

Witness Name: Dr Magda Bucholc

Statement No: 1

Exhibits:

Dated:

UK COVID-19 INQUIRY – MODULE 2C

WITNESS STATEMENT OF DR MAGDA BUCHOLC

I, **MAGDA BUCHOLC**, will say as follows: -

Background, qualifications, and my input into the pandemic in Northern Ireland

1. I worked as Research Associate in Healthcare Analytics for the EU INTERREG Centre for Personalised Medicine at Ulster University from 01/04/2018 to 31/07/2019, Research Associate in Health Analytics for the International Health Analytics Centre at Ulster University from 01/08/2016 to 31/12/2016, and Chief Data Analyst in Healthcare Analytics Ltd from 01/01/2017 - 31/07/2017. In these roles, I focused on the development of the research-based clinical approaches for optimizing clinical decision making and care for patients with heart disease, dementia, diabetes, acute kidney disease, and those undergoing emergency surgeries.
2. Furthermore, I supported information-based activities involving the collection, analysis, interpretation, and visualisation of large volumes of public health data originating from various NHS systems (Patient Administration System, A&E Symphony, NI Electronic Care Record, ITU/Critical Care, and Business Objects Enterprise XI system) and developed healthcare solutions to capture and transform the delivery of care. I also evaluated the effectiveness of control and preventative health measures and provided expert advice in the use of the public health information.

3. In 2019, I secured the Lectureship in Data Analytics at the School of Computing, Engineering, and Intelligent Systems at Ulster University. In this role I have developed the core competencies for a public health analyst including:
 - i) analytical/ assessment skills focusing on identifying and understanding health data, turning health data into information for action, addressing community health needs, and using evidence for decision making;
 - ii) communication skills through communicating public health data to the public and healthcare professionals, information making, and teaching;
 - iii) program planning skills through developing health strategic plans; and
 - iv) leadership skills through creating opportunities for multidisciplinary, collaborative research between healthcare organizations and academia.

4. From 01/06/2020 to 31/05/2022, I held an Honorary Research Contract with the Public Health Agency (PHA) to conduct analysis across disease surveillance, infectious disease modelling, and public health epidemiology and from 01/05/2020 to 07/02/2022, I was assisting the work of the Covid-19 Modelling Response Expert Group by utilizing mathematical models to estimate the Covid-19 transmission in Northern Ireland.

5. Starting from 01/12/2023, I joined the PHA as a Lead Epidemiologist. In my role, I am responsible for the design, development, and implementation of new regional surveillance systems and advise on the adoption of modern data processing methods. I have a record of securing research funding both as Principal Investigator and Co-Investigator of approximately £3.3M. My research was supported by funding from ESRC, ARUK, INTERREG VA, Department for the Economy, Science Foundation Ireland, HSC R&D Public Health Agency, Global Challenge Research Fund, and Ulster University Research Challenge Fund. As the NI representative on the British Standards Institution committee, I contributed to the development of a standard for safe and effective use of artificial intelligence in health and social care (CH/304/1).

6. I have a record of over 70 peer reviewed publications relevant to the field of public health. I've been a reviewer for journals across multiple disciplines (e.g., neuroscience, aging, epidemiology, computing, and engineering) including
 - i) The Lancet;
 - ii) Alzheimer's & Dementia: The Journal of the Alzheimer's Association;
 - iii) Age and Aging (Statistical Reviewer);

- iv) Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring;
- v) Expert Systems with Applications; and
- vi) BMC Bioinformatics.

7. I reviewed several grant/fellowship applications from Medical Research Council, EU Joint Programme, and The Royal National Institute for Deaf People. I've been a member of several professional societies, including Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART), Alzheimer's Research UK, and Royal Statistical Society and supported the wider research agenda through invited seminars and committee memberships (Royal Statistical Society NI Committee Member from 2019-2023).

