Witness Name: Professor Michael Osborn
Statement No.: tbc
Exhibits: None
Dated: 10 March 2023

UK COVID-19 INQUIRY

WITNESS STATEMENT OF Professor Michael Osborn

I, Professor Michael Osborn, President of the Royal College of Pathologists, will say as follows: -

The Royal College of Pathologists (RCPath)

1. The Royal College of Pathologists ("RCPath") is a professional membership organisation with charitable status, concerned with all matters relating to the science and practice of pathology. It oversees pathologists and scientists working in 17 different specialties, which include cellular pathology, haematology, clinical biochemistry and medical microbiology.

2. Pathology is the study of disease and is the bridge between science and medicine. It underpins every aspect of patient care, from diagnostic testing and treatment advice to using cutting-edge genetic technologies and preventing disease. Pathologists play a critical role in research, advancing medicine and devising new treatments to fight viruses, infections and diseases like cancer.

3. 95% of clinical pathways rely on patients having access to efficient, timely and cost-effective pathology services. Pathologists play an important role in disease prevention, diagnosis, treatment and monitoring. If you have ever had a blood test, cervical smear or tissue biopsy, a pathologist will have been involved in your care.

4. RCPath develops the standards for pathology education, training and research, and guidelines for pathology practice, to improve patient care and safety.

The UK's emergency and pandemic planning, preparedness and resilience

5. The UK's pandemic preparedness at the time the Covid-19 pandemic struck appears to have been governed by the UK Influenza Preparedness Strategy 2011. This strategy has a very narrow focus and was informed by limited expert engagement. As a result it doesn't provide the necessary safeguards for the UK. Furthermore, the last large-scale exercise undertaken to test this strategy prior to the Covid-19 pandemic appears to be 'Exercise Cygnus', held over three days in 2016.

6. The report of 'Exercise Cygnus' makes little reference to diagnostics, and limited references to the improvements required for the 'management of excess deaths'. 'Exercise Cygnus' focused on the clinical issues relating to an influenza pandemic, failing to consider the diagnostic or system requirements. This meant key organisations such as RCPath and the Institute of Biomedical Science (IBMS) were not involved or consulted, nor was the UK Clinical Virology Network (key in this because most pandemics are viral). The exercise therefore missed the opportunity to gain valuable insights into the potential gaps in, and risks posed by, the existing strategy, and so how these gaps might be bridged and risks might be avoided or mitigated. If the exercise had involved the right people and had the report recommended the appropriate corrective action, thousands of lives could have been saved in the Covid-19 pandemic.

7. In terms of resilience, the historic inadequacy and lack of investment in UK infrastructure (human, physical, digital) compounded the situation.

8. The UK also appeared not to accept evidence that was coming from countries where the pandemic was more advanced, such as Italy. Had it taken the data and learning from these countries, the UK's response could have been mobilised more quickly and effectively.

Engagement with RCPath

9. RCPath considers that there should have been stronger engagement with the pathology community during the pandemic. We believe this would have saved lives, saved money, established a stronger foundation for future pandemics and reduced the scale of backlogs NHS staff are now facing.

10. In the early phase of the pandemic pathology expert advice would have ensured a much better response in relation to the:

10.1. **Identification and characterisation of the infectious agent**: Medical virologists and microbiologists (specialists within pathology) play a crucial role in this, the first step in managing a pandemic. They diagnose infections, identify and classify the responsible infectious agents, develop tests for those infectious agents and establish sensitivity of pathogens to drug therapy. The approach to identification and characterisation depends on the infectious agent itself but can include microscopic examination of specimens with special stains, antigen detection, and nucleic detection by molecular assays. Genomic amplification assays amplify nucleic acid sequences before detection, increasing the sensitivity of nucleic acid-based tests. Real-time polymerase chain reaction (PCR) allows genomic amplification to happen at the same time as the detection of amplified products. Serologic and molecular techniques are necessary in typing infectious agents. They help us understand the causes of health outcomes and diseases in populations and the pathogenesis, disease progression and causality between a disease and microbial agent.

With regards to the Covid-19 pandemic, virologists were able to develop, and put into service, reliable SARS-CoV-2 ribonucleic acid (RNA) testing by polymerase chain reaction (PCR) and other molecular methods across the UK within days of the emergence of the pandemic. Medical microbiology laboratories across the country rapidly followed suit.

