

25<sup>th</sup> September 2022,

**Re: UK Covid-19 Public Inquiry: M2/SAGE/01/IEB**

Dear Mr Suter and Baroness Hallett,

Thank you for your recent request for assistance with the UK Covid-19 Public Inquiry.

Please find initial answers to your questions below, plus two pre-publication documents attached that are not yet available on-line.

*A. Brief overview of my qualifications, career history, professional expertise, and major publications:*

I am a public health physician and data scientist with 20 years of experience as a senior clinical academic researching ways to use data and information technology to improve public health and clinical decision-making. I hold academic qualifications in medicine, pharmacology, statistics/data science, and public health. I hold professional qualifications in medicine, public health, and clinical informatics. My professional expertise focuses on: developing and applying robust, data-intensive methods to understand causes of disease and problems in health & social care systems; and on building tools to improve situational awareness and decision-making at patient and population levels. I have 318 publications with 23,292 citations: h-index 73 by Google Scholar.

*B. A list of the groups (i.e. SAGE and/or any of its sub-groups) in which I have been a participant, and the relevant time periods giving an overview of my involvement between January 2020 and February 2022:*

*1. When and how I came to be a participant*

Prof Ian Hall, for the Scientific Pandemic Influenza Group on Modelling (SPI-M), asked for my input to discussions over Covid-19 and care home outbreaks from April 2020. Thereafter, he invited me into the Social Care Working Group (SCWG) for SAGE on 29 Sep 2020. We also collaborated in the NW Modelling Collaborative volunteer force at this time to improve prediction of Covid-19 bed pressures in the NHS at the request of our Local Resilience Forums.

Sir Patrick Vallance asked for my input to a SAGE meeting on 10 Dec 2020 to report on the national pilot of 'mass testing' in Liverpool for which I led evaluation: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/950695/s0958-liverpool-covid-smart-evaluation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/950695/s0958-liverpool-covid-smart-evaluation.pdf)

After delivering a report to Government on evaluation of the 'mass testing' pilot, I was invited by Professor Susan Hopkins to sit on the Testing Initiatives Evaluation Board. This Board reported into SAGE via Professor Hopkins.

Building on the Liverpool 'mass testing' pilot, enabled by a linked, real-time data environment ([www.cipha.nhs.uk](http://www.cipha.nhs.uk)) that I designed, and responding to Liverpool's need to reopen the events sector (48% of the economy depends on visitors), I was invited by Department of Health and Social Care to run the national pilot site for Project Encore, which was subsequently taken over by the Department of Culture Media and Sport, when Professors Tom Rodden and Paul Monk asked me to run the Liverpool-based part of the UK Events Research Programme. The reporting line from this Programme into SAGE was via the direct reports of Professors Rodden (Department of Culture Media and Sport) and Monk (Department of Business Enterprise and Innovation) into Sir Patrick Vallance. The Programme Board also had Sir Chris Whitty on its membership, and it appeared to have a direct (not via SAGE) report into Cabinet Office.

*2. The number of meetings I attended, and your contributions to those meetings*

I attended one SAGE meeting by invitation.

I was not a regular attendee at SCWG as I had agreed with the Chair to be on-call for urgent inputs by email and videoconference as required. The priority need for my input from SCWG was from testing evaluation and data science projects I was leading, some of which required daily meetings and intensive coordination.

I attended around half of the Testing Initiatives Evaluation Board meetings and agreed with the Chair (Susan Hopkins) to be on call for urgent inputs.

I attended most Events Research Programme Science Board meetings as an observer and Principal Investigator of a sponsored project (evaluating the Liverpool test events).

*3. My role in providing research, information, and advice*

My two roles for SAGE and its SCWG were: i) to evaluate SARS-CoV-2 testing programmes; and ii) to advise on data/intelligence systems as required, for example from deployment of the Combined Intelligence for Population Health Action ([www.cipha.nhs.uk](http://www.cipha.nhs.uk)) system.

