

UK Covid-19 Inquiry

Module 7: Test, Trace and Isolate

Statement by Public Health Scotland in response to Request for Evidence Ref M7/PHS/01

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1. Introduction to Public Health Scotland

1.1 Purpose

- 1.1.1 Public Health Scotland (PHS) was launched on 1 April 2020 to protect and improve the health and wellbeing of people in Scotland and reduce health inequalities. It does this by working across a wide range of topics and settings with many partners and stakeholders, including national and local government, NHS boards, other public bodies such as prison and police services, academia, and the third sector.
- 1.1.2 PHS shared a detailed Corporate Narrative (PHS7/001 INQ000108544)¹ with the UK Public Inquiry in January 2023. This sets out the context in which PHS operates, PHS's joint accountability to the Scottish Government and the Convention of Scottish local authorities (COSLA), the general structure of PHS, an explanation of its responsibilities, its governance, an explanation as to arrangements for its funding, how it fits into the wider NHS structures within Scotland, the background as to how PHS came into being, and how staff were transferred across from the legacy bodies. This introduction provides a summary of the Corporate Narrative.

1.2 Establishment context

- 1.2.1 The creation of PHS was an outcome of the Public Health Reform (PHR) programme which had identified the need for stronger national leadership for public health and a 'de-cluttering' of the public health landscape. Recommendations around the optimal arrangements for PHS were developed and were taken forward through the development and implementation of a Target Operating Model (TOM) (PHS7/002 INQ000183552).²
- 1.2.2 The TOM set out how all the parts of the new organisation would work together to support and enable the wider public health system to deliver the reform programme's ambition for PHS from April 2020, which was to:
 - Provide strong public health leadership and lead in a collaborative way.
 - Take a whole system approach with an external focus.
 - Have a clear focus on supporting local systems and play a key role in enabling and supporting delivery at a local, regional and national level.
 - Be intelligence, data and evidence led.

¹ Public Health Scotland. Covid-19 Public Inquiries: PHS Corporate Narrative. January 2023

² Scottish Government / COSLA. Target Operating Model version 2.0. May 2019

- Be innovative and find new ways of doing things.
- Be visibly a new and different organisation.
- 1.2.3 PHS brought together three legacy bodies. These were NHS Health Scotland (a national health board), and the two components of the Public Health and Intelligence (PHI) Strategic Business Unit of the national health board NHS National Services Scotland (NSS): Health Protection Scotland (HPS) and Information Services Division (ISD). Prior to the formation of PHS on 1 April 2020, the national public health response to Covid-19 and support for Scottish Government decision-making was provided by HPS. PHS has endeavoured throughout this statement to adequately reflect this early period, referring to 'HPS' as opposed to 'PHS' where appropriate.
- 1.2.4 All staff and functions from the legacy bodies transferred across to PHS under the Transfer of Undertakings (Protection of Employment) Regulations 2006 (PHS7/003 -INQ000147861)³ with two exceptions: the Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) function and ARHAI staff that were part of HPS remained within NSS, and a number of corporate services staff from NHS Health Scotland transferred to NSS under the shared services arrangement.
- 1.2.5 The Scottish Government and COSLA set out their ambition for PHS to provide an authoritative, credible, independent voice for public health based on evidence and professional judgement in the consultation carried out during the development of the new organisation (PHS7/004 INQ000147835).⁴ PHS was to:

'Provide a credible, independent voice based on evidence and professional judgement, that can objectively assess and comment on the likely impact, benefits and risks to the public's health and wellbeing of policy proposals.'

PHS has fulfilled this ambition in several ways since its inception and has provided a strong and respected voice for the public's health in Scotland. The benefits of the creation of one unified public health agency were immediately apparent when PHS was launched at the outset of the pandemic. This is discussed in Chapter 2.

1.3 Joint accountability of PHS

1.3.1 PHS is jointly accountable to national and local government. This means that PHS is sponsored both by the Scottish Government and by COSLA (PHS7/005 -

³ National Archives. The Transfer of Undertakings (Protection of Employment) Regulations 2006. 2006.

⁴ Scottish Government / COSLA. New national public health body 'PHS': consultation. May 2019.

INQ000235097),⁵ which represents the views of Scotland's 32 local authorities to central government. This arrangement is unique amongst health boards in Scotland.

1.3.2 PHS is distinct from national and local government, with the operational autonomy to advise and support government, local authorities and the NHS in an independent manner. As an NHS board within NHS Scotland, PHS is required to operate within the same governance and accountability frameworks set by the Scottish Government as other NHS boards (PHS7/006- INQ000235173).⁶

1.4 Establishment

- 1.4.1 PHS was launched on 1 April 2020. PHS had 1,143 members of staff on day one.
- 1.4.2 At its inception, PHS had three directorates and one service area as shown below. All staff were allocated to one of the four areas for day one. The Chief Executive, three Directors and the Head of Strategy, Governance and Performance together made up the Senior Leadership Team (SLT).



- 1.4.3 The responsibilities of each area were as follows:
 - The Clinical and Protecting Health directorate's purpose is to protect the people of Scotland from infectious and environmental hazards; enable high-quality clinical and public health knowledge, research and innovation; and improve clinical and public health practice by using audits at a national and local level.
 - The Data and Digital Innovation Directorate's purpose is to harness the power of innovation and data science to transform, expand and release the potential of our

⁵ COSLA. About COSLA. Accessed February 2023.

⁶ Scottish Government. Public Body Guidance. Accessed January 2023.

data and information assets in order to lead a data driven approach to improving public health outcomes nationally and locally.

- The Place and Wellbeing Directorate's purpose is to provide world class evidence, data and public health expertise to drive improvements in the health of the Scottish population. This includes areas such as the economy and poverty, mental wellbeing, and healthy and sustainable places.
- The Strategy, Governance and Performance⁷ service area (now a directorate) purpose is to provide critical internal and external functions for the organisation. With a responsibility for strategic planning, performance, people and communications, this directorate leads, drives and supports the organisation to deliver, with impact, the ambitious transformation programme.

1.5 Funding arrangements

- 1.5.1 The Scottish Government funds the NHS in Scotland, including PHS. Where additional funding was required to deliver the Covid-19 response, NHS boards were asked to develop a Business Case and quantify the financial impact. It was made clear to PHS in an email from Richard Foggo, Director of Population Health and Director of Covid-19 Policy and Coordination in the Scottish Government, that additional funding would be provided and that concerns about resources should not be a hindrance to the effective delivery of the pandemic response.
- 1.5.2 PHS submitted a Business Case (PHS7/007 INQ000147530)⁸ to the Scottish Government in October 2020 setting out the additional resource PHS estimated would be required to deliver an effective Covid-19 response. This totalled £11.3 million and covered areas including:
 - Additional staff resources, mainly in Health Protection and Data Analytics
 - Digital Transformation
 - Genomics
 - Marketing campaigns
 - National Contact Tracing
 - School Surveillance
 - Serology

⁷ The Strategy, Governance and Performance Directorate was initially a service area rather than a directorate.

⁸ Public Health Scotland. Additional Covid-19 Funding Business Case. October 2020

- 1.5.3 As a result of this Business Case, the Scottish Government provided Covid-19 funding allocation totalling £11.13m – just under the total requested – in 2020/21 (PHS7/008 -INQ000147556).⁹
- 1.5.4 These arrangements helped support the PHS response. Additionally, PHS commissioned NSS to provide a national contact tracing centre although the funding for that resource was provided by Scottish Government directly to NSS (this is discussed in Chapter 5).
- 1.5.5 The funding required for PHS to continue its contribution to the pandemic response was included as part of the planning and budget setting process in 2021/22. The Scottish Government commissioned a financial plan that set out Covid-19 funding requirements. The funding made available to PHS was circa £24m (PHS7/009 INQ000147559).¹⁰
- 1.5.6 The same process was followed in 2022-23, with the addition of conversations between the Scottish Government and PHS on what services should continue and what should stop. It was agreed in meetings and correspondence that PHS's work on the vaccination programme, genomics and respiratory surveillance should be continued, while contact tracing was to be stopped. £13m of Covid-19 funding was made available for PHS in 2022-23. This was in alignment with the strategic direction of the Scottish Government's pandemic transition planning, including the wind down and cessation of elements of test and protect (as described at 5.8.1).

1.6 Current position

- 1.6.1 PHS published its latest three-year strategic plan on 7 November 2022 (PHS7/010 INQ000101035).¹¹ The plan reaffirms the organisation's vision of a Scotland where everybody thrives. PHS is clear that this means a Scotland where life expectancy is improving again, and health inequalities are narrowing.
- 1.6.2 The plan sets out PHS's purpose as Scotland's national public health body: to lead and support work across Scotland to prevent disease, prolong healthy life, and promote health and wellbeing. The plan aligns PHS's work against national outcomes, elaborates on what it will do and sets out milestones for progress and measures of impact.

⁹ Scottish Government. PHS Allocation Letter and Schedule. April 2021.

¹⁰ Scottish Government. PHS Allocation Letter and Schedule. April 2022.

¹¹ Public Health Scotland. A Scotland where everybody thrives: Public Health Scotland's three-year plan: 2022–25. November 2022.

- 1.6.3 Current PHS Chief Executive Paul Johnston took up his position in March 2023. He and the Executive Team (formerly known as the Senior Leadership Team) (see Appendix A) have put in place a new framework called the PHS Portfolio setting out the activity to deliver the strategic plan (see Appendix B). The PHS Portfolio consists of 22 cross-organisational programmes of which:
 - 15 are externally focused ('Transforming Scotland'), to help Scotland thrive by:
 - o preventing disease
 - o prolonging healthy life
 - o promoting health and wellbeing
 - Seven are internally focused ('Transforming PHS') to deliver internal improvements and growth that will:
 - o enable PHS staff and the organisation to thrive
 - o deliver PHS's strategic objectives.
- 1.6.4 Appendix C sets out the role of PHS senior officers in response to the pandemic which includes their professional experience.

2. Test and Protect: Strategic policy and decision making

2.1 Context

- 2.1.1 Three over-arching elements of the Scottish Government's strategic approach provide the context for PHS's support for Scottish Government decision-making: the Four Harms Approach, the elimination strategy, and Test and Protect.
- 2.1.2 The Scottish Government set out the decisions made on the handling of the pandemic in a series of strategic documents (PHS7/011 INQ000235119)¹² published between April 2020 and February 2022. Expert advisory groups, the National Incident Management Team (NIMT) and ad hoc input from experts including PHS staff contributed to and informed the decisions set out in the framework documents. This included advice on actions to support the approach to test and protect during periods of intense pressure and on the deployment of mobile resources to bolster local testing capacity.

2.2 Test, Trace, Isolate, Support and Test and Protect.

2.2.1 'Covid-19: Test, Trace, Isolate, Support' (TTIS) (PHS7/012 - INQ000093618)¹³ was published on 4 May 2020. This set out a 'public health approach to maintaining low levels of community transmission of Covid-19 in Scotland'. This approach is summarised in the document as follows:

'We will test people in the community who have symptoms consistent with Covid-19. We will use contact tracing, a well-established public health intervention, to identify the close contacts of those cases, who may have had the disease transmitted to them. We will ask and support those close contacts to self-isolate, so that if they do develop the disease, there is less risk that they will pass it on to others. And we will make sure that support is available to enable people to isolate effectively.'

2.2.2 Over 2020, 'Test, Trace, Isolate, Support' evolved into 'Test and Protect' (T&P). While the goal remained the same, it became the language of public communications (this is discussed in Chapter 10). T&P was also used to describe the system of public health interventions: testing, contact tracing and supporting self-isolation. For the purposes of

¹² Scottish Government. Coronavirus (Covid-19): strategic approach. Accessed June 2023.

¹³ Scottish Government. Covid-19 - test, trace, isolate, support: a public health approach to maintaining low levels of community transmission of Covid-19 in Scotland. May 2020.

this statement, the phrase 'T&P' is used to refer to this approach at different stages of its development.

- 2.2.3 The T&P approach focused on 'interrupting chains of transmission in the community by identifying cases of Covid-19, tracing the people who may have become infected by spending time in close contact with them, and then supporting those close contacts to self-isolate, so that if they have the disease, they are less likely transmit to it to others' (PHS7/012 INQ000093618).¹⁴
- 2.2.4 The Scottish Government published its Covid-19 Testing Strategy on 17 August 2020, which included whole population testing of anyone with symptoms, testing in outbreaks and preventing outbreaks in high-risk settings by routine testing (PHS7/013 INQ000147448).¹⁵ This is discussed further in Chapter 4.
- 2.2.5 The strategy included plans for a locally delivered, but nationally supported, service for Covid-19 contact tracing. While contact tracing is a well-established method of nonpharmaceutical intervention (NPI) for communicable diseases, it was clear that different approaches would be required for Covid-19, due to the scale of the pandemic. This is discussed further in Chapter 5.
- 2.2.6 The Scottish Government published an updated Testing Strategy on 17 March 2021 (PHS7/014 - INQ000571147).¹⁶ The strategy included a commitment to invest £13 million in 2021-22 to build a Whole Genome Sequencing Service for Scotland. This is discussed further in Chapter 4.

2.3 Governance and decision making

Test and Protect Steering Group

2.3.1 In May 2020, the Scottish Government set up a Test, Trace, Isolate, Support (TTIS) Steering Group (later the T&P Steering Group) to provide leadership and oversight for the implementation of the 'Covid-19: Test, Trace, Isolate, Support' and the strategies which came from this. PHS was represented by Angela Leitch (PHS7/015 – INQ000357220).¹⁷ Chaired by Elinor Mitchell, Interim Director General Health and

¹⁴ Scottish Government. Covid-19 - test, trace, isolate, support: a public health approach to maintaining low levels of community transmission of Covid-19 in Scotland. May 2020.

 ¹⁵ Scottish Government. Covid-19: Scotland's testing strategy - adapting to the pandemic. August 2020.
 ¹⁶ Scottish Government. Covid-19: Scotland's testing strategy update. March 2021.

¹⁷ TTIS Operational Steering Group. TTIS Operational Steering Group minutes, Wednesday 13 May 2020. May 2020.

Social Care in Scottish Government, and later by NHS Scotland Chief Executive John Connaghan, the purpose of the group was to:

- Maintain oversight of the design and delivery of the T&P approach.
- Interpret overall progress and identify and mitigate any major challenges to achieving the desired outcomes.
- Ensure significant risks to the delivery of a joined-up T&P solution were identified and recorded and that appropriate actions were taken to mitigate risks.
- Request strategic advice as needed on key enablers such as workforce, digital solutions and supply chains.
- Act as advocates for the Scottish approach to T&P and in turn, seek endorsement from colleagues for related initiatives and developments.
- 2.3.2 In addition, as the pandemic progressed this group considered some operational aspects of agreed strategy, such as extending levels of capacity needed and reviewing progress towards ensuring adequate workforce was in place, as well as some of the more detailed aspects of system performance for contact tracing. Additional governance was subsequently provided through the Executive Delivery Group (see Section 2.3) which once established took on the operational aspects referred to and again separated out the decision making for strategy and operations (see Section 2.3). The Steering and Executive Delivery groups facilitated good engagement opportunities between public services leaders.

National Incident Management Team

- 2.3.3 HPS set up a National Incident Management Team (NIMT) on 13 January 2020. The composition of the NIMT was dynamic and adapted to the evolving response to the pandemic. NIMT members include local health board Directors of Public Health, Scottish Government policy and analytical advisors, the Chief Medical Officer (CMO), representatives from local government (COSLA and Society of Local Authority Chief Executives (SOLACE)) and PHS teams. The group was formalised and Terms of Reference (PHS7/016 INQ000147555)¹⁸ agreed in September 2020.
- 2.3.4 Its Terms of Reference were to:
 - Co-ordinate/manage national developments in a consistent manner to improve the prevention and control of Covid-19 disease threats in Scotland.

¹⁸ Public Health Scotland. National incident Management Team: Terms of Reference. September 2021.

- Facilitate the sharing of information, experience and latest developments in respect of Covid-19 disease with relevant stakeholder groups and networks in Scotland and the UK.
- Provide advice and recommendations to the Scottish Government on operational issues in relation to implementing actions, policy and/or guidance for this topic area in Scotland.
- Consider, prioritise and make recommendations for the development of any new work streams required to improve the prevention or control of Covid-19 disease threats in Scotland.
- Liaise with and support researchers and research networks to contribute to the identification of information and knowledge gaps and suggest further research in line with the scope.
- Consider and make recommendations for surveillance in Scotland in line with the scope.
- 2.3.5 PHS provided the secretariat for the NIMT which was usually chaired by the PHS Head of Infections Service and Strategic Incident Director for Covid-19, Dr Jim McMenamin. Meetings were initially held daily but this reduced in frequency to twice weekly, then weekly, then monthly until the NIMT was stood down on 27 April 2023. Ad hoc meetings of the NIMT were arranged as required in the event of high impact risks, issues or opportunities arising.
- 2.3.6 On 5 May 2020 PHS met with NHS Board Chief Executives, Scottish Directors of Public Health (SDsPH)¹⁹ and Directors of Planning to clarify roles and responsibilities between national and local partners. The Contact Tracing Oversight Board (CTOB) was subsequently set up to provide oversight and governance for the contact tracing programme. Chaired by Angela Leitch, the CTOB oversaw the design and delivery of the programme and reported to Scottish Ministers on related outcomes, benefits and risks.
- 2.3.7 The approach was predicated on the following:
 - That all cases would be triaged by a contact centre which would pass 'complex' cases, or elements of cases, to local Health Protection Teams for investigation.

¹⁹ The Scottish Directors of Public Health Group (SDsPH) group consists of Scottish Directors of Public Health or acting Directors of Public Health; and the Medical Directors / DPH of National Agencies. Its remit is to provide leadership and advocacy nationally on matters affecting public health, including planning, initiating and co-ordination.

- That NHS boards would be funded to expand into 'enhanced health protection teams' capable of managing the complex cases and situations arising from them.
- That expected number of positive cases was likely to be high, however the vast majority would be fairly straightforward, simple to trace and therefore could be traced by the contact centre.
- That Covid-19 would impact all parts of the country but in an unpredictable way, meaning flexibility to meet surges in hot spots was critical.
- 2.3.8 It was acknowledged that this approach would need to be kept under review as more information on the virus and its impacts emerged. As the pandemic progressed the approach did change and was agreed between local NHS boards and the National Contact Tracing Centre (NCTC) depending on the scale of outbreaks and available workforce both locally and nationally.
- 2.3.9 Together, PHS and NSS set up a NCTC, ready for the national roll-out of T&P on 28 May 2020. The NCTC provided additional capacity for NHS boards along with the introduction of a Case Management and Telephony System to aid coordination between national and local teams. This is discussed further in Chapter 5.
- 2.3.10 Scott Heald (Interim Contact Tracing Director) and Dr David Goldberg, a consultant in public health medicine in PHS, co-chaired a PHS/NSS team to lead the national response to contact tracing and ensure senior clinical oversight throughout. The position of this group within PHS structures is shown in figure 3.4.1 in this statement. This was supported by seven workstreams as follows:
 - Contact Centre Implementation (lead: Martin Morrison, NSS)
 - Data & Digital Solutions (lead: Carol Sinclair, PHS)
 - Public Health Approach & Guidance (lead: Dr Colin Sumpter, PHS)
 - Education and Training (lead: Ruth Robertson)
 - HR (lead: Sarah Moffat, NSS)
 - Finance (lead: Louise Roberts, NSS)
 - Communication and Stakeholder Engagement (lead: Rachel McAdams, PHS)
- 2.3.11 PHS chaired the Contact Tracing Implementation Network (CoTIN), a network of clinical and policy colleagues to inform and lead discussions and agree system-wide operational requirements in Scotland, reporting to SDsPH and providing advice to

NIMT (PHS7/016a - INQ000475039).²⁰ This facilitated good engagement opportunities between health protection lead officers and operational managers, alongside Scottish Government officials. It also enabled the consideration of system requirements and understanding of local variation and priorities.

- 2.3.12 National leadership came from PHS initially but was intended to influence a degree of consistency across Scotland and to secure best value from collective resources available. Initially, PHS set the agendas, but this moved over time to a rotating Chair between PHS and local NHS boards to strengthen collaborative leadership.
- 2.3.13 Scottish Government policy leads attended and contributed to CoTIN. There was regular contact between the PHS Director for Contact Tracing and policy leads at Deputy Director level in the Scottish Government and PHS was routinely invited to contribute to the advice for Ministers. Examples included workforce capacity requirements and the development of a case management framework to prioritise and deal with cases when case numbers were increasing dramatically. This consideration of system requirements enabled greater understanding of local variation and priorities.
- 2.3.14 In October 2020, as the pandemic progressed, the T&P Steering Group established a smaller Executive Delivery Group to lead on operational decision-making on contact tracing matters (PHS7/017 INQ000572406),²¹ (PHS7/018 INQ000572409),²² (PHS7/019 INQ000369799).²³ PHS Chief Executive, Angela Leitch, jointly chaired the Executive Delivery Group with the Chief Executive of NSS. The Executive Delivery Group led on:
 - The establishment of robust management controls and assurance across Contact Tracing and the NCTC; streamlining governance arrangements, where appropriate, to improve decision making and alignment to the national strategic direction and policy set by Scottish Government.
 - Ensuring single Scotland-wide approaches to contact tracing, including methods, systems and processes and interoperability between all parties.
 - Direct partner organisations when required in the mechanics of national policy implementation. One such example would be the agreement of a national contact tracing escalation framework.

²⁰ Public Health Scotland. Contact Tracing - Governance Arrangements. September 2021.

²¹ Contact Tracing Executive Delivery Group - Constitution and Terms of Reference, v1.2.

²² Contact Tracing Executive Delivery Group. Agenda, Tuesday 20th October 2020, Teams meeting. October 2020.

²³ Sinclair, C. to various NSS and PHS. Contract Tracing Delivery Group [email], Friday 16 October 2020.

- Providing professional expertise to drive the delivery of Contact Tracing in response to the developing pandemic.
- Providing a decision-making mechanism for all issues which have a resourcing or financial impact.
- 2.3.15 In June 2021, with SDsPH and NSS, PHS led the development and operationalisation of the Tactical Operating Group (TOG) (PHS7/020 INQ000574452),²⁴ chaired by a local health board representative (NHS Grampian-based). Commissioned by the Executive Delivery Group, its remit included resourcing, mutual aid and prioritisation. It also considered demand against an agreed escalation framework and whether any escalation to meet increased demand was needed. It aimed to provide operational public health system oversight on behalf of the Executive Delivery Group which was by now needing to meet less frequently. PHS staff and local contact tracing leads were members of this group which facilitated good engagement between partners at operational management levels.
- 2.3.16 Overall, these governance arrangements ensured effective engagement from Executive to operational managers and a flow of advice and information upwards to inform strategic decision making and operational decision making.

UK collaboration

2.3.17 The development and implementation of T&P across the UK reflected the needs of setting for each administration. There was a sharing of experience and solutions to problems encountered in the other administrations. The feedback to and from NIMT through the NSS T&P lead and the subgroup chairs was pivotal as a mechanism to ensure that the system dealt with any challenges encountered to address their remedy.

2.4 PHS role in pandemic response

- 2.4.1 As the national agency with the remit to protect and improve health, PHS was responsible for leading and contributing to Scotland's population level response to Covid-19 across a broad range of areas. This response included:
 - Providing expert advice to the Scottish and UK governments.
 - Collaborating with national and local partners to help to coordinate the response.

²⁴ Public Health Scotland. Contact Tracing Tactical Operating Group: Terms of Reference, version 1.0 FINAL. July 2021.

- Supporting work across the UK to agree effective infection prevention and control guidance, including through its collaboration with ARHAI.
- Collaborating on effective modelling to support decision-making.
- Advising on the development of national testing strategy.
- Working with Scottish Government and SDsPH on the development and roll out of the Test, Trace, Isolate and Support programme and specifically the coordination of contract tracing arrangements.
- Providing evidence and public health insights around provisions relating to schools.
- Shaping the digital infrastructure and developing tools that support the pandemic response.
- Supporting the development and implementation of whole genome sequencing in Scotland.
- Supporting the roll-out of the vaccination programme.

2.5 PHS role in Test, Trace, Isolate and Support

2.5.1 A summary of how PHS' role in Test, Trace, Isolate and Support is summarised below.

Testing

- 2.5.2 In respect to testing these included:
 - advising on the development of the national testing strategy (including Polymerase Chain Reaction (PCR), lateral flow testing and antibody testing)
 - providing advice from the NIMT to the Chief Medical Officer on testing and contact tracing
 - engaging with the Chief Scientist Office with regard to testing, wastewater testing and Whole Genomic Sequencing
 - analysing testing data in response to care home outbreaks including discharge from hospital to care homes (PHS7/021 INQ000354080),²⁵ (PHS7/022 INQ000101020)²⁶

²⁵ Public Health Scotland, University of Glasgow and University of Edinburgh. Discharges from Hospital to Care Homes: Identifying their role in Care Home Covid-19 outbreaks. May 2020.

²⁶ Public Health Scotland. Discharges from NHSScotland hospitals to care homes between 1 March and 31 May 2020. April 2021.

- publication of official statistics and dashboards on a daily/weekly basis to inform strategic planning and decision making (PHS7/023 - INQ000233604)²⁷
- establishment of PCR testing, testing infrastructure and scale up of testing
- collaboration with Public Health England over alignment with UK testing arrangements in Scotland
- collaboration with partners to implement the updated testing strategies as they developed
- undertaking surveillance as required in response to changing circumstances e.g. through primary care settings.

Tracing

- 2.5.3 In terms of tracing:
 - direct undertaking of contact tracing in the initial stages of outbreak
 - commissioning a national contact tracing function for Scotland through National Services Scotland (NSS) (PHS7/024 – INQ000189062)²⁸
 - promoting collaborative approaches across all local NHS boards, relevant national NHS boards and other partners for the effective oversight of contact tracing as a function
 - clinical oversight of the production of scripts for contact tracing staff
 - contributed to the development of various apps to improve surveillance and contact tracing effectiveness
 - publishing contact tracing data within the weekly official statistical report to inform Scottish policy and operational decision making (PHS7/025 – INQ000147523)²⁹
 - developing a business case in collaboration with partners to transition from personal (telephone) to other digital (SMS) channels for the purposes of notification to isolate and the provision of public health advice (PHS7/026 -INQ000245252)³⁰ and when it became necessary to consider further case

²⁷ Public Health Scotland. All releases of Covid-19 statistical report. Accessed August 2023.

²⁸ Central Legal Office. Minute of Variation between Common Services Agency and Public Health Scotland.

²⁹ Public Health Scotland. Covid-19 statistical report as at 1 March 2021. March 2021.

³⁰ Test and Protect Steering Group. Update: Contact Tracing - Case Management Framework. December 2020.

prioritisation through contact tracing, advice was provided to the CMO (PHS7/026a - INQ000475038).³¹

Isolation

- 2.5.4 In terms of isolation:
 - promoting and contributing to the effectiveness of isolation as a public health intervention.
 - border control and restricted entry guidance is a reserved matter. A UK-wide approach to International Travel Regulations (ITR) was taken at the outset of the pandemic, although this diverged when Scotland applied different entry restrictions to certain countries. PHS and Scottish Government worked closely to liaise with the UK Home Office and UK Health Security Agency (UKHSA) in relation to flight contact tracing, border health monitoring, Passenger Location Forms (PLF) and guidance to travellers, including quarantine and self-isolation
 - PHS initially undertook responsibility for inward travel and the information collected on the PLF was used to provide public health advice. This function later transferred to the NCTC. PHS liaised with the UK Home Office and Police Scotland in relation to travellers that were not contactable from the provided information on arrival into Scotland. This was undertaken on an individual basis, where resources permitted.

³¹ Dodds, G. and Morrison, M. Sustaining a timely public health intervention through contact tracing in the context of rapidly increasing case numbers. June 2021.

3. PHS's Covid-19 response

3.1 Background

Chronology

3.1.1 A chronology of significant events in PHS response in relation to T&P is set out in Appendix D.

Shape of PHS response

3.1.2 Providing a robust and effective contribution to Scotland's response to Covid-19 became the organisation's over-riding priority, together with protecting staff wellbeing. Staff in the Clinical and Protecting Health Directorate (CPH) provided the primary PHS response, but health improvement experts in the Place and Wellbeing Directorate led on work to reduce the wider harms associated with Covid-19. Strategy, Governance and Performance programme and project management support staff took on temporary work assignments in CPH and staff in the Data and Digital Innovation (DDI) Directorate developed the necessary data reporting mechanisms at pace.

3.2 Leadership

- 3.2.1 The Senior Leadership Team (SLT) was the key operational decision-making body within PHS during the pandemic. The SLT was chaired by Angela Leitch, PHS Chief Executive, and met on a weekly basis to drive forward the delivery of the PHS Strategic Plan. The precursor to SLT was the Shadow Executive Management Team, which was established in June 2019 to lead the transition from the legacy bodies to PHS.
- 3.2.2 PHS had daily Senior Leadership huddles to stay informed, assess and trouble shoot as required, as well as extensive ad hoc communication and contact between colleagues throughout the day, as required. There were weekly or more frequent, cross organisational huddles of key staff to deal with implementation challenges and forward planning.

Covid-19 Response Group

3.2.3 The Shadow Executive Management Team established the Covid-19 Response Group in March 2020 to provide leadership to PHS's response to the pandemic (PHS7/027 -INQ000358241)³² and comprised the SLT and key members of staff delivering of the

³² Public Health Scotland - various. Emails regarding agendas and notes from Covid-19 Response Group meetings between 24 April 2020 - 6 May 2020. 2020.

organisation's response to Covid-19. Chaired by Angela Leitch, the group addressed issues escalated through the PHS response structure (see Section 3.3 below), agreed the appropriate resourcing of the pandemic response, and authorised the creation of new programmes of work and the pausing or stopping of existing programmes.

3.2.4 The Covid-19 Response Group met every weekday until March 2021, when the frequency was reduced to three times per week. In April 2021 the Covid-19 Response Group agreed and implemented a revised approach, which is covered in Section 3.2..

Covid-19 Strategic Coordinating Group

- 3.2.5 The Covid-19 Strategic Coordinating Group (SCG) (PHS7/028 INQ000147562)³³ was established in April 2021 to enhance PHS's governance and oversight arrangements for the pandemic response. It replaced the Covid-19 Response Group and met weekly to provide oversight and direction to the PHS response.
- 3.2.6 It was chaired by Angela Leitch and membership included the Covid-19 Strategic Responsible Owner (the Director of Public Health Science, Dr Nick Phin), the other executive directors, the Strategic Incident Director (Dr Jim McMenamin), a senior member of the communications team, and the chairs of SCG sub-groups: the Covid-19 Governance Group (chaired by Dr Nick Phin); the Covid-19 Incident Management Team (chaired by Dr Jim McMenamin); and the Covid-19 Remobilisation, Recovery and Redesign Group (chaired by Claire Sweeney, Director of Place and Wellbeing).
- 3.2.7 The SCG instigated a lesson learned programme in 2022 to examine the PHS response to the pandemic, including debriefing of staff directly involved in the response to gather their views, observations, and experiences to help us to understand what worked well and to identify areas for improvement. The exercise culminated in the report Learning Lessons from Covid-19, which is discussed in Chapter 11 (PHS7/029 INQ000187754).³⁴

3.3 PHS response structure

3.3.1 The Incident and Emergency Response Plan (IERP) (PHS7/030 - INQ000130821)³⁵ was activated on 27 January 2020 and included the structure and governance of the incident response going forward and the establishment of the Incident Room at the Meridian Court offices in Glasgow.

³³ Public Health Scotland. PHS Covid-19 Strategic Coordinating Group Terms of Reference. June 2021.

³⁴ Public Health Scotland. Learning Lessons from Covid-19. March 2023.

³⁵ Health Protection Scotland. Incident and Emergency Response Plan (IERP) v5. November 2019.

- 3.3.2 The response structure comprised overarching programme areas with several 'cells'. The cells contained a mix of subject matter experts, professionals, service managers and support staff to respond rapidly to the emerging situation. The structure evolved as the pandemic progressed. The arrangements as at April 2020 can be found in Appendix E, and as at June 2020 in Appendix F.
- 3.3.3 The Covid-19 Response Portfolio Dossier (PHS7/031 INQ000147563)³⁶ provides a detailed description of the four response programmes, and three enabling programmes in place in June 2020 and sets out the work of each of the cells.

Response programmes:

- Clinical response and guidance
- Intelligence, research and development
- Contact tracing
- Social and systems recovery

Enabling programmes:

- · Data and analytics
- Health protection management and administration
- Coordination and planning

3.4 Test, Protect, Isolate and Support: PHS response structure

Structure

3.4.1 A summary of the structure employed by PHS and some key collaborators such as NSS in its response in relation to T&P, and links to wider collaboration, is shown in Figure 1 below.

³⁶ Public Health Scotland. Covid-19 Response Portfolio Dossier. June 2020.

Figure 1: PHS response structure – T&P



- 3.4.2 The principal groupings in PHS were:
 - **PHS Contact Tracing Oversight Board** ensured programme direction, resource allocation and programme progress.
 - PHS Contact Tracing Implementation Group assessed and actioned the business requirements and risks needing to be managed (including Contact Centre, Data and Digital, Guidance and Education and Training matters), to enable service delivery.
 - The role of the **Contact Tracing Programme Team** was to carry out detailed operational tasks in preparedness for service delivery.
- 3.4.3 These were complemented by the daily meetings of the Covid Response Group, allowing rapid assessment and troubleshooting of issues as they arose.
- 3.4.4 The PHS Contact Tracing Programme consisted of the following workstreams:
 - Contact Tracing Strategy
 - Workforce Education
 - Internation Travel

- Data and Digital
- 3.4.5 These workstreams reported to the Contact Tracing Change Coordination Group (previously JIG) which was responsible for coordinating and implementing changes which impacted Contact Tracing, such as:
 - Policy changes as directed and advised by Scottish Government
 - System changes requested through users (such as CoTIN)
 - Change improvements identified through the evolution of the Contact Tracing system, either from the Tactical Operating Group (TOG) or CoTIN

3.5 External collaboration

- 3.5.1 Collaboration is one of the core values of PHS value and thus informed our pandemic response. Effective formal governance between PHS, Scottish Government and wider NHS Scotland was in place in the early stages of the pandemic, through which there was regular engagement. The key groups facilitating this in relation to T&P were:
 - T&P Steering Group see Section 2.3.
 - The Scientific Advisory Group on Testing was chaired by the Chief Scientist (Health), Professor David Crossman. Dr Jim McMenamin of PHS provided detailed epidemiological analysis and evaluation of health service impact of interventions in public health as they became available, such as the effectiveness of Covid-19 vaccines. Dr McMenamin both represented PHS on the group and provided input as Chair of the NIMT. Dr Michael Lockhart, PHS Consultant Microbiologist, and Professor Matt Holden, Consultant Pathogen Sequencing Advisor, also represented PHS on the group.
 - Contact Tracing Implementation Network see Section 2.3
 - Executive Delivery Group see Section 2.3
 - NIMT (National Incident Management Team) see Section 2.3.
 - Data and Intelligence Forum see Section 9.3.
 - Tactical Oversight Group (TOG) -see Section 2.3
- 3.5.2 Throughout the design and ongoing development of the contact tracing approach, PHS received advice and support through regular informal discussions with the nominated lead Directors of Public Health (NHS Grampian (Susan Webb), NHS Fife (Donna Milne), NHS Lanarkshire (Gabe Docherty) and NHS Greater Glasgow and Clyde (Linda de Caestecker)), a Director of Planning representing NHS Lothian (Colin Briggs) and a

Director of Finance representing NSS (Carolyn Low). This group was chaired by Colin Briggs.