Virologists established widespread world-leading capacity in RNA testing on a mass scale within the Lighthouse Laboratory network (at it's peak >800,000 PCRs per day in UK) utilising artificial intelligence to interpret PCR curves. The samples and RNA extracts were used for genomic testing across the UK which allowed better understanding of transmission dynamics and the detection of new variants very early. Laboratory-generated mass testing RNA test results were made available to patients, GPs, Public Health and epidemiologists in real time, which guided government policies to evolve with the pandemic and document real-time vaccine effectiveness earlier than many other countries, leading to the "Living with COVID" policy.

Haematologists (specialists within pathology) rapidly and effectively responded to the concerns around thrombosis which emerged after the vaccination effort started.

10.2. **Generation and evaluation of diagnostic tests for the infection**: In an earlier stage of test development it may be crucial to know whether a test can differentiate diseased persons from healthy controls, although this tells us little about how a test will perform in practice. Later stages focus on the diagnostic accuracy of a test in a clinically relevant situation. However, a test that accurately distinguishes between patients with and without a certain condition may still have little effect on patient outcomes. Therefore, controlled trials of testing may be needed, as well as post roll out monitoring.

10.3. **Drafting of simple clinico-pathological case definitions or indicators of the new infectious disease:** Case definitions are sets of standard criteria used to help determine if a person has a particular infectious disease. They usually consist of clinical criteria such as confirmatory lab tests (where available) or recognised and documented symptom combinations.

10.4. **Advice provided on health and safety issues around the treatment of patients with the disease:** Pathologists and laboratories developed and provided vital health and safety advice in significant amounts and were best placed to provide this information.

10.5. **Advice on resource requirements, test numbers, staffing requirements, mortuary capacities:** Pathologists, laboratory staff and other expert groups such as anatomical pathology technologists (mortuary staff) developed and provided vital advice in these areas in significant amounts and were best placed to provide this information. Without their input no successful pandemic response would have been possible.

11. In the middle phase of the pandemic pathology input was integral in the following:

11.1. **Roll-out and performance of diagnostic tests:** Although reliable high-quality PCR diagnostic tests were rapidly established, there was not the diagnostic laboratory capacity to carry testing out at the scale required. A lack of suitable equipment and reagents meant testing could not be scaled up rapidly enough. Chronic

underinvestment meant clinical labs did not have the equipment and facilities needed to ramp up.

At the outset, government efforts to increase testing capacity did not give due regard to the importance of effective testing pathways and appropriate prioritisation of testing. The focus was on performing huge numbers of tests against numerical targets, with constantly changing guidance regarding who should be tested, and little apparent thought of how to use the available capacity to best effect by prioritising tests which would make the most clinical difference. Consequently, the testing capacity which did exist during the ramp-up was used inefficiently. Lessons could have been learned from the H1N1 (swine flu) pandemic in 2009 where a similar situation occurred.

Later in the pandemic, once reagent and equipment supply had been established and stabilised, many NHS clinical diagnostic laboratories (and also universities) could have had capacity to carry out more testing than they did, but testing was outsourced to private laboratories which were not all subject to the same high standards of quality assurance routine in NHS laboratories. Use of existing clinical labs (and of university labs and skilled staff), would have been much more financially efficient. There was a missed opportunity to invest this resource in equipment and infrastructure for existing NHS labs, with huge resources going to temporary, often lower-quality facilities in the private sector instead.

Lack of front-line clinical virologists and clinical microbiologists (specialists in pathology) in government advisory groups, decision making and operational bodies during the initial phase of the pandemic led to technical problems and delays in setting out practical plans for testing.

In addition, staffing resources were depleted in NHS facilities due to Lighthouse laboratories offering much higher wages resulting in an exodus of highly qualified, experienced and trained staff to private facilities. There are still ongoing impacts from this.

11.2. **Research into the pathogenesis of the disease:** There has been a historic lack of interconnectivity which has hampered sharing of the clinical record (in terms of both investigations and clinical data) for decades, during which time different sections of the health service, and different organisations within each section have developed

their own systems for data management. The rush towards paperless systems has resulted in a loss of much richness of the clinical record with resultant risk to patient safety. This lack of connectivity was aggravated by the diverse provision of laboratory services during the pandemic, with resultant problems, particularly of quality surveillance.