My roles for the Testing Initiatives Evaluation Board were to advise in general as a Board member and to report on specific studies as Principal Investigator for the original Liverpool mass testing pilot and for an NHS staff testing study for which I was Principal Investigator in response to the Christmas 2021 staffing crisis during the Omicron variant first wave as requested by Merseyside Resilience Forum when around a quarter of NHS staff were absent from work.

My role for the UK Events Research Programme Science Board was as an observer and Principal Investigator leading design and evaluation of the Liverpool events in Phase I of the Programme in April/May 2021. I was not responsible for design or evaluation of other parts of the Programme. I am convenor of the writing group for evaluators of all parts of the Programme, now helping to ensure the evidence (beyond the urgent reports published on gov.uk) is produce in sufficient depth to inform future study designs and risk-mitigations.



C. *A summary of any documents to which I contributed for the purpose of advising SAGE and/or its related subgroups on the Covid-19 pandemic.*

1. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/943187/S0925\\_Innova\\_Lateral\\_Flow\\_SARS-CoV-2\\_Antigen\\_test\\_accuracy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943187/S0925_Innova_Lateral_Flow_SARS-CoV-2_Antigen_test_accuracy.pdf)
2. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/950695/s0958-liverpool-covid-smart-evaluation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/950695/s0958-liverpool-covid-smart-evaluation.pdf)
3. <https://www.gov.uk/government/publications/liverpool-covid-19-community-testing-pilot-interim-evaluation-report-summary/liverpool-covid-19-community-testing-pilot-interim-evaluation-report-summary>
4. <https://www.gov.uk/government/publications/liverpool-coronavirus-covid-19-community-testing-pilot-full-evaluation-report-summary/liverpool-coronavirus-covid-19-community-testing-pilot-full-evaluation-report-summary>
5. <https://www.gov.uk/government/publications/events-research-programme-phase-i-findings/events-research-programme-phase-i-findings>

D. *A summary of any articles I have written, interviews and/or evidence I have given regarding the work of the above-mentioned groups and/or the UK's response to the Covid-19 pandemic.*

The most policy-urgent articles were published as soon as possible via the University of Liverpool at: <https://www.liverpool.ac.uk/research/research-themes/infectious-diseases/coronavirus-research/covid-smart-pilot/>

Key publications and pre-prints were:

1. Marsden L, Hughes DM, Corcoran R, Cheyne CP, Ashton M, Buchan I, Coffey E, García-Fiñana M. Daily testing of contacts of SARS-CoV-2 infected cases as an alternative to quarantine for key workers in Liverpool: A prospective cohort study. *EClinicalMedicine*. 2022 Jul 1;50:101519. <https://doi.org/10.1016/j.eclinm.2022.101519>
2. Zhang X, Owen G, Green MA, Buchan I, Barr B. Evaluating the impacts of tiered restrictions introduced in England, during October and December 2020 on COVID-19 cases: a synthetic control study. *BMJ Open*. 2022 Apr 12;12(4):e054101. <https://doi.org/10.1136/bmjopen-2021-054101>
3. Pattni K, Hungerford D, Adams S, Buchan I, Cheyne CP, García-Fiñana M, Hall I, Hughes DM, Overton CE, Zhang X, Sharkey KJ. Effectiveness of the BNT162b2 (Pfizer-BioNTech) and the ChAdOx1 nCoV-19 (Oxford-AstraZeneca) vaccines for reducing susceptibility to infection with the Delta variant (B.1.617.2) of SARS-CoV-2. *BMC Infect Dis*. 2022 Mar 20;22(1):270. <https://doi.org/10.1186/s12879-022-07239-z>
4. Hughes DM, Bird SM, Cheyne CP, Ashton M, Campbell MC, García-Fiñana M, Buchan I. Rapid antigen testing in COVID-19 management for school-aged children: an observational study in Cheshire and Merseyside, UK. *J Public Health (Oxf)*. 2022 Feb 4;fdac003. <https://doi.org/10.1093/pubmed/fdac003>