3.5.3 A summary of these external relationships is shown in Figure 2 below.



Figure 2: T&P: Relationships between PHS and partners

- 3.5.4 Ad hoc conversations about T&P were undertaken daily via email, phone or Teams in addition to regular meetings with external partners. These external partners are detailed in Section 3.5, reflecting the routine, daily nature of engagement with these colleagues.
- 3.5.5 Other regular external communication in relation to T&P were:
 - Daily contact with co-leads of the SDsPH.
 - Daily contact with NCTC Director to inform discussion with partners and operational decision making.
 - Weekly meetings with local authority Environmental Health Officers and local NHS boards to ensure smooth implementation and operation of Scottish Government commissioned isolation centres, such as hotels and ships.
 - PHS was present at weekly UKSHA Laboratory Cell meetings. As public health is
 a devolved matter, the group provided opportunity for PHS to raise concerns and
 reach consensus on testing and diagnostic issues between colleagues across the
 Four Nations. This included issues arising on data reporting, aligning diagnostic
 approaches across the Four Nations, and providing expert input for immediate
 response issues. Examples included:
 - o aligning guidance for laboratories between Four Nations
 - sharing reports on the evaluation and effectiveness of commercial assays as they became available
 - sharing up-to-date review of scientific literature and guidance for Covid-19 to support queries on diagnostic approaches, such as testing approaches during periods of low prevalence, and testing using new technologies, such as wastewater, serology antibody testing, point of care testing, and pathogen genomics.
- 3.5.6 The Scottish Government-convened the Four Harms Advisory Group (on which PHS and NIMT were represented by Dr Jim McMenamin, with Dr Nick Phin joining in April 2022) and the subgroups of T&P.
- 3.5.7 PHS had continuous engagement with devolved administration national health protection agencies colleagues to understand the differences in each system adopted in each nation.
- 3.5.8 PHS worked with local authorities in the planning and implementation of T&P. COSLA and SOLACE were represented at executive level within all key decision-making

groups as part of the formal governance processes. PHS developed guidance for local authorities and the Electoral Management Board in relation to the local elections, some of which had been postponed following the outbreak of the pandemic.

- 3.5.9 PHS contributed to the planning, assessment of suitability and the implementation of use of hotels and ships as isolation centres, following inward travel from higher risk countries.
- 3.5.10 There is further discussion on partnership working and collaboration in relation to contact tracing in Section 5.8.

Third and private sector

- 3.5.11 Engagement with third and private sector bodies included:
 - Scottish Federation of Housing Associations –to identify their vulnerable tenants and provide support that met practical needs, including with isolating.
 - Digital Health and Care Innovation Centre to help with the development of an initial "simple" contact tracing tool.
 - CapGemini –to further develop the technical elements of contact training as the pandemic progressed.
 - Local NHS boards engaged with the third sector in deploying language services.
 PHS was involved in this to a lesser extent, which also included liaising with faith groups to engage with harder to reach groups to improve access to and use of testing facilities (for example mobile testing unit deployment).

4. Testing

4.1 Introduction

- 4.1.1 One of the Scottish Government's early strategic documents Covid-19: Test, Trace, Isolate, Support (PHS7/012 - INQ000093618)³⁷ was published on 4 May 2020 and described a population approach to maintaining low levels of community transmission of Covid-19 in Scotland, consistent across the UK.
- 4.1.2 Testing policies were determined by Scottish Government and reflected the availability of testing. Testing capacity across the UK rapidly developed from March and Scotland applied testing in line with the rest of the UK. Public Health England (PHE)/UKHSA guidance was often used as the basis for the approach, following CMO and Scottish Government agreement. The role of PHS in building the capacity of testing in the pandemic is discussed below.

4.2 Evolving understanding of SARS CoV-2 and Covid-19

- 4.2.1 PHS response to Module 2a of the Inquiry sets out how its understanding of SARS CoV-2 evolved. This section summarises this evolving understanding. The evidence base to develop policy increased as understanding of the virus developed from either transmission studies or observational data from well-studied closed settings emerged (e.g. high-profile incidents on cruise ships). PHS led a range of programmes that contributed to its understanding of the epidemiology of SARS CoV-2, including enhanced surveillance, diagnostics, whole genome sequencing, and wider analytical and research work.
- 4.2.2 PHS was responsible for providing data and analysis to the Scottish Government to support their understanding of transmission, infection, mutation, re-infection and death rates in Scotland. PHS's approach to this is set out in more detail in Chapter 9. In the period May 2020 to February 2022, daily data on infection rates and community transmission were presented to the Scottish Government, the NHS boards and local authorities by the PHS Surveillance Team. The data were discussed in detail by the PHS led NIMT before offering advice to the Four Harms Group for subsequent Ministerial consideration. The advice offered was in agreement between the NIMT, CMO and Scottish Government based solely on the effects of health protection measures on harm 1 (i.e. the direct harm to life and health). There was in effect a two-way flow of communication between NIMT and CMO, in that specific questions would

³⁷ Scottish Government. Covid-19 - test, trace, isolate, support: a public health approach to maintaining low levels of community transmission of Covid-19 in Scotland. May 2020.

sometimes be put to NIMT to consider. In its deliberations, NIMT could also draw upon insights from COSLA and SOLACE (who were observers at meetings) (PHS7/031a - INQ000197270).³⁸

4.2.3 Nevertheless, Chapter 10 of this statement notes the conclusions of the NIMT that lack of feedback could lead to discontinuity between the advice that it produced, and the Scottish Government guidance outputs and policy decisions made. This compromised the ability of NIMT to fine tune the evidence and public health intelligence it used to underpin the advice and thus strengthen its impact. This is an important lesson for future co-ordination of health protection response.

January to March 2020: Early understanding

- 4.2.4 During the pandemic HPS (and then PHS) obtained epidemiological evidence from surveillance data, outbreak investigations, and research studies conducted within Scotland, the UK, and worldwide.
- 4.2.5 Initially HPS relied on information provided by PHE (in their UK role as the National Focal Point for the International Health Regulations (2005)), the World Health Organization (WHO), the European Centre for Disease prevention and Control (ECDC), along with reports from Chinese authorities to understand the evolving epidemiology around transmission and spread.
- 4.2.6 Initially WHO suggested that the novel coronavirus may have originated from animals given early cases were linked to an animal market. However, by 23 January there was growing evidence of person to person spread. as more cases were identified in China and worldwide. Before the first case in Scotland on 1 March 2020, it was recognised that the virus mainly spreads through respiratory routes.
- 4.2.7 As information accumulated in the first few months of 2020, HPS/PHS's understanding of the nature and spread of the SARS CoV-2 virus evolved rapidly. Established links with key experts and expert committees in the UK and Scotland proved useful in keeping abreast of the epidemiology.
- 4.2.8 Based on the understanding of SARS (to which this virus is closely related), early on it was assumed that it was unlikely people could spread the virus before showing symptoms or that asymptomatic individuals could transmit the virus.

³⁸ National Incident Management Team. NIMT minutes - 16/11/20. November 2020.

- 4.2.9 On 23 January WHO published an early estimate of the infectiousness of the virus, referred to as R0, ranging from 1.4 to 2.5. Various UK groups endeavoured to estimate R0, and a consensus of these estimates was used nationally to understand how the virus was spreading. Important sources of information for these estimates included the Scientific Advisory Group for Emergencies (SAGE) and the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG).
- 4.2.10 Early information from China suggested that around 25% of Covid-19 cases were severe. However, given only the more severe presentations were being identified it can be difficult to accurately assess rates of severe illness. As testing became more widespread asymptomatic and mild infections were detected the rate of severe illness became lower.
- 4.2.11 To study the early cases and their close contacts in the UK, HPS/PHS participated in the UKHSA-led First Few One Hundred study (FF100) of SARS-CoV-2 virus. The approach was used in the 2009 H1N1 pandemic and was deployed again in March 2020 for Covid-19. The FF100 study aimed to answer key questions on initial cases to inform modelling and clinical care provision. HPS/PHS contributed clinical input to the initial study (PHS7/032 - INQ000256608),³⁹ and continued to contribute across the pandemic to the epidemiology of Covid-19 (PHS7/033 - INQ000256625).⁴⁰
- 4.2.12 Other surveillance and research studies played a key role in developing our understanding. The Scottish Intensive Care Society Audit Group (SICSAG) began monitoring trends in the number of Covid-19 patients in hospitals and intensive care units (ICUs) from March 2020 by adapting existing on a monthly basis, to develop a daily flow of data from all intensive care units in Scotland by 9am each morning. reporting the number of patients in ICUs across Scotland. This was linked with laboratory data to identify ICU patients with a positive PCR test for SARS CoV-2. This allowed a more detailed report to be issued by noon providing information on the numbers of patients in Scottish ICUs, their Covid-19 test status, and those requiring mechanical ventilation and other life support therapies (PHS7/034 INQ000256631).⁴¹
- 4.2.13 Additional information from other countries conducting similar studies, alongside the availability of testing, case and morbidity and mortality data from international studies,

³⁹ Boddington NL, Charlett A, Elgohari S, et al. Covid-19 in Great Britain: epidemiological and clinical characteristics of the first few hundred (FF100) cases: a descriptive case series and case control analysis. Medrxiv. May 2020.

⁴⁰ Lopez Bernal J, Panagiotopoulos N, Byers C, et al. Transmission dynamics of Covid-19 in household and community settings in the United Kingdom, January to March 2020. Eurosurveillance 27 (15); April 2022.

⁴¹ Scottish Intensive Care Society Audit Group. SICSAG Annual Reports. Accessed August 2023.

mathematical modelling, and routine surveillance complemented HPS's understanding in this early period.

April 2020 – December 2020

- 4.2.14 Early in the pandemic, it was considered to be unlikely that asymptomatic spread could occur. However, the WHO Situation Report on Covid-19 published on 5 June 2020 (PHS7/035 INQ000273605)⁴² presented evidence suggesting that pre-symptomatic and asymptomatic individuals could spread the virus, further emphasising the importance of preventive measures such as wearing masks, practicing physical distancing, and maintaining good hand hygiene to control the spread of the virus.
- 4.2.15 At the Scottish Government Covid-19 Advisory Group on 6 April (PHS7/036 INQ000256630)⁴³ PHS presented a paper setting out the work to match PCR testing supply to demand in order to enable flexible planning 'Strategic approach to testing capacity and deployment of PCR Covid-19 virus detection programme in Scotland' (PHS7/037 INQ000286687)⁴⁴ and associated analysis (PHS7/038 INQ000286868).⁴⁵ The paper set out how PHS was coordinating testing with the NHS Board specialist virus and diagnostic laboratories, increasing laboratory capacity and trying to manage demand. The paper showed that on a per capita basis Scotland was performing well relative to England, but that full use was not being made of the diagnostic capacity available. Appendix A of the paper shows that the policy on groups who needed to be tested was evolving at that time. Alignment between available capacity and identifying those who should be tested was highlighted as a factor in the apparent under-use of testing capacity.

December 2020 onwards

4.2.16 Research was conducted to assess the effectiveness of the vaccines against infection, severe disease, and death following the introduction of the Covid-19 vaccination in December 2020. The EAVE-II study documented some of the earliest findings on how vaccines mitigated severe disease. This work also added to understanding of how the virus spreads and presented clinically with the introduction of widespread vaccine uptake and boosters.

⁴² World Health Organization. Coronavirus disease (Covid-19) Situation Report - 137 Highlights Situation in numbers (by WHO Region). June 2020.

⁴³ Scottish Government Covid-19 Advisory Group minutes: 6 April 2020. Accessed August 2023.

⁴⁴ Public Health Scotland. Strategic approach to testing capacity and deployment of PCR Covid-19 virus detection programme in Scotland v6. April 2020.

⁴⁵ Public Health Scotland. Testing estimates excel spreadsheet. April 2020.

4.2.17 PHS was aware of possible reinfections when they were first reported by Hong Kong in August 2020. Following a four nations discussion PHS revised the national case definition for Covid-19 in January 2022 to include episodes of infection, not just the first time a person is infected, and included this in its weekly statistical reports (PHS7/039 -INQ000256618).⁴⁶ This change in the case definition helped to capture changes in background transmission dynamics, which appeared to show two peaks in reinfections in July 2020 and April 2021. Reinfection proportions also appeared to increase in December 2021 and January 2022, likely due to the emergence of the Omicron variant.

4.3 Surveillance

- 4.3.1 PHS used a range of surveillance systems which evolved over the course of the pandemic. In the very early stages of the pandemic before the first positive case in Scotland, PHS was reporting on the number of individuals tested for SARS-CoV-2.
- 4.3.2 Once SARS-CoV-2 was confirmed in Scotland, PHS was reporting daily on the number of positive and negative tests and the number of positive cases. The number of positive cases is less than the number of positive tests, due to some cases having multiple positive tests during the course of their infection. Reporting on positive and negative tests and confirmed cases formed the cornerstone of the PHS reporting throughout the pandemic, with the content and structure of the reporting evolving during the pandemic (PHS7/040 INQ000202586),⁴⁷ (PHS7/023 INQ000233604),⁴⁸ (PHS7/041 INQ000569802).⁴⁹ The surveillance data on tests and cases included information on demographics, type of test (PCR or lateral flow device (LFD)) and for PCR tests if these were processed through the NHS diagnostic labs or the Lighthouse Laboratories (see Section 4.4). The daily reporting to Scottish Government also included estimates of daily testing capacity. (This is discussed further in Chapter 9.)
- 4.3.3 The Real Time Epidemiology (RTE) cell in PHS undertook surveillance work. (The RTE cell was an internal team of health care scientists, information analysts and data managers, originally stood up to support the delivery of the NSS Emergency Response Plan.) This RTE work included work undertaken in partnership with SICSAG to provide daily surveillance on the number of Covid-19 cases who required admission to ICU. This data formed part of the routine daily reporting.

⁴⁶ Public Health Scotland. Covid 19 reporting to include further data on reinfections. February 2022.

⁴⁷ Public Health Scotland. PHS Daily Data Submissions. August 2021.

⁴⁸ Public Health Scotland. All releases of Covid-19 statistical report. October 2022.

⁴⁹ Public Health Scotland. Viral respiratory diseases (including influenza and Covid-19) in Scotland surveillance report. November 2022.

- 4.3.4 The data on positive tests was linked to National Records Scotland (NRS) data on deaths to provide data on the number of cases who died within 28 days of a positive Covid-19 test. This data was included in the daily reports to Scottish Government (PHS7/042 INQ000202608),⁵⁰ public reports (PHS7/023 INQ000233604)⁵¹ and dashboard (PHS7/041 INQ000569802).⁵²
- 4.3.5 One of the elements of the surveillance was information on the number of Covid-19 outbreaks reported on the HPZone case/incident management system used by NHS Board Health Protection Teams.
- 4.3.6 The RTE cell used the data extracted from the Case Management System (CMS, described at 5.4.2) within T&P, which tracked national Covid-19 data, to produce a series of surveillance reports. The content of these reports evolved over time from July 2020 until they were stood down in early September 2021. These reports included information extracted from CMS on potential sources of infection including overseas travel, and links to known clusters/outbreaks. CMS was designed as a case management system and not a surveillance system and therefore there was a lot of free text information which made data extraction challenging. In the early stages of using CMS for these surveillance reports there was a lot of manual extraction of the data by the team; processes were then developed for the automation of data extraction and reporting (were shared by PHS with Scottish Government on a daily basis) (PHS7/043 INQ000340861).⁵³
- 4.3.7 Throughout the pandemic PHS provided a number of different datasets to UKHSA to inform surveillance and modelling at the UK level (including that undertaken by the Scientific Pandemic Influenza Group on Modelling, Operational sub-group).
- 4.3.8 The collection of data for the National Infection Survey began in Scotland in September 2020. The RTE cell were involved in some discussions about getting the data from this testing, especially the positive tests, to come into ECOSS (see Section 4.8) and CMS for reporting and case management in Scotland. Once the data flows were established these results were included as part of the daily reporting on cases by the RTE Cell within PHS. Therefore, this testing was incorporated into the wider surveillance reports.

⁵⁰ HPS. Daily data submissions 16/07/2021. July 2021.

⁵¹ Public Health Scotland. All releases of Covid-19 statistical report. October 2022.

⁵² Public Health Scotland. Viral respiratory diseases (including influenza and Covid-19) in Scotland surveillance report. November 2022.

⁵³ Public Health Scotland. Daily summary of Covid cases. December 2020.

4.3.9 RTE used the National Infection Survey prevalence trends to benchmark PCR and LFD case report data. As testing guidance changed, for example moving from widespread population testing to testing only for clinical need, this information was used to shift messaging about interpreting trends in case data and PCR test positivity over time.

Enhanced community surveillance of Covid-19

- 4.3.10 PHS established a Community Surveillance programme in April 2020 to estimate the proportion of people across Scotland with mild to moderate symptoms of Covid-19 who were unwell at home (following self-care advice) and who were positive for Covid-19 infection. This was an adaptation of PHS's existing GP Influenza surveillance scheme.
- 4.3.11 The enhanced surveillance programme aimed to:
 - Inform understanding of the clinical features, epidemiology and transmission of Covid-19.
 - Evaluate and inform national control measures and diagnostic strategies.
 - Fulfil duties for mandatory international reporting for Scotland and allow data sharing with equivalent surveillance programmes in Europe.
 - Inform national and local health care planning and support local health and social care response.
 - Support identification and triaging of patients in communities who were at higher risk of infection.
- 4.3.12 The Community Surveillance pilot scheme becoming fully operational from 27 April 2020 when triage hubs and clinical assessment centres undertook swabbing and data collection across all health boards in Scotland. PHS gathered up to 1,000 samples every week from people with mild to moderate Covid-19 like symptoms 500 samples from people attending clinical assessment centres, and 500 from people triaged by Covid-19 telephone triage hubs. Data was shared on a weekly basis with front line practitioners produced to improve accessibility of the statistical release (PHS7/044 INQ000256613).⁵⁴
- 4.3.13 The initial programme ran for 12 weeks. It was extended into October 2020 and then Scottish Government extended it further to May 2021 with the addition of testing for

⁵⁴ Public Health Scotland. Progression of Covid-19 in the Community in Scotland: the journey so far. November 2020.
influenza and Respiratory Syncytial Virus (RSV). This was outlined in a letter to NHS boards from the CMO on 28 October 2020 (PHS7/045 - INQ000320571).⁵⁵

4.3.14 In the first 26 weeks of the programme 13,832 samples were analysed. An important finding from the subsequent report was that presenting with symptoms of cough and altered sense of smell/taste, was associated with a significantly increased odds of a positive Covid-19 test (PHS7/046 - INQ000320536).⁵⁶ This reinforced the change that had been made to the clinical case definition for adults to include loss of smell or taste on 18 May 2020.

Surveillance and response

- 4.3.15 On 15 July 2020 the Scottish Government published Surveillance and Response (PHS7/047 - INQ000235127),⁵⁷ which 'sets out how existing planning arrangements, structures and national health protection guidance was being adapted to address the challenges of the next phases of the public health management of the Covid-19 outbreak.' The document highlights a number of ways in which PHS was supporting the delivery of Scottish Government strategy, including:
 - PHS's involvement in the Data and Intelligence Forum (see Section 9.3), production of the weekly statistical work and PHS's work on early warning dashboards.
 - PHS's work to develop a Scottish Covid-19 Workbook (PHS7/048 -INQ000235180)⁵⁸ and sectoral Advice Cards, which brought advice on how local and national public health agencies will provide support to prevent virus spread and provide advice on the management of an outbreak into one place.
- 4.3.16 The document also referred to the interim update of the Management of Public Health Incidents Guidance (PHS7/049 - INQ000130954),⁵⁹ which outlines the roles and responsibilities of all relevant agencies involved in the event of an outbreak or pandemic and provides direction around the process of identification, investigation, risk assessment and incident evaluation. PHS undertook this revision to the guidance as a

⁵⁵ Scottish Government. Surveillance of Severe Acute Respiratory Illness - Extension of Winter SARI Surveillance for Covid and Extension of CO-CIN (ISARIC Tier 0) Covid Surveillance Funding. September2020.

⁵⁶ Public Health Scotland. Community Surveillance of Covid-19 in Primary Care Report summarising findings from data collected in Phase 1 and 2 of the programme. November2020.

⁵⁷ Scottish Government. Coronavirus (Covid-19): Surveillance and Response - position statement. Accessed February 2023

 ⁵⁸ Scottish Government. Coronavirus (Covid-19): Scottish workbook 2020. Accessed March 2023
 ⁵⁹ Public Health Scotland. Management of public health incidents: guidance on the roles and responsibilities of NHS led incident management teams Version 12.1. July 2020.

rapid update to the 2017 edition to incorporate specific information relating to the management of the Covid-19 pandemic, such as new legislation. Due to time constraints, this rapid update did not follow the full standard guidance revision process and did not incorporate a review of relevant new scientific evidence. A full-scale Scottish Health Protection Network (SHPN) guidance review will be carried out as the subgroups of the network are re-mobilised. PHS is currently in dialogue with the Scottish Government with a view to doing this work in 2025/26.

4.4 Microbiology capacity and capability

Context

4.4.1 In the UK, NHS diagnostic laboratories undertake testing to identify what organisms are causing illness in a patient to direct clinical treatment and NHS reference laboratories undertake additional or specialist use specialist tests to inform public health outbreak or pandemic response, disease transmission, inform vaccine development etc.

Pre-pandemic

- 4.4.2 From 2016 to 2019, governance for laboratory services in Scotland was undertaken by National Services Scotland (NSS) National Services Division (NSD). The governance structure relied on the Chief Executives from the 14 territorial NHS health boards advising Scottish Government on strategy, investment, and procurement requirements for diagnostic services (a change at national level required all 14 boards to agree). Population health requirements (including pandemic preparedness) had little leverage in overall NHS diagnostic service delivery and procurement planning with individual health boards adopting different approaches to investment in pandemic preparedness and diagnostic testing so that comparing test results between boards could be challenging to interpret and standardisation of testing platforms difficult. In retrospect, given the need for rapid upscaling of testing and diagnostic capacity in the initial pandemic response, this fragmented approach with limited co-ordination was inadequate.
- 4.4.3 .Pre-pandemic the Diagnostics Steering Group was established by Scottish Government and NHS NSS to provide strategic and high-level planning for diagnostic services, including laboratories, and reported into the NHS Board Chief Executives. HPS was a member of the group to provide input and expertise for public health requirements, and as a co-commissioner of NHS Scotland Reference Laboratories. In 2020, NHS NSS consolidated existing governance structures to form the Diagnostics in Scotland Strategic Group, whose role would be the development and implementation of

programmes to ensure high-quality diagnostic services in Scotland (PHS7/050 – INQ000569808).⁶⁰ During the initial stages of the pandemic response the Scottish Government was used by PHS as a governance route to escalate initial concerns aligning Scotland's PCR testing capacity with demand, until Scottish Government T&P governance was established.

Position at start of pandemic

- 4.4.4 Initially there were no commercial or experimental tests available to detect SARS CoV2. Consequently, an "in house" PCR test was developed for Scotland, which was validated in collaboration with UKHSA (then Public Health England (PHE)). In Scotland expertise and equipment to conduct these tests were initially restricted to Edinburgh and Glasgow NHS Scotland Specialist Virology laboratories. PHS/HPS (PHS7/051 INQ000478137),⁶¹ (PHS7/052 INQ000478202),⁶² (PHS7/053 INQ000478143),⁶³ (PHS7/054 INQ000273611).⁶⁴
- 4.4.5 In Scotland the expertise and equipment to conduct specialist PCR testing for this new pathogen was only available in NHS Scotland Specialist Virology Laboratories in Edinburgh and Glasgow. Diagnostic laboratories in local health boards did not have the necessary testing equipment and consumables, and for some rural and island health boards the suitable containment level facilities to undertake the specialist PCR reference testing required at this stage of the response.
- 4.4.6 PHE hosted its first Covid-19 Virology Cell meeting (often interchangeably called SARS CoV-2 Laboratory Cell meeting) on 16 January 2020 to review and advise on developments and guidance regarding sampling, testing, and surveillance for Covid-19, bringing together key stakeholders from the four nations. The cell met twice a week, including representation from Scottish NHS laboratories, the Scottish Microbiology and Virology Network (SMVN), NSS National Procurement, and NSD (PHS7/047 INQ000478127).⁶⁵

⁶⁰ Diagnostics in Scotland Strategic Group: Governance framework.

⁶¹ Health Protection Scotland. Update on Diagnostic Support for the Response to Covid-19 to Scottish Government 26th February from the HPS Laboratory SARS-CoV-2 Cell. February 2020.

⁶² Lockhart, M. Update on testing capacity in Scotland 2020-02-24 [email]. February 2020...

⁶³ Lockhart, M. FW: Assessment of Private lab support for NHS diagnostic infrastructure in Scotland AND additional testing concerns [email]. March 2020.

⁶⁴ Health Protection Scotland, NHS National Services Scotland. Laboratory Testing for SARS-CoV-2 / Covid-19. June 2020.

⁶⁵ Health Protection Scotland. Terms of Reference (ToR): Covid-19 HPS/ Laboratories Cell. March 2020.

- 4.4.7 The PHS Public Health Microbiology (PHM) team worked to define the anticipated PCR testing capacity for diagnostic need in Scotland recognising that NHS Scotland health boards and laboratories were in differing states of readiness to respond. The virus was classified as a category three pathogen and thus stringent safety measures in containment level three laboratories were needed. This limited testing locations and the operation of testing within laboratories.
- 4.4.8 On 23 January 2020 HPS published 'Wuhan novel coronavirus (WN-CoV) Guidance for sampling and laboratory investigations v1.0' (PHS7/055 INQ000495953)⁶⁶ in line with PHE guidance (PHS7/056 INQ000273610)⁶⁷ and with input from NHS Scotland Reference Laboratories. This document was updated ta further seventeen times during the first year of the pandemic, and 19 times in total, until it was incorporated into 'Covid-19: guidance for Health Protection Teams (HPTs) version 2.2' (PHS7/057 INQ000273606)⁶⁸ on 31 May 2022.
- 4.4.9 During the initial stages of the pandemic response the focus was building diagnostic testing capacity. Given the lack of national governance oversight for diagnostics in Scotland the PHS PHM team coordinated the initial planning for diagnostic test delivery in partnership with the NHS Scotland Specialist Virology Labs, and the SMVN (PHS7/058 INQ000280732),⁶⁹ (PHS7/059 INQ000478177),⁷⁰(PHS7/054 INQ000273611).⁷¹
- 4.4.10 Roll out of PCR tests to other NHS diagnostic laboratories in Scotland required new equipment and consumables, for which there was worldwide demand. Cross board training and support was also needed, especially for smaller boards who had limited experience with PCR testing. At the time, support for NHS Scotland diagnostic laboratories lay with the individual health boards, with no national policy or oversight from Scottish Government or nationally coordinated procurement to ensure planned and consistent NHS testing services. Thus, across the NHS boards in Scotland, previous levels of investment in terms of numbers and types of staff, equipment and

⁶⁶ Health Protection Scotland. Wuhan novel coronavirus (WN-CoV). Guidance for sampling and laboratory investigations v1.0. January 2020.

⁶⁷ Public Health England. Covid-19: guidance for sampling and for diagnostic laboratories Information for clinical diagnostic laboratories regarding safety, sampling and packaging specimens associated with Covid-19. January 2020.

 ⁶⁸ Public Health Scotland. Covid-19 Guidance for Health Protection Teams Version 2.2. May 2022.
 ⁶⁹ National Laboratories Programme, NHS National Services Scotland. SARS-CoV2
 Diagnostic Equipment Allocation SBAR. Accessed 15 May 2020.

⁷⁰ Harley, Kate. NLP and HPS collaboration for SARS-CoV2 approach K Harley 2020-03-09 [email]. March 2020.

⁷¹ Health Protection Scotland, NHS National Services Scotland. Laboratory Testing for SARS-CoV-2 / Covid-19. June 2020.

test repertoire varied and in retrospect were insufficient to deal with the initial pandemic response required.

Initial scale-up

4.4.11 On 5 March 2020, PHS submitted a paper to the Diagnostic in Scotland Group and Scottish Government-led Laboratory Oversight Board (LOB) that had been developed in collaboration with SMVN, NSS National Labs Programme (NLP) and NSS National Procurement. The paper outlined the equipment and staffing requirements to meet testing demands (PHS7/054 - INQ000273611).⁷² The paper provided a situation report which outlined progress, and risks and issues including:

"Not all health boards have up-to-date pandemic plans. In the event of a pandemic there will be a surge in samples for Covid-19 testing. It will be difficult to maintain a routine service requiring CL3 facilities if there is a surge in Covid-19 testing. Depending on the dynamics of an outbreak in Scotland, there is an expectation that Microbiology / Virology laboratories will have to increase their out of hours services which may pose challenges with current staffing levels. Financial and staff pressures mean it will be challenging for many health boards to absorb any surge in demand which will likely have an impact on routine testing. There will be waste management issues. Instigation of business continuity plans in the event of limited staffing will result in reduction of routine local laboratory services."

- 4.4.12 Recommendations within the paper were accepted by the Scottish Government LOB and this led to the formation of the Joint Diagnostic Group (JDG), established on 19 March 2020. The role of this group was to bring together key stakeholders, including Scottish Government, NHS Scotland Diagnostic Laboratories and NSS National Procurement, to initiate procurement and delivery of the initial scale up to further expand commercial PCR testing capacity across all NHS health boards. PHS provided guidance and expertise, particularly around validation of new equipment, the sharing of data, and escalation of concerns around procurement to Scottish Government. Expertise on the quality of testing services was largely provided by the Edinburgh and Glasgow NHS Scotland Specialist Virology laboratories, the SMVN and the NLP.
- 4.4.13 JDG meetings were held twice weekly and dealt with the roll out of PCR testing and procurement issues. Roll out of commercial tests to assist in upscale of testing capacity

⁷² Health Protection Scotland, NHS National Services Scotland. Laboratory Testing for SARS-CoV-2 / Covid-19. June 2020.

also commenced, in partnership with SMVN, the SMVN Operational Group (SMOG), and Diagnostic Steering Group (Scottish Government). The Laboratories and Diagnostic cell helped to develop a Situation-Background-Assessment-Report (SBAR) which outlined the volume of testing required, and steps needed to get NHS Scotland diagnostic labs live, including funding with input from the members of the JDG.

4.4.14 Pre-pandemic the NSS National Procurement team did not have a nationally identified lead officer for microbiological diagnostics related to virology. There was therefore no national framework to coordinate procurement of microbiology diagnostic testing equipment and consumables across health boards in Scotland. Consequently, they were managed through local contracts at health board level. Following a PHS request to the Scottish Government for additional national support in February 2020 (PHS7/060 – INQ000478166),⁷³ a NSS Procurement National Laboratories lead was appointed. Work was required to quickly build relationships and establish knowledge of the virology diagnostic testing needs. The PHS PHM team worked collaboratively with the NSS Procurement National Laboratories lead and the NHS diagnostic and specialist virology reference laboratories to facilitate the early stages of national procurement of PCR testing equipment and consumables (PHS7/058 – INQ000280732),⁷⁴ (PHS7/051 – INQ000478137).⁷⁵

Laboratories and Diagnostic Cell

4.4.15 The Laboratories and Diagnostic Cell at the beginning of February 2020. The purpose of the cell was outlined in the terms of reference (PHS7/061 - INQ000256628)⁷⁶:- to facilitate the strategic coordination of laboratory services in line with public health need, focusing on, and in collaboration with, Specialist and Reference Laboratories as part of the clinical response to Covid-19 across Scotland. The co-chairs of the cell, David Yirrell, Consultant Clinical Scientist in Virology, and Michael Lockhart, Consultant Microbiologist, engaged with the Chair of the Scottish Government Clinical Care Cell, Professor Tom Evans, to discuss specific laboratory issues. Initially the role of the Laboratories and Diagnostic Cell focused on the establishment of PCR testing and dataflow in Scotland; this shifted to assessing quality, developing new testing technologies, and building an end-to-end Whole Genome Sequencing (WGS) service

⁷³ Hornby, P. RE: Wuhan virus response - procurement advice on lab consumables [email]. January 2020.

⁷⁴ National Laboratories Programme, NHS National Services Scotland. SARS-CoV2 Diagnostic Equipment Allocation SBAR. Accessed 15 May 2020.

⁷⁵ Health Protection Scotland. Update on Diagnostic Support for the Response to Covid-19 to Scottish Government 26th February from the HPS Laboratory SARS-CoV-2 Cell. February 2020.

⁷⁶ Public Health Scotland. PHS Lab Cell TOR V0.1 2022-02-01 DRAFT. February 2022.

for Scotland (see Section 4.16). Data gathering of results became more complex over time as testing increased and involved capturing results from UK Lighthouse Laboratories (see Section 4.4), Regional Hub laboratories, and private laboratories, as well as capturing DNA sequencing data.

- 4.4.16 As the Laboratories and Diagnostic Cell developed, additional colleagues joined and the cell worked with other response groups which were established within PHS to focus on specific issues, such as Clinical Guidance and Real-Time Epidemiology (PHS7/062 INQ000478126).⁷⁷ The cell provided the initial forum to bring together key partners to develop a coordinated plan for emergency diagnostic response and to identify procurement needs.
- 4.4.17 On 14 February 2020, the cell published 'Covid-19 Laboratory testing frequently asked questions V1.3' (PHS7/063 INQ000189360).⁷⁸ This document was updated and published a further four times during the pandemic.
- 4.4.18 In early March 2020, capacity for testing was limited in NHS Scotland Laboratories, partly by national laboratory infrastructure which was designed for specialist microbiology testing rather than mass testing. Modelling information developed for testing capacity predictions was based on assumptions/revision on reasonable worstcase scenario for Covid-19.
- 4.4.19 Further roll out to local NHS Scotland diagnostic testing laboratories awaited Advisory Committee on Dangerous Pathogens (ACDP) advice on laboratory specimen handling requirements (PHS7/056 - INQ000273610),⁷⁹ as well as the delivery and installation of new testing equipment, staff training and IT connections to share results.
- 4.4.20 The Laboratories and Diagnostic Cell developed a process in early March to ensure returns from Scottish NHS laboratories were accurate. This allowed quality measures to be developed to ensure that dataflow was robust, timely, and accurate, and enabled confidence in reporting of statistics.
- 4.4.21 The role of serological testing (antibodies in blood) as part of diagnosis of Covid-19 disease was explored in early March together with the UK and Scottish Government, PHE, and NHS Diagnostic labs. Stakeholders agreed to restrict the use of serology

⁷⁷ Lockhart, M. Covid-19 Cell Descriptions for PHE - 2020-02-24 [email]. February 2020.

⁷⁸ Health Protection Scotland. Covid-19 Laboratory testing frequently asked questions. V1.3. February 2020.

⁷⁹ Public Health England. Covid-19: guidance for sampling and for diagnostic laboratories Information for clinical diagnostic laboratories regarding safety, sampling and packaging specimens associated with Covid-19. January 2020.

testing to epidemiological studies and surveillance of spread of disease. PHS thereafter established the serology stream of its Enhanced Surveillance of Covid-19 in Scotland programme (see Section 4.2)

- 4.4.22 When the required containment level of laboratories was changed from three to two in early March 2020, work commenced in setting up Covid-19 sample testing in NHS Scotland Labs that could work with medium risk biological agents and hazards.
- 4.4.23 The Scottish Government asked HPS about the potential demand for PCR testing in mid-March 2020 and they found that the numbers for anticipated admissions would overwhelm existing planned capacity. An emergency meeting was held to discuss laboratory capacity on 16 March (PHS7/064 - INQ000280820)⁸⁰ and a warning provided to health boards that there would be a substantial increase for the demand for laboratory testing for healthcare workers.
- 4.4.24 Following the receipt of Covid Testing UK expansion plans on 22 March 2020, PHS sent the Scottish Government proposals for Scotland to take forward (PHS7/065 INQ000256619).⁸¹
- 4.4.25 PHS worked with the NLP, SMVN, NSS National Procurement and the Scottish Government to align capacity and demand. This was a challenge due to escalating demands for testing and a global race for testing resources. The Scottish Government's testing strategy evolved as the pandemic progressed and there was closer alignment between capacity and demand by 2021.

PCR testing capacity build-up

- 4.4.26 PCR testing capacity at the Edinburgh and Glasgow NHS Scotland Specialist Virology laboratories was 350 specimens per day by 10 February 2020. The first positive PCR test which was reported as carried out by NHS Scotland lab was reported on 28 February 2020 and then published on the daily dashboard on 2 March 2020 (the dashboard is discussed in Chapter 9).
- 4.4.27 The increase in PCR testing capacity beyond the initial emergency response (see Table 1) was coordinated through different governance arrangements. Significant

⁸⁰ Health Protection Scotland. Notes of Emergency Meeting to discuss Laboratory Capacity held 17 March 2020.