11.3. **Running surveillance programmes to monitor through blood, serology and other tests response of individuals & populations to infection & vaccination:** Pathologists were vital in delivering the expertise underpinning the use of post infection serum in patients with acute infections.

12. In the middle phase of the pandemic, pathologists, laboratory staff and other expert groups such as anatomical pathology technologists (mortuary staff) and academic units developed and provided vital advice in these areas in significant amounts and were best placed to provide this information:

12.1. Advice on testing strategies for patients, healthcare providers and the general public. Detailed description of the clinical pathology, i.e., what the infection does to tissues, organ and how it results in disease and mortality

12.2. Development of blood, serology & other tests to facilitate monitoring of infection rates, severity & other parameters in individuals & populations

12.3. Through such monitoring, facilitating accurate modelling of the pandemic & possible responses to it, including the vaccination programme

12.4. Advice on health and safety issues around the acquisition, processing and diagnosis of routine surgical pathology samples, including those which have to be sectioned as frozen sections (e.g., intraoperative diagnosis, muscle biopsies)

12.5. Advice on health & safety issues around the post-mortem examination of patients who die with the disease

12.6. Providing guidelines on how to perform autopsy examinations on those who die of and with the infection, recommending what diagnostic samples to take

12.7. Advice on safe practices for those who remove and dispose of cadavers that contain the infection

12.8. Diagnosing through autopsy who has died because of the infection versus with the infection; evaluating the impact of co-morbidities on the outcome of infection

12.9. Contributing to vaccine development, including safety studies in animals and humans

12.10. Advising on resource requirements, test numbers, staffing requirements, mortuary capacities

13. In the late phase of the pandemic, pathologists, laboratory staff and other expert groups such as anatomical pathology technologists (mortuary staff) and academic units and research scientists conducted post mortems and assessed treatments and vaccines and obtained data and information in these areas in significant amounts and were best placed to provide this:

13.1. Monitoring, through autopsy, adverse effects of treatments and vaccines against the infection
13.2. Eternal population surveillance for the infection, in the living and the dead
13.3. Advising on testing strategies for patients, healthcare providers and the general public

14. We also believe greater engagement in the late phase of the pandemic was necessary with the pathology profession in relation to:

14.1. **Monitoring through the autopsy the potential excess deaths from other causes as the pandemic impacts on normal diagnostic and life-saving therapeutic procedures:** Coroners and the coroners services together with Medical Examiners in some areas worked with pathologists and anatomical pathology technologists (mortuary staff) to monitor the causes of death during the pandemic.
14.2. **Veterinary pathology study of possible sources of the infection in the wild and how they transmitted to humans:** Veterinary Pathologists studied these areas and provided data on the relationship of the pandemic to animal disease. Without their input no successful pandemic response would have been possible

Consideration of pre-existing inequalities and vulnerabilities

15. The UK Influenza Preparedness Strategy 2011 references an equality impact assessment having been completed, but whilst the strategy is still publicly accessible, the equality impact assessment is not, so it is very difficult to ascertain how robust this assessment was. In many of the framework documents published subsequently, a cursory reference is given:

'Promoting equality and addressing health inequalities are at the heart of NHS England's values. Throughout the development of the policies and processes cited in this document, we have:

- *Given due regard to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant protected characteristic (as cited under the Equality Act 2010) and those who do not share it; and*
- *Given regard to the need to reduce inequalities between patients in access to, and outcomes from healthcare services and to ensure services are provided in an integrated way where this might reduce health inequalities.'*

16. In reality, the outcomes reported during the Covid-19 pandemic suggest the inequalities and vulnerabilities were incompletely assumed. Had they been foreseen accurately, specific groups may have been treated differently (like did occur for immune supressed populations, for instance). Similarly, investment in contingencies around diagnostics, track and trace, healthcare capacity in the community and hospitals may have followed.

17. Aside from the impacts during the pandemic, the very significant backlog issues currently facing NHS services are exacerbating health inequalities for all areas of the population with many people struggling to reach the appointments they need or facing unacceptable delays.

Communications from UK Government

18. It is our view that there was a lack of clarity from Westminster Government at times, in contrast to the more candid briefings made available through the Scottish Government, in particular to members of the public. It is our view that this was in part down to particular individuals, such as the National Clinical Director of the Scottish Government.

