immune response
- Integration of phenotypic and genetic analyses
- Pathogen surveillance
- Fitness landscapes
- Vaccination
- Epidemiology

Current Appointments

Member, WHO Information Meeting on the composition of influenza virus vaccines for the Southern and Northern hemispheres (2005 - present)

Professor of Infectious Disease Informatics (2007 – present) Department of Zoology, University of Cambridge, Cambridge, UK

Director, Centre for Pathogen Evolution (2010 – present) Department of Zoology, University of Cambridge, Cambridge, UK

Member, ECDC/WHO Europe Joint SARS-CoV-2 virus characterisation working group (2022 - present)

Previous Appointments

Director (2012 – 2017)

World Health Organization (WHO) Collaborating Center for Modeling, Evolution, and Control of Emerging Infectious Diseases

Senior Research Fellow (2008 – 2011)

US National Institutes of Health

Research Associate (2003 – 2007)

Department of Zoology, University of Cambridge, Cambridge, UK

Post-doctoral Fellow (1998 – 1999)

Department of Computer Science, University of New Mexico, USA

Graduate Fellow (1992 – 1997)

Sante Fe Institute, Sante Fe, New Mexico

Research Scientist (1982 – 1992) Texas Instruments, Computer Science and Very Large Scale Integrated Circuit Design Laboratory, Dallas, Texas, USA

Education

University of New Mexico (1994–1997)

Ph.D. in Computer Science. Thesis: *The cross-reactive immune response: Analysis, modeling, and application to vaccine design.*

University of New Mexico (1992–1994)

M.Sc. in Computer Science

University of Bradford (1978–1982)

B.Sc. in Computer Science

Principal Distinctions and Honours

Thomson-Reuters/Clarivate Analytics Highly Cited Researcher 2016, 2017, 2018, 2019

UNM (University of New Mexico) James F. Zimmerman Award, 2013. Presented to an alumnus who has made a significant contribution which has brought fame and honor to UNM and to the state of New Mexico.

2010 FIC Director's Merit Award. Recognition for outstanding achievements in the area of pandemic and seasonal influenza research as part of the FIC MISMS team.

National Institutes of Health Director's Pioneer Award for "highly innovative - potentially transformative biomedical research with the potential to produce an unusually high impact" (2005)

Graduate Fellowship, Santa Fe Institute, Santa Fe, NM, USA (1992 – 1997)

Major publications

Smith DJ, Lapedes AS, de Jong JC, et al. *Mapping the Antigenic and Genetic Evolution of Influenza Virus*. Science. 2004;305(5682):371-376. doi:10.1126/science.1097211

Russell CA, Jones TC, Barr IGL...[+24]... Smith, DJ (corresponding author) *The Global Circulation of Seasonal Influenza A (H3N2) Viruses*. Science. 2008;320(5874):340-346. doi:10.1126/science.1154137

Garten RJ, Davis CT, Russell CA...[+55]... Smith DJ (co-corresponding author). *Antigenic and Genetic Characteristics of Swine-Origin 2009 A(H1N1) Influenza Viruses Circulating in Humans*. Science. 2009;325(5937):197-201. doi:10.1126/science.1176225

Koel BF, Burke DF, Bestebroer, TM...[+14]... Smith, DJ (co-corresponding author) *Substitutions Near the Receptor Binding Site Determine Major Antigenic Change During Influenza Virus Evolution*. Science. 2013;342(6161):976-979. doi:10.1126/science.1244730

Fonville JM, Wilks SH, James SL...[+30]... Smith, DJ (corresponding author). *Antibody landscapes after influenza virus infection or vaccination*. Science. 2014;346(6212):996-1000. doi:10.1126/science.1256427

Katzelnick LC, Fonville JM, Gromowski GD...[+23]... Smith DJ (corresponding author). *Dengue viruses cluster antigenically but not as discrete serotypes*. Science. 2015;349(6254):1338-1343. doi:10.1126/science.aac5017

Netzl A, Tureli S, LeGresley E, Mühlemann B, Wilks SH, Smith DJ (corresponding author). *Analysis of SARS-CoV-2 Omicron Neutralization Data up to 2021-12-22*. bioRxiv. January 2022:2021.12.31.474032. doi:10.1101/2021.12.31.474032

Wilks SH, Mühlemann B, Shen X...[+28]... Smith DJ (corresponding author). *Mapping SARS-CoV-2 antigenic relationships and serological responses*. bioRxiv. January 2022:2022.01.28.477987. doi:10.1101/2022.01.28.477987

Branche AR, Rouphael NG, Diemert DJ...[+63]... Smith DJ, Roberts PC, Beigel JH, the COVAIL Study Group. *SARS-CoV-2 Variant Vaccine Boosters Trial: Preliminary Analyses*. medRxiv. January 2022:2022.07.12.22277336. doi:10.1101/2022.07.12.22277336

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.

SAGE

Vaccine Updates Group (VUG) March 2021 to February 2022

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;

Wendy Barclay contacted me in late January 2021 to ask whether I could chair a task and finish group to discuss when to update the COVID vaccine, which became the VUG.

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

5 SAGE meetings (as Scientific Expert)

7 Vaccine Updates Group (VUG) (Chair and Scientific Expert)

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

When it became apparent that the SARS-CoV-2 virus was evolving antigenically I was asked to advise using my expertise in antigenic cartography otherwise used for WHO influenza vaccine strain selection to provide interpretation of antigenic characterization data. My lab received titration data and has published antigenic maps of SARS-CoV-2 antigenic variation, and I also coordinated and aggregated information relevant for the assessment of variants of concern and interest. I also worked with Wendy Barclay, Paul Kellum and Ron Fouchier on an outline of our recommended vaccine strain selection process and necessary steps to insure timely delivery of vaccine strain update recommendations

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.

- Vaccine Updates Group (VUG): *Considerations on when and how to update SARS-CoV-2 vaccines*
<https://www.gov.uk/government/publications/vaccine-updates-group-considerations-on-when-and-how-to-update-sars-cov-2-vaccines-11-march-2021>
- Vaccine Updates Group (VUG): *Setting up medium-and long-term vaccine strain selection and immunity management for SARS-CoV-2* <https://www.gov.uk/government/publications/vaccines-update-group-setting-up-medium-and-long-term-vaccine-strain-selection-and-immunity-management-for-sars-cov-2-4-may-2021> • Covid-19 Medium-Term Scenarios
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/105432_3/S1513_Viral_Evolution_Scenarios.pdf

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.

None.

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;

The composition of the groups was excellent drawing experts from the relevant range of disciplines and institutions.

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

The way in which the groups were commissioned to work was remarkably thoughtful and efficient for an emergency response.

c. The resources and support that were available;

Support from Go-Science was excellent and gratefully received.

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

The advice and/or recommendations given were very good in my opinion.

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

The groups worked effectively together where appropriate.

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

Excellent scientists working together extremely well and effectively. Broad scientific attendance and input. Well organised secretariat support. Excellent chairing of SAGE by Patrick Vallance.

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.

In any situation such as a pandemic, emerging situation, limited situational awareness, decisions made with incomplete information and refined as data comes through. From our perspective, it was clear this was a very good active involvement of academia and public health and continuing to support academic excellence and academic projects that will help to support UK pandemic preparedness in the future.

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.

Emails.