Covid Modelling Group and other projects

- 8. My first engagement with the group occurred on May 1, 2020, following a request from Professor Cathy Gormley-Heenan, who served as the Deputy-Vice-Chancellor of Ulster University at that time. This initial contact was followed by a conversation with Professor Ian Young, Chief Scientific Advisor to the Department of Health Northern Ireland. As such, I cannot provide insights into the specific circumstances that led to the formation of the Covid Modelling Group.
- 9. I'm unable to provide details on how the Covid Modelling Group was initially established or how its members were identified, as my participation commenced at a later stage.
- 10. To my knowledge, the role of the Covid Modelling Group was to lead the way in charting Northern Ireland's response and roadmap amid the coronavirus pandemic. However, I'm not aware of who provided instructions or briefed the group on what modelling was required.
- 11. I am not aware of the specific details of the limitations of the modelling which had been used in Northern Ireland prior to the Covid Modelling Group being instituted.
- 12. To my knowledge, the Covid Modelling Group provided the weekly R number paper which was published by the Department of Health.
- 13. I am not aware of any specifics regarding the relationship between the Covid Modelling Group and the Strategic Intelligence Group.
- 14. I do not have knowledge of the circumstances surrounding the operational dynamics between the Covid Modelling Group and the Strategic Investment Board (SIB).
- 15. I'm unable to elaborate on the role of the SIB within the Covid Modelling Group.

16. I lack sufficient details to explain how the involvement of the SIB contributed to the work of the Covid Modelling Group.
17. I lack knowledge about the specifics of the formal arrangement between SIB, PHA and the Health and Social Care Board regarding the Covid-19 modelling. Given that I lack knowledge about the specifics of the formal arrangement between SIB, PHA and the Health and Social Care Board regarding the Covid-19 modelling, I cannot elaborate on how this agreement impacted the work of the Covid Modelling Group.
18. The Covid Modelling Group included representatives from the Public Health Authority. However, to my knowledge, PHA did not provide the Covid Modelling Group with the modelling outputs.
19. I cannot provide specific details to explain why modelling on an all-Ireland basis was not considered achievable because I am unaware of the exact content of the 'original' Terms of Reference for the Covid Modelling Group, including whether such a provision was included. As I cannot provide specific details to explain why modelling on an all-Ireland basis was not considered achievable, I am unable to identify the barriers to collaboration on modelling. As I cannot provide specific details regarding why modelling on an all-Ireland basis was not deemed feasible, I am unable to discuss the potential advantages of implementing such an approach.
20. I lack specific knowledge to address whether any actions were undertaken in either the Republic of Ireland or Northern Ireland to enhance collaboration in data collection or modelling as the pandemic evolved.
21. I do not have detailed information to confirm whether Northern Ireland relied solely on modelling provided by UK bodies, UK data, or a combination of both before the establishment of the Covid Modelling Group.

Sources of data

22. The extracts obtained from the Department of Health were used to produce modelling. I am not aware of the source of the hospital admissions and occupancy data. Data extracts I received came from the Department of Health. While no concerns regarding the reliability of this data were discussed with me, it does not mean that such concerns did not exist.
23. I was only provided with the following data on a regular basis:
- i) The number of reported tests for SARS-COV2;
 - ii) The number of reported individuals tested for SARS-COV2 Virus;
 - iii) The number of reported individuals with a positive laboratory test for SARS-COV2 Virus; and
 - iv) The number of reported deaths associated with COVID-19.
24. I am unable to comment on any other data sources the Covid Modelling Group had access to.
25. The Covid Modelling Group had access to data from care homes, including confirmed Covid-19 cases, and Covid-19-related deaths by setting. However, I do not possess sufficient knowledge to ascertain whether any modelling had been conducted using this data.
26. There might have been concerns raised regarding potential issues with data quality and completeness in Northern Ireland. I lack sufficient knowledge to address any issues or weaknesses related to the collection of data or the data itself in Northern Ireland for the purpose of modelling.
27. By synthesising data from multiple sources, the group aimed to produce comprehensive and accurate modelling to inform decision-making and public health strategies in the region. I lack sufficient knowledge to confirm whether the approach to utilizing various sources of information evolved over the course of the pandemic.
28. I provided the Covid Modelling Group with the R value and 7-day prevalence of active community cases, considering various scenarios based on different percentages of asymptomatic cases reported in the literature (i.e., 15%¹, 50%², 80%³⁻⁵ asymptomatic cases). References:
- i) Mizumoto K, Kagaya K, Zarebski A, Chowell G. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. *Eurosurveillance*. 2020;25(10):2000180.
 - ii) <https://hub.jhu.edu/2020/05/12/gigi-gronvall-asymptomatic-spread-covid-19-immunity-passports/>