⁸¹ Lockhart M. Covid testing - UK expansion plans - Request for Leadership and Direction from S.Gov 2022-03-23 [email] March 2020.

scaling up of NHS PCR testing was led by the Joint Diagnostics Group; co-chaired by NLP and SMVN, with the PHM clinical lead acting as deputy chair (PHS7/059 – INQ000478177),⁸² (PHS7/066 – INQ000478120),⁸³ (PHS7/067 – INQ000478121).⁸⁴

Month	Samples per day)
Jan 2020	0
Feb 2020	350
Mar 2020	2250
Apr 2020	19,484
Jul 2020	53,016
Oct 2020	60,341
Jan 2021	66,060
Apr 2021	67,138
Jul 2021	73,886
Oct 2021	73,886
Jan 2021	74,535
Apr 2021	74,040
Jun 2021	74,040

Table 1: NHS Labs Covid-19 PCR Testing capacity (samples per day)

- 4.4.28 The initial upscaling of Scottish PCR testing capacity was underway when, on 22 March 2020, information on the Covid Testing UK expansion plan was shared by the UK Government. The ambition of the plan was to increase UK PCR testing capacity to enable up to 100,000 PCR tests per day. These would initially allow for testing of frontline NHS staff before scaling towards wider population testing
- 4.4.29 To meet this ambition, large-scale academic and commercial testing facilities, which would be known as Lighthouse Laboratories, were developed. (PHS7/068 INQ000280817).⁸⁵ These were in place by early April 2020 in three locations: Milton Keynes, Alderley Park and Glasgow. Decisions for these labs were made centrally in England by the Department of Health and Social Care (DHSC) where samples were

⁸² Harley, K. NLP and HPS collaboration for SARS-CoV2 approach K Harley 2020-03-09 [email]. March 2020.

⁸³ Health Protection Scotland. Proposal for meetings going forward.

⁸⁴ NHS National Services Scotland. Joint Covid-19 Diagnostics Group: SARS-CoV-2 / Covid-19 Update. April 2020.

⁸⁵ Foggo, Richard. Covid testing - UK expansion plans - suggested forum 2020-03-23 [email]. March 2020.

shipped, how many were tested, how they were tested, were all designed centrally with no input from PHS.

4.4.30 In response to the UK PCR testing expansion plans, the Scottish CMO recommended the formation of a Scottish Testing Oversight Group which would have oversight of a Scottish Covid-19 Testing Strategy for increasing test capacity consistent with the UK plans, including addressing the challenges faced by procurement (PHS7/069 -INQ000316272).⁸⁶ This would also support contact tracing to manage spread of infection.

4.5 **Procurement of PCR tests and consumables**

- 4.5.1 The availability of testing consumable supplies was a key factor in decision making. The PHS PHM team approached NSS National Procurement at the end of January 2020 to discuss consumables related to laboratory services (PHS7/060 – INQ000478166).⁸⁷ This included a proposal for review of the current stock levels of laboratory consumables (in particular swabs used for collecting viral samples for testing) for consideration for forward planning. It was advised by NSS National Procurement that lab consumables were not managed centrally but locally by health boards.
- 4.5.2 In February 2020, a review of test swabs stocks levels for each health board was undertaken by PHS in partnership with NHS Specialist Virology Reference Labs, SMVN, and NSS Procurement to establish a baseline of what was currently used in NHS Scotland laboratories (PHS7/070 - INQ000478118).⁸⁸
- 4.5.3 PHS provided the NSS National Procurement lead information on the further requirements for the procurement of testing consumables for health boards (PHS7/071 INQ000280895),⁸⁹ (PHS7/072 INQ000478197).⁹⁰ This included swabs and sample packaging required for the transportation of samples to UKHSA Reference Laboratory in Colindale, in line with the available guidance from UKHSA in early 2020. The capacity requirements for swabs and consumables were based on comparable viral testing kits for influenza which were already in use by health boards. The details of

 ⁸⁶ Chief Medical Officer to First Minister and Cabinet Secretary for Health and Social Care [letter]. Covid-19 testing in Scotland – progress and developments in the Scottish testing strategy. March 2020.
 ⁸⁷ Hornby, Paul. RE: Wuhan virus response - procurement advice on lab consumables [email]. January 2020.

⁸⁸ Health Protection Scotland, Public Health Microbiology Team. Update of stocks of viral transport media & swabs held at NHS boards 7-Feb-2020. February 2020.

⁸⁹ Labs and Testing Cell. Labs and Testing Cell action log v0.1 2021-01-05. 2021.

⁹⁰ Swab information from SMVN. 2020.

these consumables were provided to PHS by the NHS Scotland reference laboratories and diagnostic laboratories and shared with NSS National Procurement to assist with their procurement activities.

- 4.5.4 By the beginning of February 2020 PHS were alerted by health boards that the suppliers of swabs and testing kits had begun limiting supply and delaying deliveries which posed a risk of developing nationwide inequity in the ability to collect samples, which further highlighted the need for a centralised response from PHS and NSS and Scottish Government to resolve (PHS7/073 INQ000478203),⁹¹ (PHS7/070 INQ000478118),⁹² (PHS7/074 INQ000478176).⁹³ The PHM team worked with SMVN to provide advice to health boards to hold stock levels in line with seasonal flu where possible, and coordinated information sharing on alternative swab types which could be used when one type was not available (PHS7/075 INQ000478162).⁹⁴ The PHM team and NSS National Procurement lead also helped to coordinate the sharing of consumables between health boards when this option was available. PHS then worked with National Procurement to secure a central supply of preferred testing swabs which health boards were able to draw down from.
- 4.5.5 In early March 2020, ECDC and WHO recognised that a key risk was arising worldwide from laboratory supply shortages and recommendations were issued to countries on how laboratories could best manage these shortages to ensure that testing interruption was minimised (PHS7/076 INQ000478170).⁹⁵ This advice from WHO and ECDC was incorporated into national UKHSA "Covid-19 guidance for sampling and for diagnostic laboratories" (PHS7/056 INQ000273610)⁹⁶ which formed the basis for the PHS "Covid-19 guidance for laboratories" (PHS7/077 INQ000495929).⁹⁷ Individual health boards would be responsible for incorporating guidance into their laboratory operating protocols, but would have the support from PHS, NHS Procurement, NLP, SMVN and NSS to ensure that health boards had access to the resources and assistance required to provide Covid-19 testing.

⁹¹ Keyes, E. Viral swabs issues NHS Orkney 2020-02-13 [email]. February 2020.

⁹² Health Protection Scotland, Public Health Microbiology Team. Update of stocks of viral transport media & swabs held at NHS boards 7-Feb-2020. February 2020.

⁹³ Currie, S. Re: ICM Action Log - t/c 20/02/20 [email]. February 2020.

⁹⁴ Currie, S. FW: SMOG : SARS-CoV-2 swab / VTM stock [email]. April 2024.

⁹⁵ EDCD/WHO-EURO TC: 2020-03-13. March 2020.

⁹⁶ UK Government. Covid-19: guidance for sampling and for diagnostic laboratories [web page]. Accessed 31 August 2023.

⁹⁷ Public Health Scotland. Covid-19 health protection guidance: Covid-19 guidance archive: Laboratory guidance. November 2023. Last accessed 23 July 2024.

- 4.5.6 As new commercial PCR tests became available, they required to undergo quality review and validation, which for the UK was managed through the Medicines and Healthcare Products Regulatory Agency (MHRA) and UKHSA (see Section 4.12). The first commercial award notification was received on 11 March 2020 from PHE/MHRA to assist with expanding testing capacity. This allowed a transition from specialist 'inhouse' testing services in reference laboratories towards a diagnostic laboratory commercial platform delivery model. NSS National Procurement provided updates to PHS on the timeframes and availability of commercial PCR tests as and when they became available, but Scotland was often in competition with other countries to get access to these supplies.
- 4.5.7 In April 2020, the JDG provided an update to the Diagnostics in Scotland Steering Group on the approach to increase Scotland's PCR testing capacity (PHS7/067 -INQ000478121).⁹⁸ A key challenge highlighted was the fragile supply chain in procuring PCR tests and consumables due to significant global demand. Mitigations were put in place through the diversification of the PCR testing platforms procured for use by health board laboratories. This would ensure minimal reliance on a single supplier for diagnostic testing supplies.
- 4.5.8 NHS Regional Hub laboratories were operational in Scotland in December 2020: North (Grampian); East (Lothian); West (Glasgow). These were established by a collaboration of NSS National Laboratories Programme and NHS Scotland Diagnostic Laboratories to help bolster Scotland's PCR testing capacity by an additional 22,000 PCR tests per day.

4.6 Decision-making

- 4.6.1 The decisions on eligibility of PCR sampling and lateral flow device testing were led by the UK Government. PHS were not involved in the decision making or distribution of PCR sampling kits and Lateral Flow Tests (LFTs) or defining the eligibility of their use. PHS had no direct responsibility for the procurement of Lateral Flow Tests. The evaluation, procurement and roll out of LFTs was managed by the UK Government who coordinated the supplies to the four nations. Distribution of supplies to NHS health boards was coordinated by Scottish Government and NSS Procurement.
- 4.6.2 PHS role was to provide expertise into Scottish Government T&P groups and ensure that data from testing was collated and analysed to provide daily oversight of the

⁹⁸ NHS National Services Scotland. Joint Covid-19 Diagnostics Group: SARS-CoV-2 / Covid-19 Update. April 2020.

transmission of disease in Scotland. Eligibility for sampling was directed by the UK and Scottish governments. Initial sampling in 2020 was limited to patents in hospital presenting with severe disease who met the clinical case definitions for Covid-19, before expanding to routine monitoring of infection in healthcare workers. As cases increased nationwide, and understanding of Covid-19 improved, and testing was expanded, anyone who presented symptoms of Covid-19 or had been identified as a contact of a positive case was tested, in line with guidance provided by WHO and ECDC.

- 4.6.3 The delivery and effectiveness of each testing strategy was assessed and the NIMT then offered advice to the Four Harms Advisory Group for consideration by Scottish Government Ministers in their decision making.
- 4.6.4 In overview, differences in prioritisation when compared to England, Wales and Northern Ireland reflected the different healthcare structures, health profiles and differential availability of testing resource.

4.7 Targets and impact

- 4.7.1 Scottish Government set targets for testing and gave progress reports to milestones in Scotland as part of the Scottish Government communication strategy. Scottish Government is therefore best placed to address any queries on Covid testing backlogs.
- 4.7.2 Scotland for the most part was reaching people with Covid-19 and their contacts within the timeframe set out within the WHO standards for contact tracing. However, the impact would have been diminished *if* individuals waiting test results did not adhere to the public health advice to self-isolate until their result was known. Assuming adherence was less than 100% it is the likely that inadvertent transmission continued for some of these individuals.

4.8 Microbiology data

Pre-pandemic

4.8.1 Electronic Communication of Surveillance Scotland (ECOSS) is the centralised system which derives microbiology and virology laboratory test results from all Scottish NHS labs (PHS7/078 – INQ000569810).⁹⁹ The datasets from ECOSS are used by PHS and ARHAI Scotland for surveillance programmes, infectious disease publications, and outbreak and pandemic management.

⁹⁹ Public Health Scotland. Electronic Communication of Surveillance Scotland (ECOSS). November 2024.

- 4.8.2 As discussed above, pre-pandemic both NHS Scotland diagnostic and reference laboratories had existing automated data connections in place with ECOSS for patient test results via their Laboratory Information Management Systems (LIMS). There was no automated link with results arising outside of Scottish NHS Laboratories such as PHE's Second-Generation Surveillance System, academic or commercial laboratories. Work had commenced with PHE prior to the pandemic to establish an automated feed for results arising in English laboratories for Scottish patients, but progress was halted due to the Covid-19 response.
- 4.8.3 Prior to the pandemic there was no central directorate or team within HPS/PHS overseeing ECOSS. The ECOSS data team based within the PHM team in HPS/PHS introduced a quality assurance programme from 2017 to audit the quality of results received into ECOSS by NHS Scotland microbiology and virology laboratories. The purpose of this audit was to ensure that the information found in ECOSS was accurate and met the needs of the public health surveillance teams for monitoring and reporting, with data management oversight.
- 4.8.4 Although ECOSS had been used for outbreak management purposes prior to Covid-19 pandemic, it included smaller volumes of results and involved more manual processing for reporting. The need for data from a variety of sources which was required to inform pandemic response decisions had not been fully prepared for prior to Covid-19 response, including the volume and speed of data to be processed into ECOSS for pandemic response.
- 4.8.5 Following the pandemic, the DDI directorate within PHS assumed the management of ECOSS, with an agreed hub-and-spoke model in place with clear change control processes to minimise risk of disruption and oversee quality of data. Work to implement an automated data linkage between UKSHA and ECOSS is ongoing but is still at an early stage. Information Governance issues are currently being progressed in advance of technical work commencing. It is expected that this work will be completed by the end of 25/26 year, but may be completed sooner.

Ensuring data quality

4.8.6 From early March 2020, the laboratory and diagnostics cell ECOSS data team developed an audit process of the quality of data arising from Scottish laboratories. The team worked closely with laboratory staff to improve accuracy and timing of data submissions for reporting purposes to inform the epidemiological picture of spread in Scotland and UK.

- 4.8.7 As there was no centralised oversight of NHS Scotland Laboratories, there was variation between health boards in the type of LIMS systems used, the staff resources available to respond to audits, and the staff skills necessary to understand and undertake the changes required to improve data quality. This often meant that health boards provided data in different formats which required additional time for the ECOSS data team to review and work with the laboratories to understand and seek to apply standardisation for improved data reporting. There were also some issues encountered when LIMS system providers were unable to apply the changes required and as such different solutions were required to ensure accuracy of data was maintained. The partnership working between the PHS laboratories and diagnostic cell and staff in boards ensured that any issues were responded to promptly and there was continuity of service to allow reporting of results.
- 4.8.8 Another challenge was the limited IT resource available within PHS to apply necessary changes to the ECOSS infrastructure to assist with the changes required to process the volume and complexity of data management. An ECOSS Quality Improvement Group was established in 2020 to bring together ECOSS data management with ARHAI Scotland, DDI, Digital and Security (IT team within NSS) and epidemiologists to manage resources and tasks required to improve the quality of data available for reporting (PHS7/079 INQ000569828),¹⁰⁰ (PHS7/080 INQ000569827).¹⁰¹

4.9 Future development of microbiology services

4.9.1 As discussed earlier, in Scotland at the outset of the pandemic there was a lack of clarity on responsibility at a national level for the coordination of diagnostic laboratory service delivery and maintenance of a fit for purpose repertoire of tests. National leadership and the funding of public health microbiology services were identified as areas of learning in two 2024 reports: "Gap Analysis of public health microbiology services in Scotland" (PHS7/081 - INQ000495928)¹⁰² and "Global review of reference lab services" report (PHS7/082 - INQ000569832).¹⁰³ These are discussed in Chapter 11.

¹⁰⁰ Public Health Scotland laboratory and testing cell, ECOSS Plus Quality Group. Terms of Reference, version 0.1 (draft). June 2020.

¹⁰¹ Public Health Scotland. ECOSS Quality Improvement Group (EQIG) terms of reference, v0.4 (draft). June 2021.

¹⁰² Public Health Scotland. Gap analysis of Public Health Microbiological services in Scotland: Analysis across One Health Microbiology disciplines to meet Public Health / Health Protection requirements. June 2024.

¹⁰³ Public Health Scotland. Review of Global Reference Laboratory Service Delivery Models: analysis to identify comparable exemplars of modern, well governed, and efficiently resourced services aligned with public health agency need in countries of a similar population size to Scotland. May 2024.

- 4.9.2 HPS published a strategy in 2018 which sought to set the direction for HPS/PHS to improve coordination and modernisation of PHM services in Scotland and facilitate diagnostic surge capacity in the event of a major infection outbreak as part of a national preparedness plan (PHS7/083 – INQ000569780).¹⁰⁴ In 2020, work on the delivery of the strategy was put on hold to divert response to Covid-19 pandemic.
- 4.9.3 There was no agreed route for funding of the diagnostic pandemic response in Scotland. Funding for Scottish reference services was assigned from an agreed "top slice" of health board budgets. Therefore, investment in reference services was dependent on the endorsement of the NHS health board chief executives and directors of finance. Investment for individual patient management was prioritised over public health reference services and pandemic preparedness which left services poorly equipped to deal with a large-scale response to a pandemic. PHS shared a proposal on 28 February 2020 to NSD around funding to support procurement of commercial testing capacity in NHS Scotland Laboratories (PHS7/084 - INQ000478153),¹⁰⁵ but the need for clarity on procurement funding and oversight of significant increases in PCR testing capacity ultimately led to the development of the Scottish Testing Oversight Group and T&P governance structures (in late spring 2020).

4.10 Sector-specific testing

- 4.10.1 PHS had both a statutory role (e.g. to the NHS in tandem with our ARHAI colleagues) in advising on policy or an advisory role for principles in non-NHS settings in a cross sectoral approach.
- 4.10.2 All groups in society were afforded access to testing, once population testing capacity was established. The key intervention was for groups of staff to remain off work if they had symptoms or were identified as contacts. Without testing, people would have been required to self-isolate for the period of infectiousness or incubation from a viral exposure. Home testing was made increasingly available over a period of months for those with transport or disability issues. Sector-specific aspects of PHS involvement are set out below.

Healthcare workers

4.10.3 PHE/UKHSA led the four nations SARS-CoV-2 Immunity and Reinfection Evaluation (SIREN) study, working in partnership with the four nations' public health bodies.

¹⁰⁴ Scottish Health Protection Network. A public health microbiology strategy for Scotland. November 2018.

¹⁰⁵ Harley, K. Coronavirus - increasing laboratory test costs [email]. February 2020.

- 4.10.4 The study monitored a cohort of 44,500 healthcare workers who provided samples for regular PCR and antibody testing. Analysis of these samples helped the UK to evaluate the immune response to Covid-19, provided insight into Covid-19 reinfections and helped build an understanding of the level of protection offered by vaccines.
- 4.10.5 PHS co-opted and collaborated with Glasgow Caledonian University (GCU) colleagues to deliver the Scottish arm of the four nations SIREN study, including the recruitment of Scottish healthcare workers to take part in the study.
- 4.10.6 PHS was the data controller for the SIREN Scotland database and created automated processes to establish and maintain the database which contained all Scottish participants' PCR and Serology results. These data were securely transferred to UKHSA along with information on participants' vaccination status and sequencing results.
- 4.10.7 PHS agreed that the research questions for SIREN were best addressed by analysis of the data for the whole UK cohort. Therefore, all analyses of the data, peer review publications and reports to the four CMOs and the JVCI was done by UKHSA (PHS7/085 - INQ000256632).¹⁰⁶
- 4.10.8 PHS produced a monthly data report from September 2021 to March 2023 for the Scottish Government on the Scottish data. The report did not include interpretation or recommendations.

Social care

- 4.10.9 PHS had a key role in operationalising the testing and contact tracing policies applicable in social care settings, outlining issues and management of risks in guidance documents, with several revisions over the course of the pandemic, either for clarification of Scottish Government policy or when this changed at short notice. PHS would aim for consistency with wider UK partners across the other three nations and adhering to scientific evidence as this became available. PHS guidance in this regard is included in Appendix G.
- 4.10.10 The Scottish Government introduced LFD testing in November 2020 for certain pathways, including initially healthcare workers, care home staff, care home visitors and visiting care home workers. These are standalone test devices and (initially) there was no flow of data from the device. This is quite different from the situation with PCR

¹⁰⁶ UK Health Security Agency. SIREN study. June 2022.

(and serology) testing in which the data was generated and sent via lab reporting systems.

- 4.10.11 The testing policy of patients discharged from hospital was led by the Scottish Government and once decided, it was PHS' role to operationalise this for local HPTs and NHS services with the support of ARHAI and to support its application across all sectors, including social care.
- 4.10.12 Limited testing of residents in care homes was initially used to identify outbreaks when clusters of individuals presented with respiratory symptoms. Once testing capacity was established across the UK, guidance on the use of testing of symptomatic residents was implemented according to Scottish Government policy. PHS operationalised this for use by frontline staff.
- 4.10.13 People in receipt of their care at home could access testing similarly to the general population and if they were housebound, guidance was provided for the staff attending them to obtain a sample. Those in receipt of care at home or the disabled (or contacts) were not specifically targeted for testing, but population-level testing for symptoms applied to them, as did shielding interventions.
- 4.10.14 On 12 March 2020 HPS published 'COVID-19: information and guidance for social or community care and residential settings' (PHS7/086 INQ000189305).¹⁰⁷ This was adapted from guidance developed for hospital and primary care settings in that it reflected important principles employing a hierarchy of controls. Expected interventions included high standards of hygiene, patient distancing, patient cohorting (i.e. the practice of grouping patients together who either have the same or were exposed to the same infection when single room isolation of individuals is not possible), use of personal protective equipment (i.e. personal protection and for source control for staff, visitors and patients (including specific masks)) and visitor management.
- 4.10.15 On 14 May 2020, PHS published 'Interim guidance on Covid-19 PCR testing in care homes and the management of Covid-19 PCR test positive residents and staff' (PHS7/087 INQ000320628)¹⁰⁸ to aid NHS Board colleagues, care home providers and others interpret and implement the policy for Covid-19 testing on in care homes announced on 1 May 2020. The aim was to reduce the risk of transmission of the virus within residential care home settings, in the shortest possible time. The advice was

¹⁰⁷ Health Protection Scotland. COVID-19: Information and guidance for social or community care & residential settings. March 2020.

¹⁰⁸ Public Health Scotland. Interim guidance on Covid-19 PCR testing in care homes and the management of Covid-19 PCR test positive residents and staff. May 2020.

therefore written from a clinical perspective and reflected a consensus on which health protection measures are likely to be the most effective in achieving the maximum reduction in the risk of infection, most quickly. In particular, the guidance was produced to assist NHS Board Health Protection teams (HPTs), and care home providers manage Covid-19 PCR test positive residents and staff, especially asymptomatic test positive staff.

4.10.16 Further revisions to the care home testing guidance referred to above were subject to discussion between PHS and the Scottish Government. Operationalising policy intent in guidance whilst maintaining scope for local HPTs to use their professional judgement to assess how best to manage an outbreak was a recurring challenge. It was – and continues to be – PHS's view that guidance must be applied using clinical and professional judgement based on an assessment of the local circumstances. The Scottish Government twice queried the necessity of this approach in relation to care home guidance between July and September 2020 (PHS7/088 – INQ000320629).¹⁰⁹ Agreement was reached following a series of discussions and version 1.7 of the guidance (PHS7/089 – INQ000320627),¹¹⁰ published on 17 September 2020, included the following clear revised description of the role of risk assessment:

'On identification of a new suspected or confirmed Covid-19 case, the care home must immediately contact the local HPT who will undertake an assessment of the situation including the adequacy of Infection Prevention and Control (IPC) measures and will advise on the need for testing of residents and staff. Based on a risk assessment of the case and the home circumstances, testing of all residents and staff may be considered necessary at this point. Upon receipt of a positive result a HPT conducts a public health risk assessment to decide if whole home testing is appropriate. There is discretion for local HPTs to assess whether whole home testing is appropriate where, for example, a weak PCR positive turns out to be negative upon re-testing or there is a false positive result for another reason. If for whatever reason the HPT decided not to go ahead with whole home testing after one case only (e.g. a false positive test), if there was a second case then they must consider it. An outbreak will be declared by the local HPT following identification of 2 linked cases, at least one of which has been laboratory confirmed. At this point, if whole home testing of all residents and staff

¹⁰⁹ PHS and SG email exchange. Answer re: risk assessment process question from cab Sec today. 24.07.20 – 10.09.20

¹¹⁰ Public Health Scotland. Information and guidance for care home settings v 1.7. September 2020.

has not already been carried out, it must be actively considered. A number of other measures will follow as guided by the HPT.'

- 4.10.17 The guidance for stepdown of infection control precautions and discharging Covid-19 patients from hospital to residential setting was first published on 11 April 2020 by which time HPS was part of PHS with ARHAI remaining within NSS. ARHAI led nine updates to this guidance in 2020, before incorporating it into the National Infection Prevention and Control Manual (NIPCM) in February 2021. This guidance advised hospitals when testing was needed prior to stepdown from isolation rooms and wards or before discharge to care homes or transfer to other hospitals and on isolation into single rooms. This guidance is now solely owned by ARHAI.
- 4.10.18 PHS worked with the ARHAI team within NSS on the development of guidance for IPC in health and social care settings and provided links to ARHAI guidance on IPC matters. ARHAI provided links to PHS guidance on health protection matters. This ensured that both sets of documentation provided the most up to date guidance in healthcare and social care settings (where ARHAI is responsible) and in the wider settings in which HPTs operate (the primary audience of PHS guidance). IPC guidance is used by HPTs in managing care home and social care setting outbreaks, with PHS supporting when requested. Local IPC teams manage healthcare setting outbreaks and refer to ARHAI for national support.
- 4.10.19 PHS worked with the SDsPH to provide advice to Scottish Government on symptomatic health and social care workforce. Testing capacity was eventually expanded to enable asymptomatic screening of the heath and care home workforce up to thrice weekly, a policy devised by Government for which PHS provided officials with a number of options for its operationalisation early in its consideration.
- 4.10.20 Asymptomatic testing (screening) was applicable across acute healthcare and social care settings, although there was phasing applied to adult social care workers. An assessment of the merits of asymptomatic screening in this workforce using routine screening programme assessment tools National Screening Council criteria 20 was not employed (i.e. "Public pressure for widening the eligibility criteria for reducing the screening interval, and for increasing the sensitivity of the testing process, should be anticipated. Decisions about these parameters should be scientifically justifiable to the public."). These decisions were made by Scottish Government.

4.10.21 Asymptomatic testing (screening) of the workforce was not prioritised above symptomatic or clinical testing. PHS is unable to find any direct evidence that it was asked to provide specific advice on this.

Schools

- 4.10.22 The Scottish Government established a sub-group of the Covid-19 Advisory Group to increase capacity and capability to provide rapid, regular and more granular scientific advice on education and children's issues to support the Scottish Government's decision-making. PHS was represented on the Scientific Advisory Sub-Group on Education and Children's Issues by Dr Eileen Scott, Public Health Intelligence Principal. It was a time-limited, expert sub-group, chaired by the Chief Social Policy Adviser to the Scottish Government.
- 4.10.23 PHS led a discussion on 30 June 2020 around the monitoring that should be implemented in schools and early learning settings as these reopen. The minutes reflect that the sub-group noted the surveillance, testing, control and prevention approach (PHS7/090 - INQ000235111).¹¹¹
- 4.10.24 The group published an advisory note on 3 February 2021 on the phased return to inperson learning in schools and early learning and childcare settings (PHS7/091 -INQ000274021).¹¹² The note refers to PHS's data linkage study undertaken with the support of the General Teaching Council for Scotland (GTCS) which provided a way of assessing the risk of Covid-19 in teachers, compared with non-teachers (PHS7/092 -INQ000147577).¹¹³

Those living in overcrowded accommodation

4.10.25 Chapter 7 discusses how PHS articulated evidence that interventions designed to suppress viral transmission have an unequal impact across the population, with differential impact most adversely affecting those in more deprived populations, e.g. overcrowded housing. For example, May 2022 guidance for HPTs, in reflecting more targeted testing rather than population-wide, recognised that among targeted groups were those applying for self-isolation support grant (PHS7/057 - INQ000273606).¹¹⁴

¹¹¹ Covid-19 Advisory Sub-Group on Education and Children's Issues. Minutes from the second meeting of the Covid-19 Advisory Group held on Tuesday 30 June 2020. July 2020.

¹¹² Advice from the Covid-19 Advisory Sub-Group on Education and Children's Issues. Phased return to in-person learning in schools and early learning and childcare (ELC) settings. February 2021.

¹¹³ Public Health Scotland. Report of record linkage study of Covid-19 among teachers, healthcare workers and other working-age adults: summary report. December 2020.

¹¹⁴ Public Health Scotland. Covid-19 Guidance for health protection teams, version 2.2. May 2022.

Prisons and asylum centres

- 4.10.26 PHS worked with the Scottish Prison Service (SPS) to support pandemic management in the prison estate in Scotland and the development of dedicated and consistent SPSspecific guidance for preventing and managing outbreaks within a prison setting and providing advice and expertise through local incident management structures, working closely with local Health Protection Teams.
- 4.10.27 The Cabinet Secretary for Justice established a Clinical Advisory Group for Prisons (CPAG) in November 2020 to provide SPS and Scottish Ministers with clinical expertise and guidance for prisons settings during the pandemic. PHS was represented on the group by Professor Sharon Hutchinson, Professor of Epidemiology and Population Health at Glasgow Caledonian University who has an honorary contract with PHS. Professor Hutchinson undertook analysis of vaccination rates in the prison population and presented findings at CPAG meetings. Dr Maria Rossi supported the operationalisation of Scottish pandemic guidance as this related to prison settings, along with ARHAI colleagues.
- 4.10.28 PHS published Covid-19 Guidance for Prison Settings v1.0 on 16 July 2021 (PHS7/093 - INQ000189277).¹¹⁵ Rationale for prison guidance was highlighted in the document. Despite the constraints of the pandemic, the considerable efforts of those working in prisons (both prison and healthcare staff) meant that throughout 2020 there were relatively few infections, outbreaks, hospitalisations or deaths among residents and staff. With the increase in community transmission of Covid-19 from late 2020, driven in part by new variants, several prisons experienced large and sometimes sustained outbreaks. Learning emerged from these outbreaks, from prison-based staff, local HPTs, national public health bodies and Scottish Government, and gaps in existing national guidance have been highlighted. As the courts resumed and social mitigation measures were relaxed, prison visits began again and the risk of infection for the prison population would likely persist. Ongoing robust infection prevention and control measures (as for the community) such as physical distancing, hand and respiratory hygiene, and the use of face coverings would continue, while mitigating measures such as symptom vigilance, appropriate ventilation, vaccination and testing (of both staff and those in prison) were rolled out.

¹¹⁵ Public Health Scotland. Covid-19 Guidance for Prison Settings, version 1.0. July 2021.

4.11 Test sites

- 4.11.1 In the first months of the pandemic the establishment and running of test sites was initially limited to pre-established NHS virological laboratories and coordinated by HPS with its stakeholders. The expansion of these NHS sites and of testing hubs was undertaken through coordination between Scottish Government, NSS and local partners.
- 4.11.2 Whilst PHS made contribution to strategy and tactical responses through the T&P group and its subgroups, NSS, NHS boards and their local authorities made operational decisions on the establishment of testing sites.
- 4.11.3 The PHS led NIMT offered advice on actions to support the T&P on the deployment of mobile resource to bolster local availability of testing.

4.12 Quality and reliability

Quality measures for new testing technologies

- 4.12.1 As discussed earlier, PHS did not and does not undertake laboratory testing but followed the diagnostic guidance and advice of WHO relating to SARS CoV-2 laboratory testing (including quality measures) (PHS7/094 INQ000478206)¹¹⁶ which reviewed the growing body of evidence regarding SARS-CoV-2 and continues to provide guidance to all nations.
- 4.12.2 There were a variety of commercial and 'in-house' PCR tests in use in Scotland throughout the pandemic response which were used to confirm the presence of the virus SARS CoV-2, all of which were regulated and approved by the MHRA, and thereafter validated for use by the Scottish laboratory performing the test.
- 4.12.3 The selection of suitable suppliers was advised by UKHSA (then PHE) who worked with the MHRA to assess and validate new commercial kits before approving availability for four nations to draw from. Any tests procured were calibrated and validated by the testing laboratory for clinical use.
- 4.12.4 At the beginning of the response in 2020, the initial verification of validation reports for new PCR tests being used in NHS Scotland laboratories were conducted in collaboration with the Consultant Virologist in the PHS PHM team and the NHS Scotland Specialist Virology Reference Laboratory Virology Consultants.

¹¹⁶ World Health Organisation. Diagnostic testing for SARS-CoV-2: Interim guidance. September 2020.

- 4.12.5 By November 2020, the SARS CoV-2 Assay Development and Innovation (CADI) group, chaired by the Director of Healthcare Science in NSS NLP, was established to provide a formal mechanism for Covid-19 test evaluation. A Consultant Virologist from the PHS PHM team joined this group to provide expertise input (PHS7/095 INQ000478122).¹¹⁷ The group had the responsibility to evaluate innovative testing methods and platforms in parallel to UKHSA and other four nations groups. The group carried out evaluations of the sensitivity and specificity of new PCR tests so advice could be given as to their suitability for use in Scotland NHS diagnostic laboratories. These evaluations were shared with NSS National Procurement and the Scottish Government to aid decision making on the suitability of procuring and rolling out new testing technologies and methodologies. The evaluations were published online by NSS NLP to allow review by NHS laboratories to assist in their own decision making and validation processes (PHS7/096 INQ000478129).¹¹⁸
- 4.12.6 Over the course of the pandemic response several parallel groups were established to review new technologies and assess quality which PHS were invited to join to provide expertise guidance on testing and data linkages. These included the Joint Diagnostics Interim Quality Assurance Group (May 2020) (PHS7/097 INQ000280893),¹¹⁹ the Expert Panel for Support of UK Testing and Validation Group (PHS7/098 INQ000480602),¹²⁰ Diagnostics in Scotland Strategic Group, NHS Diagnostic Steering Group, Scottish Government Clinical Guidance Group (established April 2020) (PHS7/099 INQ000480594),¹²¹ and PHE Laboratory & Virology Cell (PHS7/100 INQ000478183).¹²²

Testing results reliability and usefulness

4.12.7 To optimise the reliability of test results in informing the assessment of the nature and spread of the virus over the period of the pandemic response, testing policies took into account the incidence of SARS CoV-2. The prevalence of disease is one of the variable numbers used in the formula to determine the predictive value of a test. Prevalence of infection in the population therefore can impact the positive predictive

¹¹⁷ SARS CoV-2 Assay Development and Innovation group (CADI). CADI meeting notes: 16th December 10:00 - 12:00. December 2020.

¹¹⁸ Lockhart, M. Covid-19 test evaluation - LIVE on NSS Website 2020-05-31 [email]. May 2020.

¹¹⁹ Yirrell, D. Joint Covid-19 Diagnostics Group - Interim Quality Assurance Group 2020-07-27 [email]. May 2022.

¹²⁰ Lockhart, M. RE: Draft Agenda for Expert Panel -08/10-2020 [email]. October 2020.

¹²¹ Clinical Cell Secretariat (Scottish Government). Papers for the Clinical Guidance Cell meeting - 3 June 2020 [email]. June 2020.

¹²² PHE. Covid-19 Incident Virology Cell. Meeting minutes 13th February 2020. February 2020.

value of a test, and in periods of low disease prevalence the positive predictive value of a test is different from times of high prevalence.

4.12.8 As a result of this, low levels of infection may lead to false positive results in a small number of cases. Thus, interpretations and laboratory procedures particularly with regards to low positive results need to reflect this to provide confidence to the clinician in the final result. Advice therefore from the PHS laboratories cell to NHS laboratories, and involvement with other SARS CoV-2 specific groups such as the Scottish Government clinical cell and elite sport groups, was vital to provide assurances of the accuracy of PCR testing, disease prevalence, and subsequent public health action. The Laboratory cell requested that NLP lead on developing a Joint Diagnostics quality group to address issues around implementation of new testing technologies.

4.13 LAMP

4.13.1 Loop-mediated Isothermal amplification (LAMP) is a type of rapid diagnostic test method which was used in some NHS Scotland health boards alongside other point of care tests for Covid-19. Coordination of the provision and application was managed by NLP in partnership with SMVN. UKHSA undertook review to consider this new technology for use in limited circumstances. LAMP was used by a number of private laboratories for rapid workplace testing. PHS were made aware of updates via the JDG and NSS CADI who considered new diagnostic technologies for use in health boards as part of building overall testing capacity (PHS7/101 – INQ000569784),¹²³ (PHS7/102 – INQ000569806),¹²⁴(PHS7/103 – INQ000280928),¹²⁵ (PHS7/103a – INQ000569841).¹²⁶ PHS worked with UKHSA and NHS health boards to ensure that any results arising for Scottish residents could be captured in reporting systems accurately (PHS7/104 – INQ000569787),¹²⁷ (PHS7/105 – INQ000569835).¹²⁸

4.14 Use of private laboratories in Scotland

4.14.1 As travel restrictions were lifted in 2021 monitoring visitors from other countries became important to identify any incoming variants. PHS established a working group in partnership with Scottish Government colleagues to review the urgent need for

¹²³ Department of Health and Social Care - Diagnostics Innovation Team. Covid-19 national testing programme: Testing supply: Innovation programme board. August 2020.