5. Knight SR, Gupta RK, Ho A, Pius R, Buchan I, Carson G, Drake TM, Dunning J, Fairfield CJ, Gamble C, Green CA, Halpin S, Hardwick HE, Holden KA, Horby PW, Jackson C, Mclean KA, Merson L, Nguyen-Van-Tam JS, Norman L, Olliaro PL, Pritchard MG, Russell CD, Shaw CA, Sheikh A, Solomon T, Sudlow C, Swann OV, Turtle LCW, Openshaw PJM, Baillie JK, Docherty A, Semple MG, Noursadeghi M, Harrison EM; ISARIC Coronavirus Clinical Characterisation Consortium (ISARIC4C) Investigators; ISARIC4C investigators. Prospective validation of the 4C prognostic models for adults hospitalised with COVID-19 using the ISARIC WHO Clinical Characterisation Protocol. *Thorax*. 2021 Nov 22;thoraxjnl-2021-217629. Epub ahead of print. PMID: 34810237  
<https://doi.org/10.1136/thoraxjnl-2021-217629>
6. Rafferty J, Hughes J, Buchan I. Covid has given us the data blueprint for 'programming' population health. *Health Service Journal* 13 Oct 2021: [www.hsj.co.uk/technology-and-innovation/covid-has-given-us-the-data-blueprint-for-programming-population-health/7031058.article](http://www.hsj.co.uk/technology-and-innovation/covid-has-given-us-the-data-blueprint-for-programming-population-health/7031058.article)
7. Petersen I, Crozier A, Buchan I, Mina M, Bartlett J. Recalibrating SARS-CoV-2 Antigen Rapid Lateral Flow Test Relative Sensitivity from Validation Studies to Absolute Sensitivity for Indicating Individuals Shedding Transmissible Virus. *J Clin Epi* 2021;13:935-940. <https://doi.org/10.2147/clep.s311977>
8. Macfarlane H, Kenny LC, Buchan I, Wolf J, Rymer J, Ourselin S, Steves CJ, Spector TD, Newson LR, Bell JT. Estrogen and COVID-19 symptoms: Associations in women from the COVID Symptom Study. *PLoS One*. 2021 Sep 10;16(9):e0257051. <https://doi.org/10.1371/journal.pone.0257051>
9. Green MA, García-Fiñana M, Barr B, Burnside G, Cheyne CP, Hughes D, Ashton M, Sheard S, Buchan IE. Evaluating social and spatial inequalities of large scale rapid lateral flow SARS-CoV-2 antigen testing in COVID-19 management: An observational study of Liverpool, UK (November 2020 to January 2021). *Lancet Reg Health Eur*. 2021 Jul;6:100107. <https://doi.org/10.1016/j.lanepe.2021.100107>
10. Tulloch JSP, Micocci M, Buckle P, Lawrenson K, Kierkegaard P, McLister A, Gordon AL, García-Fiñana M, Peddie S, Ashton M, Buchan I, Parvulescu P. Enhanced lateral flow testing strategies in care homes are associated with poor adherence and were insufficient to prevent COVID-19 outbreaks: Results from a mixed methods implementation study. *Age Ageing*. 2021 Jul 16:afab162. <https://doi.org/10.1093/ageing/afab162>
11. Vaselli NM, Setiabudi W, Subramaniam K, Adams ER, Turtle L, Iturriza-Gómara M, Solomon T, Cunliffe NA, French N, Hungerford D; COVID-LIV Study Group. Investigation of SARS-CoV-2 faecal shedding in the community: a prospective household cohort study (COVID-LIV) in the UK. *BMC Infect Dis*. 2021 Aug 9;21(1):784. <https://doi.org/10.1186/s12879-021-06443-7>
12. Crozier A, Dunning J, Rajan S, Semple MG, Buchan IE. Could expanding the covid-19 case definition improve the UK's pandemic response? *BMJ*. 2021 Jun 30;374:n1625. <https://doi.org/10.1136/bmj.n1625>
13. Oni L, Hawcutt DB, Buchan IE, Semple MG. Soft drinks can be misused to give false "false positive" SARS-CoV-2 lateral flow device results. *medRxiv* 2021.07.05.21260003; doi: <https://doi.org/10.1101/2021.07.05.21260003>