Trainees

19. Whilst trainees have been given opportunities through the pandemic, the reduction in subspecialty cases for histopathology trainees meant that there was less material to learn from, and the case mix was different, impacting their learning. The shutting of diagnostic functions in the NHS meant patients were not investigated. As well as delayed

diagnoses for patients and the negative consequences for these people, trainees also no longer had access to learning opportunities that stem from diagnostic interventions. As a result, training has been lengthened to enable catch up experience, slowing the rate of production of trained specialists. This is detrimental to services who rely on trained people to enter the service especially in pathology specialties which had already fewer trainees than the number needed to provide expanding services.

20. There were also challenges for trainees in undertaking autopsy case number, which is particularly worrying given the rapidly decreasing numbers of trainee pathologists interested in this vital area of work.

21. Education itself was also disrupted; high-stakes examinations were deferred in the first half of 2020, courses were cancelled, teaching methods altered, and educators were less available. In fact, many of our trainees were themselves redeployed to work on Covid-19 wards – a stressful experience that required all of their attention and all of our support. The impact on the wellbeing of junior doctors cannot be underestimated.

22. The IT infrastructure required to support remote teaching during the pandemic was insufficient, leading to reduced levels of engagement and learning.

23. Worryingly, wellbeing was significantly impacted during the pandemic, with some trainees reporting that they want to leave the specialty because of it. This will have significant impacts on a specialty which is already struggling to meet demand.

The Department of Health and Social Care's 'Technical report on the COVID-19 pandemic in the UK'

24. The report makes no mention of pathology, diagnostics or laboratories. Testing is mentioned several times but the report ignores the thoughts, knowledge, skills and actions that are required to enact "testing".

25. There is some content in the report about infection prevention and control but nothing about how the infection is diagnosed effectively in a population so that prevention and control can follow. Infection prevention and control requires understanding of the virus and its natural history, and without pathology that is not possible. The lack of diagnostic facilities available currently, coupled with the need for sophisticated technology making this a significant challenge, which isn't even alluded to in the report.

26. There is a failure in the report to recognise the impact of the pandemic on the day-to-day work of laboratories in the report. There are huge backlogs of patients with malignant or potentially malignant diagnoses which resulted from the diversion of the NHS in pandemic. The effects on morbidity and the consequent workload on laboratory staff is aligned with increased work for GPs and hospitals. We already see this in terms of the pressures on primary care across the UK. Capacity issues are thus present across the system, supporting current claims around the lack on investment in the NHS. Nowhere is this more apparent than in laboratory diagnostics.

27. The Demand Optimisation Working Group in Scotland, led by Professor Bernie Croal, tracked the decline in diagnostic biopsies of cancer and other conditions as well as the fall off in routine disease monitoring., The graphs are spectacular and forecast the backlog we now see. Expertise from groups like this were not properly considered before the pandemic hit, nor have they been since.

Lessons to be learned

Capacity

28. Hospital capacity, staffing levels and diagnostic reserves were major barriers to the UK Government's ability to effectively manage the Covid-19 pandemic and protect the public. These issues were mitigated to some extent by the goodwill and reserves of NHS staff and volunteers. We are now faced with further challenges in these areas post-pandemic, impacting our resilience for any future pandemics. Hospital capacity has decreased even further as compared with pre-pandemic capacity owing to the elective care and cancer backlogs. The efforts of healthcare staff and the voluntary sector were remarkable and the goodwill, dedication and immense hard work shown by staff should be applauded, particularly in facing a virus of unknown capabilities. But we are now facing a situation of increased risk of, and actual, burnout, increased numbers of staff leaving and not enough being done to focus on retaining staff in their roles through improving working conditions. The pressure has not eased for anyone in pathology since Covid-19 numbers decreased, as diagnostic reserves are battling backlog demand.

29. Given what we've seen happen to healthcare services during the Covid-19 pandemic, it has become clear that we need to establish the reserves to provide a continued, resilient, high quality pathology testing service for routine fluids, biopsy samples, etc in

any future pandemics. Many laboratories had unnecessarily shut down or vastly reduced their routine services, leading to backlogs, breach of agreed turnaround times, and as a result, delayed treatments. Decisions were made by middle-management in hospitals or pathology departments, without clinical expertise. The lack of sufficient workforce has really been showcased by the struggle that pathology is facing at the moment. The government needs to focus on provisioning for a properly funded and staffed NHS which will help ensure that it is better equipped and prepared for such medical emergencies in the future. Prevention is better than cure.