¹²⁴ Covid-19 Diagnostic innovations – sensitive. 2020.

¹²⁵ Using point of care tests in Scotland - Paper for discussion. July 2020.

¹²⁶ Department of Health and Social Care. Webinar - Update on innovation in testing and pillars 3&4 of the national testing strategy. [n.d].

¹²⁷ SBAR: Management of LAMP results coming via Scottish Government. November 2021.

¹²⁸ Currie, S. Re: LAMP SBAR [email]. November 2021.

guidance for private laboratories operating in Scotland to address key concerns with quality of testing, data capture for surveillance and identification of positive specimens for sequencing from private companies (PHS7/106 – INQ000569831).¹²⁹ Unless the laboratory was UK Accreditation Service (UKAS) or Certificate Quality Consortium (CQC) accredited there was little assurance around the quality of the test result provided.

- 4.14.2 A testing protocol was established by UK Government where testing for amber and red routes would be carried out by NHS and Lighthouse Laboratories, and green routes would be predominantly carried out by private companies (PHS7/107 INQ000237465),¹³⁰ (PHS7/108 INQ000569843),¹³¹ (PHS7/109 INQ000353735).¹³² Travellers were directed to use private testing providers held and managed centrally by the DHSC for the four nations (PHS7/110 INQ000569842).¹³³ Providers on the centralised list were required to ensure they were working towards accreditation.
- 4.14.3 Positive results arising were initially shared manually daily to PHS for surveillance purposes and for distribution to local health protection teams for test and trace purposes, until an automated data link could be established. Initial concerns were shared with PHE about the quality and timeliness of data shared which impacted its use in test and trace of patients, which had limited patient identifiers or were shared too late for test and trace action to be undertaken. Action was taken by PHE to improve the quality of results shared and automate the data link for Covid-19 results between England and Scotland.
- 4.14.4 Concerns were shared with PHE regarding the quality of data received. Results shared had limited patient identifiers required to undertake test and trace, such as contact numbers, addresses or patient Community Health Index (CHI) reference.
 The timeliness of data received was often too late for test and trace action to be taken, often more than five days of the patient result being issued.
- 4.14.5 PHE made PHS aware that they liaised with private providers to improve the timing of receipt of results and improve the capture of patient identifiers required for test and trace activities to occur. PHE also liaised with data management colleagues in PHS to

¹²⁹ Public Health Scotland. PHS Covid-19 non-NHS laboratories group Terms of reference, v0.4 (draft). June 2021.

 ¹³⁰ UK Government. [News story] Test to release for international travel goes live. December 2020.
 ¹³¹ UK Government. Guidance: Travel to England from another country - Covid-19 rules [Withdrawn]. April 2023.

¹³² Scottish Government. Coronavirus (Covid-19) update: First Minister's statement - 5 October 2021. October 2021.

¹³³ UK Government. Finding and choosing a private coronavirus (Covid-19) test provider. December 2020.

establish an automated data link for Covid-19 results between England and Scotland to improve timely access to results which could be shared onwards for test and trace purposes.

4.14.6 Being limited in use, there was no automated dataflow from private labs into Scottish reporting systems. This was processed manually. Within Scotland, guidance was established which encouraged private labs to work with local health board lab to review quality and sign up to system to report private results for contact. Covid-19: SARS-CoV-2 virus detection testing within Scotland: a guide for non-NHS laboratories, version 1.0 was published on 23 March 2021 (PHS7/111 – INQ000495952).¹³⁴ PHS liaised with private laboratories to ensure that they provided patient identifiable information of results to ensure that contact tracing could be carried out by local health protection teams tracing.

4.15 Large scale events

- 4.15.1 PHS provided input into testing strategies for large scale events in Scotland such as the European Football Championships (Euros) and COP26. As these events would utilise private laboratories, a key focus was ensuring planning was in place to capture positive results for contact tracing purposes.
- 4.15.2 For the Euros, the PHS laboratories cell was not substantially involved in the initial planning for the event, and how results would be obtained from the private laboratory undertaking delegate and staff testing was considered late. The laboratories cell worked quickly to ensure contact with the private laboratory was established and a manual processing route for results to PHS and to local health protection teams for contact tracing was put in place. Although the event was a success, lessons learned were shared that recommended that an end-to-end testing strategy should be considered at the earliest stages of development. These were used to help improve the coordination for COP26 (PHS7/112 INQ000569811).¹³⁵
- 4.15.3 Organisation for COP26 was led by UK Government. The role of the laboratories cell was to ensure that there was a testing and reporting strategy for delegates and staff, that additional testing would not impact on Scottish population testing, and mitigation measures were implemented based on public health advice. This was developed in collaboration with the Cabinet Office, Scottish Government, UKHSA, and local health

¹³⁴ Public Health Scotland. Covid-19: SARS-CoV-2 virus detection testing within Scotland: a guide for non-NHS laboratories, version 1.0. March 2021.

¹³⁵ Lessons identified tracker - Euros 2021.

boards. The strategy advised that key VIP attendees tested would be processed by NHS and Lighthouse Laboratories (PHS7/113 – INQ000569840).¹³⁶ This would ensure that results and response would be timely, due to an established dataflow in place and eligible positives could be prioritised for sequencing to ensure monitoring of any variants of concern were captured, which would not be achieved through use of private laboratories. All other attendees were advised to follow the national travel guidance in place. The event was managed successfully due to the team-working across the devolved administrations, but key learning shared by PHS included consideration of the data management of results at the earliest stages of planning for any future mass event management (PHS7/114 – INQ000569818).¹³⁷

4.16 Building Whole Genome Sequencing capacity for Covid-19 response

Background

- 4.16.1 Prior to the pandemic pathogen genomics in Scotland had limited capacity, funding, and infrastructure, and was not keeping pace with PHE and Public Health Wales who had established infrastructure, sequencing capacity and new technologies such as whole genome sequencing (WGS). There was localised sequencing capacity established in the Glasgow and Edinburgh based reference laboratories, with a single bioinformatician based within HPS providing analysis across both sites
- 4.16.2 WGS is an essential technology for the genotyping of pathogens. Prior to the pandemic there had been limited investment from NSD to implement WGS in Scottish reference laboratories for a narrow selection of bacterial pathogens. There was localised sequencing capacity established in the Glasgow and Edinburgh based reference laboratories, with a single bioinformatician based within HPS providing analysis across both sites

UK development

4.16.3 The Covid-19 Genomics UK (COG-UK) Consortium was set up in March 2020 to collect, sequence and analyse genomes of SARS CoV-2 as part of the UK's Covid-19 pandemic response. COG-UK was a collaboration between the four-nations' public health bodies, NHS organisations and academic institutions.

¹³⁶ UKHSA. UN Climate Change Conference (COP26): SARS-CoV-2 PCR testing for world leaders in UKHSA and WoSSVC laboratories: standard operating procedure. November 2021.

¹³⁷ Public Health Scotland. Diagnostics & testing workstream - COP26 slide deck.

Scottish development

- 4.16.4 WGS analysis was relatively new to HPS and had been used in reporting and outbreak investigations for a limited range of bacterial infections. The PHM team were working to grow this service and expand the range of pathogens in the lead up to 2020, but as a small-scale operation with limited resources focused on improving knowledge and understanding of the use of WGS for public health utility. HPS/PHS identified the need to introduce viral genotyping services for Covid-19 from early in the pandemic response. An approach was made to the Scottish Government in February 2020 but at that time HPS was advised that there was no funding available for NHS Scotland SARS-CoV-2 sequencing.
- 4.16.5 WGS was found to provide vital intelligence to inform the nature and spread of the virus in UK, supported with early but limited evidence from WGS data produced by COG-UK. PHS again sought funding from the Scottish Government for a Scottish NHS-based end-to-end WGS service which was received in July 2020. PHS worked with NSS and partners in the specialist NHS Virus laboratories to establish an end-to-end Covid WGS service for NHS boards in Scotland. Launched on 2 December 2020 the new service offered rapid sequencing of Covid-19 samples so that genotype of the virus could be compared with other samples. The aim was for PHS and NHS boards to use WGS analysis to:
 - · identify outbreaks and transmission of the virus
 - investigate the origins of outbreaks
 - genotype virus sample to identify clinically relevant mutations
 - take targeted action to reduce the size of the outbreaks
 - reduce the chances of repeat outbreaks in similar settings.
- 4.16.6 The service was used by IPC and public health teams in NHS boards to investigate community and hospital-based outbreaks ruling out transmission and improving prevention practices whilst also detecting and confirming 'Variants of Concern' and 'Variants under Investigation'.
- 4.16.7 Initially the service struggled to meet the large volume of demand. As there was a small resource available at the beginning of the pandemic response it took time to access additional funding to grow the team and develop the infrastructure required to provide the support to meet the demand.

4.16.8 The Scottish Government's updated Testing Strategy published on 17 March 2021 included a commitment to invest £13 million in 2021-22 to build a WGS service for Scotland. The ambition was to be able to sequence all positive Covid-19 cases found in Scotland and to provide a legacy beyond Covid-19 to support Scotland's resilience to a range of threats, including antibiotic resistance. The new sequencing service built on the end-to-end SARS CoV-2 WGS service PHS developed with NHS boards in 2020. The delivery of the subsequent WGS service was led by PHS in partnership with many teams, and the PHS WGS Operational Group (WOCG) was established in March 2021 to oversee this (PHS7/115 - INQ000280923).¹³⁸

Sequencing new variants

- 4.16.9 Towards the end of 2020 there were reports of a new variant of SARS CoV-2 in minks in Denmark. The role of sequencing became apparent in identifying this variant to enable contact tracing and assessment of spread. Fortunately, the "mink" variant had limited impact but highlighted the need for continued surveillance and rapid sequencing capabilities. Soon after the more significant and more transmissible "Kent" ("Alpha") variant arose. Although this could only be definitively identified by sequencing, a novel deletion mutation meant it also gave a negative result in one of the three targets in the diagnostic PCR test used at the Lighthouse Laboratories and Scottish Regional Hub Laboratories. This effect (referred to as a "S gene drop out") was used as a surrogate marker to quickly identify this variant in samples.
- 4.16.10 Early in 2021 PHS linked with UKHSA to co-ordinate their responses to any future variants of concern. To assist in the rapid detection of a new variant a technique called Allele Specific PCR (ASP) was used. This could provide variant results more rapidly than WGS but was not definitive and required detailed knowledge of each variant to be detected, therefore requiring an initial set-up period of two to four weeks before it could be rolled out for use in laboratories. As the range and diversity of variants increased and the speed of the spread of variants within the population often meant that the discriminatory usefulness of ASP was often gone by the time the ASP assay was set up, as the variant it was set up to detect had become dominant within the population. This limited its usefulness in public health intervention and as such its use was paused. However, ASP remained a testing option for individual patients when certain therapeutic treatment options were restricted to defined variants and required quick results.

¹³⁸ Public Health Scotland, Whole Genome Sequencing Operational Coordination Group. PHS WGS Operational Coordination Group meeting action sheet 18/03/2021. March 2021.

Challenges

- 4.16.11 Challenges arising from the centralised decision-making and operationalisation for the Lighthouse Laboratories were access to data and samples for Scottish residents. When new ways to test were being established it was found that consideration of data management design were not integrated into the processes at an early stage. This caused issues once the test infrastructure was established but sequencing results could not be captured into existing Scottish systems such as ECOSS. This meant that new data systems were required to accommodate results to be received, or manual processing, which were not sustainable or scalable. This was seen with the use of non-NHS laboratories such as the Lighthouse Laboratories.
- 4.16.12 The Lighthouse Laboratories did not have a functional LIMS which could provide an automated direct link into ECOSS in the same manner as other NHS laboratories. PHS worked with UKHSA and NHS Digital to establish what information was essential for contact tracing by local health boards, such as patient information and CT values (PHS7/116 INQ000569813).¹³⁹ When data was received, it could not be fully audited by PHS and resulted in cases of "orphan samples" which could not be accurately matched with patient details and therefore not contact traced.
- 4.16.13 A major issue for the WGS service in Scotland was an inability to gain rapid access to isolates of Scottish patients tested in a Lighthouse Laboratory. There were several challenges with accessing Lighthouse Laboratory samples to undertake sequencing. A key factor was that due to the contracts that underpinned the PCR testing at the Lighthouse Laboratories and the sequencing of samples at the Sanger Institute, both sites lacked the necessary flexibility and resources to make the necessary changes to accommodate the requests for access for Scottish samples.
- 4.16.14 There was limited access to Scottish samples for WGS from Lighthouse Laboratories who sent all samples to Sanger Institute. The Sanger Institute had practical issues with storing and processing the volume of samples received from all Lighthouse Laboratories, which resulted in many Scottish samples of interest not undergoing WGS or not being available for WGS.
- 4.16.15 As Sanger were not able to sequence Scottish samples as needed and the Lighthouse Laboratories did not have storage space to retain samples of interest for the Scottish sequencing service (thereby limiting scope for investigation), PHS organised and funded the use of centralised cold storage in Lanarkshire and couriers between the

¹³⁹ Various - PHS [emails]. Accessing Lighthouse data for contact testing, 14-15 May 2020. May 2020.

Glasgow Lighthouse Laboratories and NHS Scottish Reference Laboratories to allow WGS of Scottish samples to occur.

4.16.16 Arranging the logistics of accessing samples from Lighthouse Laboratories was a barrier to timely WGS of samples of interest (PHS7/117 – INQ000569782).¹⁴⁰ PHS did not participate in the decision making regarding the Lighthouse Laboratories and prioritisation of samples that Sanger sequenced. Initial issues raised to the DHSC and Deloitte, who had responsibility for Lighthouse Laboratories operations, often caused delays in responsiveness to immediate requests. PHS were able to raise concerns with UKHSA and the Scottish Government to assist in resolving issues as well as build connections with the Glasgow managers (PHS7/118 - INQ000280967),¹⁴¹ (PHS7/119 – INQ000569833),¹⁴² (PHS7/120 – INQ000569814).¹⁴³ This helped PHS to establish dataflow of results, align testing methodologies, and seek access to samples for WGS for outbreak investigations from Glasgow Lighthouse Laboratory.

WGS information governance

- 4.16.17 During the pandemic there were issues in resolving information governance for data sharing between the four-nations for genomic data.
- 4.16.18 PHS were not part of the initial collaborators on the COG-UK grant, so were not part of early discussions of what data would be shared on CLIMB (Cloud Infrastructure for big data Microbial Bioinformatics IT infrastructure for analysis of WGS results). Some suggestions for data to be shared had been driven by researchers rather than public health agencies, so there was a tension between what was being asked for and what public health agencies would be content to share. The data sharing agreement for COG-UK was drawn up by the legal team at Cambridge University and their approach was more attuned to the use of data for academic research rather than public health and patient data.
- 4.16.19 Beyond COG-UK, there were challenges with sharing of data with the Sanger Institute. Scotland was not part of the original discussions about the establishment data sharing and sampling which subsequently created operational and governance challenges for the sharing of Scottish data. This further emphasised the need for a Scottish

¹⁴⁰ Evaluation of turnaround times for Glasgow Lighthouse samples via the Sanger SARS-CoV-2 and Scottish COG-UK sequencing process.

¹⁴¹ SBAR: update to the testing programme on delivery of the SARS-CoV-2 WGS upscale - risks/issues and timelines 1st September 2021. 2021.

¹⁴² Fleming, F. Test and protect workstream weekly report: PHS whole genome sequencing. August 2021.

¹⁴³ Public Health Microbiology. Genomics risk and issue register.

sequencing service to ensure that there was timely access to WGS for public health needs.

4.16.20 Another challenge was providing an understanding to data controllers and decision makers on what genomic data contained and what parts would be considered patient identifiable. Information governance understanding of genomic data had not progressed from its use in HIV, which had strict protocols in place, and there was not a willingness for lessons learned. There was concern that although genomic sequences were anonymised and included in large national datasets, that there could be a risk in some circumstances that sequences linked to outbreaks could result in identification of individuals or patient groups. The different public health agencies across the fournations had different risk appetites for sharing of patient data. The processes to adapt to requirements were slow, even with the rapidity that Covid-19 response enabled in other areas of delivery.

4.17 Waste water testing

- 4.17.1 The implementation of wastewater testing for surveillance in Scotland was coordinated by Scottish Government, with minimal involvement from PHS. The SARS-CoV-2 monitoring programme in Scotland was conducted by Scottish Water and the Scottish Environment Protection Agency (SEPA) from May 2020. Analysis was performed by Biomathematics and Statistics Scotland (BioSS) and presented in Scottish Government weekly reports.
- 4.17.2 PHS representatives were included in strategic and operational groups to provide pathogen genomic expertise. PHS identified scope for refining and optimising wastewater sampling strategies, without which meant limitations on the use of the genomic data arising. Other issues identified but not fully resolved included information governance to allow greater sharing of the data arising from wastewater sampling by PHS, including locations of positive results.
- 4.17.3 PHS undertook an evaluation exercise, published in May 2024 to formally assess the public health utility of wastewater-based surveillance of SARS-CoV-2 in Scotland (PHS7/121 INQ000569812).¹⁴⁴
- 4.17.4 The report found that the Wastewater Monitoring Programme in Scotland has potential value in supporting three key epidemiological goals: (i) the description of broad temporal trends and geographic spread of Covid-19, (ii) the timely identification of new

¹⁴⁴ Public Health Scotland. Evaluation of the public health utility of wastewater-based surveillance for monitoring SARS-CoV-2 in Scotland. May 2024.

Covid-19 growth periods, and (iii) determination of predominant SARS CoV-2 variants. It was recommended that Covid-19 wastewater monitoring activities continued but were reviewed to ensure they addressed the evolving public health need for Covid-19 and wider infectious respiratory disease surveillance. The report cautioned on application of the system for informing immediate public health action, particularly when applied to smaller geographic areas. Recommendations were made for future improvements to ensure the reliability and validity of the system in Scotland.

4.17.5 PHS has committed to transitioning delivery of wastewater monitoring from being led by Scottish Government- to being co-ordinated by PHS, through a three-year strategy plan published in August 2024 (PHS7/122 – INQ000569837).¹⁴⁵ The aim will be to ensure that use of wastewater-based surveillance as a public health tool is quality assured and scientific led, with development of public health guidance on the appropriate application of wastewater-based epidemiology to inform public health action and decision making in Scotland, including how the Wastewater Monitoring Programme contributes to future pandemic preparedness in Scotland in the investigation and management of new or emerging public health threats. Flexibility and scalability will also be critical, to ensure the system can be rapidly mobilised to support evolving public health priorities.

¹⁴⁵ Public Health Scotland. Scotland's wastewater monitoring programme: 3-year strategic plan. August 2024.

5. Contact tracing

5.1 Context

- 5.1.1 Contact tracing was an existing (pre Covid-19 pandemic) method of NPIs for communicable diseases. During the 2009 swine flu pandemic response, HPS developed a limited capacity expansion to enable contact tracing to support NHS boards in collaboration with NHS24. Such learning and experience led to limited preplanning in advance of the Covid-19 pandemic within NSS Emergency Response to reinstitute this capability in the event of a further pandemic. This was however very limited and not on the scale of whole population contact tracing or for thousands of cases or contacts on a daily basis.
- 5.1.2 At the outset of the pandemic, it quickly became clear that different approaches for contact tracing would be required in response to Covid-19, due to the scale of the pandemic. The Scottish Government convened a Deep Dive on Test, Trace and Isolate with public health experts on 22 April 2020. This followed a Ministerial Deep Dive the previous week (PHS7/123 INQ000202129),¹⁴⁶ (PHS7/124 INQ000202126),¹⁴⁷ (PHS7/125 INQ000202127),¹⁴⁸ (PHS7/126 INQ000202128).¹⁴⁹ PHS attendees were Angela Leitch, Mary Black, and Phil Couser. An advice note was prepared by civil servants for Ministers, and a further Ministerial Deep Dive was held on 27 April 2020 (PHS7/127 INQ000202367),¹⁵⁰ (PHS7/128 INQ000572437),¹⁵¹ (PHS7/129 INQ000202362),¹⁵² (PHS7/130 INQ000202364),¹⁵³ (PHS7/131 INQ000202365),¹⁵⁴ (PHS7/132 INQ000202368).¹⁵⁵

5.2 Governance framework for contact tracing

5.2.1 Chapter 2 discusses how the Scottish Government put in place two governance groups– the T&P Delivery Group and the T&P Steering Group. The PHS Director of Contact

¹⁴⁶ Ministerial Deep Dive (Testing) Agenda - 16 April 2020. April 2020.

¹⁴⁷ Dove, N. Email to various: URGENT - Testing - meeting request. 13 April 2020.

¹⁴⁸ Turpie, A. Email to various: RE: Deep dive on testing. 15 April 2020

¹⁴⁹ SGoRR. Email to various. Dial in details and agenda for Deep Dive on Covid-19 - Testing. 16 April 2020.

¹⁵⁰ Ministerial Deep Dive - Testing: Agenda, Monday 27th April. April 2020.

¹⁵¹ Deep Dive: Testing and contact tracing. April 2020.

¹⁵² Foggo, R. Email to various - Deep dive slides. 25 April 2020.

¹⁵³ Digital Health & Care Institute. Paper 2A: Digital tools to support Covid19 co-managed community control (CO4): Project mandate, version 2. April 2020.

¹⁵⁴ SGoRR. Email to various. FW: Ministerial Deep Dive on 'Testing' - Agenda and Dial in Details. 27 April 2020.

¹⁵⁵ Goldberg, D. Email to various. RE: Deep Dive slides. 28 April 2020.

Tracing updated on progress with the contact tracing elements of the programme at these groups.

- 5.2.2 In initial stages, timelines for delivery were tight and putting in place a governance framework for this work was crucial (PHS7/133 – INQ000286861).¹⁵⁶ Section 2.3 sets out this framework.
- 5.2.3 Leadership in PHS for contact tracing was provided by Scott Heald as interim Contact Tracing Director from May 2020 to October 2020. From 3 September 2020, Scott Heald passed on responsibility for contact tracing to George Dodds, with an extended handover period until 14 October 2020 to ensure continuity. Scott Heald remained available in an advisory capacity until early January 2021, along with Dr David Goldberg providing clinical leadership in his capacity as a consultant in public health medicine.

5.3 Resources

- 5.3.1 In the early stages of the disease outbreak and before being classified as a pandemic, HPS and PHS staff were involved in carrying out contact tracing. This function was carried out alongside staff in similar roles in local NHS boards. During this early phase there was no known assessment of the totality of resource required for contact tracing.
- 5.3.2 As the pandemic progressed, operational groups and the T&P Steering Group at strategic level considered the number of cases emerging and the level of capacity required to carry out timely public health interventions through contact tracing. The Steering Group considered that a plan should be in place to ensure that contact tracing capacity could meet demand (and flex downwards should case numbers reduce) and Scottish Government arranged to collate data on workforce availability for contact tracing on a regular basis. This capacity would be drawn from a combination of existing staff carrying out temporary work assignments and directly recruited staff.
- 5.3.3 At peak, the T&P Steering Group and the Executive Delivery Group received information that sufficient capacity existed to meet demand and that plans were being made to increase or decrease the available workforce according to need. NSS, in carrying out a commissioned function of NCTC, would be best placed to demonstrate their own contact tracing workforce profile throughout the pandemic. Scottish

¹⁵⁶ NSS National Contact Tracing Centre (NCTC) Programme Governance Approach. Public Health Scotland/National Services Scotland. June 2020.
Government collated weekly returns from health boards of staff in place and would therefore be best placed to describe overall numbers at any one time.

- 5.3.4 Initially, contact tracing staff were drawn from existing NHS staff cohorts nationally and locally. Nationally, staff from NSS performed the role alongside PHS staff in the form of temporary work assignments. PHS identified a small number of staff to be involved in contact tracing from airline manifest data, before that function subsequently transferred to the NCTC.
- 5.3.5 In PHS, as well as the senior leadership capacity allocated, there was capacity contributed by public health consultant colleagues and operational management and administrative support dedicated to the running and development of contact tracing. This included for example capacity to develop and amend scripts for contact tracing staff and, in the advanced stages, SMS content.
- 5.3.6 As the pandemic developed, teams from other public services were drafted in to support contact tracing and worked remotely. For example, NSS had a contractual arrangement with Barrhead Travel to utilise furloughed staff. Also, some local authority employees whose work had been paused were effectively "loaned" into the NCTC in the initial stages of setting up the centre. The details of those arrangements along with those of Barrhead Travel can be provided by NSS.

5.4 National Contact Tracing Centre

Development

- 5.4.1 Section 2.3 sets out the collaboration from May 2020 between PHS, NHS Board Chief Executives, SDsPH and Directors of Planning to clarify roles and responsibilities between national and local partners, culminating with the establishment of the CTOB which oversaw the design and delivery of the contact tracing programme and reported to Scottish Ministers on related outcomes, benefits and risks.
- 5.4.2 This included the commissioning from NSS of a core national service for contact tracing. This new approach was based upon the NCTC and NHS boards working together, using a new Case Management System (CMS). This enabled standardised and consistent tracking of case data with geographic health boards in Scotland migrating to the system. Prior to "go live" of this new approach, a short-term simple tracing tool was developed quickly to enable contact tracers to record limited information about individuals contacted through contact tracing. The introduction of a CMS would subsequently allow a greater level of detail to be captured and enabled

greater collaboration between the NCTC and NHS boards. Operation of the simple tracing tool and the Case Management System was undertaken by NSS who can provide details of the information captured via both.

5.4.3 NSS carried out direct recruitment of staff through advert. PHS supported that recruitment by contributing a recruitment team of circa 80 managers to carry out the necessary interviews. NSS managed the recruitment processes. Some PHS staff stayed "loaned" to NSS as part of the NCTC. This relatively small number of staff, whilst anchored with PHS, remained within the NCTC "setting up" team. Examples included one qualified nurse and one experienced Environmental Health Officer (both NHS Agenda for Change Band 7) who supported the development of the NCTC. In addition, a small number of PHS employees (mainly administrative) whose work had been paused altogether carried out a contact tracing function for a period of time.

"Go live"

5.4.4 A readiness assessment was undertaken by KPMG on behalf of the Scottish Government (PHS7/134 - INQ000369795).¹⁵⁷ On 20 June 2020, Scott Heald and Susan Webb of SDsPH met with Caroline Lamb (currentl Director General for Health and Social Care, Scottish Government) and senior representatives from NHS Grampian (the first board to go live with a new CMS and joint working with the NCTC). PHS was given direction to proceed from 22 June 2020. The NCTC became operational on 22 June 2020, the same date as the start of the operation of the new CMS in Scotland. Following successful implementation for NHS Grampian, the programme then rolled out to all NHS boards in a phased manner from 22 June to the end of July 2020.

Staffing model

5.4.5 Putting in place the optimum seven days a week staffing model for contact tracing was an important aspect of PHS's work. The staffing model had to be flexible enough to cope quickly with peaks and troughs in demand, as Covid-19 cases could increase or decrease quickly, and thus it was important PHS had a system in place which could adapt to these uncertainties.

¹⁵⁷ Scottish Government. Test and Protect Go/No-Go for 'Release 2': Readiness as at close 19 June 2020 Version 0.1. June 2020.

- 5.4.6 Staffing levels across Scotland (in both the NCTC and NHS boards) were kept under review by Scottish Government. The staffing approach for the NCTC was discussed at the NHS Scotland Workforce Senior Leadership Group on 12 June 2020.
- 5.4.7 Contact tracing staff in the NCTC were employed on a mixture of pay bands. Initially, the NCTC employed staff on NHS Agenda for Change Band 3 for contact tracers (who could undertake straightforward contact tracing) and they were to be managed by Team Leaders at Band 5 (who could also undertake more complex contact tracing cases, or direct cases to NHS Board teams to handle). That was based on equivalent jobs for call handlers in the Scottish Ambulance Service (SAS) and NHS 24¹⁵⁸. It was important that the pay bands of staff in the NCTC were the same as those for equivalent roles in SAS and NHS24. Otherwise, there could have been a shift of resource from those organisations to the NCTC (i.e. if the pay bands were higher in the NCTC, SAS and NHS24 may have lost staff who would have moved to the NCTC, leaving the services provided in SAS and NHS24 vulnerable due to lack of resource).
- 5.4.8 PHS worked with NSS to develop job descriptions for the NCTC. These job descriptions were based on similar banded roles in other organisations (like NHS24) and were evaluated (to determine the pay band) independently using the NHS Scotland job description governance framework called "Agenda for Change". The staffing model in use in the NCTC included a mixture of full and part time employees (either employed directly through recruitment, or through existing staff in PHS and NSS who were directed to this work). NSS, who ran the NCTC, also established a contact tracing staff "bank", which allowed staff to be called upon at short notice where there were increases in Covid-19 case numbers. NSS also put in place arrangements with organisations used to running large call centres (e.g. Barrhead Travel)). This model of staffing ensured the NCTC had flexibility given the unpredictability of Covid-19 case numbers and the need to respond quickly to peaks and troughs in case numbers.
- 5.4.9 A universal "online" onboarding checklist was established by NES/PHS as a basis for induction of all contact tracing staff (nationally and locally) (PHS7/135 INQ000574448).¹⁵⁹ For the NCTC, NSS would be best placed to describe the supervision and training provided more completely. Any additional training provided was initiated and managed by local boards.

¹⁵⁸ NHS 24 is one of Scotland's 7 special health boards, providing digital health and care services to the people of Scotland. These services are delivered by phone and through a range of digital channels including online platforms.

¹⁵⁹ National Contact Tracing Centre. Week 1 routemap - new starter version. June 2020.

5.5 Operation

Review

5.5.1 Following the initial roll-out of the CMS to all NHS boards, and the implementation of the new model for contact tracing (i.e. the NCTC working with NHS boards), Scott Heald of PHS co-led a short-life working group with Linda de Caestecker, Director of Public Health in NHS Greater Glasgow and Clyde, to review the profile of staffing (e.g. the balance of Band 3 and Band 5 contact tracing staff to ensure sufficient capacity in the NCTC to handle complex cases) and ways of working and triaging of cases between the NCTC and NHS boards, particularly during period of high volume outbreaks. The review did not materially change the staffing profile in the NCTC but introduced a triage process whereby the NCTC could manage peaks and troughs in demand across Scotland. This included the "mutual aid" process whereby a Scotland wide approach was taken to support Boards who were experiencing high numbers of cases - with contact tracing support being provided by both the NCTC and other NHS Boards (who had capacity due to a lower volume of cases). Note that Band 3 and Band 5 contact tracing staff within the NCTC received clinical supervision through a team of health protection nurses, overseen by a Consultant in Public Health Medicine. These were all areas which were kept under subsequent review and actioned by Scott Heald's successor in the contact tracing role, George Dodds.

Contact tracing guidance

- 5.5.2 PHS has a professional role to provide guidance that operationalises Scottish Government policy. PHS guidance should therefore be aligned to and reflect Scottish Government policy. It plays an important part in informing the evolution of effective policy and in encouraging societal compliance with Non-Pharmaceutical Interventions (NPIs). In recognition of this, PHS and Scottish Government agreed a Policy Alignment Check process (PAC) (PHS7/136 - INQ000147529)¹⁶⁰ in June 2020.
- 5.5.3 Following the establishment of the PAC process, all guidance on contact tracing was produced by PHS specifically for Scotland, aligning with UK policy changes only where they were agreed to apply to all four nations. All such guidance is set out in Appendix G. All contact tracing guidance produced went through the PAC process and was signed off by Scottish Government. Scripts for contact tracers were developed following each iteration of the guidance.

¹⁶⁰ Scottish Government and PHS. Policy Alignment Check (PAC) Process V6. June 2020.

Data

- 5.5.4 Data was an important driver in the process. The data was governed using data protection protocols and was used to assess the effectiveness of the T&P strategy. For example, PHS published contact tracing data as part of the weekly Covid-19 statistical report (PHS7/023 INQ000233604)¹⁶¹ from 10 June 2020, which was a primary driver in policy decisions about contact tracing. Additionally, it included statistics on apps such as Check in Scotland (from December 2020). HPTs in NHS boards were able to request contact details provided by Check in Scotland via the CMS process to assist in any local health protection investigations to manage outbreaks, but this facility had some limitations and was rarely used..
- 5.5.5 Theoretically the facility was intended as a means of capturing data (to aid contact tracing) when Scotland's businesses and services were reopening. The assumption was that if an outbreak was to occur, it would be possible to track other people who had been in the venue for contact tracing purposes. In practice, however, the quality of the data relied upon voluntary logging (checking) into a venue using a QR code and then entering personal details and those of others present. As well as non-engagement, spurious or incomplete data was sometimes provided, limiting the effectiveness. This did not impinge on Scotland's ability to undertake contact tracing, though, as the established process of contact tracer in the NCTC or NHS Board and contacts identified through this route.
- 5.5.6 Contact tracing software that was developed enabled access to data at local and national level in response to the pandemic. There were no known significant software issues that affected the performance of contact tracing.

5.6 Use of applications (apps) in Scotland

5.6.1 During the pandemic, several digital solutions, both government and private sector sponsored, were introduced to help manage and understand the evolution and impact of the pandemic. Some were used to collect data to inform an understanding of what was happening (e.g. the PHS Covid-19 dashboards and Zoe app) and others were used to manage operational aspects of the pandemic such as NHS Scotland Covid status app (an app which enabled users to share their vaccination status if required

¹⁶¹ Public Health Scotland. All releases of Covid-19 statistical report [webpage]. October 2022. Available at: https://publichealthscotland.scot/publications/show-all-releases?id=20580

e.g. for international travel), the Protect Scotland app and the Check In Scotland app. These are described below.

- 5.6.2 The Zoe Health Study, formerly the Covid Symptom Study, is a health research project of British company Zoe Limited (formerly Zoe Global limited) that used a mobile app created in 2020 in response to the Covid-19 pandemic. The initial purpose was to track Covid-19 symptoms and other salient data in many people, to enable epidemiological results to be calculated and allow, not just tracking of the pandemic, but an indication of how the disease was changing over time
- 5.6.3 The Protect Scotland app was launched in September 2020 as a 'warn and inform' alert for users where they had been in close contact with someone who had received a positive Covid-19 test result. The app focused solely on proximity tracing. If an individual tested positive for Covid-19, they were sent a unique code to their mobile. If they gave permission, the data was then sent to a server so that close contacts also using the app could be notified by text and advised to self-isolate. The app was developed in collaboration with the Scottish Government and NSS. PHS played a supporting role.
- 5.6.4 The Check In Scotland app was launched in April 2021 to support businesses in collecting contact details for contact tracing purposes. It enabled places where people gathered, such as restaurants and bars, to record the contact details of people visiting the premises so that in the event a case of Covid-19 was identified, those attending at the same time could be contacted and asked to self-isolate. It was posted as a way of allowing use of restaurants and bars. The Scottish Government led the development of Check In Scotland, with NSS developing the digital infrastructure. The app linked to the CMS used by local and national contact tracing teams, which allowed contact tracers to request data in relation to an active positive case who had disclosed venue attendance during their infectious period.
- 5.6.5 PHS published the number of people who downloaded the Protect Scotland App via the weekly Covid-19 Statistical Report (and supporting dashboard). As of 1 November 2021, the total number of people who had downloaded the app was 2,320,947, with the number of contact notifications at 102,764 (PHS7/137 - INQ000346176).¹⁶²
- 5.6.6 There were many unknown factors about how the apps would work in practice. These included the extent to which socialisation and mixing would return to pre Covid-19 levels and if so when. They also included whether, for example, people might choose

¹⁶² Public Health Scotland. Covid-19 Statistical Report as at 01 November 2021. November 2021.

to avoid public places to protect close family members if they themselves were vulnerable. Whilst there were no established targets for app downloads or usage, there was an underlying expectation that data of cases and contacts who had been in a particular venue could only be helpful in the process of outbreak management through contact tracing. The information was therefore only one part of a range of data sources to aid outbreak management. This is also discussed at point 5.5.5 above.