14. García-Fiñana M, Hughes DM, Cheyne CP, Burnside G, Stockbridge M, Fowler TA, Fowler VL, Wilcox MH, Semple MG, Buchan I. Performance of the Innova SARS-CoV-2 antigen rapid lateral flow test in the Liverpool asymptomatic testing pilot: population based cohort study. *BMJ*. 2021 Jul 6;374:n1637. <https://doi.org/10.1136/bmj.n1637>.
15. Buchan IE, Semple MG, Peto TE. Can rapid tests help ease Covid-19 restrictions? Infectious Diseases campaign on [www.globalcause.co.uk](http://www.globalcause.co.uk) distributed with the New Scientist magazine 25 Mar 2021: [http://issuu.com/mediaplanetuk/docs/infectious\\_diseases\\_8deed21b8e173e](http://issuu.com/mediaplanetuk/docs/infectious_diseases_8deed21b8e173e)
16. Fearon E, Buchan IE, Das R, Davis EL, Fyles M, Hall I, Hollingsworth TD, House T, Jay C, Medley GF, Pellis L, Quilty BJ, Silva MEP, Stage HB, Wingfield T. SARS-CoV-2 antigen testing: weighing the false positives against the costs of failing to control transmission. *Lancet Respir Med*. 2021 Jul;9(7):685-687. [https://doi.org/10.1016/s2213-2600\(21\)00234-4](https://doi.org/10.1016/s2213-2600(21)00234-4)
17. Buckle P, Micocci M, Tulloch J, Kierkegaard P, Parvulescu P, Thompson C, Spilsbury K, Allen AJ, Body R, Hayward G, Buchan I, Gordon AL. COVID-19 point-of-care testing in care homes: what are the lessons for policy and practice? *Age Ageing*. 2021 Sep 11;50(5):1442-1444. <https://doi.org/10.1093/ageing/afab101>
18. García-Fiñana M, Buchan IE. Rapid antigen testing in COVID-19 responses. *Science*. 2021 May 7;372(6542):571-572. <https://doi.org/10.1126/science.abi6680>
19. Setiabudi W, Hungerford D, Subramaniam K, Vaselli NM, Shaw VE, Wilton M, Vivancos R, Aston S, Platt G, Moitt T, Jones AP, Gabbay M, Buchan I, Carrol ED, Iturriza-Gomara M, Solomon T, Greenhalf W, Naisbitt DJ, Adams ER, Cunliffe NA, Turtle L, French N; COVID-LIV Study Group. Prospective observational study of SARS-CoV-2 infection, transmission and immunity in a cohort of households in Liverpool City Region, UK (COVID-LIV): a study protocol. *BMJ Open*. 2021 Mar 17;11(3):e048317. <https://doi.org/10.1136/bmjopen-2020-048317>
20. Johnson-León M, Caplan AL, Kenny L, Buchan I, Fesi L, Olhava P, Nsobila Alugnoa D, Aspinall MG, Costanza E, Desharnais B, Price C, Frankle J, Binding J, Working Group RT, Ramirez CL. Executive summary: It's wrong not to test: The case for universal, frequent rapid COVID-19 testing. *EClinicalMedicine*. 2021 Mar;33:100759. <https://doi.org/10.1016/j.eclinm.2021.100759>
21. Mina MJ, Peto TE, García-Fiñana M, Semple MG, Buchan IE. Clarifying the evidence on SARS-CoV-2 antigen rapid tests in public health responses to COVID-19. *Lancet*. 2021 Apr 17;397(10283):1425-1427. [https://doi.org/10.1016/s0140-6736\(21\)00425-6](https://doi.org/10.1016/s0140-6736(21)00425-6)
22. Daras K, Alexiou A, Rose TC, Buchan I, Taylor-Robinson D, Barr B. How does vulnerability to COVID-19 vary between communities in England? Developing a Small Area Vulnerability Index (SAVI). *J Epidemiol Community Health*. 2021 Aug;75(8):729-734. <https://doi.org/10.1136/jech-2020-215227>
23. Crozier A, Rajan S, Buchan I, McKee M. Put to the test: use of rapid testing technologies for covid-19. *BMJ*. 2021 Feb 3;372:n208. <https://doi.org/10.1136/bmj.n208>