30. During the pandemic we raised the need for increased post-mortems of Covid-19 patients to improve the understanding of the disease. There are very significant challenges with capacity for post-mortems in the UK which have been further exacerbated by the lack of opportunities for trainees to engage in post-mortems during the pandemic. Consideration should be given to building resources and safeguards to support increased post-mortems into the UK's planning for future pandemics. They are fundamental to our understanding of new diseases.

31. The increased system capacity that was enabled by the creation of lighthouse/mega labs has been eroded as these are dismantled post-pandemic. Whilst there may be some organisational memory available for future pandemics, the labs themselves would need to be built from scratch, costing time and resources. Any organisational memory should be captured so it is not lost over time, and learning taken into account when formulating guidance on any future development. In particular, the training, and use, of individuals who came forward to support these labs. We know many of our trainees were asked to pause their clinical work and be redeployed to these labs for training, never to be called upon to provide valuable services.

32. Clinical virologist training program in the UK needs improvement. The number of consultant Virologists is on the decline, and most are in the twilight of their career with no sustained and robust succession plan in place. An area of real concern for pandemic preparedness in the future and one which needs to be addressed immediately as it takes many years to complete specialty pathology training.

Digital infrastructure

33. Electronic referral and messaging systems were vital during Covid-19 owing to the increased and urgent communication required. We saw rapid increases in the use of

digital pathology, with many viewing images and sample analyses remotely. This has huge benefits to patients, and it is our view that it is an area which requires further investment and developed to fully realise its capabilities.

34. As well as increases in the use of digital pathology, we also saw increased use of decision support tools and AI supporting faster diagnosis and better effectiveness of non-consultant grade colleagues. There is enormous potential in this for the future, and if sufficient investment is made, we'd see a much swifter and more effective response across healthcare in any future pandemic.

35. Digital infrastructure varies across the UK though, and in some cases is often simply obsolete. This created significant challenges and inequalities during the Covid-19 pandemic and continues to now. It needs to be addressed urgently.

Data and intelligence

36. The NHS long term plan states that 'without access to timely and accurate data we cannot maximise the opportunities to improve care for all patients'. We have never seen the impacts of this more than during the Covid-19 pandemic, which exposed the huge gaps in the interoperability, accuracy and accessibility of data. This meant that:

    - the sharing of lab results was slower than it should be;

    - there were challenges with integrating lab results with patient records; and

    - data aggregation across the country wasn't possible without significant investment, delaying public health officials gaining access to case numbers, testing number and vaccination rates.

37. It is also our view that the UK Government should focus on taking data and experience from other countries and building on their learning in future pandemics. It felt at times during the Covid-19 pandemic that the UK Government was reluctant to consider the experience of other countries, more advanced in the pandemic. This led to poor outcomes for many Covid-19 patients in the UK which were entirely avoidable.

Communication

38. The UK Government and healthcare professionals have lost the public confidence battle, with large parts of the population not trusting the philosophy of lockdowns, vaccinations, mask wearing or other public health measures if we ever needed to employ them again. This will limit such actions in future pandemic responses. Education needs to happen and trust needs to be built. Engaging and collaborating with experts to avoid poor decisions, missed opportunities and unnecessary waste of resources.

39. Establishing a more robust communication strategy to ensure messaging and tone maintains trust in Government both by healthcare staff and the general public, would be vital in future pandemics to avoid some of these challenges.

Infection control

40. Infection control is a clinical area in which Medical Microbiolgists and Virologists play a significant role. Their advice and guidance is fundamental in this regard, and they should be engaged fully in preparing for, and managing, pandemics.

41. The challenges faced in relation to personal protective equipment (PPE), hospital bed availability, discharge policies and testing strategies were significant and planning needs to take place for how this would be managed in the future.

42. Infection control efforts were severely hampered by inadequate stocks of PPE putting infection prevention and control teams in an impossible position when trying to properly carry out their duties. The PPE produced via new contracts with the government were inadequate and not fit for purpose, resulting in huge wastage and compounding the problem of lack of PPE. This needs to be reflected on for future pandemics.