- 5.6.7 PHS did not collate or publish data from any of the other apps developed. However, once the Check In Scotland app was operational a limited number of senior PHS officials had a role in approving requests for access to check in data from local health boards to ensure good information governance. Requests were approved within a rapid timescale both in and out of normal office hours.
- 5.6.8 PHS were not involved in the monitoring of efficacy or impact of the apps.
- 5.6.9 The decision to develop and utilise the Protect Scotland and Check In Scotland apps rather than use the NHS T&T app provided to those living in England and Wales was made by Scottish Government which PHS was not involved in. PHS is therefore unable to offer detail about any possible differences in functionality and service.
- 5.6.10 Similarly, as PHS was not involved in the development of the apps, it also had no involvement in the consideration of alternative measures of accessing apps for those who would be unlikely or unable to use them. Any decision making and planning around this was undertaken by Scottish Government and NSS.
- 5.6.11 Whilst PHS were involved in conversations to ensure data from the apps was available to support contact tracing, it was not involved in the underpinning technical detail and functionality of the apps. Scottish Government and NSS would be best placed to answer questions relating to the interplay between different apps in the Four Nations and decisions made therein.
- 5.6.12 Additionally, PHS does not hold detail pertaining to the cost of building the Protect Scotland and Check in Scotland apps or the cost of their maintenance. This area of cost was managed by Scottish Government.

5.7 Contact tracing performance

5.7.1 Reference was made to WHO guidance and standards for contact tracing. Simply put, for a public health intervention to be effective in preventing onward transmission of the

disease, at least 80% of cases and contacts needed to be given public health advice within 72 hours of diagnosis (PHS7/138 - INQ000346876).¹⁶³

- 5.7.2 Performance against those standards (not defined as targets by the WHO, a matter PHS clarified with the Office for Statistics Regulation) was considered formally by the T&P Steering Group on the production of the PHS weekly statistical report (PHS7/023 INQ000233604).¹⁶⁴ This informed a strategic approach to the planning of contact tracing capacity. Additionally, operational management information (extracted daily from the CMS) was considered on a daily basis to ensure sufficient resource was in place each day to deal with anticipated cases.
- 5.7.3 The PHS weekly report included contact tracing performance information (PHS7/139 INQ000569794).¹⁶⁵ Improvements to PHS reporting of related figures were discussed between PHS and Ed Humpherson (Director General for Regulation at the Office for Statistics Regulation) in November 2021, highlighting the clarity around contact tracing statistics in relation to the WHO guidance (PHS7/140 INQ000092825).¹⁶⁶
- 5.7.4 From a data perspective many aspects of the sharing of information worked well. However, there were some challenges, such as:
 - In relation to contact tracing, during periods of intense pressure the minimum dataset shrunk to increase throughput and reduce lag in T&P performance. This led to limitations in the utility of the contact information for reporting on incidents and outbreaks.
 - In relation to test data, for much of the pandemic there were challenges in not being able to fully integrate levels of T&P data with WGS results from the UK Lighthouse Laboratories information.
- 5.7.5 Further information on the logistical challenges faced to access Scottish samples from Lighthouse Laboratories for WGS, and the Scottish WGS results arising from the Sanger Institute (who undertook nation WGS for all Lighthouse Laboratories) due to information governance difficulties are discussed in Section 4.16.

¹⁶³ World Health Organisation. Public health criteria to adjust public health and social measures in the context of COVID-19: annex to considerations in adjusting public health and social measures in the context of COVID-19. May 2020.

¹⁶⁴ Public Health Scotland. All releases of Covid-19 statistical report. October 2022.

¹⁶⁵ Public Health Scotland. Public Health Scotland Covid-19 Statistical Report as at 18 October 2021. October 2021.

¹⁶⁶ Humpherson, E. Letter from Ed Humpherson to Scott Heald - Test and Protect statistics. 4 November 2021.

5.7.6 There were no other known significant adverse technological issues from the perspective of contact tracing. System development, maintenance, adaptation and development were successful elements of the PHS pandemic response.

5.8 Partnership working

- 5.8.1 In relation to contact tracing, examples of partnership working and collaboration included:
 - Data in the contact tracing database was used to inform wider staffing capacity issues and address overall system pressures.
 - PHS helped NHS boards identify contact tracing pressures around capacity and demand, thereby allowing national contact tracing support to be directed towards them.
 - Local NHS boards effectively identified their own capacity and scope to support the national response thereby contributing to a whole system response. (This whole system approach supported, for example, the facilitation of annual leave at peak periods of need, such as Christmas and New Year, which was particularly important for morale and wellbeing.)
- 5.8.2 Despite the pace of action, a balance of formal governance and informal collaboration worked well overall. There was general acceptance of the role of PHS as a lead agency and a mutual understanding by PHS of competing priorities, pressures and responsibilities of service delivery at local Health Board level.
- 5.8.3 As the pandemic progressed, PHS and SDsPH secured the agreement of the Executive Delivery Group to create a formal system oversight group for contact tracing which it was agreed would be chaired by a local health board representative to strengthen collaboration.
- 5.8.4 On occasions, there was a degree of unequal engagement according to circumstances. For example, it proved difficult on all days for all boards to join a daily mutual aid discussion with the National Contact Tracing Centre. This required a degree of time and investment to ensure greater attendance throughout the pandemic. Necessarily, local boards were directing scarce resource towards local outbreaks and whilst understandable, did on occasions create a potential weakness in a system designed for overall collaboration on a Scotland wide basis.
- 5.8.5 It is the view of PHS that, in the main, collaboration arrangements worked well. Nevertheless, in the early stages of the pandemic, there appeared to be

inconsistencies in communication between Scottish Government and UK Government. This meant for example that PHS lead officers sometimes heard about changes to border monitoring arrangements and country designation (where countries were deemed to be red or amber in terms of risk for example) via the media. As processes improved, the Home Office began to communicate this with Scottish Government on a weekly basis, which made a vast improvement to planning.

- 5.8.6 An area of potential improvement could have been the timing of these updates, which were often communicated at the end of a week. As a result, for the changes to be operationalised, colleagues were regularly required to work additional hours over the weekend, which might have been avoided if the announcements had come earlier in the week. Whilst there were possibly unnecessary cost implications because of this, more significantly this added to the pressures on already stretched staff.
- 5.8.7 In some instances, PHS provided data to Police Scotland about travellers from abroad returning to Scotland. A Data Protection Impact Assessment (DPIA) made it clear that this was for public health purposes, on occasions where contact tracers could not reach the traveller to provide advice on isolation requirements (PHS7/141 INQ000301066).¹⁶⁷ It is felt that the rationale and importance of this information sharing could have been better communicated to reassure its necessity to the public. This is discussed in Section 9.5.

5.9 Stand-down of contact tracing

5.9.1 Elements of contact tracing began to be stood down in line with changes in the pandemic. Changes to testing requirements for travellers who were fully vaccinated came into place in February 2022 and communication processes changed for different groups depending on perceived risk level, over the subsequent weeks. Following the publication of the Scottish Government Test and Protect Transition Plan on 15 March 2022 further changes to testing began to be implemented, including the cessation of twice weekly LFT testing and the closing of test sites, eventually leading to the decision by PHS Senior Leadership Team to begin the wind down of its T&P Coordination and Oversight Team.

¹⁶⁷ Public Health Scotland. Data Protection Impact Assessment (DPIA) questionnaire for sharing of Home Office data with PHS for the purpose of following up travellers in order to give advice and guidance and Sharing of contact details of travellers who are non-contactable with Police Scotland, V3.4. July 2020.

6. Isolation policy

6.1 PHS isolation guidance

6.1.1 The isolation recommendations used in PHS guidance, and any resources developed by PHS to support the delivery of contact tracing in NHS boards and in the NCTC, followed the agreed isolation policy determined by Scottish Government during the pandemic.

PHS role in guidance

- 6.1.2 PHS had three main roles in relation to self-isolation guidance:
 - the provision of expert public health advice to inform Scottish Government decision making on the appropriate approach to self-isolation (providing advice)
 - the formalisation of Scottish Government policy decisions into written guidance for stakeholders, particularly health protection teams and health and social care providers (publishing guidance)
 - providing support to health protection teams and health and social care providers in interpreting Scottish Government policy and PHS guidance, during complex or challenging situations (supporting response).
- 6.1.3 PHS guidance was ultimately agreed and signed off by the Scottish Government before it could be issued. It operationalised Scottish Government policy intent by setting out the necessary public health and health protection action to combat Covid-19 infection in Scotland, including the requirements for self-isolation. The term 'guidance' is specifically used to refer to published written materials that support agreed health protection principles and national policy in line with the Public Health etc. (Scotland) Act 2008 (PHS7/142 - INQ000147832).¹⁶⁸
- 6.1.4 For the purposes of the PAC, 'policy' referred to Scottish Government positions that had been set out publicly by the First Minister and Cabinet Secretary for Health and Sport in press briefings and in published documents. The process recognises that clinical and public health advice is to be developed and agreed on a UK basis and therefore that the PHS guidance would align with that of the other devolved administrations. However, given that health is devolved, it was for Scottish Ministers to determine policy within Scotland if there were differences and PHS was therefore to ensure that guidance aligned with Scottish Government policy.

¹⁶⁸ National Archives. Public Health etc. (Scotland) Act 2008. 2008

6.1.5 Scottish Government officials directed PHS to the policy to which the guidance must align. In most instances the Scottish Government was content with PHS's professional view on how best to operationalise the policy. Where there was a need for clarity on the policy to be provided to allow it to be operationalised within the guidance, PHS made Scottish Government officials aware, and the government then made any necessary refinements to the policy in writing to ensure clarity around the intent of the policy.

Published guidance

- 6.1.6 PHS has reported on published guidance in its evidence to each Module of the UK Covid Inquiry. In the case of Module 7, testing and isolation requirements featured in a range of PHS guidance. This is summarised in Appendix G.
- 6.1.7 Core to the delivery of these responsibilities was critical engagement with virological and epidemiological data to inform advice and guidance on self-isolation. Self-isolation recommendations are a standard public health control measure and are recommended for many infections.
- 6.1.8 During the pandemic the term 'self-isolation' became a catch-all term for all forms of remaining at home to prevent onward spread. Traditionally however 'self-isolation' of contacts (those who have no symptoms but have a known contact with someone confirmed or suspected to have an infection) is known as quarantine. Self-isolation is used to refer to the period during which a confirmed or suspected case should remain in 'self-isolation'.
- 6.1.9 Recommendations for self-isolation (both cases and contacts) are based on several critical factors. Some are amenable to quantification and are likely to be broadly similar across countries and others are more qualitatively evidenced and culturally specific. This is important to understand when discussing international comparisons of policy / recommendations.
- 6.1.10 These critical factors are provided below to support the inquiry's understanding of how evidence informed the decisions:
 - Evidence on the infectious period: this is the length of time that a 'case' (suspected or confirmed) is infectious to others i.e. during what period they may pass the infection on. The longer the period of isolation, the higher the chance that there will be no onward transmission, and the higher the cost to the individual.

- Evidence on the incubation period: this is the length of time during which we would reasonably expect a person to display symptoms of an infection (or to test positive asymptomatically demonstrating a sub-clinical infection), if they are infected. The longer the period of isolation, the higher the chance the contact is not infected, and the higher the cost to the individual.
- Evidence on maximising compliance with self-isolation: the more compliant cases and contacts are with the recommendation, the higher the chance there is no onward transmission, but at a higher cost to the individuals. Opportunities exist to both punish non-compliance and to support compliance. If a recommendation is not understood by the public by being too complex or challenging to comply with – the public will not comply.
- Evidence on the public health harms of self-isolation: this is a factor of the number of people being asked to isolate, the length of time they are asked to isolate for, the frequency with which the request is made and the individual impacts on their own physical and mental health as a result of the request to self-isolate.
- Evidence on the population level impact of the infection in terms of mortality and morbidity, in order to balance the benefits of self-isolation against the identified harms: this changed significantly over the course of the pandemic through the introduction of the vaccine.
- 6.1.11 All five of these elements are required to be balanced in setting successful selfisolation periods and they are all relevant.

How self-isolation guidance changed

- 6.1.12 Isolation guidance developed and changed as the pandemic progressed through three additional key phases:
 - Moving contact isolation requirements from 14 to 10 days
 - Moving to fully vaccinated contact not requiring isolation
 - Moving to 'stay at home' advice, to replace self-isolation.

These stages featured in the range of guidance published by PHS as set out in Appendix G.

6.1.13 In practical terms, population wide self-isolation requirement came with the introduction of contact tracing in May 2020. Before this point there was a requirement for cases to isolate but with limited cases and minimal/no formal contact tracing in place, there was

limited direct advice to contacts on how long or how to self-isolate. Those with symptoms were asked to self-isolate.

6.1.14 Advice from PHS during this period focused on the introduction of contact tracing. Initial proposals from PHS to Scottish Government on the periods of self-isolation recommended (PHS7/143 – INQ000569800)¹⁶⁹ and the importance of support in maintaining population compliance with self-isolation are provided in submitted evidence (PHS7/144 – INQ000569801).¹⁷⁰ The first iteration of contact tracing guidance was published by PHS on 17/05/20 (PHS7/145 – INQ000572433).¹⁷¹ This guidance set initial isolation periods for seven days after symptom onset for cases, and for 14 days for contacts. This was a cautionary period based on the best available evidence at the time of a maximum incubation period of 14 days i.e. the aim was to stop any onward transmission. This again reflects the evidence that a precautionary approach was required while the population was largely immune to a virus with a relatively high mortality rate. The evidence set out in these papers also show the PHS focus on support (as opposed to punishment of non-compliance).

National and international comparison

6.1.15 The key comparison was to other UK nations. In addition, Scottish Government and PHS worked collaboratively to monitor and discuss movements in other countries in relation to self-isolation advice and evidence on the five key aspects identified (infectious / incubation periods, compliance, harms, benefits). Such variations were discussed in SAGE, on occasion, following the provision of data by UKHSA and Cabinet Office.

6.2 Contact tracing and isolation

- 6.2.1 As discussed in Chapter 5, in the early stages of the pandemic (January 2020 to May 2020) PHS led on the development of the contact tracing model. This included providing public health advice to inform Scottish Government's policy decisions and translating those decisions into professional digital resources and guidance for public health professionals including contact tracers and health protection teams.
- 6.2.2 The original contact tracing model concepts submitted to Scottish Government during the 'FM Deep Dives' (see Section 5.1) highlighted the need for self-isolation support.

¹⁶⁹ Public Health Scotland. PHS Covid-19 Contact Tracing Programme. May 2020.

¹⁷⁰ Covid Operational Strategy Sub-group. Test, trace, isolate and support - supported isolation. May 2020.

¹⁷¹ Public Health Scotland. Contact tracing Covid-19: Interim guidance for pilot sites version 1.0. May 2020.

PHS promoted a public health model using 'support' as a fourth pillar of the strategy.. This public health led model, and the role that 'support' would play in the overall isolation strategy, was set out most fully in May 2020 in Covid-19 – Test, Trace, Isolate, Support: A Public Health approach to maintaining low levels of community transmission of Covid-19 in Scotland (PHS7/012 - INQ000093618).¹⁷²

6.2.3 The impact of self-isolation policy on different population groups is discussed in Chapter 7.

¹⁷² Scottish Government. Covid-19 - test, trace, isolate, support: a public health approach to maintaining low levels of community transmission of Covid-19 in Scotland. May 2020.

7. Inequalities

7.1 Approach

- 7.1.1 Staff working in PHS were commonly in agreement from the outset that both the health effects of the pandemic and the measures to reduce the health effects (e.g. isolation recommendations) were going to impact on people differently. This thinking was not new to public health professionals during the pandemic.
- 7.1.2 Strategically, PHS applied a focus on inequalities in its input to the planning and delivery of T&P under the leadership of Scottish Government. This focus was strengthened by the bringing together of Health Scotland, who focused more on health inequalities (primarily in non-communicable disease); and Health Protection Scotland, who focused on communicable disease control.

7.2 Impact of isolation and social distancing

7.2.1 The Scottish model of isolation strategy was public health led and support-based model to isolation strategy. Sections 24 to 27 of the May 2020 document 'Covid-19 – Test, Trace, Isolate, Support: A Public Health approach to maintaining low levels of community transmission of Covid-19 in Scotland' (PHS7/012 - INQ000093618)¹⁷³ set out some early observations on groups that may struggle to maintain isolation. It is clear from the language used that the focus in the early stages was on support to maximise compliance, not support to minimise any unintended harms arising from isolation:

For some people, this may mean that they need to be provided with somewhere to isolate away from the rest of their household. Others will need practical support with food and medicine, whilst ensuring their physical and mental health needs are met. Work is underway to develop plans for providing the support that is needed to enable people to isolate effectively. We will also discuss with the UK Government steps to ensure that between individual employment rights and the social security system, people are able to secure any necessary financial support if self-isolating as a result of contact tracing.

Evolving understanding

7.2.2 PHS's understanding of the variable impact of isolation recommendations evolved over the pandemic. This is characterised as being more focused on the direct health effects

¹⁷³ Scottish Government. Covid-19 - test, trace, isolate, support: a public health approach to maintaining low levels of community transmission of Covid-19 in Scotland. May 2020.

in the earlier stages of the pandemic, with an increased understanding of the wider unintended consequences of isolation recommendations as the pandemic progressed. This evolution was driven by the evidence of health harms, the impact of vaccination and then by growing evidence of harm arising from isolation recommendations. By the time of the publication of the Scottish Government T&P: Equality and Fairer Scotland Duty impact assessment (March 2021) (PHS7/146 – INQ000569778)¹⁷⁴ the shared understanding that PHS and other T&P agencies had reached is clearer. (The impact assessments in this regard are discussed in section 7.4 below).

- 7.2.3 As the harm reducing effects of the vaccination programme and the impact of natural immunity became more apparent, the risk balance shifted further, continuing steadily until reaching the current position. The benefits of isolation to society became harder to weigh against the costs to individuals. It also became clearer that the largest costs were not borne by those receiving the greatest benefits. Scotland's role in responsiveness shifted as the evidence changed on costs and benefits, on how those costs and benefits were quantified and on how decisions were made. PHS' role in this shift has been a key learning point for PHS.
- 7.2.4 The impact on children is the clearest example in this regard: children were more frequently tested (including through the intensive asymptomatic testing programme in schools), more likely to be asked to isolate, yet were far less likely to suffer the health effects of Covid-19.

Impacted groups

7.2.5 PHS worked with the Scottish Health and Inequalities Impact Assessment Network (SHIIAN) and other collaborators to publish 'Mitigating the wider health effects of Covid-19 pandemic' in the British Medical Journal (BMJ), first as a pre-print on 21 March 2020 (PHS7/147 - INQ000228407)¹⁷⁵ and then as a peer-reviewed publication on 27 April 2020. (PHS7/148- INQ000147553)¹⁷⁶ The pre-print was considered at the 2 April meeting of the Scottish Government Covid-19 Advisory Group (PHS7/149 -INQ000228395)¹⁷⁷ and the impact assessment was referenced in the paper outlining

¹⁷⁴ Scottish Government. Test and Protect: equality and Fairer Scotland Duty impact assessment. March 2021.

¹⁷⁵ Douglas M, Katikireddi S V, Taulbut M, et al. Mitigating the wider health effects of Covid-19 pandemic. [Pre-publication manuscript]. March 2020.

¹⁷⁶ Douglas M, Katikireddi S V, Taulbut M. et al. Mitigating the wider health effects of Covid-19 pandemic; BMJ. April 2020.

¹⁷⁷ Scottish Government. Covid-19 Advisory Group evidence papers: April 2020.

supporting evidence for the Framework for Decision-making, published in May 2020 (PHS7/150 - INQ000369689):¹⁷⁸

- 7.2.6 The paper noted the risks of distancing measures negatively impacting on people's health, and how to mitigate these wider harms. It found that the interventions in place to lower transmission of the virus can themselves cause a wide range of harms and that building a more sustainable and inclusive economy for the future will be crucial to mitigating these wider harms.
- 7.2.7 The paper noted that several groups may be particularly vulnerable to the effects of both the pandemic and the social distancing measures. These are listed in Table 2

Table 2: Groups at particular risk from responses to Covid-19

- Older people—highest direct risk of severe Covid-19, more likely to live alone, less likely to use online communications, at risk of social isolation
- Young people—affected by disrupted education at critical time; in longer term most at risk of poor employment and associated health outcomes in economic downturn
- Women—more likely to be carers, likely to lose income if need to provide childcare during school closures, potential for increase in family violence for some
- People of East Asian ethnicity—may be at increased risk of discrimination and harassment because the pandemic is associated with China
- People with mental health problems-may be at greater risk from social isolation
- People who use substances or in recovery—risk of relapse or withdrawal
- People with a disability—affected by disrupted support services
- People with reduced communication abilities (e.g. learning disabilities, limited literacy or English language ability)—may not receive key governmental communications
- Homeless people—may be unable to self-isolate or affected by disrupted support services
- People in criminal justice system—difficulty of isolation in prison setting, loss of contact with family

¹⁷⁸ Scottish Government. Covid-19 - a framework for decision making. April 2020.

- Undocumented migrants—may have no access to or be reluctant to engage with health services
- Workers on precarious contracts or self-employed—high risk of adverse effects from loss of work and no income
- People on low income—effects will be particularly severe as they already have poorer health and are more likely to be in insecure work without financial reserves
- People in institutions (care homes, special needs facilities, prisons, migrant detention centres, cruise liners)—as these institutions may act as amplifiers
- 7.2.8 The analysis was further explored through SHIIAN and published as 'The Health Impacts of Physical Distancing Measures in Scotland: rapid health impact assessment' on 26th May 2020 (PHS7/151 - INQ000147586).¹⁷⁹

Mitigations

- 7.2.9 Steps that were taken to mitigate such impacts included:
 - All PHS contact tracing manuals (and associated training and scripts) was developed to incorporate such mitigation, for example including advice on supporting communications e.g. translation service and discussions with carers or advocates (examples: PHS7/152 INQ000569838),¹⁸⁰ (PHS7/153 INQ000569839),¹⁸¹ (PHS7/153a –INQ000569820),¹⁸² (PHS7/154 INQ000569822),¹⁸³ (PHS7/154a INQ000569797).¹⁸⁴
 - Scottish Government and UK Government financial support to isolate, particularly the funds available to support social care staff to isolate. This is likely covered by Scottish Government responses.
 - The joint PHS and Scottish Government led 'Enduring Transmission' project, that sought to understand variation in engagement with T&P advice. This is discussed below.

¹⁷⁹ Douglas, M., Vittal Katikireddi, S., Taulbut, M., et al. Scottish Health and Inequality Impact Assessment Network (SHIIAN) Report - Health impacts of physical distancing measures in Scotland: Rapid health impact assessment. 2020.

 ¹⁸⁰ Self-Isolation Support Grants: Frequently asked questions - 14th December 2020. December 2020.
 ¹⁸¹ Sumpter, C. National Contact Tracing Centre - Contact Tracer Script 3: Contact Interview v7.0. August 2020.

 ¹⁸² Sumpter, C. National Contact Tracing Centre: Contact Tracing Manual. September 2020.
 ¹⁸³ PHS Advanced Practitioners. National Contact Tracing Centre - Script 7 Inbound Calls v7.0. June 2021.

¹⁸⁴ PHS Advanced Practitioners. National Contact Tracing Centre - Contact Call - Contact Interview - Script 3 v13.0. December 2021.

7.3 Wider impact

Enduring Transmission

- 7.3.1 As discussed above, PHS had identified the risk of Covid-19 mitigations widening inequalities early in the pandemic and had worked to raise that awareness with policy makers and others by, for example, providing inequalities briefings to others involved in the response (PHS7/155 INQ000228400),¹⁸⁵ (PHS7/156 INQ000569816);¹⁸⁶ and publishing work on the issue.
- 7.3.2 The 'Enduring Transmission' programme of work followed a UK Government initiative to better understand why the health effects of Covid-19, and the effect of measures to reduce the health effect, were felt differently by different groups.
- 7.3.3 In late 2021 the UK Government Joint Biosecurity Centre (JBC) began a project on 'enduring transmission' and a short-life working group was formed around this issue in Scotland, jointly led by Scottish Government and PHS (PHS7/157 - INQ000569829).¹⁸⁷ The working group was established to provide multi-agency analytical and project management expertise to scope, facilitate and evaluate pilots within local authorities and place-based settings (e.g. workplaces), identifying areas of enduring transmission and understand characteristics. While there were no outputs which directly or immediately influenced the development of T&P, such outputs – including those described below - will be helpful in ensuring better application of, for example, isolation policy in future.
- 7.3.4 The Scottish Government led on understanding Enduring Transmission for Scotland and completed an analysis applying the JBC method to Scotland (PHS7/158 INQ000574461).¹⁸⁸ They found that the areas of enduring transmission observed across Scotland did not vary by socioeconomic deprivation alone, and therefore other drivers of high case rates were likely to be factors in these areas. Local intelligence is vital in interpreting these data and understanding local driving factors for high case rates. Local Intelligence in this context could take various forms such as geographical (rural/urban) make up or demographics of cases and of determinants of vaccination uptake including ethnicity in a local area, local community understanding on matters

¹⁸⁵ McCartney, G. Socioeconomic inequalities and the Covid-19 pandemic. March 2021.

¹⁸⁶ McCartney, G., Craig, P., Pulford, A. et al. Inequalities briefing - draft 4.0: How do socioeconomic inequalities impact on inequalities in health during the Covid-19 pandemic and what can we do about it? March 2021.

¹⁸⁷ Sumpter, C. Enduring transmission: what is the role for Public Health Scotland? 2021.

¹⁸⁸ Scottish Government - Covid-19 Analysis Division. Neighbourhood enduring transmission analysis. September 2021.

such as density of population, the availability of local resources to address inequality (e.g. engagement of faith leaders, translation services and targeted testing).

- 7.3.5 To help understand any variable impact of public health interventions, PHS completed an analysis of all Scottish contact tracing data from June 2020 to June 2021 as part of the Enduring Transmission work. This covered 262,112 cases and 940,911 contacts. The key messages were that overall, observed inequalities are small but there was an inequitable burden on children and young people: 11.4% cases and 25.5% contacts aged ≤16 years. This was likely due to school contact tracing and the exclusion of 'bubbles' as the mean number of contacts per case: 7.22 contacts in ≤16 years and 1.04 contacts ≥75 years. Cases in education had a mean of 6.68 contacts per case. There was also a socioeconomic gradient in time from test to interview completed i.e. those who were more deprived were more likely to take longer to contact trace. (PHS7/159 INQ000574467),¹⁸⁹ (PHS7/160 INQ000572404).¹⁹⁰ No analytical research into the reasons for these findings has been carried out by PHS.
- 7.3.6 Views on the reasons for variation in impact were sought from, for example, health protection teams through NIMT (PHS7/161 INQ000569824)¹⁹¹ and from the Scottish Government outbreak management team (PHS7/162 INQ000569825).¹⁹² Factors affecting access to and engagement with T&P are summarised in the reports.

Secondary harms

7.3.7 PHS's paper 'The early impacts of the Covid-19 pandemic on Scotland's mental health – not just one story' dated 22 July 2022 (PHS7/163 - INQ000320572)¹⁹³ presented an analysis of quantitative and qualitative material collected early in the pandemic looking at the impacts of the Covid-19 pandemic on mental health. This found that while 'everyone', in one form or another, has been affected mentally by the pandemic, the qualitative studies in particular reveal the profound impacts the changes in every day and working life had on people's mental lives, including the impact of isolation. It noted the uneven distribution of those impacts, with the potential to worsen and widen mental health inequalities across society. Where people started from, and their social and

¹⁸⁹ Public Health Scotland. Equity of Test and Protect: quantitative assessment. February 2022.

¹⁹⁰ Hainey, K. Lessons learned: health inequalities and Covid-19. February 2022.

¹⁹¹ Hainey, K. and Gibb, C-A. Outbreak surveillance and lessons learned: inequalities debrief - draft v1.0. February 2022.

¹⁹² Outbreak Management Team (OMT) Observations reference enduring transmission in Scotland. April 2021.

¹⁹³ Public Health Scotland, Scottish Government, Healthcare Improvement Scotland. The early impacts of the Covid-19 pandemic on Scotland's mental health - not just one story. July 2022.

economic position may well influence the impacts of the pandemic on their mental health and wellbeing. It may also influence the emotional and financial resources people are able to draw on to recover from the pandemic.

Ethnicity

- 7.3.8 PHS's paper 'Monitoring ethnic health inequalities in Scotland during Covid-19 Data and evidence' dated 8 March 2022 (PHS7/164 INQ000147479)¹⁹⁴ noted how in October 2020, Black and Ethnic Minority Infrastructure in Scotland (BEMIS) facilitated an engagement session with third sector organisations representing the interests of ethnic minority communities. This gathered initial feedback on the cultural sensitivity of the programme and identified potential improvements that could make it more accessible for ethnic minority communities. In response, PHS took the following actions:
 - Slides were developed on ethnicity and why it is important to record it on the case management system. These were shared with the National Contact Tracing Centre and incorporated into the contact tracer continuous professional development.
 - The collection of ethnicity data at point of testing was trialled in Motherwell.
 Feedback from the trial was that when people came for a test, they were anxious and that collection of ethnicities and their preferred language should be collected at the point of booking a test through the UK Government system.
 - A recommendation for T&P that automated emails and text messages should be translated into other languages. A quote for translation of emails and text messages was requested from the translation service. (This was not implemented, mainly due to change in translation provider, changing guidance and support information, a focus on vaccination information and the emergence of the Omicron variant).
- 7.3.9 Learning from the establishment of the T&P programme was shared with colleagues from NHS NSS and the vaccination programme. The main learning was that any planning of new services should include people from ethnic and equalities groups in their development, and that equality impact assessments should continue and be updated as processes are developed.

¹⁹⁴ Public Health Scotland. Monitoring ethnic health inequalities in Scotland during Covid-19: data and evidence. March 2022.

Women, children and young people

7.3.10 PHS led on the development of 'New guidance for tackling violence against women during Covid-19' dated 19 May 2022 (PHS7/165 – INQ000569823)¹⁹⁵ with the aim of ensuring a sustainable, joined-up approach to safeguarding the needs of women, children and young people experiencing violence against women and girls (VAWG) during Covid-19 is embedded at a local strategic level. It recognised increased risks of VAWG associated with isolation. It recommended that local authorities include clear messages about VAWG as part of any local campaigns in response to Covid-19, for example highlighting that survivors of trauma, violence and abuse may experience adverse effects of social isolation, such as increased anxiety, control and violence, and the increased challenges in accessing support.

7.4 Impact assessments

- 7.4.1 As T&P was led by Scottish Government, the equality and Fairer Scotland Duty impact assessment was conducted by them. PHS fed into this process as described in 'T&P: equality and Fairer Scotland Duty impact assessment' (PHS7/166 – INQ000569795).¹⁹⁶
- PHS also worked with NSS, the Digital Health and Care Innovation Centre¹⁹⁷, Scottish Government and others to complete equality impact assessments for some early aspects of the isolation recommendation implementation agreed at the T&P Steering Group. Some examples include an inequality impact assessment completed by NSS for the introduction of the simple tracing tool (May 2020) (PHS7/167 INQ000532750)¹⁹⁸ and for the overall T&P programme (May 2020) (PHS7/168 INQ000569783).¹⁹⁹
- 7.4.3 Beyond the Scottish Government-led equality and Fairer Scotland Duty impact assessment, the production of equality impact assessments is now part of the standard process of published guidance development for PHS.

¹⁹⁵ Public Health Scotland. New guidance for tackling violence against women during Covid-19. May 2020.

¹⁹⁶ Scottish Government. Test and protect: equality and Fairer Scotland Duty impact assessment:7. Who was involved in this EQIA? March 2021

¹⁹⁷ The Digital Health & Care Innovation Centre (DHI) is a national resource and key enabler and catalyst for change, occupying a unique and visible position at the heart of the innovation ecosystem for digital health and social care in Scotland.

¹⁹⁸ NSS. Equality and Human Rights Impact Assessment of the DHI Tracing Tool: Virtual meeting held over Microsoft Teams on Tuesday 12th May 2020 facilitated by NHS National Services Scotland (NSS). May 2020.

¹⁹⁹ McLaughlin, E. Covid-19 Test and Protect: Roadmap for information security and governance and equalities, Draft version 0.1. May 2020.

8. Modelling

- 8.1.1 The Scottish Government had the overall remit for modelling the pandemic and its impact. However, PHS supported longer-term scenario planning and modelling through the provision of data and contributed to the fortnightly State of the Epidemic reports (PHS7/169 INQ000354100).²⁰⁰ These reports were considered by the Scottish Government Cabinet and brought together different sources of evidence and data about the pandemic to summarise and analyse the current situation, and what was likely to happen next.
- 8.1.2 PHS and the Scottish Government worked together from April 2020 to develop a new Modelling Collaboration. The aim was to ensure modelling resources were brought together to deliver the high quality and consistent modelling outputs that were needed to support decision-making in Scotland. The Modelling Collaboration included representation from SDsPH, Directors of Planning, academic modellers, Scottish Government and PHS.
- 8.1.3 PHS did not, however, undertake modelling in relation to T&P. This was carried out by the Scottish Government. However, the PHS led NIMT and the related T&P groups reporting to the NIMT documented frequent issues related to system pressures experienced by the UK Lighthouse Laboratories in processing laboratory specimens (see Chapter 4). There were significant backlogs in processing samples which lead to consequent challenges for contact tracing and inevitable knock on for modelling.

²⁰⁰ Scottish Government. Coronavirus (Covid-19): state of the epidemic: Reports. Accessed January 2025.

9. Data

9.1 Introduction

- 9.1.1 The production of Official Statistics during the Covid-19 pandemic was a crucial part of PHS's role in disseminating timely data to inform the pandemic response and provide public transparency. PHS is the main provider of official health and social care statistics for NHS Scotland, a role inherited from ISD in April 2020.
- 9.1.2 T&P data was widely used to inform policy decision making during the pandemic. Information from the CMS and laboratory testing results figures were provided to Scottish Government colleagues, health boards (and UKSHA) each morning in the form of a SITREP report (PHS7/170 – INQ000569785).²⁰¹ This was originally developed by the NCTC Programme Director. The report focused on how the contact tracing system operated (test demand, test positivity, networks of transmission and variation by geography and demography and the performance of contact tracing system) to inform resource decision making and to identify when the system may experience more demand.
- 9.1.3 It is the view of PHS that the impact of the T&P data on policy makers and decision makers was substantial as it was the central repository of intelligence about the pandemic, and the performance of our public health response.

9.2 Reporting

Weekly statistical report

9.2.1 PHS published weekly statistics via the Covid-19 Statistical report and supporting publication dashboard, both included T&P information (PHS7/023 - INQ000233604),²⁰² (PHS7/041 – INQ000569802).²⁰³ The Covid-19 dashboard was updated daily at 2pm (7 day per week). It included testing and contact tracing data as the main focus of the dashboard was to update on the daily number of Covid-19 cases, presented at local geographies to enable users to understand local case numbers (please note that testing data was produced daily and contact tracing data produced weekly) (PHS7/171 - INQ000233599).²⁰⁴

²⁰¹ NCTC Programme Director. National Contact Tracing Centre - Daily Status Report and SITREP. October 2020.

 ²⁰² Public Health Scotland. All releases of Covid-19 statistical report. Accessed August 2023.
 ²⁰³ Public Health Scotland. Viral respiratory diseases (including influenza and Covid-19) in Scotland surveillance report. November 2022.

²⁰⁴ Public Health Scotland. Covid-19 & Respiratory Surveillance in Scotland - dashboard [online]. Accessed August 2023.

- 9.2.2 PHS worked closely with NRS, both as a partner in the Scottish Public Health Observatory (ScotPHO) Collaborative and specifically on the provision of death registration data. NRS published a weekly report on Covid-19 mortality, which was released at 12 noon on a Wednesday to coincide with the weekly publication of the PHS Covid-19 statistical report to provide a joined-up overview of key statistical measures relating to Covid-19 in Scotland.
- 9.2.3 The weekly published statistical report was used to inform developing strategy and operational responses as the pandemic progressed (PHS7/023 INQ000233604).²⁰⁵ Examples of this use included:
 - Understanding the laboratory turnaround times for Scotland and so (a) the extent to which there was adequate testing capacity in Scotland and (b) understanding any consequential implications for the real remaining time available for contact tracing in order to carry out an effective public health intervention to prevent the spread of the virus.
 - The PHS led NIMT utilised this output in describing geographical challenges to support examination and the offer of advice to the Four Harms Group re whether current societal measures applied at the time should continue/increase/reduce.
- 9.2.4 As the pandemic developed new data was added to meet the changing requirements and enhance the quality of information and data available.