24. Harrison EM, Docherty AB, Barr B, Buchan I et al. Ethnicity and Outcomes from COVID-19: The ISARIC CCP-UK Prospective Observational Cohort Study of Hospitalised Patients. SSRN; 2020. DOI: 10.2139/ssrn.3618215.  
<https://europepmc.org/article/ppr/ppr385492>
  25. Gupta RK, Harrison EM, Ho A, Docherty AB, Knight SR, van Smeden M, Abubakar I, Lipman M, Quartagno M, Pius R, Buchan I, Carson G, Drake TM, Dunning J, Fairfield CJ, Gamble C, Green CA, Halpin S, Hardwick HE, Holden KA, Horby PW, Jackson C, Mclean KA, Merson L, Nguyen-Van-Tam JS, Norman L, Olliaro PL, Pritchard MG, Russell CD, Scott-Brown J, Shaw CA, Sheikh A, Solomon T, Sudlow C, Swann OV, Turtle L, Openshaw PJM, Baillie JK, Semple MG, Noursadeghi M; ISARIC4C Investigators. Development and validation of the ISARIC 4C Deterioration model for adults hospitalised with COVID-19: a prospective cohort study. *Lancet Respir Med*. 2021 Apr;9(4):349-359.  
[https://doi.org/10.1016/s2213-2600\(20\)30559-2](https://doi.org/10.1016/s2213-2600(20)30559-2)
  26. Knight SR, Ho A, Pius R, Buchan I, Carson G, Drake TM, Dunning J, Fairfield CJ, Gamble C, Green CA, Gupta R, Halpin S, Hardwick HE, Holden KA, Horby PW, Jackson C, Mclean KA, Merson L, Nguyen-Van-Tam JS, Norman L, Noursadeghi M, Olliaro PL, Pritchard MG, Russell CD, Shaw CA, Sheikh A, Solomon T, Sudlow C, Swann OV, Turtle LC, Openshaw PJ, Baillie JK, Semple MG, Docherty AB, Harrison EM; ISARIC4C investigators. Risk stratification of patients admitted to hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: development and validation of the 4C Mortality Score. *BMJ*. 2020 Sep 9;370:m3339. <https://doi.org/10.1136/bmj.m4334>
  27. Jacob J, Alexander D, Baillie JK, Berka R, Bertolli O, Blackwood J, Buchan I, Bloomfield C, Cushnan D, Docherty A, Edey A, Favaro A, Gleeson F, Halling-Brown M, Hare S, Jefferson E, Johnstone A, Kirby M, McStay R, Nair A, Openshaw PJM, Parker G, Reilly G, Robinson G, Roditi G, Rodrigues JCL, Sebire N, Semple MG, Sudlow C, Woznitza N, Joshi I. Using imaging to combat a pandemic: rationale for developing the UK National COVID-19 Chest Imaging Database. *Eur Respir J*. 2020 Aug 13;56(2):2001809.  
<https://doi.org/10.1183/13993003.01809-2020>
  28. Andersson M, Low N, French N, Greenhalgh T, Jeffery K, Brent A, Ball J, Pollock A, McCoy D, Iturriza-Gomara M, Buchan I, Salisbury H, Pillay D, Irving W. Rapid roll out of SARS-CoV-2 antibody testing-a concern. *BMJ*. 2020 Jun 24;369:m2420. <https://doi.org/10.1136/bmj.m2420>
  29. Peto J, Alwan NA, Godfrey KM, Burgess RA, Hunter DJ, Riboli E, Romer P; 27 signatories. Universal weekly testing as the UK COVID-19 lockdown exit strategy. *Lancet*. 2020 May 2;395(10234):1420-1421. [https://doi.org/10.1016/s0140-6736\(20\)30936-3](https://doi.org/10.1016/s0140-6736(20)30936-3)
- E. *My 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.*
1. The knowledge-exchange and evidence synthesis functions of SAGE and its working groups worked well as intended with the constituents assembled. However, I think that the public health profession was under-represented in this constituency, resulting in a gap in SAGE advice on how biological, behavioural, and environmental aspects of a respiratory virus pandemic interact in terms of risks and risk-mitigations.