43. There were delays in roll-out of testing and it was centralised for longer than it should have been. Eventually, we saw a hub and spoke model facilitating faster roll-out and increase in testing capacity in England and Scottish labs linked in networks with specimens sent where there was capacity. The key though, regardless of the specifics of the approach, is ensuring the right person is processing the right test using the right resources. There needs to be capacity to expand at scale quickly, and reduce down as required. Also vital is that test results are quickly and effectively sent to a patient's record. Failure to link test data to patient records was a huge issue during the Covid-19

pandemic, although the linkage was made sooner in Scotland, and there is learning to to gain from their approach.

44. A better plan establishing regional hubs that tests could be rolled out to and from regional centres to local centres in a hub and spoke model would facilitate a faster roll-out and increase in testing capacity that was required early during the pandemic e.g. to facilitate testing for care homes. That would leave the national reference lab to concentrate of assuring quality performance of the diagnostic tests.

45. New guidance on testing and infection control was frequently released late on Friday evenings, making it very difficult for virology, microbiology and infection control teams to implement changes rapidly. Engagement with key experts needs to take place in future pandemics to avoid unintended consequences like these.

46. Patients with immune deficiency (who would be seen by both haematologists and immunologists, among others) are a group who continue to be more likely to have adverse outcomes with Covid-19 despite the advances in vaccines/treatments (better than before but still worse than an otherwise healthy person). They continue to feel worried about Covid-19 and feel "left out" by most policy decisions. Also, there are still limited diagnostics to evaluate how well protected they are from SARS-CoV-2. Careful consideration needs to be given to this group to ensure they are safeguarded in the future.

Redeploying healthcare staff

47. Healthcare professionals, including trainees, were very willing to help in any way they could with the Covid-19 pandemic. However, many simple steps were not followed, creating unnecessary stress and challenge for them. In future, healthcare professionals being redeployed would benefit from:

    47.1. Better communication about where, when and timescales for the period of redeployment.

    47.2. Clear information about what their roles and responsibilities will be.

    47.3. Supporting them to get whatever training they need to make them feel able to undertake the work they will be doing.

47.4. Providing a supervisor so they have someone to turn to for advice etc.

47.5. Clear guidance regarding where they stand with regards to their medical indemnity should something go wrong

47.6. An appreciation that redeployment may mean being in clinical scenarios (e.g. frontline medical services) that many have not faced for many years – any communication about this should therefore take into consideration the understandable fears, concerns and uncertainty experienced by staff.

Vaccination programme

48. Some of our members who trained as vaccinators were never contacted or asked to help following their training. There were many examples of similar situations where retired staff were willing and able to help but were not approached or not given an avenue to do so.

49. Careful communication about vaccines is also needed, taking into consideration that there are many groups in society who may have concerns about them – communication tended to be very reactionary rather than being prepared for this inevitability.

Resources

50. We have had feedback that the RCPath webinars delivered during the pandemic during this period were excellent and really helped to provide further information about the virus and the latest information that was being published about this. However, more things like this should be done by the government with greater accessibility for the general public too. Communication is so important, and because of the reactionary nature to everything that was happening, this aspect was frequently neglected and therefore generated more anxiety.

Other key bodies

51. The Institute of Biomedical Science (IBMS): the leading professional body for scientists, support staff and students in the field of biomedical science. The organisation is dedicated to the promotion, development and delivery of excellence in biomedical

science within all aspects of healthcare, and to providing the highest standards of service to patients and the public.

52. The Clinical Virology Network (CVN): consists of a linked and co-ordinated group of laboratories distributed in all major centres throughout the UK and Ireland. The aim of the CVN is to promote the interests of clinical virology, and its medical and laboratory practice in the United Kingdom and Ireland. The CVN provides evidence-based and practical virological advice on all aspects of viral infections; helps to establish and maintain the standards of practice amongst its membership and promotes a uniform approach to surveillance; a rapid and considered response to virological emergencies; centrally agreed protocols for the management of viral infections and best laboratory practice; an education and training resource and undertakes related activities.

53. National Demand Optimisation Group, Scotland: A multi-disciplinary group comprised of individuals from the main diagnostic disciplines within Laboratory Services and Radiology, the Scottish Government, NHS National Services Scotland and the National Managed Diagnostic Networks (NMDNs).The Scottish Government Healthcare Science Officer has commissioned the work, Scottish labs teams provide the expertise, and NSS provide the resource and methodology to ensure improvements can be replicated and sustained

Statement of Truth

I believe that the facts stated in this witness statement are true. I understand that proceedings may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief of its truth.

Signed: Personal Data

Dated: 09/05/2023