Daily management information

9.2.5 Management information was produced daily for Scottish Government, NHS boards and other key stakeholders (usually by 10am each day). The Scottish Government used the management information for its daily reporting on Covid-19 statistics. To ensure transparency and maintain public trust, PHS and Scottish Government published this information daily on their websites.

Dashboards

- 9.2.6 PHS made data available for partners and the public through a variety of dashboards including:
- 9.2.7 A public-facing dashboard launched in April 2020 with data on confirmed cases updated on a daily basis. An enhanced version was launched in October 2020

²⁰⁵ Public Health Scotland. All releases of Covid-19 statistical report. Accessed August 2023.

(PHS7/172- INQ000515918),²⁰⁶ which included neighbourhood level data and new interactive features. The dashboard has had over 51 million hits since its launch.

- 9.2.8 In May 2020 PHS launched a new dashboard on the wider impact of Covid-19 on the healthcare system (PHS7/173 INQ000233600),²⁰⁷ which provided a high-level overview of how the pandemic was impacting more widely on health and health inequalities. The dashboard includes data on hospital admissions, A&E attendances, cancer services, excess mortality, and mental health.
- 9.2.9 In December 2020 PHS launched a Serology Surveillance Dashboard (PHS7/174 INQ000346189).²⁰⁸ The serology surveillance programme used blood samples provided in community healthcare settings and by blood donors to estimate the proportion of people who had antibodies to the virus in the general population and to see if this changed over time.
- 9.2.10 In March 2021 PHS launched an Education Surveillance Dashboard (PHS7/175 INQ000189511)²⁰⁹ that brought together summary data and intelligence on Covid-19 cases in educational settings and populations, testing, hospital admissions and contact tracing related to the education setting. The dashboard, which was updated weekly, provided transparent and accessible information to key stakeholders, including Scottish Government, local authorities, health boards, education leaders, education staff, pupils and families.

Test data

- 9.2.11 At the outset of the pandemic when there was a low number of cases, PHS undertook a manual process and reporting focused on high level case numbers. This developed into a collaborative approach with data managers and statisticians working together to manage and link the data, and perform the analysis, followed by epidemiologists and clinicians providing more in-depth analysis and setting direction for analysis at different stages of the pandemic.
- 9.2.12 PHS decided to include positive LFD results in their reporting because these tests were increasingly offered to the public to support Covid-19 management. By January 2021, LFD tests were freely available in public settings to help manage and contain community transmission. For this reason, alongside high background prevalence and

²⁰⁶ Public Health Scotland. Improved Covid-19 daily dashboard published. October 2020.

²⁰⁷ Public Health Scotland. Covid-19 Wider impacts dashboard. Accessed August 2023.

²⁰⁸ Public Health Scotland. Enhanced surveillance of Covid-19 in Scotland: Population-based seroprevalence surveillance 23 December 2020. December 2020.

²⁰⁹ Public Health Scotland. Covid-19 Education surveillance report. Accessed January 2025.

testing requirements, Scottish Government changed policies to no longer require confirmatory PCR testing of positive LFD results.

- 9.2.13 With the policy change to drop the requirement for PCR confirmation, capturing LFDconfirmed cases became essential for accurately characterising the disease burden and guiding public health responses. As an example of scale, more than 80% of reported cases in late May and early June 2022 were from publicly reported LFDs.
- 9.2.14 A key challenge in incorporating LFDs in case counts at the time was its potential impact on test positivity. This was the case because negative LFD results were less frequently reported by the public to PHS whereas all laboratory reported PCR positive and negative tests were reported to PHS via a laboratory reporting system.
- 9.2.15 To address this potential reporting bias, PHS continued to calculate test positivity rates (the number of positive tests divided by the total number of tests) using only PCR results, where negative results were consistently reported. This approach aligned with practices across two nations, with Wales never including LFD results in their case counts.
- 9.2.16 LFD testing was introduced in universities in Scotland at the end of November 2020. The first reporting that the RTE cell within PHS undertook on LFD was the number of positive and negative LFD test results uploaded from the university testing. As LFD testing expanded this was incorporated into the surveillance reports produced by the team. These were reports produced for Scottish Government and also public facing reports and contributions to the PHS dashboards.
- 9.2.17 When LFD testing was first introduced, the guidance was that a positive LFD test should be confirmed by a PCR test. Work was undertaken to match the positive LFD test result to the confirmatory PCR test result, and this was incorporated into the surveillance reporting.

Contact tracing data

- 9.2.18 When initially developing the CMS prior to June 2020 to ensure delivery of Contact Tracing across Scotland, a list of data items to collect for each case was developed. This included:
 - Index case: name, CHI number, test result, date of birth, contact details such as telephone number and address (also is this the same as where they are currently isolating), ethnicity, employment and occupation details (such as healthcare, emergency services, food preparation or education setting), language and

accessibility requirements, guardian details (when necessary), symptoms(if they are symptomatic), infectious period/onset date, if in shared/communal accommodation, whether they have been at a port setting (such as on a boat/cruise) and recent air travel details. Also recorded that isolation guidance had been provided, if they needed support to isolate or refused to isolate.

- Contact details: whether they are a household or non-household contact, their relationship with the case, the setting of where the exposure took place and then also collected the same details as those outlined above for index cases.
- Test details: these details were provided through the ECOSS data system.
- 9.2.19 As well as informing Scottish Government the daily data report (produced by NSS) was also provided to the Covid-19 Tactical Operating Group of T&P to help inform operational decisions regarding Contact Tracing and to identify areas requiring additional resource. The report was originally developed by the NCTC Programme Director. This reporting provided an overview of the contact tracing system to operational decision makers. It was also a mechanism for highlighting when there were data or testing issues within the system. The report included data on:
 - The number of index cases (both awaiting interview and those with contact tracing underway) within CMS
 - The contact tracing completion trend data
 - The number of contacts
 - · Laboratory samples results received.

9.3 Sources and infrastructure

Corporate data warehouse

9.3.1 With increasing volumes of testing in Scotland, the original data processing infrastructure and methodology that had been developed at pace at the beginning of the pandemic became increasingly inefficient. A long-term more viable solution to modernise the approach was to move all Covid-19 reporting from the ECOSS system, which had been used historically to hold all positive microbiology laboratory specimen results in Scotland, to the new Corporate Data Warehouse (CDW). This was necessary because ECOSS was not a suitable platform to deal with the volumes of the pandemic. Reporting moved over to the CDW on 28 July 2021. Benefits of transitioning to the CDW included:

- A single, consolidated set of data with automated updates each day, which could be accessed by both PHS and NHS boards
- More accurate identification of cases and linkage to other sources (e.g., deaths and hospital admissions) through improved capture and use of CHI which enabled better linkage to other data sources and more accurate identification of individuals
- Scalability as the CDW is a database specifically designed to support analysis and reporting
- Saving time as it was an automated process it saved over two hours in daily reporting.

Co-ordination

- 9.3.2 PHS and the Scottish Government held a weekly Data and Intelligence Forum to ensure effective coordination and coherence across the various Covid-19 data and intelligence streams that flowed between Scottish Government, PHS and NSS as the main providers of Covid-19 data and analytical products and infrastructure solutions.
- 9.3.3 Co-chaired by the PHS Director of DDI and the Head of Health and Social Care Analysis at the Scottish Government, the Forum provided oversight to data and intelligence, including reports for ministerial briefings, support for incident management (both nationally and locally), support for performance management, and sharing of data for public consumption. The remit of the forum was to:
 - Monitor the effectiveness of current data and intelligence flows and products.
 - Proactively identify new requirements for data and intelligence products.
 - Ensure there was effective collaboration between all relevant parties, including overseeing the effectiveness of the operation of routine points of contact.
 - Ensure that there was consistency between different data and reporting sources.
 - Prioritise work against finite resources.
 - Monitor agreed milestones and plans against progress.
 - Act as a point of escalation and unblocking.
 - Minimise duplication of effort and constantly reviewing the need for existing products.

- Secure clarification of roles and responsibilities in relation to data and intelligence across member organisations.
- Ensure coordination of changes to reporting, and ensuring key decisions were made by statisticians and epidemiologists.
- 9.3.4 The principal data sources that were especially relevant to routine advice provided to the Scottish Government included:
 - The number of cases and tests by testing location (Scottish laboratories and UK Lighthouse Laboratories), demographic data such as age and sex, and by NHS boards and local authorities.
 - Testing data from the contact tracing case management system (CMS), which provided an overview of exposures reported by cases, including overseas travel.
 - Timely NHS hospital admissions data through the RAPID (Rapid Preliminary Inpatient Data) reporting system, Intensive Care Unit (ICU) data provided through SICSAG and NRS death data linked to Covid-19 testing data.
- 9.3.5 Structures and processes that were most critical for the provision of this data on a routine basis included:
 - The RTE team within PHS that held half hour daily huddles to validate data outputs, interpret and describe current trends in testing, case, and outcomes data (including hospital, ICU and death data).
 - PHS hosted a daily morning huddle (see Section 3.2) with participation from PHS, Scottish Government and other partners to review daily trends in case numbers, hospital impact, ICU cases and deaths and to capture occasional data quality issues before officially sharing with Scottish Government more widely. For this daily meeting, the RTE team would produce an overview of the data and identify any concerns in trends or issues of note.
- 9.3.6 Data was presented to the NIMT to inform recommendations made to the ScottishGovernment and CMO about managing the health impact of the pandemic (see Section 4.2).

9.4 Data assessment

9.4.1 From PHS's perspective, no formal review of T&P data was necessary in relation to the flow of information that was required for PHS's purposes, because no data subject

rights and or privacy concerns were raised which would have merited such a formal review.

9.4.2 NSS managed the technical infrastructure for many of the data flows which supported T&P. NSS will be best placed to comment on any impact assessments undertaken as part of their work in this area.

9.5 Data challenges

9.5.1 From PHS perspective, the management of data and development of associated technologies was an area of success. However, there were areas of challenge around data protection and instances where researchers were ill-informed about the types and quality of data that was available and the ease and speed with which this could be made available resulting in unrealistic expectations and disappointment.

Volume

9.5.2 One of the challenges experienced by PHS was the handling of the sheer volumes of testing data every day which required PHS to modernise its approach leading to greater automation using the CDW (see Section 9.3).

Veracity

- 9.5.3 In terms of completeness checks, Covid test monitoring was carried out twice daily (morning and afternoon). This included checking to make sure all data flows were running as expected and that there were no job load failures. From a data perspective PHS then checked that data had been received from all expected sources and that the number of records received were at expected levels. Contact tracing data was also checked twice daily (morning and afternoon) to establish if there were any increase in the number of records for cases and contacts identifiable in CDW.
- 9.5.4 For data received from Scottish laboratories via ECOSS, different data checks were carried out weekly to identify any discrepancies in the data from health boards and that received via an automated route in terms of number of positive or negative test results. These were then followed up with the lab directly. This would then allow for further contact tracing processes to run as expected and for cases to be contacted to provide isolation guidance and to collect details about them, their current symptoms and to identify contacts.

Data protection

- 9.5.5 Data protection and privacy was another area of concern for PHS, particularly in terms of data received from the Home Office, in which data captured was used to contact recently returned travellers to Scotland to provide public health advice.
- 9.5.6 On 7 June 2020 the Scottish Government announced new health measures for travellers to Scotland to help suppress Covid-19 and prevent new cases being brought into Scotland. The measures that came into force on 8 June required residents and visitors entering the UK from abroad to self-isolate for 14 days. Ministers were concerned about compliance with these measures and as a result the Scottish Government requested that PHS undertake follow-up calls of a sample of self-isolating recently returned travellers to provide public health advice and information.
- 9.5.7 In instances where someone could not be reached, their details were to be provided to Police Scotland in order to make direct contact. PHS was concerned that if nonrespondents' personal details were passed to Police Scotland for enforcement purposes, this could detrimentally impact on the public's trust in PHS.
- 9.5.8 PHS Chief Executive Angela Leitch clarified with Police Scotland that the request did not extend to passing the contact details of travellers to Police Scotland in relation to any other potential offence, including under regulation 9(1) of the Health Protection (Coronavirus) (International Travel) (Scotland) Regulations 2020. This meant that PHS would not be passing details to Police Scotland of individuals who PHS suspected may be breaching the 14-day quarantine period. It was only the contact details of individuals PHS was not able to make contact with that were passed to Police Scotland, not those with whom contact was made and call handlers informed that the individual did not intend to comply with the 14-day quarantine period.
- 9.5.9 Prior to the transfer of data from the Home Office, a number of data protection and security measures had to be put in place to ensure the safe transfer of data from the Home Office. PHS also received test data sets from the Home Office which contained errors, and this had to be addressed before a full flow of data could begin. PHS had originally anticipated that the flow of data (and subsequent contacting of arrivals in Scotland) would begin on 22 June 2020 (when the NCTC went operational) but this was delayed until 7 July 2020 to ensure all data protection and security measures were in place and testing of data was complete. At this time, the number of arrivals into Scotland was low as there was limited permitted foreign travel at the time.

10. Public communications and messaging

- 10.1.1 The addition of the word 'Support' to Test, Trace and Isolate is described in Section 7.2 as having resulted following PHS involvement in the development of Scottish Government strategy. Nevertheless, the decision to move from the language of 'Test, Trace, Isolate, Support' to 'T&P' was one taken by Scottish Government, without PHS influence. 'T&P' became the language of public communications, including the specific marketing campaign that PHS led on behalf of the Scottish Government. T&P was also the language of the operationalisation of the strategy; it was used to describe the system of public health interventions: testing, contact tracing and supporting self-isolation.
- 10.1.2 Scottish Government funded and strategically led all public facing campaign activity for T&P and PHS worked in partnership with Scottish Government to deliver. The purpose of this activity was to raise awareness of changing guidance to testing, social isolation and protection measures as well as to launch specific tools used during that time such as the Protect Scotland App. The Scottish Government's Health Marketing team, who had oversight for this work, is best placed to comment on rationale for approach, evaluation and identification of areas for improvement of public messaging in future. PHS were not involved in the evaluation of impact of the public-facing activities and are therefore not able to offer insight into their effectiveness.
- 10.1.3 Scottish Government's Health Marketing team also led on all bespoke communications and outreach work targeting specific demographic groups and those deemed at-risk, vulnerable or from lesser-heard communities that were less likely to engage with T&P guidance during the pandemic. Identification of these groups and approaches to improve reach to people in these communities was carried out by Scottish Government. To support this work, PHS produced the following resources in alternative formats, although the original material and content were produced by Scottish Government:
 - T&P door drop leaflet (June 2020) posted to every household in Scotland as part of initial campaign roll-out, providing guidance around testing, contacting tracing, what to do in event of positive test result and support available.
 Translated into 18 languages including BSL as well as audio and large print

(Examples: PHS7/176 - INQ000582517,²¹⁰ PHS7/177 - INQ000582518,²¹¹ PHS7/178 - INQ000582514,²¹² PHS7/179 - INQ000582515²¹³).

- FACTS poster (May 2021) (Face coverings, Avoid crowded places, Clean your hands regularly, Two metre distance, Self-isolate and book a test if you have symptoms) translated into 38 languages including BSL and audio (Examples: PHS7/180 INQ000582519,²¹⁴ PHS7/181 INQ000582520²¹⁵).
- 10.1.4 PHS Public Health Alerts are issued to clinicians and other healthcare workers, rather than directly to members of the public (PHS7/182 INQ000469391).²¹⁶ This information is then re-purposed as appropriate to be shared with the public. Examples include First Minister briefings, social media content, news releases, media interviews/briefings, content on NHS inform, campaigns and informed consent leaflets for the Covid-19 vaccine. Given their primary audience, therefore, it would not be practically useful or appropriate to attempt to measure whether the Public Health Alerts had any impact on compliance or engagement with T&P.

²¹⁰ Door drop leaflet - Arabic translation. 2020

²¹¹ Door drop leaflet - Polish translation. 2020.

²¹² First Minister letter infographic - Arabic. April 2020.

²¹³ First Minister letter infographic - Polish. April 2020.

²¹⁴ FACTS poster - Arabic translation. 2020.

²¹⁵ FACTS poster - Polish translation. 2020.

²¹⁶ Public Health Scotland. Issuing a Public Health Scotland Health Protection Alert. December 2020.

11. Reflections and Lessons Learned

11.1 Test and Protect – value for money

Testing

- 11.1.1 PHS has not undertaken any formal assessment of value for money of the National Testing Programme. The Inquiry has however sought the view of PHS on whether the National Testing Programme was value for money. Given the complexity of such an assessment and the ownership of the programme by the Scottish Government, the Scottish Government is best placed to provide this.
- 11.1.2 For its part, PHS has provided in this statement the evidence of the need from the outset of the pandemic for a substantial upscaling at considerable pace of capacity of various aspects of T&P. In retrospect, it is the view of PHS that given the scale of such challenges, the development and deployment of T&P was a substantial achievement, and experience therefrom is a valuable contribution to preparedness for future pandemics. The legacy aspects of T&P as described below are the product of such learning.
- 11.1.3 Testing strategies were dependent on test availability and the developing knowledge on transmission risk from detailed analysis of the epidemiology of cases. The recognition of the role of asymptomatic cases and pre-symptomatic cases in amplifying transmission took many months to be clarified and led to a significant revision of testing strategies and associated recommendations.
- 11.1.4 In retrospect, the practice of only testing individuals with symptoms was flawed, as asymptomatic or pre-symptomatic transmission made a significant contribution to cases and thus the extension of testing to everyone, once this was logistically practical, was a very important step. The whole of the UK took its lead from SAGE with additional insight offered by the Scottish Advisory Committee (SAC) on COVID-19 and from the Scottish Government directly. HPS/PHS were updated by this SAGE/SAC discussion which included consideration of WHO and other international advice as to the importance of testing.
- 11.1.5 PHS greatly benefited from the continued provision of test result information for the first and subsequent waves of Covid-19. From 1 April 2020, laboratory capacity, whilst increased, was not consistently meeting demand. In community settings, meeting the demand required to offer testing to support suspected and confirmed cases in care home management was a well-documented challenge. Outside closed community
settings, the provision of testing for the wider population suspected of having Covid-19 allowed increasing confidence that people could take control of their own destiny. This became greatly more effective with the development and deployment of LFDs for the population.

- 11.1.6 In terms of public engagement, mass testing was an incredibly successful programme as evidenced by the sustained level of testing, reporting and adherence with public health actions requested of those being tested. The local offer of testing greatly facilitated this and was supplemented by mobile testing units for local areas of pressure.
- 11.1.7 Prior to the availability of LFD there were huge pressures on the T&P system particularly during rapid increases in cases in the community with waves of infection. For example, delays to the interpretation and thus sharing of an individual's test result risked public and professional confidence in the T&P system. These coupled with intermittent data transfer issues from the Lighthouse Laboratories system and consequent difficulties in assessing trends in cases and the impact of Covid-19 also presented risk to confidence.
- 11.1.8 The advent of LFD availability led to further ease of access but led to its own issues in interpreting changes in trends on subsequent PCR requests and results.
- 11.1.9 On an individual basis, this test result along with contact tracing information allowed individuals to take control of their circumstance and offered further opportunity to protect their families. PHS, NHS boards, local authorities and Scottish Government then benefitted from the collated and analysed data from such testing in assessing the start of subsequent waves of infection, their magnitude relative to other waves and the consequent implementation of public health measures.

Contact tracing

11.1.10 It is the view of PHS that the rapid establishment of a NCTC and associated infrastructure was a success. It is acknowledged that the statutory duty of local NHS boards, board chief executives and their Health Protection teams to protect the health of their local populations meant that their focus was understandably directed towards local areas. It could therefore be challenging to find capacity to make national contributions with limited resources in an incredibility complex health environment. Assessing local need and obligation against scope to contribute to the national effort meant that not all boards were able to attend all daily mutual aid calls convened by NSS (PHS7/183 - INQ000572418),²¹⁷ (PHS7/184 - INQ000574462).²¹⁸

- 11.1.11 National grading and job descriptions were applied to contact tracing roles but there was a degree of variation in pay despite people carrying what were often very similar functions. This was particularly the case across NHS bands 3, 4 and 5. As described in Section 5.4, in ensuring parity with equivalent jobs in the Scottish Ambulance Service (SAS) and NHS24 there was a challenge to ensure that these services were not destabilised.
- 11.1.12 Given the need for local recruitment and national consistency throughout the pandemic to meet need and improve capacity at all levels, candidates often had multiple opportunities to apply for posts. The deployment of remote working increased this pressure, with candidates able to consider jobs across Scotland regardless of their location. This meant that recruitment was often very competitive from the perspective of the employer, as multiple organisations were vying for the same pool of potential employees.
- 11.1.13 NCTC had a clear remit and successfully offered support to local boards with contact tracing capacity at times of increased pressure locally. National understanding of capacity was underpinned by the provision of national and local data about how many staff were in post on a regular basis, thus making it easier to predict the overall system capacity to cope with increasing demand.

11.2 Test and Protect – transition and legacy

Test and Protect Transition Plan

11.2.1 The Scottish Government published the T&P Transition Plan (PHS7/185 - INQ000235186)²¹⁹ on 15 March 2022, which set out the government's plans for the endemic phase of Covid-19. The strategic intent was described as:

'To adapt T&P to support the effective management of Covid-19 as it becomes endemic, to support patient treatment and care; protect those in highest risk settings; monitor prevalence and the risk of new variants, respond to outbreaks, scale if required for future health threats, and build a legacy for wider population health benefit.'

²¹⁷ NCTC Team Managers. National Contact Tracing Centre Mutual Aid Process, v1.0. January 2021.

²¹⁸ Mutual Aid meeting 08/12/2021. December 2021.

²¹⁹ Scottish Government. Test and Protect transition plan. March 2022.

- 11.2.2 In the Plan, the endemic phase of Covid-19 was described as 'steady state'. This included a move from population level symptomatic testing to testing for clinical care, surveillance and outbreak response. It saw the end of population level contact tracing, isolation and support, and the use of the Protect Scotland proximity contact tracing app. The Scottish Government was clear that surveillance would continue and the contingency infrastructure for outbreak response would remain in place, both of which PHS leads at a national level (see PHS's 'Plan for monitoring and responding to new SARS-CoV-2 variants and mutations' published in September 2022) (PHS7/186 INQ000147521)²²⁰ and respiratory surveillance plan discussed below).
- 11.2.3 The decisions to end testing requirements at population level in April 2022 resided with Scottish Government but were likely dependent on the advice offered by UK SAGE, the Scottish Advisory Committee on Covid-19, the epidemiological picture presented by the PHS-led NIMT and in particular early observations on the impact of the high uptake on a societal basis of the Covid-19 vaccines.

Legacy

- 11.2.4 A legacy of T&P is that a model IT infrastructure and support and logistics which worked for the Covid-19 pandemic for population coverage was achieved and could be used for future learning. This was in partnership with NHS, local government, Scottish Government, academia and UK government. It is important to note that the support of the NSS National Procurement team was critical to the successful delivery of this service that is now a legacy for Scottish pandemic preparedness.
- 11.2.5 This model and partnerships would need to be considered in the event of a future pandemic and it cannot be presumed that the same structures could be applied to any future threat. PHS would expect to have a coordinating role in such a future endeavour, as set out in multi-agency command and control arrangements in the updated PHS Incident and Emergency Response Plan (PHS7/187 INQ000515924)²²¹ published in July 2024.
- 11.2.6 The PHS led NIMT documented the positive societal benefits of the success of the Covid-19 vaccination programme in which reduction in mortality, hospitalisation and GP consultation had led to incremental easing of measures and amendment to testing and self-isolation that could accompany this.

²²⁰ Public Health Scotland. Plan for monitoring and responding to new SARS-CoV-2 variants and mutations (VAMs) September 2022.

²²¹ Public Health Scotland. Incident and emergency response plan. July 2024.

- 11.2.7 The T&P Transition Plan saw the award of financial allocation from Scottish Government to ensure PHS respiratory surveillance was in place for Covid-19 and other respiratory pathogens. This has resulted in the Five-Year Pathogen Genomic strategic plan published in July 2024 by Scottish Government and PHS (PHS7/188 -INQ000569826),²²² and the development of new WGS services.
- 11.2.8 PHS was able to step down its Covid-19 reporting from weekly to monthly, in keeping with the pre-pandemic approach for coverage of respiratory pathogens (PHS7/189 INQ000569796).²²³ PHS also developed Scotland's National Respiratory Surveillance Plan (PHS7/190 INQ000147522),²²⁴ in close consultation with colleagues in the Four Nations, to facilitate data sharing and pooling. The plan has proved successful in that PHS surveillance allows the description of Covid-19 along with other respiratory pathogens as part of a steady state of recording, surveillance and reporting.

11.3 PHS pandemic response

11.3.1 The initial response to the pandemic raised challenges for PHS around staff, information systems, governance and creating a new cohesive organisational culture from the three legacy public health bodies. At the start of the pandemic much of the transition and strategy preparatory work in the establishment of PHS was still underway adding to the challenges the organisation faced.

PHS Lessons Learned report

- 11.3.2 In the PHS Lessons Learned report (May 2023) (PHS7/029 INQ000187754),²²⁵ PHS identified and highlighted the following challenges, all of which were critical factors in PHS's support for T&P:
 - Flexibility and adaptability of PHS: Responding to the pandemic while establishing a new national public health organisation for Scotland was a unique and highly challenging scenario. Flexibility and adaptability were key to PHS's ability to deal with the fast-paced and changing nature of the pandemic and the far-reaching implications for the public in Scotland.
 - **Pressure on staff**: There was significant and ongoing pressure on PHS staff, especially where expertise was held by a small number of people who needed to be part of the response throughout the pandemic. Staff were naturally committed

 ²²² Public Health Scotland. Pathogen Genomics in Scotland: 5-year strategic plan 2024-2029. July 2024.
²²³ Public Health Scotland. Changes to our Covid-19 reporting. May 2023.

²²⁴ Public Health Scotland. Scotland's national respiratory surveillance plan. September 2022.

²²⁵ Public Health Scotland. Learning Lessons from Covid-19. March 2023.

to playing their part in protecting the health of the public, but the sustained requirements on staff had a negative wellbeing impact on them.

While wellbeing support was available, it could have been more of a focus from the outset. That said, a comprehensive wellbeing plan was implemented, offering significant support to staff. This plan included counselling, bitesize wellbeing sessions, signposting to wellbeing resources via the Spark (intranet), wellbeingrelated courses and sessions delivered through shared services, and specific work in the CPH directorate to produce a wellbeing plan.

 Governance arrangements: It is critical that clear and well-communicated governance arrangements are developed in the early stages of future pandemics or serious public health incidents, while ensuring staff are aware of structure, escalation, and roles and responsibilities, including when changes are made. This was inevitably a challenge given the pace and progression of the pandemic.

Previous roll out of equipment such as laptops, to allow greater flexibility of working arrangements, proved to be essential in enabling staff to work remotely at short notice.

• Systems, processes and procedures: Personal and professional involvement in the pandemic was a significant factor in motivating colleagues to go above and beyond usual working practices. While organisational systems, processes and procedures were evolving, staff had to find ways to navigate a way forward to deliver high-quality work and support the response.

While this was a unique scenario, forming a new organisation amid our response to a pandemic, systems issues undoubtedly added to the challenge facing staff.

• **Resources**: The health protection function within PHS was resourced at the outset in proportion to the expected day-to-day activities, which did not include a pandemic response sustained over a period of years. Although there was early reassurance and later demonstrable additional resource provided by Scottish Government eight months into the pandemic, for periods there were insufficient trained and experienced staff to deliver certain functions resulting in staff working excessive hours. This was particularly so for more experienced public health trained individuals with health protection experience, reflecting the extensive period of training such individuals.

Large numbers of staff, new to PHS, were recruited on fixed-term contracts and secondments while working from home. This presented real operational,

leadership and staff wellbeing challenges including in relation to induction, teambuilding and training.

- Information sharing: Information sharing and situational awareness was a challenge for all organisations, especially through the most intense phases of the pandemic.
- Training: As PHS came into existence during the pandemic, not all staff were adequately trained in incident management and systems were not fully established. The updated PHS Incident and Emergency Response Plan is accompanied by associated training and documentation for incident management.
- 11.3.3 It is the view of PHS that despite these significant challenges inherent in the establishment of a new organisation at the start of a pandemic, it was able to play its part in contributing substantially to Scotland's response. The Lessons Learned report notes that it is important to recognise the many significant achievements that PHS was able to deliver and support, including: sampling; testing and sequencing arrangements; contact tracing; guidance and information for professionals, applicable to settings and in language suitable for communication to the public; vaccination programmes; data and epidemiological analysis; public information and messaging; and support to partners including Scottish Government, territorial and special health boards and local authorities. Nevertheless, as noted throughout this statement, it is important to acknowledge that inevitably there are areas for improvement and development.

Additional observations

- 11.3.4 Other operational matters of note for PHS, particularly in the early days of the pandemic:
 - Accountability: Section 1.3 describes the joint accountability of PHS to national and local government. This arrangement – while a core strength of PHS in implementing its core value of collaboration - presented additional complexity during the inception of PHS.
 - Autonomy: From 17 March 2020, when NHS Scotland was placed on an emergency footing, the operational autonomy of PHS was impacted. This lasted until April 2022. PHS's lead role in delivering public health advice transferred to Scottish Ministers, meaning that PHS operated in a more advisory role when it came to health guidance, with Scottish Government having final sign off. PHS is of the view that there is potential in clarifying such a relationship including how it

would operate in practice (such as the operation of the PAC process (discussed in Section 5.5).

- Coordination of requests for support received by PHS: Processes by which requests for support came to PHS were myriad in the early stages of the pandemic. A process allowing efficient recording and logging of such requests took some time to be implemented and was aided by the introduction of the liaison function by the Scottish Government which operated from late January 2020 until May 2022. Managing the competing demands of these requests was also impacted by remote working.
- Prioritisation: Business as usual was impacted by capacity requirements of the PHS response to the pandemic, resulting in the pausing of some PHS functions. This was agreed with Scottish Government and COSLA. As well as this having significant impact on the delivery of the original function of PHS, the management of this balance of resource could be time consuming and complex.
- **Data and statistics:** In order to manage the volume of daily testing data which needed to be handled required PHS to modernise our approach. This led to greater automation using the Corporate Data Warehouse (see Section 9.3).
- **Pace**: The ever-changing nature of the pandemic meant that PHS had to be dynamic and flexible in order to adapt guidance at short notice or carry out complex analytical work, whilst ensuing accuracy and statistical robustness. This often required PHS staff to work additional hours and out with the parameters of normal office timetable.

11.4 Wider response

NIMT Lessons Learned report

- 11.4.1 The NIMT has recently published the conclusion of its Lessons Learned exercise (PHS7/191 - INQ000506964).²²⁶ The conclusions, while not focused on T&P, will be important to future pandemic management, thus:
 - Attendance by Scottish Government and CMO colleagues at NIMT meetings enhanced engagement, allowing direct and open communication. This also reduced the potential for multiple briefings and afforded opportunities for earlier briefings to Ministers.

²²⁶ Public Health Scotland. Covid-19 National Incident Management Team - lessons identified report. September 2024.

- There could have been more feedback to NIMT members on the four harms decision-making process and Scottish Government policy intentions, including how these related and considered NIMT advice. This would have enabled the NIMT to fine tune the evidence and public health intelligence it considered to underpin the advice and thus strengthen its impact. Limited feedback resulted in NIMT members not being fully aware what influence the outcome of their deliberations and advice had on national decisions or policy, including the timing of changes to guidance or directions.
- The lack of feedback led to, on occasion, a discontinuity between the advice produced at NIMT and the Scottish Government guidance outputs and policy decisions. Whilst it is understood that not all advice and recommendations would be taken forward, the lack of feedback resulted in health boards and partners agencies being on the backfoot in trying to implement that guidance locally. There were comments that, at times, contributions from the NIMT outlining operational impacts or concerns of planned strategic policy were not fully considered, resulting in local challenges during implementation of policies.

SCoPP and Scottish Government response to UK Inquiry Module 1

- 11.4.2 The Scottish Government established an expert group of leading scientists and medical specialists in August 2021 the Standing Committee on Pandemic Preparedness (SCoPP) to advise on preparations for the threat of a future pandemic. Dr Nick Phin was a member of the committee in a personal capacity and Dr Jim McMenamin first attended as an observer on 29 April 2022 and was then formally invited to become a member on 10 May 2022.
- 11.4.3 The report recommends the establishment of a Scottish Pandemic Sciences Partnership (SPSP), hosted by PHS and reporting to relevant Ministers, with a view to: fostering connectedness among the academic, research and wider pandemic preparedness community; Identifying and securing the effective use of data for pandemics; horizon-scanning and developing role of innovation; and integrating behavioural sciences and a focus on inequalities into future pandemic preparedness (PHS7/192 - INQ000530949).²²⁷

²²⁷ The Standing Committee on Pandemic Preparedness. Pandemic ready: safeguarding our future through preparedness, Final report. November 2024.

11.4.4 In its response to Module 1 of the UK Inquiry, published on 16 January 2025, the Scottish Government accepted the recommendations in SCoPP's final report in principle and stated that it will work closely with partners to deliver those. Work is now underway led by PHS in collaboration with partners on SCoPP to put initial arrangements in place and scope future work.

11.5 Public Health Microbiology

- 11.5.1 It is the view of PHS that a fit-for-purpose Public Health Microbiology service for Scotland is required to meet public health need for surveillance, outbreak management, biosecurity and the delivery of microbiological pandemic preparedness in diagnostics and testing. This should be underpinned by a One Health approach which recognises that the health of humans, animals and ecosystems are interconnected. (One Health microbiology partners include Food Standards Scotland, Animal Plant Health Agency, Scottish Rural College, SEPA, Scottish Water, Public Analyst Laboratories and COSLA.)
- 11.5.2 PHS has led reviews which include recommendations on improving pandemic preparedness for future response: 'Gap Analysis for Public Health Microbiology services' (2024) (PHS7/081 INQ000495928),²²⁸ the 'Pathogen Genomics in Scotland: five year strategic plan' (2024) (PHS7/188 INQ000569826),²²⁹ and the Review of Global Reference Laboratory Service Delivery Models (2024) (PHS7/082 INQ000569832).²³⁰
- 11.5.3 Key recommendations from the reports being taken forward by the Scottish Government are:
 - There is a need for national governance and oversight of diagnostic and Public Health microbiology in Scotland. This includes enabling efficient access to decision making and funding for microbiology tests and technologies to align with public health need to support public sector laboratory services.
 - Reference laboratories must provide a quality assured, fit for purpose repertoire of testing going forwards as they are central to the public health response and any immediate response to future pandemics/outbreaks.

²²⁸ Public Health Scotland. Gap analysis of Public Health Microbiological services in Scotland: Analysis across One Health Microbiology disciplines to meet Public Health / Health Protection requirements. June 2024.

²²⁹ Public Health Scotland. Pathogen Genomics in Scotland: 5-year strategic plan 2024-2029. July 2024. ²³⁰ Public Health Scotland. Review of Global Reference Laboratory Service Delivery Models: analysis to identify comparable exemplars of modern, well governed, and efficiently resourced services aligned with public health agency need in countries of a similar population size to Scotland. May 2024.

- Development of a modernised and unified national data and digital infrastructure that integrates all microbiology results across sectors in Scotland to meet the requirements of public health surveillance and response.
- Establishing a Scottish quality-assured, cost-effective pathogen genomic capacity which produces genomic intelligence integrated with epidemiological data and pathogen knowledge for local, national, and international infection prevention, and public health priorities.