2. The production of data and intelligence feeding into SAGE was good within individual workstreams and perspectives, however, the overall intelligence lacked integrated public health analysis. Specifically, there was excellent infectious diseases modelling from SPI-M, alongside behavioural insights from SPI-B, but without a holistic public health perspective – the missing ‘SPI-S’ (systems) view. This integration came together eventually in loosely associated groups such as the Testing Initiatives Evaluation Board, but SAGE may have benefited from a stronger presence of public health professionals and researchers from the outset. For example, giving early warning that community rapid antigen testing is a complex intervention where one family member’s testing behaviour may affect the whole family’s Covid-19 behaviours – thus the scientific modelling of testing to identify single cases and break their onward chains of transmission independently of the community effect is flawed.
3. Data and intelligence were produced efficiently within groups (e.g. SPI-M) feeding into SAGE, or from individual organisations such as ONS, but whole-system, multi-agency data integration and combined intelligence production was lacking at national level, apart from a few national studies run by regions. I helped with ONS’ internal review into their Covid-19 response and am aware of where national agencies did and did not have access to data and/or contextual knowledge for understanding Covid-19 risks and mitigations at system-level. One two occasions – over NHS bed capacity modelling and later Covid-19 vaccination uptake – I was asked not to share data between the NHS and Public Health England – permission to do so would have led to more actionable information.
4. A lack of data-sharing by national agencies impeded policy-relevant evidence. For example, my research group requested data from NHS Digital and NHS England, to study the impact of ‘mass testing’ on hospital admissions for Covid-19. These requests were not granted. Instead, the necessary data came via NHS Digital’s contract with the University of Liverpool for supplying the relevant data into the Place Based Longitudinal Data Resource, after which we were able to complete a synthetic control analysis that the Joint Biosecurity Centre – who also struggled to access relevant data – did not deliver 8 months earlier. Given access to these data sooner, policies would have been better informed.
5. The evaluation team for the Liverpool ‘mass testing’ pilot faced obstacles of external academics and their associates writing to Liverpool MPs and schools and using social media, broadcast media, scientific media, and the press to oppose the pilot. Self-appointed expert groups put out press releases, to which the pilot team was forced to respond via Universities UK. These groups had strong views but were not sighted on the latest data and evidence, and their hypotheses were subsequently overturned by the data. The combative communications affected uptake of the pilot, particularly in schools. Similar communications arose again in Spring 2021, but with personal threats to me and others over the Events Research Programme surrounding opposition to “Covid passports”.
6. The Control of Patient Information notice by NHSX enhanced national and local dataflows and advanced pandemic responses. The benefits of this initiative were limited by NHS Digital demanding all data flowed through them and controlling what regions could and could not do with their data – creating parallel data processing that incurred delays and impeded pandemic insights and actions.
7. Funding from NHSX enabled Cheshire & Merseyside to develop and deploy (in 90 days over Summer 2020) the award-winning Combined Intelligence for Population Health Action (CIPHA, [www.cipha.nhs.uk](http://www.cipha.nhs.uk)) system that underpinned coordination

of the Liverpool 'mass testing' pilot and the world's first evidence on large-scale, voluntary rapid antigen testing to reduce the transmission of SARS-CoV-2. The University of Liverpool subsidised evaluation of this 'mass testing' pilot. Only partial funding was offered by the Department of Health and Social Care. The pilot was not covered by national Covid-19 research programmes. The support offered from PHE, ONS, HDRUK and Joint Biosecurity Centre was of limited value as these agencies lacked the contextual understanding and linked data necessary for robust evaluation. Requests by NHSX to NHS Digital to flow the necessary data into the evaluation team were not acted upon.