- iii) Lavezzo E, Franchin E, Ciavarella C, Cuomo-Dannenburg G, Barzon L, Del Vecchio C, Rossi L, Manganelli R, Loregian A, Navarin N, Abate D. Suppression of a SARS-CoV-2 outbreak in the Italian municipality of Vo'. *Nature*. 2020;30:1-5.
- iv) Day M. Covid-19: four fifths of cases are asymptomatic, China figures indicate. *BMJ*, 2020.
- v) Ing AJ, Cocks C, Green JP. COVID-19: in the footsteps of Ernest Shackleton. *BMJ Thorax*. 2020.

29. As for its similarity to the models used by UK modelling groups, I cannot provide a definitive answer. While the SEIR framework is a standard approach used across various modelling contexts, the specific implementation and parameterization of the model may vary between different modelling groups. The details on how the parameters for the core model used by the NI Covid Modelling Group were determined or calibrated based on available data and assumptions were never shared with me.

30. Regarding the testing of the efficacy of this modelling approach, I am not aware of the specific methods or procedures used for evaluation. I do not recall this information ever being shared with me.

31. I lack the necessary information to explain how the work of the Covid Modelling Group intersected with SAGE's efforts to calculate the R value for Northern Ireland.

32. My role within the Covid Modelling Group primarily focused on assessing how many people, on average, will be infected by a single infected individual at a specific point in time during an epidemic.

33. My primary responsibility included estimating the time-varying instantaneous reproduction number (R_t) for Covid-19 transmission, which involved providing regular updates, typically on a weekly basis. These R_t estimates were generated to assess their alignment with the R number produced by the core model utilized by the NI Covid Modelling Group, aiming to identify any discrepancies and establish the accuracy of both sets of estimates. The framework I implemented was based on Cori et al1. This method only required case incidence data and the distribution of the serial interval (SI) to estimate R (per time step of incidence) over the course of an epidemic. The SI distribution was generated using a discrete gamma distribution. Estimates of R_t incorporated the uncertainty in the SI distribution parameters by integrating over a range of means and standard deviations of SI. References:

- i) Cori A, Ferguson NM, Fraser C, Cauchemez S. A new framework and software to estimate time-varying reproduction numbers during epidemics. *American journal of epidemiology*. 2013 Nov 1;178(9):1505-12.

34. The model scenarios were based on the total number of Covid-19 community cases and did not incorporate specific characteristics of the Northern Irish population, such as age distribution, comorbidities, or other demographic factors. As a result, while it provided a general framework for understanding disease spread, it may not have fully captured the unique dynamics and vulnerabilities present within the local population. I personally did not model the impact of NPIs on a Northern Ireland specific basis.
35. I do not recall participating in any discussions or analyses regarding whether Northern Ireland had a time lag compared to other parts of the United Kingdom in terms of transmission rates.
36. I was not present at the Northern Ireland Health Committee meeting on October 15, 2020. Therefore, I cannot confirm whether there was any indication during that meeting suggesting that modelling efforts had significantly underestimated the progression of the pandemic in Northern Ireland at that time.
37. My primary responsibility was to estimate the transmission dynamics of Covid-19. I did not primarily engage in elaborating on potential factors contributing to the spread of the virus. I lack sufficient knowledge to detail how the work of the modelling group influenced government decision-making in Northern Ireland, including direct interactions with Ministers. I cannot provide insights into how the work of the Covid Modelling Group was evaluated throughout the pandemic.
38. 2 Committee for Health Meeting Thursday 15 October 2020, available at: <https://niassembly.tv/committee-for-health-meeting-thursday-15-october-2020/>. Assessing the transparency of the Covid Modelling Group's role and activities requires specific criteria, which have not been provided. I do not have sufficient knowledge to confirm if the Covid Modelling Group conducted self-evaluations as to its role during the pandemic.
39. It is my opinion that the Covid Modelling Group could have benefitted from a broader representation of individuals with expertise in statistical modelling. A greater emphasis on recruiting individuals with specialized expertise in statistical modelling could have enhanced the group's capacity to address the complex challenges posed by the pandemic and facilitated a more robust and comprehensive approach to data analysis and interpretation.