Pathogen Genomic Strategy for Scotland

- 11.5.4 The pandemic highlighted the importance of pathogen genomics as part of a public health response. The Scottish Government's updated Testing Strategy (PHS7/014 INQ000571147)²³¹ published on 17 March 2021 incorporated a commitment of £13 million investment to build a WGS Service for Scotland to be able to sequence all positive Covid-19 cases in the country. This is intended to provide a legacy beyond Covid-19 to support Scotland's resilience to a range of threats, including antibiotic resistance. Such legacy includes the new sequencing service built on the end-to-end Covid WGS service that PHS developed with NHS boards in 2020; and the delivery of the subsequent WGS service, led by PHS in partnership with others.
- 11.5.5 Building on the success of developing SARS CoV-2 Sequencing capacity in Scotland, PHS published a strategy in July 2024 which sets out the direction and plan for pathogen genomics in Scotland (PHS7/188 – INQ000569826).²³² This strategy recognises the need for a centralised IT infrastructure, particularly for qualityassurance, and the importance of clinical governance for reporting of pathogen genomic analysis to ensure it meets the needs of public health surveillance.
- 11.5.6 Since the pandemic a Quality Management System has been developed for bioinformatic analysis, and PHM are working towards UKAS accreditation for the SARS CoV-2 sequencing service. Work is underway to centralise IT infrastructure for pathogen genomics which is scalable and able to be applied to other pathogens. The benefits of a centralised bioinformatic infrastructure would allow for a scalable and cost-effective IT solution to be established and would allow for standardisation in systems which would aim for a "single version of the truth" for reporting.
- 11.5.7 PHS has developed stronger partnership with Scottish Government, with an identified sponsor for pathogen genomics. This will ensure that Scotland is able to keep pace

²³¹ Scottish Government. Coronavirus (Covid-19) Scotland's testing strategy update. March 2021.

²³² Public Health Scotland. Pathogen Genomics in Scotland: 5-year strategic plan 2024-2029. July 2024.

with worldwide technological advancements in providing a high-quality, responsive public health service for future outbreaks.

Gap Analysis for Public Health Microbiology services

11.5.8 The 'Gap Analysis for Public Health Microbiology services' (2024) (PHS7/081 -INQ000495928)²³³ makes a number of recommendations for the establishment of a fit for purpose integrated microbiology service for Scotland. Of these, recommendation 13 is the most important in clarifying procurement need for future pandemic response. It states that:

> "PHS will collate Scottish Government public health microbiology requirements (both routine and emergency response) into a single framework to support coordinated microbiology services between NHS Diagnostic microbiological and reference laboratories, non-NHS public sector laboratories, and commercial laboratories. This should include a planned approach to microbiology requirements for pandemic preparedness, biosecurity..."

- 11.5.9 Furthermore, the document proposes the formation of a Scottish Public Health Microbiology Board, co-chaired by Scottish Government and PHS. The development of the SPHM Board commenced in 2024. One of its responsibilities is to ensure there is resilient capacity and capability in place to meet Scotland's One Health microbiology and biosecurity/biosurveillance needs (including pandemic preparedness). To do so, it will require to keep abreast of Scotland's horizon scanning for future pandemic threats by linking with Scotland's pandemic preparedness governance structures and thereby provide a route to rapidly activate planning, procurement, and funding as part of the microbiology response. This will address a major gap in the early SARS-CoV-2 response in Scotland.
- 11.5.10 The Board will also seek to provide clarity for responsibility at a national level for diagnostic laboratory service delivery and maintaining a fit for purpose repertoire of tests as outlined in recommendation 14, which advises that:

"Access to microbiological tests and technological innovation should be nationally coordinated and monitored. This shall include:

²³³ Public Health Scotland. Gap analysis of Public Health Microbiological services in Scotland: Analysis across One Health Microbiology disciplines to meet Public Health / Health Protection requirements. June 2024.

- Review and monitor the geographical distribution of existing microbiology tests to align with public health need and enable efficient access across sectors.
- Overseeing the evaluation of new microbiological tests/technology and assessment of the associated capacity and expertise to implement these within all sectors.
- Providing advice to the Scottish Government as to technologies that should be prioritised/funded for implementation."
- 11.5.11 Following the approval of the report by the Scottish Government in December 2023, a programme of work is underway to implement the recommendations from the report. The programme of work will be delivered in partnership between PHS, Scottish Government, NSS and other key One Health microbiology partners over several years.

Global review of reference laboratory services

- 11.5.12 PHS conducted a global review of Reference Laboratory service delivery models to identify comparable exemplars of modern, well governed, and efficiently resourced services aligned with public health agency need in countries of a similar population size to Scotland. The 'Global review of reference laboratory services' report was approved in 2024 by a programme board which included representation from NSD, Scottish Government, PHS senior leadership, and Scottish reference laboratories senior management (PHS7/082 – INQ000569832).²³⁴
- 11.5.13 From the report, the most relevant recommendation is for:

"PHS to lead work to ensure the Reference Laboratories can provide a scalable laboratory capacity that can flex between changing public health endemic/epidemic need and provide the initial support for pandemic response."

- 11.5.14 Other recommendations from the report pertain to the clarification of funding and clarity of leadership during a future early pandemic response which will require planning in advance with partners (including NSS Procurement) to ensure Scotland has built the necessary procurement plans in advance of future pandemics.
- 11.5.15 A phased approach to deliver the report's recommendations is expected to commence in 2025 and will take several years to complete.

²³⁴ Public Health Scotland. Review of Global Reference Laboratory Service Delivery Models: analysis to identify comparable exemplars of modern, well governed, and efficiently resourced services aligned with public health agency need in countries of a similar population size to Scotland. May 2024.

11.6 Governance

11.6.1 It is the view of PHS that in general the governance arrangements described in Chapters 2 and 3 worked well. Also, as described in Chapter 4, governance arrangements for testing and public health microbiology evolved appropriately given the need for rapid development of an approach. Use of data and published statistics to inform strategic planning and decision making was effective, as was appropriate use of management information from the contact tracing data base, on a close to real time (or very short lag) basis, to understand and inform the operational response to wider staffing capacity issues and overall system pressures and controls. This was effective in informing responses to specific local health board pressures, e.g. to anticipate ability to maintain contact tracing locally and so determine best use of national capacity for contact tracing to support local effort through mutual aid.

11.7 Whole system working

11.7.1 The pandemic saw all parts of the public health system in Scotland working together towards a common goal in a way not previously seen in Scotland. Health was recognised as not being the responsibility of the healthcare system alone, with partners from across sectors coming together for the good of the public's health. PHS is now focused on harnessing this whole system way of working to galvanise partners in shared action towards reducing health inequalities and improving health and wellbeing. A healthier population going into a pandemic would result in less pressure on the health and social care system in responding.

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: _	PD
Name: Pa	aul Johnston
Designati	ion: Chief Executive Officer
Date:14/3	3/2025
Signed: _	PD
Name: So	cott Heald
Designati	ion: Director of Data & Digital Innovation
Date: 14/	3/2025
Signed:	PD
Name: G	eorge Dodds
Designation: Chief Officer	
Date: 14/	3/2025
Signed:	PD
Name: Di	r. Jim McMenamin
Designation: Head of Health Protection (Infection Services)	

Date: 2/4/2025

Appendix A: PHS Senior Leadership / Executive Team structure



PORTFOLIO OF CROSS-ORGANISATIONAL PROGRAMMES

Updated JAN 2025



Appendix C: Key staff involved in PHS's response

Name	Job Title	Description of role
Angela Leitch	Chief Executive (November 2019 – March 2023)	Angela Leitch led the organisation and represented the executive on the Board. As Accountable Officer, Angela Leitch was responsible for the effective management and use of all the resources entrusted to PHS by the Scottish Parliament.
Dr Nick Phin	Director of Public Health Science and Medical Director (January 2021 – March 2025)	Dr Phin led the directorate responsible for national public health protection and leads clinical professional development and training. He took up post in Scotland in the beginning of January 2021, joining from PHE/UKHSA, where he held the position of Deputy Director National Infection Service and PHE Incident Director for the Covid- 19 pandemic from January 2020 to December 2020.
Scott Heald	Interim Contact Tracing Director (May 2020 – January 2021) Interim Chief Officer (January 2021 – May 2021) Interim Director of Data and Digital Innovation (June 2021 – May 2022) Director of Data and Digital Innovation (June 2022 – present) Head of Profession for Statistics (April 2020 – present)	Scott Heald leads the directorate responsible for the collection, access, and use of data to derive insight and drive innovation in how PHS protects and improves health. In his role of the Head of Profession for Statistics, Mr Heald is responsible for all health and social care statistics in five national health boards - PHS, National Services Scotland (NSS), Scottish Ambulance Service (SAS), NHS 24, and NHS Education for Scotland (NES) which are named in legislation as producers of Official Statistics. The head of profession for statistics role is set out in the Framework for National Statistics 2000 and the UK Code of Practice for Statistics 2018. He held several roles throughout the pandemic including lead director for the establishment of contact tracing in Scotland for Covid-19, one of the Interim Chief Officers and he took over the Director of DDI from Phil Couser.
George Dodds	Contact Tracing Director (September 2020 – August 2021) Interim Chief Officer (August 2021 – January 2023) Chief Officer (January 2023 – present)	George Dodds held a variety of roles over the course of the pandemic, including leading collaborative work on contact tracing with DsPH.

Name	Job litle	Description of role
Dr Jim McMenamin	Interim Clinical Director Health Protection, HPS/PHS (April 2018 to October 2021) Strategic Incident Director for Covid-19 (January 2020 – present) Head of Health Protection (Infection Services) (October 2021 – present) Consultant Epidemiologist since 2003	As one of the strategic incident directors and the Chair of the NIMT, Dr McMenamin was the main contributor to the advice offered to Scottish Government (Scottish Government) through representation at Scottish Government, ministerial deep dives, and coordinated response from PHS to specific questions posed by Scottish Government. He is a consultant epidemiologist in the field of Infectious Disease and for the past 19 years has been the strategic lead for the Respiratory team in PHS/HPS.
Dr Michael Lockhart	Consultant Microbiologist (January 2020 – present) Co-Chair of Labs and Diagnostic cell (January 2020 – June 2024)	Dr Lockhart sat on Scottish Government led groups and provided clinical and technical expertise on laboratory testing, and dataflow from laboratories to PHS. Michael provided updates to Scottish Government on the development of the SARS CoV-2 Whole Genome Sequencing Service and Scottish National Upscaling project.
Dr David Yirrell	Consultant Virologist (January 2020 – retirement in March 2023) Co-Chair of Labs and Diagnostic cell (January 2020 – retirement in March 2023)	As a consultant clinical scientist in virology with many years' experience of running an NHS diagnostic laboratory Dr Yirrell was able to offer advice at both a technical and clinical level on laboratory testing, new technologies, and quality measures. He acted as a representative for the labs & Diagnostic cell on Scottish Government led meetings such as the Clinical Cell, Elite Sports, Scottish Scientific Advisory Group on Testing, and Testing Operational Delivery Group.
Professor Matt Holden	Consultant Pathogen Sequencing Advisor (January 2020 – present)	Professor Holden provided pathogen sequencing expertise. He was key lead for the development of the SARS CoV-2 Whole Genome Sequencing Service and Scottish National Upscaling project. Matt provided updates to Scottish Government as a key lead on the development of the SARS CoV- 2 Whole Genome Sequencing Service and Scottish National Upscaling project.
Dr Mary Black	Director of Clinical and Protecting Health (April 2020 – January 2021)	Dr Black led the directorate responsible for national public health protection and clinical professional development and training.

Name	Job Title	Description of role
Dr Maria K Rossi	Consultant in Public Health Medicine (end March 2020 – present) Interim Lead for COVID-19 Clinical Response Group (November 2020 – September 2022) Interim Head of Health Protection (Environment and Emergency Response) (February 2022 – Oct 2023) Head of Health Protection (Environmental and Emergency Response (Oct 2023 – present)	Dr Rossi contributed throughout the pandemic to the PHS Guidance function. She supported the incident directors in the public health (clinical) response, stepping in during two leads' sickness absence and eventual retirals. Dr Rossi also led the response function in support of health board Health Protection Teams (June 2020 to date) and COVID-19 Clinical Response and Guidance Group (as interim lead) from Nov 2020 – Sept 2022).
Professor David Goldberg	Strategic Incident Director for COVID-19 (January 2020 – December 2021) Interim Depute Clinical Director (April 2020 – December 2021) Programme Lead for Blood Borne Viruses/Sexually Transmitted Diseases	Professor David Goldberg is a Clinical Epidemiologist who, was one of the Strategic Incident Directors for COVID-19 alongside Dr McMenamin and Dr Ramsay. He retired in January 2023. Dr David Goldberg had two periods of long-term sickness absence between 05 January 2022 until 31 May 2022 and 01 July 2022 until 05 January 2023. Dr McMenamin carried out duties as Strategic Incident Director throughout this period.
Phil Couser	Director of Data Driven Innovation (April 2020 – June 2021)	Led the directorate responsible for the collection, access, and use of data to derive insight and drive innovation in how PHS protects and improves health.

Appendix D: Chronology - core decisions and engagement relevant to Test and Protect taken by PHS during the pandemic

Date	Decision / engagement
13 January 2020	HPS set up a National Incident Management Team (NIMT). (The group was formalised and Terms of Reference agreed in September 2020) (PHS7/016 - INQ000147555) ²³⁵
23 January 2020	HPS published 'Wuhan novel coronavirus (WN-CoV) Guidance for sampling and laboratory investigations v1.0' (PHS7/055 - INQ000495953) ²³⁶ This document was updated a further 17 times during the first year of the pandemic, and 19 times in total, until it was incorporated into 'Covid-19: guidance for Health Protection Teams (HPTs) version 2.2' on 31 May 2022 (PHS7/057 - INQ000273606) ²³⁷
23 January 2020	Contact tracing was recommended in Health Protection Scotland (HPS) Health Protection Team (HPT) guidance from first publication on 23rd January 2020 onwards. This guidance was initially produced by Public Health England (PHE) and reviewed / adapted for use in Scotland by HPS after publication
30 January 2020	Public Health Microbiology (PHM) team began linking with National Services Division (NSD) regarding accessing centralised funding to support testing (PHS7/193 - INQ000572410) ²³⁸
February 2020	HPS submitted a paper to the national Diagnostics in Scotland Strategic Group alerting them to the need for rapid buildup of testing capacity (PHS7/054 - INQ000273611) ²³⁹
14 February 2020	The Laboratories and Diagnostic Cell published 'Covid-19 Laboratory testing frequently asked questions V1.3'. This document was updated and published a further 4 times during the pandemic (PHS7/063 - INQ000189360) ²⁴⁰
28 February 2020	HPS developed a proposal around funding to support testing in NHS Scotland Laboratories in response to Covid-19 (PHS7/084 - INQ000478153). ²⁴¹ The team suggested that the first six months of the response should be funded by Scottish Government as a public health response.

 ²³⁵ Public Health Scotland. National incident Management Team: Terms of Reference. September 2021.
²³⁶ Health Protection Scotland. Wuhan novel coronavirus (WN-CoV). Guidance for sampling and laboratory investigations v1.0. January 2020.

 ²³⁷ Public Health Scotland. Covid-19 Guidance for Health Protection Teams Version 2.2. May 2022.
²³⁸ Labs & Testing Cell. Action Log v0.1. January 2021.

²³⁹ Health Protection Scotland, NHS National Services Scotland. Laboratory Testing for SARS-CoV-2 / Covid-19. June 2020.

²⁴⁰ Health Protection Scotland. Covid-19 Laboratory testing frequently asked questions. V1.3. February 2020.

²⁴¹ Lockhart, M. FW: Coronavirus - increasing laboratory test costs [email]. February - March 2020.

Date	Decision / engagement
March 2020	The Shadow Executive Management Team established the Covid-19 Response Group to provide leadership to PHS's response to the pandemic
9 March 2020	The initial (1st wave) test response was established by HPS and set up in the Royal Infirmary of Edinburgh (RIE) / Glasgow Royal Infirmary (GRI).
11 March 2020	Agreement reached that NHS partner organisations would lead on roll out of provision of PCR capacity in NHS diagnostic labs.
21 March 2020	PHS worked with the Scottish Health and Inequalities Impact Assessment Network (SHIIAN) and other collaborators to publish 'Mitigating the wider health effects of Covid-19 pandemic' in the British Medical Journal (BMJ), first as a pre-print on 21st March 2020, and then as a peer-reviewed publication on 27 April 2020 (PHS7/147 - INQ000228407), ²⁴² (PHS7/148 - INQ000147553) ²⁴³
22 March 2020	Emails were sent by Virology-Laboratories cell clinical lead to key colleagues in Scottish Government with proposals for Scotland to take forward regarding Covid testing UK expansion plans (PHS7/065 – INQ000256619) ²⁴⁴
25 March 2020	Paper shared with Scottish Government regarding stage 3 testing capacity. Capacity in Scotland was 800 samples per day with potential to scale to 2000-3000 samples once machines in place and working to full capacity within health board labs.
31 March 2020	An SBAR is developed which recommends against use of covid antibody tests for Covid testing in Scotland. Ultimately national antibody testing did not go ahead.
April 2020	A public-facing dashboard was launched with data on confirmed cases updated on a daily basis.
1 April 2020	PHS established.
22 April 2020	The Scottish Government convened a Deep Dive on Test, Trace and Isolate with public health experts. This followed a Ministerial Deep Dive the previous week (PHS7/123 - INQ000202129). ²⁴⁵ PHS attendees were Angela Leitch, Mary Black, and Phil Couser.
23 April 2020	SG/PHS call about the expansion of testing and where best to target the additional testing capacity, including all admissions to hospital aged over 75 years and then testing during admission.

²⁴² Douglas M, Katikireddi S V, Taulbut M, et al. Mitigating the wider health effects of Covid-19 pandemic. [Pre-publication manuscript]. March 2020. ²⁴³ Douglas M, Katikireddi S V, Taulbut M. et al. Mitigating the wider health effects of Covid-19 pandemic;

BMJ. April 2020.

²⁴⁴ Email: Covid testing – UK expansion plans - Request for Leadership and Direction from S.Gov 2022-03-23. March 2020

²⁴⁵ Ministerial Deep Dive (Testing) Agenda - 16 April 2020. April 2020.

Date	Decision / engagement
24 April 2020	PHS proposed and developed a national-local partnership approach to universal contact tracing. This model was described and agreed through a series of meetings with NHS boards and Scottish Government including with Directors of Public Health on 24th April; and with First Minister and Cabinet Secretary for Health on 26th April
27 April 2020	Further Ministerial Deep Dive on Test, Trace and Isolate (PHS7/127 - INQ000202367), ²⁴⁶ (PHS7/128 - INQ000572437). ²⁴⁷
28 April 2020	A contact tracing planning meeting was held with all NHS boards to agree a shared way forward for the local-national model and roll-out of contact tracing. Planning templates were shared and completed by each NHS Board (PHS7/194 - INQ000572405) ²⁴⁸
May 2020	PHS worked with NSS, DHI, Scottish Government and others to complete equality impact assessments for some early aspects of the isolation recommendation implementation agreed at the T&P Steering Group (PHS7/167 – INQ000532750), ²⁴⁹ (PHS7/168 – INQ000569783). ²⁵⁰
May 2020	PHS launched a new dashboard on the wider impact of Covid-19 on the healthcare system which provided a high-level overview of how the pandemic was impacting more widely on health and health inequalities (PHS7/173 - INQ000233600) ²⁵¹
5 May 2020	PHS convened a meeting with NHS Board Chief Executives, DsPH, and Directors of Planning in order to clarify roles and responsibilities between national and local partners. A position was agreed that the national-local model proposed by PHS was the right way forward and tentative staff numbers were agreed. The Contact Tracing Oversight Board (CTOB) - chaired by Angela Leitch - was subsequently set up to provide oversight and governance for the contact tracing programme. (PHS7/133 - INQ000286861), ²⁵²

²⁴⁶ Ministerial Deep Dive - Testing: Agenda, Monday 27th April. April 2020.

²⁴⁷ Deep Dive: Testing and contact tracing. April 2020.

²⁴⁸ Covid-19 contact tracing planning session 1: MS Teams Chat, Tuesday 28th April 2020.

²⁴⁹ NSS. Equality and Human Rights Impact Assessment of the DHI Tracing Tool: Virtual meeting held over Microsoft Teams on Tuesday 12th May 2020 facilitated by NHS National Services Scotland (NSS). May 2020.

²⁵⁰ McLaughlin, E. Covid-19 Test and Protect: Roadmap for information security and governance and equalities, Draft version 0.1. May 2020.

²⁵¹ Public Health Scotland. Covid-19 Wider impacts dashboard. Accessed August 2023.

²⁵² NSS National Contact Tracing Centre (NCTC) Programme Governance Approach. Public Health Scotland/National Services Scotland. June 2020.

Date	Decision / engagement
17 May 2020	The roll-out of contact tracing using the local-national model began. PHS published updated contact tracing Guidance; call handler action cards (scripts) and other resources (PHS7/195 - INQ000572425), ²⁵³ (PHS7/196 - INQ000572392), ²⁵⁴ (PHS7/197 - INQ000572391), ²⁵⁵ (PHS7/198 - INQ000572408), ²⁵⁶ (PHS7/199 - INQ000572393). ²⁵⁷
18 May 2020	Simple Tracing Tool for Test, Trace and Isolate pilot launched. Digital tool piloted in three Health boards (NHS Lanarkshire, NHS Fife and NHS Highland).
21 May 2020	Scottish Government started implementing the policy alignment check (PAC)
22 May 2020	WGS Upscale revised funding bid proposal was submitted to representatives of Scottish Government with updated information on funding required over a 3-year period
25 May 2020	Simple Tracing Tool for Test, Trace and Isolate rolled out across Scotland. Digital tool rolled out further through PHS led workshops.
26 May 2020	NSS commissioned by PHS to run the National Contact Tracing Centre (NCTC)
28 May 2020	PHS and NSS worked together to set up a National Contact Tracing Centre (NCTC), which was operationally ready for the national roll-out of Test and Protect on 28 May 2020
10 June 2020	PHS starts publishing contact tracing data as part of the weekly Covid-19 statistical report (PHS7/200 - INQ000572423). ²⁵⁸ This data was used to assess the effectiveness of the TTIS strategy
22 June 2020	The NCTC became operational on 22 June 2020, the same date as the start of the operation of a new CMS in Scotland. Following successful implementation for NHS Grampian, the programme then rolled out to all NHS boards in a phased manner from 22 June to the end of July 2020 (PHS7/201 - INQ000572401), ²⁵⁹ (PHS7/202 - INQ000358863) ²⁶⁰
22 June 2020	Case Management System (CMS) start date. Guidance documents and communications were produced by PHS/NSS

 ²⁵³ Sumpter, C. Email to various dated 17 May 2020. Roll-out pack. May 2020
²⁵⁴ Health Protection Scotland. Covid-19 Contact Tracing: Call handler action cards, version 1.0. May 2020.

²⁵⁵ SOP: Simple tracing tool for contact tracers and protection teams. May 2020.

²⁵⁶ Digital Health & Care Institute. Simple Tracing Tools (STT): A guidance pack for the roll out of simple contact tracing digital tools. May 2020.

²⁵⁷ Isolation advice. May 2020.

²⁵⁸ Public Health Scotland. Covid-19 Statistical Report as at 8 June 2020. June 2020

²⁵⁹ White, S. Email to various, dated 19th June 2020. Contact Tracing Programme - Transition. May 2020.

²⁶⁰ Public Health Scotland. Health Board transition to the National Contact Tracing Service. June 2020.

Date	Decision / engagement
30 June 2020	PHS led a discussion on 30 June 2020 around the monitoring that should be implemented in schools and early learning settings as these reopen (PHS7/090 - INQ000235111) ²⁶¹
13 July 2020	A Short-life Working Group, supported by PHS was established to review the national Contact Tracing model implemented across Scotland Tier 1 and 2 approach, skill mix to support NCTC and consistency of approach across all health boards to implementation and use of contact tracing technology/systems (PHS7/203 - INQ000572422), ²⁶² (PHS7/204 - INQ000572419), ²⁶³ (PHS7/205 - INQ000572395) ²⁶⁴
30 July 2020	A bid for funding to support lab staff for seroprevalence testing in diagnostic labs was submitted by the Serology Strategy Group to Scottish Government
13 August 2020	Funding for seroprevalence study to March 2021 was approved by Scottish Government
7 September 2020	Additional clinical support from within PHS as part of the NCTC response (later to be known as the Health Protection Advanced Practitioners) took up post.
October 2020	An enhanced dashboard was launched which included neighbourhood level data and new interactive features (PHS7/172 - INQ000515918) ²⁶⁵
November 2020	Consultant Virologist from the PHS PHM team joined the SARS CoV-2 Assay Development and Innovation (CADI) group (chaired by the Director of Healthcare Science in NSS NLP) to provide expertise input (PHS7/095 – INQ000478122) ²⁶⁶
December 2020	PHS launched a Serology Surveillance Dashboard (PHS7/174 - INQ000346189). ²⁶⁷

²⁶¹ Covid-19 Advisory Sub-Group on Education and Children's Issues. Minutes from the second meeting of the Covid-19 Advisory Group held on Tuesday 30 June 2020. July 2020.

²⁶² Public Health Scotland. Contact Tracing SLWG - first meeting 15/07/2020. July 2020.

²⁶³ Public Health Scotland. PHS Covid-19 Contact Tracing Programme (CTP) Short Life Working Group (SLWG) Actions Log 15th July 2020. July 2020.

²⁶⁴ Public Health Scotland. PHS Covid-19 Contact Tracing Programme. Terms of Reference - Contact Tracing Short Life Working Group (SLWG), version 0.5 DRAFT. JULY 2020.

²⁶⁵ Public Health Scotland. Improved Covid-19 daily dashboard published. October 2020.

²⁶⁶ SARS CoV-2 Assay Development and Innovation group (CADI). CADI meeting notes: 16th December 10:00 - 12:00. December 2020.

²⁶⁷ Public Health Scotland. Enhanced surveillance of Covid-19 in Scotland: Population-based seroprevalence surveillance 23 December 2020. December 2020.

Date	Decision / engagement
December 2020	PHS led the development of a Case Management Framework v1.0 and provided a prioritised approach to whole system use and effectiveness as a timely public health intervention in keeping with WHO guidance. It was developed in partnership with DsPH and Scottish Government policy leads as well as the Chief Medical Officer and his representative (PHS7/028 - INQ000245252) ²⁶⁸
2 December 2020	PHS worked with NSS and partners in the specialist NHS Virus laboratories to establish an end-to-end Covid Whole Genome Sequencing (WGS) service for NHS boards in Scotland
17 December 2020	Lab cell clinicians met with UKAS on 17 December to discuss the UK Government process for using private labs for test and release (PHS7/206 - INQ000280768) ²⁶⁹
11 January 2021	The Clinical Governance Oversight Group established to provide a point of escalation through to the testing programme board and the Government
March 2021	PHS launched an Education Surveillance Dashboard (PHS7/175 – INQ000189511) ²⁷⁰
March 2021 – April 2022	Between March 2021 and the stand down of the board in April 2022, PHS provided public health advice and evidence to the Scottish Government Asymptomatic Testing Board (PHS7/207 - INQ000197811). ²⁷¹
4 March 2021	An extra-ordinary non-NHS Labs group meeting was raised to focus on the non-NHS LFD testing services and kits. The group provided comments which were incorporated into the Scottish Gov Employers guidance. It was agreed not to update the PHS guide for non-NHS labs guidance but that the two guidance documents would link for further information
18 March 2021	A first meeting of the PHS Whole Genome Sequencing Operational Coordination Group (WOCG) took place. Membership, Organogram and ToR were all agreed (PHS7/208 - INQ000572421). ²⁷²
April 2021	The Covid-19 Strategic Coordinating Group (SCG) was established (PHS7/028 - INQ000147562) ²⁷³

²⁶⁸ Test and Protect Steering Group. Update: Contact Tracing - Case Management Framework. December 2020.

²⁶⁹ Public Health Scotland. Non-NHS Labs Group (Formerly Private Labs) action sheet. March 2022.

²⁷⁰ Public Health Scotland. Covid-19 Education surveillance report. Accessed January 2025.

²⁷¹ Public Health Scotland. Chronology: PHS Advice to Scottish Government Asymptomatic Testing Board [n.d].

²⁷² Public Health Scotland. PHS WGS Operational Coordination Group: Action sheet. March 2021.

²⁷³ Public Health Scotland. PHS Covid-19 Strategic Coordinating Group Terms of Reference. June 2021

Date	Decision / engagement
April 2021	As part of a continuous improvement approach, feedback from contact tracers using the Microsoft Word-based script with expandable/collapsible 'macro' content identified operational challenges (e.g. calls were becoming quite lengthy as additional information was given and the system was sometimes stretched to deal with the volume). In response, the Advanced Practitioners (PHS) led the development of a more interactive script, which acted similar to that of a webpage. This was an extensive piece of work which aimed to make telephone calls for contact tracers easier and shorter for the public.
7 April 2021	Decision was made to stop LFD results coming into ECOSS, but would be accepted into Corporate Data Warehouse (CDW)
May – June 2021	Due to the increased case figures and current system capacity, 'enhanced CT' (which was a fuller more investigative approach that involved calling not just contacts but where helpful, contacts of contacts to identify the cause of outbreaks and contain them) was paused. A 'red' index script was launched and 'red' index proforma launched for NHS boards which was a shorter script that prioritised the most critical health protection information to convey to those infected and their contacts. Its purpose was to still reach as many people as possible to provide essential health protection information within the capacity of the resource available.
15 June 2021	The Contact Tracing Tactical Operating Group (TOG) was established. PHS staff and local contact tracing leads were members of this oversight group (PHS7/020 - INQ000574452), ²⁷⁴ (PHS7/209 - INQ000574453) ²⁷⁵
28 July 2021	All Covid-19 reporting from the ECOSS system was moved to the new Corporate Data Warehouse (CDW)
July – September 2021	A script known as Red Script 1 was revised to prioritise cases in complex settings and any identification of a number of high-risk settings. Script and SMS 7 were amended, directing contacts to NHS inform where more information about who may be exempt from current isolation requirements due to working within critical infrastructure could be accessed. A completion of business rule was established that directed the system to pause and then auto-close low risk cases received via Co3. The Tactical operating group decided this.
	The CT team supported NHS Inform colleagues to update guidance for contacts (people who'd been in proximity with someone having the Covid-19 virus) to determine their self-isolation status.

²⁷⁴ Public Health Scotland. Contact Tracing Tactical Operating Group: Terms of Reference, version 1.0 FINAL. July 2021. ²⁷⁵ Contact Tracing Tactical Operating Group. Weekly SG briefing 15/07/21. July 2021.

Date	Decision / engagement
19 August 2021	A refreshed CT Case Management Framework (CMF) was agreed by TOG who made the decision to move to the Amber level of the CMF based on the weekly forecast data available that anticipated daily cases (PHS7/210 - INQ000572399) ²⁷⁶ In light of the rapid increase in cases, TOG subsequently made the decision to move immediately to the Red level of the Case Management Framework. Immediate actions included: CT Following the red script only and cease any additional local activity that may have been carried out. This prioritised the use of resources. (PHS7/211 - INQ000574454) ²⁷⁷
26 August 2021	Red Script 1 was aligned again to revised policy: New separate pathways introduced to gather non-household contacts of adult index cases and those aged under 18 (to ensure no one is asked to test and isolate unnecessarily).
	TOG made the decision to move to the red level of the Case Management Framework, in light of the ongoing increase that saw daily case numbers reach 7,340 on Thursday 26th August, and the forecast based on test bookings predicting a further rise in the coming days. TOG made the decision based on the updated data and risk assessment, to move to the Red+ level of the Case Management Framework. An SMS was activated after 8 hours that would provide a further reminder to cases to complete the self-trace option if it had not already been completed. Other immediate decisions were: Follow the red script only. TOG strongly advised all partners to use the interactive national scripts to support streamlined call pathways (PHS7/212 - INQ000574456) ²⁷⁸
27 August 2021	CT released a reminder SMS to encourage self-tracing and introduced triage for those who hadn't completed CO3.
1 December 2021	The Contact SMS was amended: information was no longer linked to vaccination status and age (contacts of confirmed or suspected Omicron variants would be required to isolate for 10 days, regardless of vaccination status / age / negative PCR). If there was contact with an Omicron case, CT would be in touch. The reference to the 90-day rule was removed, all contacts were advised to seek PCR testing for sequencing. Red Contact Script 3 was revised as secondary contact tracing was required for confirmed / probable contact with cases of the Omicron variant. Red Script 1 and Red Contact Script 3 were revised: the 90-day rule was removed for PCR testing. A new rapid triage pathway and 'visited high risk setting' would be flagged as red on CMS to help prioritisation.

²⁷⁶ TOG. Letter dated 19th August 2021 to DsPH, CoTIN, TOG, HP Teams, Mutual Aid, Ops Service

 ²⁷⁷ Contact Tracing Tactical Operating Group. Weekly SG briefing 20/08/21. August 2021.
²⁷⁸ TOG. Letter dated 27th August 2021 to DsPH, CoTIN, TOG, HP Teams, Mutual Aid, Ops Service Leads - Move to Red+ Level. August 2021.

Date	Decision / engagement
15 December 2021	TOG made the decision to move to the newly agreed Pink level of the Case Management Framework (PHS7/212a - INQ000574457) ²⁷⁹
31 December 2021	CMS had been updated to support boards to identify those cases that had indicated visiting High-Risk settings
8 January 2022	Updates for asymptomatic cases were noted. CMS change was implemented and Asymptomatic SMS turned off.
28 January 2022	TOG agreed to remain on FOCUS level within the Case Management Framework in line with the strategic aims. Case numbers remained high; however, system performance indicated capacity within the system that would support additional actions being undertaken while remaining within FOCUS level (PHS7/213 - INQ000328737) ²⁸⁰
7 February 2022	TOG reviewed the case numbers, workforce availability and case completion rates. Reflecting on current system capacity and case numbers it was agreed it would be appropriate to move to the PINK level within the Case Management Framework. (PHS7/214 - INQ000192214) ²⁸¹
8 March 2022	PHS's paper 'Monitoring ethnic health inequalities in Scotland during Covid-19 Data and evidence' (PHS7/164 - INQ000147479) ²⁸²
10 March 2022	TOG discussed and agreed to move to FOCUS level within the Case Management Framework, in line with the revised Strategic Framework (PHS7/215 - INQ000280980), ²⁸³ (PHS7/215a - INQ000574455) ²⁸⁴
From 18 April 2022	The CT team made preparations to revise policy, PPE workforce tab, CMS and CO3 changes in response to the announcements. PHS Senior Leadership Team decided in principle to close the T&P Head Office Function. Plans were made to properly close the programme and files down for good governance.
19 May 2022	PHS led on the development of 'New guidance for tackling violence against women during Covid-19' dated 19 May 2022 with the aim of ensuring a sustainable, joined-up approach to safeguarding the needs of women, children and young people experiencing violence against women and girls (VAWG) during Covid-19 (PHS7/165 – INQ000569823) ²⁸⁵

²⁷⁹ TOG. Test & Protect: Proposal for Contact Tracing beyond RED + Level. December 2021.

 ²⁸⁰ TOG. Letter dated 28th January 2022 to DsPH, CoTAN, TOG, HP Teams, Mutual Aid, Ops Service Leads - Test & Protect: remain in Focus Level amendment to actions within Focus Level. January 2022.
²⁸¹ TOG. Letter dated 7th February 2022 to DsPH, CoTAN, TOG, HP Teams, Mutual Aid, Ops Service Leads - Test & Protect: change to PINK level. February 2022.

²⁸² Public Health Scotland. Monitoring ethnic health inequalities in Scotland during Covid-19: data and evidence. March 2022.

²⁸³ TOG. Letter dated 9th March 2022 to DsPH, CoTAN, TOG, HP Teams, Mutual Aid, Ops Service Leads - Test & Protect: move to FOCUS level. March 2022.

²⁸⁴ Contact Tracing Tactical Operating Group. Weekly SG briefing 11/03/22. March 2022.

²⁸⁵ Public Health Scotland. New guidance for tackling violence against women during Covid-19. May 2020.