8. Working with the military was efficient and effective in deployment and evaluation of testing. At the mop-up meeting for the Liverpool Covid-SMART 'mass testing' pilot, chaired by the then Chief of Defence Staff, Sir Nick Carter, it was agreed that integrated intelligence such as CIPHA in Cheshire & Merseyside would be important for understanding poor vaccine uptake and informing outreach. The vaccination programme relied on the NHS Covid-19 Foundry datastore, and NHS colleagues were told not to share this information outside the NHS. This frustrated local authority public health teams and their charity and voluntary sector partners who are key to community engagement in tackling anti-vax misinformation.
9. The large-scale transmission of SARS-CoV-2 between acute hospitals and care homes was acted upon months later than it could have been. In mid-2020, before CIPHA was deployed, calls to link NHS Covid-19 testing data with social care records (e.g. via a relatively advanced system in Cheshire West for tracking admissions and discharges between hospital and care homes) were not heeded – and local public health teams were told that the within-hospital transmission of SARS-CoV-2 was an internal NHS matter and too sensitive for data sharing across local health & care systems.

*F. My 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.*

1. Ensure SAGE has sufficient representation from the public health profession in a public health emergency.
2. Where a region hosts national research for SAGE that affects local resilience, its local resilience forum should be able to call upon national resources, including data and funding, as needed. Here, data, including national comparative data, should flow under the direction of the Principal Investigator and a nominated, properly empowered national data governance lead.
3. Traditional emergency planning structures and processes, such as Gold/Silver/Bronze command operations, are highly effective in delivering urgent public health research at region/system level and could be used more by SAGE.
4. NHS Integrated Care Systems' Shared Care Records should link with UK Health Security Agency records, with appropriate privacy preservation, to deliver health protection operations that are fully responsive to local Gold Command without national dependencies/delays. These linked records and local commands are also needed for tackling the escalating problem of antimicrobial resistance.
5. Digital industry collaborations to deliver pandemic symptom monitoring, testing coordination and passporting can be improved between pandemic emergencies and the technologies used also for improving self-care and NHS access.



6. Diagnostics industry collaborations to deliver urgent public health testing can be prepared ahead of time with standard frameworks for research, development, evaluation, and procurement. Clear (cost-)utility functions can be defined now and used to full effect in emergency situations. For example, utility beyond diagnostic accuracy being 1/time to %appropriate actions following self-testing.
  7. Travel, logistics, and events industries could define the legal basis for data sharing, and technical interfaces, needed to link tickets and pandemic certification in real time, including test results and vaccination status. Regulation of these industries might require such pandemic preparedness.
  8. Misinformation that is harmful to public health could be tackled more effectively through deeper collaboration between public health and security researchers and services, working with digital industries under clear and progressive governance.
  9. The Department for Education could develop guidance on social media etiquette in public health emergency situations to turn the occasionally destructive debate seen in Covid-19 into constructive alternatives in future.
  10. Pandemic responses that create opportunities to advance British science, industry, and public services could be protected in the national interest more systematically through audits reporting up to GO-Science.
  11. An NHS national library of algorithms (recommended in Apr 2019 by me to NHSX as attached, then reinforced in the Goldacre review), should be established. If this had been available during Covid-19 it may have reduced the cost and eased the delivery of national surveillance (e.g. CO-CIN) and trials (e.g. RECOVERY).
  12. The current Data Saves Lives policy implementation would do well to prioritise the combination of data, intelligence, and actions across the health-social care divide, including public health laboratory data, antimicrobial resistance intelligence and the interdependency of NHS and social care workflows and staffing pressures.
- G. *A brief description of documentation relating to these matters that I hold (including soft copy material held electronically).*

Email and digital document stores. Most policy-relevant documents are already published. Two pre-publication reports and two policy advisory notes are attached.

With kind regards.

Yours sincerely,

**Personal Data**

Iain Buchan  
Chair in Public Health & Clinical Informatics  
Associate Pro Vice Chancellor for Innovation