Covid Data Tracker

40. The Covid-19 Data Tracker allowed members of the public to access a visual comparator of collated Covid-19 data from official government and health sources across the island of Ireland. The tracker reported cases at the local government district level in Northern Ireland and county level across Ireland, providing gender and age breakdowns of reported cases, growth rates and statistics per 100,000 of the population. The tracker also visualised changes in daily mobility by region and across different categories of places and activities using Google and Apple feeds.
41. While the Covid Data Tracker was designed to provide the public with access to Covid-19 data and insights into the daily situation on the island, the data presented was not utilized in the Northern Ireland pandemic response. This was due to concerns regarding potential issues with data quality and completeness.
42. I initially created the Covid-19 Tracker for Northern Ireland because no visual representation of the Covid-19 data was available for the public at the beginning of the pandemic (March/April 2020). The data used to create all visualizations initially came from the COVID-19 surveillance reports (in PDF format) published by the Public Health Agency on a daily basis. The Covid-19 tracker aimed to provide much needed Covid-19 information to the general public in a format that is easy to understand, digest and used for comparison across regions.
43. Shortly after the deployment of the Covid Data Tracker, the PHA stopped publishing their Covid-19 surveillance reports. Ulster University contacted the PHA to request further updates of Covid-19 data. The University's request, along with the offer of assistance, was passed on to the Public Health Agency's Head of Communications, the Health and Social Care Board's Head of Communications, and the Health Protection Department. However, the PHA was not in a position to make these numbers available at that time. The Covid Data Tracker figures were only updated after the official deployment of the Department of Health dashboard.
44. The Covid Data Tracker never sought to include data from care homes and other community settings.
45. I do not recall encountering any specific issues regarding the consistency, and comparability of the data between Northern Ireland and the Republic of Ireland.
46. The tracker reported cases at the local government district in Northern Ireland and county level across the island of Ireland, provided gender and age breakdowns of reported cases, growth rates, and statistics per 100,000 of the population. This information was mostly updated on a daily basis.

(3) Analyse immune cell and inflammatory responses in hospitalised and non-hospitalised SARS-CoV-2 positive cases and frontline healthcare staff (harmonising N. Ireland approach with existing previously funded approach planned at Trinity College Dublin).

(4) Investigate the relationship between host genotype, viral genotype, phenotypic and other data (as identified in environmental risk factor list above) with SARS-CoV-2 disease severity.

54. To the best of my knowledge, the outputs generated from COVRES were not available to the government in Northern Ireland as the pandemic progressed, primarily due to the lengthy process of data collection and analysis.

Challenges relating to the use and sharing of data during the pandemic

55. While I did not personally encounter any technical, legal, or cultural and organizational barriers related to data access, as I received the necessary data for modelling in a timely manner, it is possible that the accuracy and reliability of Covid-19 models and data-driven decision-making processes were affected by factors such as data quality and completeness.

56. In terms of recommendations, the Inquiry may wish to consider measures to enhance data governance frameworks, promote interoperability and standardization of health data systems, and facilitate greater collaboration and knowledge-sharing among relevant stakeholders. Additionally, efforts to improve data quality assurance mechanisms, enhance transparency and accountability in data-sharing practices, and invest in data literacy and capacity-building initiatives could help improve the use of data in pandemic preparedness and response efforts.

Statement of Truth

I declare that the contents of this statement are true and accurate to the best of my knowledge.

Personal Data

Date: 23 February 2024