Appendix E: Covid-19 response structure as at April 2020



Appendix F: Covid-19 response structure as at June 2020

Public Health Scotland COVID-19 Response Portfolio Structure



Appendix G: Published PHS guidance of relevance to Test & Protect²⁸⁶

Title	Version	Published	Removed	INQ
Advice for social or community care residential settings staff	1.0	17 Apr 2020 19:10	20 May 2020 15:05	PHS7/216 - INQ000189126
ditto	1.1	20 May 2020 15:05	17 Jun 2020 17:49	PHS7/217 - INQ000189127
ditto	1.2	17 Jun 2020 17:49	13 Aug 2020 18:00	PHS7/218 - INQ000189128
ditto	1.3	13 Aug 2020 18:00	23 Dec 2020 16:10	PHS7/219 - INQ000189129
ditto	1.4	23 Dec 2020 16:10	29 Dec 2021 03:20	PHS7/220 - INQ000189130

Advice for social or community care and residential settings staff

Care homes outbreak checklist

Title	Version	Published	Removed	INQ
Care home outbreak checklist	1.11	1 Jul 2020 17:00	3 Jul 2020 09:50	PHS7/221 - INQ000189135
ditto	1.12	3 Jul 2020 09:50	24 Jun 2021 12:30	PHS7/222 - INQ000189136
ditto	1.13	24 Jun 2021 12:30	2 Feb 2022 16:10	PHS7/223 - INQ000189063
ditto	2.0	2 Feb 2022 16:10	24 May 2023 15:55	PHS7/224 - INQ000189137

Contact tracing: Health Protection Team guidance

Title	Version	Published	Removed	INQ
Covid-19 Contact Tracing: Health Protection Team Guidance	3.0	22 Jun 2020 12:20	3 Aug 2020 10:20	PHS7/225 - INQ000189148
ditto	3.1	3 Aug 2020 10:20	19 Oct 2020 15:00	PHS7/226 – INQ000515896
ditto	3.2	19 Oct 2020 15:00	19 Dec 2020 14:35	PHS7/227 - INQ000515897
ditto	3.3	19 Dec 2020 14:35	31 Dec 2020 17:00	PHS7/228 - INQ000515898
ditto	3.4	31 Dec 2020 17:00	29 Apr 2021 15:05	PHS7/229 - INQ000515899

²⁸⁶ Delays caused by completion of the PAC process mean that the actual publication date for some guidance documents is later than the date stated on the document itself

Title	Version	Published	Removed	INQ
Covid-19 Contact Tracing Guidance (including complex settings): Health Protection Team Guidance	3.5	29 Apr 2021 15:05	13 Sep 2021 16:30	PHS7/230 - INQ000515900

Contact tracing in complex settings: Health Protection Team guidance

Title	Version	Published	Removed	INQ
Covid-19 Contact Tracing in complex settings: Health Protection Team Guidance	1.0	22 Jun 2020 14:30	3 Aug 2020 10:30	PHS7/231 - INQ000189143
ditto	1.1	3 Aug 2020 10:30	19 Oct 2020 15:00	PHS7/232 - INQ000189144
ditto	1.2	19 Oct 2020 15:00	19 Dec 2020 14:15	PHS7/233 - INQ000189145
ditto	1.3	19 Dec 2020 14:15	31 Dec 2020 16:50	PHS7/234 - INQ000189146
ditto	1.4	31 Dec 2020 16:50	29 Apr 2021 15:05	PHS7/235 - INQ000189147

Core Covid-19 sectoral information and guidance for homelessness settings

Title	Version	Published	Removed	INQ
Core Covid-19 Sectoral Information and Guidance for Homelessness Settings	1.0	20 Jan 2021 10:50	20 May 2022 10:25	PHS7/236 - INQ000189321

Guidance for domiciliary care

Title	Version	Published	Removed	INQ
Covid-19: Guidance for Domiciliary Care	1.0	4 May 2020 17:20	20 May 2020 15:30	PHS7/237 - INQ000189165
ditto	1.1	20 May 2020 15:30	4 Jun 2020 13:10	PHS7/238 - INQ000189166
ditto	1.2	4 Jun 2020 13:10	10 Jul 2020 14:35	PHS7/239 - INQ000189167
ditto	1.3.2	10 Jul 2020 14:35	19 Aug 2020 15:00	PHS7/240 - INQ000189168
ditto	1.4	19 Aug 2020 15:00	19 Aug 2020 16:30	PHS7/241 - INQ000189170
ditto	1.4 amended	19 Aug 2020 16:30	20 Aug 2020 16:25	PHS7/242 - INQ000189169

Title	Version	Published	Removed	INQ
ditto	1.4.1	20 Aug 2020 16:25	16 Apr 2021 16:20	PHS7/243 - INQ000189171

Guidance for Health Protection Teams (to January 2021)

Title	Version	Published	Removed	INQ
Novel coronavirus (2019-nCoV) Guidance for health protection teams	5.0	7 Feb 2020 10:20	7 Feb 2020 17:05	PHS7/244 - INQ000189176
ditto	5.1	7 Feb 2020 17:05	13 Feb 2020 08:00	PHS7/245 - INQ000357279
ditto	6.0	13 Feb 2020 08:00	24 Feb 2020 15:20	PHS7/246 - INQ000189177
ditto	6.1	24 Feb 2020 15:20	28 Feb 2020 15:50	PHS7/247 - INQ000189178
ditto	6.2	28 Feb 2020 15:50	2 Mar 2020 14:00	PHS7/248 - INQ000189182
ditto	6.3	2 Mar 2020 14:00	5 Mar 2020 14:50	PHS7/249 - INQ000189179
ditto	6.4	5 Mar 2020 14:50	12 Mar 2020 12:55	PHS7/250 - INQ000189180
ditto	6.5	12 Mar 2020 12:55	17 Mar 2020 07:20	PHS7/251 - INQ000189181
ditto	7.0	17 Mar 2020 07:20	24 Mar 2020 16:10	PHS7/252 - INQ000189183
ditto	7.4	24 Mar 2020 16:10	27 Mar 2020 18:50	PHS7/253 - INQ000189184
ditto	7.5	27 Mar 2020 18:50	2 Apr 2020 21:00	PHS7/254 - INQ000189185
ditto	7.8	2 Apr 2020 21:00	12 Apr 2020 16:30	PHS7/255 - INQ000189186
ditto	8.0	12 Apr 2020 16:30	16 Apr 2020 18:30	PHS7/256 - INQ000189187
ditto	8.1	16 Apr 2020 18:30	29 Apr 2020 19:05	PHS7/257 - INQ000189188
ditto	8.3	29 Apr 2020 19:05	1 May 2020 18:30	PHS7/258 - INQ000189189
ditto	8.4	1 May 2020 18:30	1 May 2020 19:40	PHS7/259 - INQ000189190
ditto	8.5	1 May 2020 19:40	20 May 2020 15:20	PHS7/260 - INQ000189191

Title	Version	Published	Removed	INQ
ditto	8.6	20 May 2020 15:20	22 May 2020 18:10	PHS7/261 - INQ000357280
ditto	9.0 *	22 May 2020 18:10	22 May 2020 22:30	PHS7/262 - INQ000189192
ditto	8.6**	22 May 2020 22:30	26 Jun 2020 17:30	PHS7/261 - INQ000357280
ditto	9.1	26 Jun 2020 17:30	10 Jul 2020 15:20	PHS7/263 - INQ000189193
ditto	9.2	10 Jul 2020 15:20	14 Jul 2020 16:50	PHS7/264 - INQ000189194
ditto	9.3	14 Jul 2020 16:50	16 Jul 2020 15:30	PHS7/265 - INQ000189195
ditto	9.4	16 Jul 2020 15:30	31 Jul 2020 14:45	PHS7/266 - INQ000189196
ditto	9.5	31 Jul 2020 14:45	20 Aug 2020 16:00	PHS7/267 - INQ000189197
ditto	9.6	20 Aug 2020 16:00	19 Dec 2020 16:00	PHS7/268 - INQ000189198
Covid-19 Guidance for Health Protection Teams	9.7	19 Dec 2020 16:00	31 Dec 2020 15:30	PHS7/269 - INQ000189199
ditto	9.8	31 Dec 2020 15:30	22 Jan 2021 16:45	PHS7/270 - INQ000189200
ditto	9.9	22 Jan 2021 16:45	28 Jan 2021 13:30	PHS7/271 - INQ000189201
ditto	10.0	28 Jan 2021 13:30	13 Sep 2021 16:40	PHS7/272 - INQ000189174

Notes:

* V9.0 was withdrawn within a few hours of being published and was replaced by V 8.6.

** V8.6 was initially published 20th May 2020 – 22 May 2020 when it was replaced by V9.0. However, V9.0 was withdrawn soon after publication and V8.6 was reinstated.

Guidance for Health Protection Teams (September 2021 onwards)

Title	Version	Published	Removed	INQ
Covid-19 Guidance for health protection teams Including contact tracing guidance	1.2	13 Sep 2021 16:40	21 Dec 2021 16:10	PHS7/273 - INQ000189067
Covid-19 Guidance for health protection teams	1.5	21 Dec 2021 16:10	7 Jan 2022 16:45	PHS7/274 - INQ000176741

Title	Version	Published	Removed	INQ
ditto	1.7	7 Jan 2022 16:45	28 Feb 2022 15:50	PHS7/275 - INQ000189069
Covid-19 Guidance for health protection teams Including guidance for healthcare settings	1.8	28 Feb 2022 15:50	14 Apr 2022 17:20	PHS7/276 - INQ000189074
ditto	2.0	14 Apr 2022 17:20	19 May 2022 09:30	PHS7/277 - INQ000189075
Covid-19 Guidance for health protection teams	2.1	19 May 2022 09:30	31 May 2022 14:20	PHS7/278 - INQ000189076
ditto	2.2	31 May 2022 14:20	21 Jun 2022 09:30	PHS7/057 - INQ000273606
Covid-19 Guidance for health protection teams (HPTs)	2.3	21 Jun 2022 09:30	12 Jul 2022 14:25	PHS7/279 - INQ000189078
ditto	2.4	12 Jul 2022 14:25	17 Oct 2022 14:00	PHS7/280 - INQ000189079
ditto	2.5	17 Oct 2022 14:00	16 Jan 2023 10:00	PHS7/281 - INQ000189081

Note:

* The publication of this coincides with the removal of V10.0 of the title noted on the table above. All versions of the previous guidance document, up to V10.0, included guidance for HPTs alone. However, the standalone contact tracing guidance was then merged into the HPT guidance and was published as version 1.2 which was the first completed, publicly available version.

Guidance for healthcare providers

Title	Version	Published	Removed	INQ
Guidance for healthcare providers: healthcare workers who have travelled to a risk area for 2019- nCoV	1.0	12 Feb 2020 14:20	13 Feb 2020 11:25	PHS7/282 - INQ000189571
ditto	2.0	13 Feb 2020 11:25	24 Feb 2020 15:15	PHS7/283 - INQ000189572
Guidance for healthcare providers: healthcare workers who have travelled to a risk area for Covid-19	2.1	24 Feb 2020 15:15	28 Feb 2020 11:55	PHS7/284 - INQ000189573
Guidance for healthcare providers: Healthcare workers returning from risk areas or who have had contact with possible or confirmed cases of Covid-19	3.0	28 Feb 2020 11:55	27 Jul 2021 16:55	PHS7/285 - INQ000189306

Guidance for healthcare settings

Title	Version	Published	Removed	INQ
Covid-19 Guidance for Healthcare Settings - Public health guidance	1.0	2 Nov 2021 11:00	19 Nov 2021 16:30	PHS7/286 - INQ000347535
ditto	1.1	19 Nov 2021 16:30	23 Dec 2021 15:10	PHS7/287 - INQ000347536
ditto	1.2	23 Dec 2021 15:10	28 Feb 2022 15:55	PHS7/288 - INQ000347537

Guidance for non-healthcare settings

Title	Version	Published	Removed	INQ
Covid-19: Information and Guidance for Non-Healthcare Settings	1.0	4 Mar 2020 17:15	13 Mar 2020 21:00	PHS7/289 - INQ000189216
ditto	2.1	13 Mar 2020 21:00	16 Mar 2020 13:55	PHS7/290 - INQ000189217
ditto	2.2	16 Mar 2020 13:55	17 Mar 2020 21:15	PHS7/291 - INQ000189218
ditto	3.2	17 Mar 2020 21:15	20 Mar 2020 15:30	PHS7/292 - INQ000189219
ditto	3.5	20 Mar 2020 15:30	23 Mar 2020 16:40	PHS7/293 - INQ000189220
ditto	3.6	23 Mar 2020 16:40	24 Mar 2020 18:00	PHS7/294 - INQ000189221
ditto	3.7	24 Mar 2020 18:00	14 Apr 2020 12:00	PHS7/295 - INQ000189222
Core Covid-19 Information and Guidance for General (Non- Healthcare) Settings	4.0	14 Apr 2020 12:00	30 Apr 2020 17:15	PHS7/296 - INQ000189223
ditto	4.1	30 Apr 2020 17:15	1 May 2020 17:35	PHS7/297 - INQ000189224
ditto	4.2	1 May 2020 17:35	20 May 2020 15:25	PHS7/298 - INQ000189225
ditto	4.3	20 May 2020 15:25	26 Jun 2020 15:50	PHS7/299 - INQ000189226
ditto	4.4	26 Jun 2020 15:50	10 Jul 2020 15:20	PHS7/300 - INQ000189227
ditto	4.5	10 Jul 2020 15:20	30 Jul 2020 16:40	PHS7/301 - INQ000189228
Title	Version	Published	Removed	INQ
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ditto	4.6	30 Jul 2020 16:40	20 Aug 2020 15:25	PHS7/302 - INQ000189229
ditto	4.61	20 Aug 2020 15:25	16 Dec 2020 14:00	PHS7/303 - INQ000189230
Covid-19 information and guidance for non-health and care settings	4.7	16 Dec 2020 14:00	31 Dec 2020 16:30	PHS7/304 - INQ000189231
ditto	4.8	31 Dec 2020 16:30	19 Jan 2022 15:00	PHS7/305 - INQ000189232
ditto	5.0	19 Jan 2022 15:00	19 Apr 2022 12:00	PHS7/306 - INQ000189233

Guidance for ophthalmology

Title	Version	Published	Removed	INQ
Covid-19 Advice for Opticians and Optometrists	1.0	14 Feb 2020 15:50	16 Mar 2020 10:30	PHS7/307 - INQ000189236
ditto	3.0	16 Mar 2020 10:30	24 Mar 2020 11:50	PHS7/308 - INQ000189237
ditto	3.1	24 Mar 2020 11:50	2 Apr 2020 19:30	PHS7/309 - INQ000189238
ditto	3.2	2 Apr 2020 19:30	27 Jul 2021 15:50	PHS7/310 - INQ000189239

Guidance for pharmacies

Title	Version	Published	Removed	INQ
Covid-19 Advice for Pharmacies	1.0	14 Feb 2020 12:10	3 Mar 2020 15:40	PHS7/311 - INQ000189240
ditto	2.0	3 Mar 2020 15:40	16 Mar 2020 10:30	PHS7/312 - INQ000189241
ditto	3.2	18 Mar 2020 18:18	24 Mar 2020 11:50	PHS7/313 - INQ000189242
ditto	3.3	24 Mar 2020 11:50	2 Apr 2020 18:05	PHS7/314 - INQ000189243
ditto	3.4	2 Apr 2020 18:05	27 Jul 2021 15:50	PHS7/315 - INQ000189244

Title	Version	Published	Removed	INQ
Guidance for prevention and management of cases of Covid19 on Offshore Installations during the Delay Phase	1.1	29 Apr 2020 18:00	20 May 2020 15:25	PHS7/316 - INQ000189234
ditto	1.2	20 May 2020 15:25	12 Jul 2022 17:00	PHS7/317 - INQ000189235

Guidance for prevention and management of cases of Covid-19 on offshore installations

Guidance for Primary Care

Title	Version	Published	Removed	INQ
Wuhan novel coronavirus (WN- CoV) guidance for Primary Care Management of patients presenting to primary care	4.0	1 Feb 2020 09:55	2 Feb 2020 14:40	PHS7/318 - INQ000188993
Novel coronavirus (2019-nCoV) Guidance for primary care Management of patients presenting to primary care	5.0	2 Feb 2020 14:40	5 Feb 2020 13:00	PHS7/319 - INQ000189006
ditto	6.0	5 Feb 2020 13:00	7 Feb 2020 10:10	PHS7/320 - INQ000189009
ditto	7.0	7 Feb 2020 10:10	7 Feb 2020 10:15	PHS7/321 - INQ000189269
ditto	7.1	7 Feb 2020 10:15	13 Feb 2020 14:20	PHS7/322 - INQ000189270
ditto	8.0	13 Feb 2020 14:20	24 Feb 2020 15:20	PHS7/323 - INQ000189271
Novel coronavirus (Covid-19) Guidance for primary care management of patients presenting to primary care	8.1	24 Feb 2020 15:20	28 Feb 2020 16:35	PHS7/324 - INQ000189275
ditto	8.3	28 Feb 2020 16:35	5 Mar 2020 15:20	PHS7/325 - INQ000189272
ditto	8.4	5 Mar 2020 15:20	12 Mar 2020 17:00	PHS7/326 - INQ000189273
ditto	8.5	12 Mar 2020 17:00	13 Mar 2020 20:10	PHS7/327 - INQ000189274
ditto	9.0	13 Mar 2020 20:10	14 Mar 2020 19:35	PHS7/328 - INQ000189276
ditto	9.1	14 Mar 2020 19:35	17 Mar 2020 07:10	PHS7/329 - INQ000347539

Title	Version	Published	Removed	INQ
ditto	10.0	17 Mar 2020 07:10	19 Mar 2020 17:30	PHS7/330 - INQ000189249
ditto	10.1	19 Mar 2020 17:30	20 Mar 2020 17:20	PHS7/331 - INQ000189250
ditto	10.2	20 Mar 2020 17:20	24 Mar 2020 18:00	PHS7/332 - INQ000189251
ditto	10.3	24 Mar 2020 18:00	27 Mar 2020 19:35	PHS7/333 - INQ000189254
ditto	10.4	27 Mar 2020 19:35	2 Apr 2020 18:10	PHS7/334 - INQ000189252
ditto	10.5	2 Apr 2020 18:10	11 Apr 2020 15:15	PHS7/335 - INQ000189253
Novel coronavirus (Covid-19) Guidance for primary care Management of patients in primary care. Including general dental practice, general medical practice, optometry and pharmacy	11.0	11 Apr 2020 15:15	16 Apr 2020 18:40	PHS7/336 - INQ000189255
ditto	11.1	16 Apr 2020 18:40	29 Apr 2020 17:30	PHS7/337 - INQ000189256
ditto	11.2	29 Apr 2020 17:30	2 May 2020 13:40	PHS7/338 - INQ000189257
ditto	11.3	2 May 2020 13:40	13 May 2020 15:00	PHS7/339 - INQ000189258
ditto	11.4	13 May 2020 15:00	20 May 2020 15:25	PHS7/340 - INQ000189259
ditto	11.5	20 May 2020 15:25	4 Jun 2020 16:50	PHS7/341 - INQ000189260
ditto	11.8	4 Jun 2020 16:50	14 Jun 2020 12:45	PHS7/342 - INQ000189261
ditto	11.81	14 Jun 2020 12:45	8 Jul 2020 13:35	PHS7/343 - INQ000189245
ditto	11.9	8 Jul 2020 13:35	10 Jul 2020 13:20	PHS7/344 - INQ000189246
ditto	12.0	10 Jul 2020 13:20	16 Jul 2020 13:30	PHS7/345 - INQ000189248
ditto	12.1	16 Jul 2020 13:30	17 Aug 2020 15:35	PHS7/346 - INQ000189262
ditto	12.2	17 Aug 2020 15:35	24 Aug 2020 12:35	PHS7/347 - INQ000189247

Title	Version	Published	Removed	INQ
ditto	12.3	24 Aug 2020 12:35	17 Sep 2020 12:35	PHS7/348 - INQ000189263
ditto	12.4	17 Sep 2020 12:35	29 Jan 2021 16:40	PHS7/349 - INQ000189264
ditto	13.0	29 Jan 2021 16:40	1 Feb 2021 17:55	PHS7/350 - INQ000189265
ditto	13.1	1 Feb 2021 17:55	9 Feb 2021 17:00	PHS7/351 - INQ000189266
ditto	13.2	9 Feb 2021 17:00	1 Apr 2021 14:40	PHS7/352 - INQ000189267
ditto	13.3	1 Apr 2021 14:40	2 Nov 2021 10:30	PHS7/353 - INQ000189268

Guidance for prison settings

Title	Version	Published	Removed	INQ
Covid-19 Guidance for prison Settings	1.0	6 Jul 2021 15:35	14 Jun 2022 16:40	PHS7/093 - INQ000189277
Covid-19: Guidance for prison settings	2.0	14 Jun 2022 16:40	22 Jul 2022 15:30	PHS7/353a - INQ000214258

Guidance for sampling and laboratory investigations

Title	Version	Published	Removed	INQ
Wuhan novel coronavirus (WN- CoV) Guidance for sampling and laboratory investigations	1.0	28 Jan 2020 11:40	1 Feb 2020 18:50	PHS7/055 - INQ000495953
Novel coronavirus (2019-nCoV) Guidance for sampling and laboratory investigations	2.0	1 Feb 2020 18:50	2 Feb 2020 12:15	PHS7/354 - INQ000495954
ditto	3.0	2 Feb 2020 12:15	4 Feb 2020 15:45	PHS7/355 - INQ000495950
ditto	4.0	4 Feb 2020 15:45	7 Feb 2020 10:20	PHS7/356 - INQ000495951
ditto	5.0	7 Feb 2020 10:20	9 Feb 2020 17:00	PHS7/357 - INQ000495931
ditto	6.0	9 Feb 2020 17:00	15 Feb 2020 15:50	PHS7/358 - INQ000495932
Covid-19 Guidance for sampling and laboratory investigations	6.1	15 Feb 2020 15:50	26 Feb 2020 13:40	PHS7/359 - INQ000495933

Title	Version	Published	Removed	INQ
ditto	6.2	26 Feb 2020 13:40	26 Mar 2020 19:15	PHS7/360 - INQ000495934
ditto	7.1	26 Mar 2020 19:15	17 Apr 2020 18:00	PHS7/361 - INQ000495935
ditto	7.2	17 Apr 2020 18:00	30 Apr 2020 18:00	PHS7/362 - INQ000495936
ditto	7.4	30 Apr 2020 18:00	3 May 2020 14:30	PHS7/363 - INQ000495937
Covid-19: Guidance for Sampling and Laboratory Investigations	7.5	3 May 2020 14:30	26 Jun 2020 16:30	PHS7/364 - INQ000495938
ditto	7.8	26 Jun 2020 16:30	31 Jul 2020 14:15	PHS7/365 - INQ000495939
ditto	8.0	31 Jul 2020 14:15	21 Sep 2020 16:00	PHS7/366 - INQ000189211
ditto	8.1	21 Sep 2020 16:00	26 Feb 2021 16:20	PHS7/367 - INQ000495941
ditto	8.2	26 Feb 2021 16:20	10 Mar 2021 16:40	PHS7/368 - INQ000495942
ditto	8.3	10 Mar 2021 16:40	8 Oct 2021 18:00	PHS7/369 - INQ000495943
Covid-19: Guidance for sampling and laboratory investigations	8.4	8 Oct 2021 18:00	31 May 2022 13:40	PHS7/370 - INQ000495944

Guidance for Secondary Care

Title	Version	Published	Removed	INQ
Wuhan novel coronavirus (WN- CoV) Guidance for secondary care	2.0	23 Jan 2020 00:00	31 Jan 2020 20:50	PHS7/371 - INQ000189669
Novel coronavirus (2019-nCoV) guidance for secondary care Management of patients presenting to secondary care	3.0	31 Jan 2020 20:50	7 Feb 2020 10:20	PHS7/372 - INQ000189670
ditto	5.0	7 Feb 2020 10:20	13 Feb 2020 08:00	PHS7/373 - INQ000189280
ditto	6.0	13 Feb 2020 08:00	2 Mar 2020 14:00	PHS7/374 - INQ000189281
ditto	6.2	2 Mar 2020 14:00	5 Mar 2020 15:40	PHS7/375 - INQ000189282

Title	Version	Published	Removed	INQ
ditto	6.3	5 Mar 2020 15:40	12 Mar 2020 13:00	PHS7/376 - INQ000189283
ditto	6.6	12 Mar 2020 13:00	13 Mar 2020 20:25	PHS7/377 - INQ000189284
Novel coronavirus (Covid-19) Guidance for secondary care Management of possible/confirmed Covid-19 patients presenting to secondary care	7.0	13 Mar 2020 20:25	14 Mar 2020 18:50	PHS7/378 - INQ000189285
ditto	7.1	14 Mar 2020 18:50	17 Mar 2020 07:15	PHS7/379 - INQ000189286
ditto	8.0	17 Mar 2020 07:15	19 Mar 2020 19:10	PHS7/380 - INQ000189287
ditto	8.1	19 Mar 2020 19:10	27 Mar 2020 19:30	PHS7/381 - INQ000189288
ditto	8.2	27 Mar 2020 19:30	2 Apr 2020 19:30	PHS7/382 - INQ000189289
ditto	9.0	2 Apr 2020 19:30	11 Apr 2020 17:05	PHS7/383 - INQ000189290
ditto	9.1	11 Apr 2020 17:05	29 Apr 2020 18:55	PHS7/384 - INQ000189291
ditto	9.2	29 Apr 2020 18:55	20 May 2020 15:15	PHS7/385 - INQ000189292
ditto	9.3	20 May 2020 15:15	26 May 2020 15:45	PHS7/386 - INQ000189293
ditto	9.4	26 May 2020 15:45	29 May 2020 12:30	PHS7/387 - INQ000189294
ditto	9.5	29 May 2020 12:30	6 Jul 2020 17:00	PHS7/388 - INQ000189295
ditto	9.6	6 Jul 2020 17:00	14 Aug 2020 13:35	PHS7/389 - INQ000189296
ditto	9.7	14 Aug 2020 13:35	20 Aug 2020 14:30	PHS7/390 - INQ000189297
ditto	9.8	20 Aug 2020 14:30	30 Oct 2020 12:00	PHS7/391 - INQ000189298
Covid-19 Guidance for Secondary Care Settings	9.9	30 Oct 2020 12:00	19 Dec 2020 12:00	PHS7/392 - INQ000189299
ditto	10.0	19 Dec 2020 12:00	31 Dec 2020 16:00	PHS7/393 - INQ000189278

Title	Version	Published	Removed	INQ
ditto	10.1	31 Dec 2020 16:00	2 Nov 2021 10:30	PHS7/394 - INQ000189279

Guidance for stepdown of infection control precautions

Title	Version	Published	Removed	INQ
Guidance for stepdown of infection control precautions and discharging Covid-19 patients from hospital to residential settings	1.0	11 Apr 2020 16:35	26 Apr 2020 18:40	PHS7/395 - INQ000189404
ditto	1.1	26 Apr 2020 18:40	29 Apr 2020 13:40	PHS7/396 - INQ000189405
ditto	1.2	29 Apr 2020 13:40	22 May 2020 22:40	PHS7/397 - INQ000189406
ditto	1.4	22 May 2020 22:40	4 Jun 2020 13:55	PHS7/398 - INQ000189407
ditto	1.5	4 Jun 2020 13:55	19 Aug 2020 16:30	PHS7/399 - INQ000189408
ditto	1.6	19 Aug 2020 16:30	20 Aug 2020 14:30	PHS7/400 - INQ000189409
ditto	1.61	20 Aug 2020 14:30	16 Dec 2020 14:45	PHS7/401 - INQ000189410
ditto	1.7	16 Dec 2020 14:45	19 Dec 2020 11:45	PHS7/402 - INQ000189411
ditto	1.8	19 Dec 2020 11:45	31 Dec 2020 16:25	PHS7/403 - INQ000189412
ditto	1.9	31 Dec 2020 16:25	15 Feb 2021 12:00	PHS7/404 - INQ000189413

Guidance on Covid-19 PCR testing in care homes

Title	Version	Published	Removed	INQ
Interim guidance on Covid-19 PCR testing in care homes and the management of Covid-19 PCR test positive residents and staff	2.4	14 May 2020 17:50	16 May 2020 17:25	PHS7/087 - INQ000320628
ditto	2.6	16 May 2020 17:25	10 Jul 2020 14:15	PHS7/405 - INQ000347544

Title	Version	Published	Removed	INQ
Guidance on Covid-19 PCR testing in care homes and the management of Covid-19 PCR test positive residents and staff	2.82	10 Jul 2020 14:15	31 Jul 2020 14:45	PHS7/406 - INQ000301055
ditto	2.9	31 Jul 2020 14:45	13 Aug 2020 18:30	PHS7/407 - INQ000347540
ditto	3.0	13 Aug 2020 18:30	7 Oct 2020 16:00	PHS7/408 - INQ000347541
ditto	4.0	7 Oct 2020 16:00	19 Dec 2020 16:20	PHS7/409 - INQ000347542

Information and guidance for care home settings

Title	Version	Published	Removed	INQ
Covid-19: Information and Guidance for Care Home Settings	1.0	26 Apr 2020 12:20	29 Apr 2020 19:55	PHS7/410 - INQ000189331
ditto	1.1	29 Apr 2020 19:55	1 May 2020 17:55	PHS7/411 - INQ000189332
ditto	1.2	1 May 2020 17:55	20 May 2020 15:20	PHS7/412 - INQ000189333
ditto	1.3	20 May 2020 15:20	15 Jun 2020 17:00	PHS7/413 - INQ000189334
ditto	1.52	15 Jun 2020 17:00	4 Aug 2020 17:15	PHS7/414 - INQ000189335
ditto	1.6	4 Aug 2020 17:15	17 Sep 2020 17:20	PHS7/415 - INQ000189336
ditto	1.7	17 Sep 2020 17:20	7 Oct 2020 16:25	PHS7/089 - INQ000320627
ditto	1.8	7 Oct 2020 16:25	13 Oct 2020 12:00	PHS7/416 - INQ000189337
Covid-19: Information and Guidance for Care Home Settings (Adults and Older People)	1.9	13 Oct 2020 12:00	19 Dec 2020 16:30	PHS7/417 - INQ000189338
ditto	2.0	19 Dec 2020 16:30	31 Dec 2020 16:50	PHS7/418 - INQ000189347
ditto	2.1	31 Dec 2020 16:50	24 Jun 2021 12:30	PHS7/419 - INQ000189339
ditto	2.2	24 Jun 2021 12:30	13 Aug 2021 16:15	PHS7/420 - INQ000189340

Title	Version	Published	Removed	INQ
ditto	2.3	13 Aug 2021 16:15	8 Sep 2021 16:05	PHS7/421 - INQ000189341
ditto	2.4	8 Sep 2021 16:05	17 Dec 2021 12:45	PHS7/422 - INQ000189342
ditto	2.5	17 Dec 2021 12:45	24 Dec 2021 14:15	PHS7/423 - INQ000189343
ditto	2.6	24 Dec 2021 14:15	27 Jan 2022 16:30	PHS7/424 - INQ000189344
ditto	2.7	27 Jan 2022 16:30	4 Apr 2022 12:40	PHS7/425 - INQ000189345
Covid-19: Information and Guidance for Care Home Settings (For older adults)	2.8	4 Apr 2022 12:40	3 May 2022 14:45	PHS7/426 - INQ000189346
ditto	2.9	3 May 2022 14:45	11 Jul 2022 11:25	PHS7/427 - INQ000515902
ditto	3.0	31 May 2022 14:45	6 Jul 2022 13:05	PHS7/428 - INQ000515903

Information and guidance for social, community and residential care

Title	Version	Published	Removed	INQ
Covid-19: Information and Guidance for Social, Community and Residential Care Settings	1.0	4 May 2020 17:10	20 May 2020 15:30	PHS7/429 - INQ000515904
ditto	1.1	20 May 2020 15:30	11 Jun 2020 16:35	PHS7/430 - INQ000515905
ditto	1.2	11 Jun 2020 16:35	13 Aug 2020 17:15	PHS7/431 - INQ000515906
Covid-19: Information and Guidance for Social, Community and Residential Care Settings. (excluding Care Home settings)	1.4	13 Aug 2020 17:15	21 Aug 2020 10:45	PHS7/432 - INQ000189307
ditto	1.4.1	21 Aug 2020 10:45	13 Oct 2020 10:10	PHS7/433 - INQ000189308
Covid-19: Information and Guidance for Social, Community and Residential Care Settings. (excluding Adult and Older People Care Home settings)	1.5	13 Oct 2020 10:10	24 Dec 2020 09:00	PHS7/434 - INQ000189309

Title	Version	Published	Removed	INQ
ditto	1.6	24 Dec 2020 09:00	31 Dec 2020 16:40	PHS7/435 - INQ000189310
ditto	1.7	31 Dec 2020 16:40	16 Apr 2021 16:20	PHS7/436 - INQ000189311
ditto	1.8	16 Apr 2021 16:20	25 Feb 2022 14:00	PHS7/437 - INQ000189312
Covid-19: information and guidance for social, community and residential care settings (excluding adult and older people care home settings)	1.9	25 Feb 2022 14:00	31 Mar 2022 15:35	PHS7/438 - INQ000189313
Covid-19: information and guidance for social, community and residential care settings (Excluding care homes for older people registered with the Care Inspectorate)	2.0	31 Mar 2022 15:35	4 Apr 2022 15:55	PHS7/439 - INQ000189314
ditto	2.0a	4 Apr 2022 15:55	16 May 2022 15:25	PHS7/440 - INQ000189315
ditto	2.1	16 May 2022 15:25	6 Jul 2022 13:05	PHS7/441 - INQ000515880

Information and guidance for social or community care & residential settings (including

care homes)

Title	Version	Published	Removed	INQ
Covid-19: Information and Guidance for Social or Community Care & Residential Settings	1.0	12 Mar 2020 18:40	20 Mar 2020 18:30	PHS7/086 - INQ000189305
ditto	1.2	20 Mar 2020 18:30	23 Mar 2020 18:00	PHS7/442 - INQ000189300
ditto	1.3	23 Mar 2020 18:00	26 Mar 2020 18:20	PHS7/443 - INQ000189301
ditto	1.5	26 Mar 2020 18:20	2 Apr 2020 19:40	PHS7/444 - INQ000189302
ditto	1.6	2 Apr 2020 19:40	17 Apr 2020 19:20	PHS7/445 - INQ000189303
ditto	1.7	17 Apr 2020 19:20	4 May 2020 17:10	PHS7/446 - INQ000189304

Title	Version	Published	Removed	INQ
Covid-19 information and guidance for workplaces and community settings	1	19 Apr 2022 12:00	6 May 2022 12:30	PHS7/447 - INQ000569789
Covid-19 information and guidance for workplaces and community settings	1.1	6 May 2022 12:30	20 Jun 2022 14:40	PHS7/448 - INQ000569790
Covid-19 information and guidance for workplaces and community settings	1.2	20 Jun 2022 14:40	9 Feb 2023 17:00	PHS7/449 - INQ000569792

Information and guidance for workplaces and community settings

Laboratory testing – Frequently Asked Questions

Title	Version	Published	Removed	INQ
Covid-19 Laboratory testing	Version	14 Feb 2020	3 Apr 2020	PHS7/063 -
Frequently Asked Questions	1.3	21:30	12:10	INQ000189360
Covid-19 Laboratory testing	Version	3 Apr 2020	11 Apr 2020	PHS7/450 -
Frequently Asked Questions	2.0	12:10	12:15	INQ000495946
Covid-19 Laboratory testing	Version	11 Apr 2020	25 Jun 2020	PHS7/451 -
Frequently Asked Questions	2.1	12:15	16:00	INQ000495947
Covid-19 Laboratory testing	Version	25 Jun 2020	21 Dec 2020	PHS7/452 -
Frequently Asked Questions	2.2	16:00	16:40	INQ000495948
Covid-19 Laboratory testing	Version	21 Dec 2020	28 Sep 2021	PHS7/453 -
Frequently Asked Questions	3.2	16:40	15:20	INQ000495949

SARS-COV-2 virus detection testing within Scotland: a guide for non-NHS laboratories

Title	Version	Published	Removed	INQ
Covid-19: SARS-CoV-2 Virus Detection Testing within Scotland: A Guide for non-NHS Laboratories	1.0	23 Mar 2021 16:40	29 Sep 2022 14:00	PHS7/111 - INQ000495952

Social, community care and residential settings outbreak checklist

Title	Version	Published	Removed	INQ
Social, Community Care and Residential Settings Outbreak Checklist	1.0	5 Aug 2020 15:55	13 Apr 2022 15:05	PHS7/454 - INQ000189616