COVID-19 UK Inquiry

Module 2/2A: Decision-making and political governance in Scotland

Public Health Scotland Statement produced in response to Request for Evidence reference M2-2A/PHS/01

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2 October 2023

Contents

Preface

PHS received a Rule 9 request from Module 2A of the UK Public Inquiry on 1st December 2022 and submitted a draft corporate statement in response on 17th March 2023.

On 15th May 2023, PHS received the Module 2A Provisional List of Issues which provides an indicative guide to the topics and areas that it is proposed Module 2A should explore within its investigation. PHS then undertook a review of the draft corporate statement to ensure that it represented a full account of what PHS could offer to the inquiry. Amendments were made to the statement as a result of this analysis, and the statement was resubmitted to the inquiry on 14th September 2023.

On review of the revised statement, the inquiry asked eight follow-up questions on 22nd September 2023 and requested that PHS's response be added to the revised statement.

The table below sets out all of the above amendments to the PHS draft corporate statement.

Additional material provided in evidence of these amendments are detailed in end notes.

Paragraph	Amendment
1.1.5	Clarification provided that activities prior to 1st April 2020 were undertaken by PHS legacy body Health Protection Scotland (HPS).
1.3.7	Reference added in the emergency powers section (previously referred to as 'emergency footing') to the impact of the emergency powers on the status of public health advice.
4.1.2	Additional context provided for PHS's support for Scottish Government decision making.
4.1.4	Comment provided on the appropriateness of the use of WhatsApp messaging.
4.2.3	Content added around herd immunity.
4.2.6	Content expanded relevant to vulnerable and at-risk groups.
4.3.6	Addition of information about the NIMT lessons learned exercise.
4.4.8 – 4.4.9	Further exploration of the challenges PHS encountered in the operationalisation of Scottish Government policy through guidance.
5.1.2 – 5.1.4	Information provided pertaining to the Nike conference in Edinburgh on 26th and 27th February 2020 and the Scotland versus France Six Nations rugby match at Murrayfield Stadium in Edinburgh on 8th March 2020.
5.2	New section added on how PHS supported the Scottish Government's understanding of the nature and spread of ARAS CoV-2.
5.2.31	Supplementary material added to answer the inquiry's follow-up question as to whether laboratory testing increased sufficiently to meet demand and if not, why not.
5.2.34	Supplementary material added to answer the inquiry's follow-up question about the underutilisation of diagnostic capacity.
5.2.38	Supplementary material added to answer the inquiry's follow up question about requests for WGS funding prior to July 2020.

5.2.45	Supplementary material added to answer the inquiry's follow up question about issue of identifying and targeting the sequencing of Scottish samples by Lighthouse Laboratories.
7.1.3	Content expanded relevant to vulnerable and at-risk groups.
7.6.4	Content expanded relevant to vulnerable and at-risk groups.
8.1.4	Comment provided around the timeliness and effectiveness of the first lockdown.
9.6.3	Clarity provided around the outcome of a joint piece of work with the Directors of Public Health.
Appendix A	Senior Leadership / Executive Team structure updated.
Appendix C	Key staff involved in supporting Scottish Government decision-making updated.
Appendix D	Key staff involved in PHS's operational response updated.

1. Introduction to Public Health Scotland

1.1 Establishment

1.1.1 Public Health Scotland (PHS) is responsible for leading and enabling the drive to protect and improve the health and wellbeing of people in Scotland and reduce health inequalities across Scotland. The organisation's primary role is to work with others to produce, share and implement knowledge of what works to improve health outcomes in Scotland, including protecting the people of Scotland from communicable diseases and environmental hazards. PHS works 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 (PHS/1 - 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.

1.1.3 The creation of PHS was an outcome of the Public Health Reform (PHR) programme (see chapter 5 of the Corporative Narrative: Creation of PHS). The PHR programme identified the need for stronger national leadership for public health and a 'de-cluttering' of the public health landscape. A significant amount of work was undertaken by a wide range of stakeholders in order to develop recommendations around the optimal arrangements for PHS in that regard. These recommendations were taken forward through the development and implementation of a Target Operating Model (TOM) (PHS/2 - INQ000183552).[2]

1.1.4 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, which was to:

- Provide strong public health leadership and lead in a collaborative way.
- Take a whole system approach with an external focus.

[1] PHS. COVID-19 Public Inquiries: PHS Corporate Narrative. January 2023.

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

- 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.
- Be innovative and find new ways of doing things.
- Be visibly a new and different organisation.

1.1.5 PHS brought together three legacy bodies (see chapter 4 of the Corporative Narrative: Legacy Bodies). These were NHS Health Scotland (a national Health Board), and the two components of the Public Health and Intelligence 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 1st 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.

1.1.6 All staff and functions from the legacy bodies transferred across to PHS under the Transfer of Undertakings (Protection of Employment) Regulations 2006 (PHS/3 - INQ000147861)[3] with two exceptions: the Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) function and staff that were part of HPS remained within NSS (see paragraphs 4.2.12 – 4.2.14 of the Corporative Narrative), and a number of corporate services staff from NHS Health Scotland transferred to NSS under the shared services arrangement.

1.1.7 The PHR programme intended for PHS to be more than the sum of its parts; to be more effective in meeting the challenges facing the people of Scotland than the legacy organisations before it. The Annual Operating Plan (AOP) (PHS/4 - INQ000101039)[4] for the first year of PHS's operation largely brought together the work programmes of the three legacy bodies with minimal changes. However, the vision shared by the Chief Executive in the staff engagement events prior to PHS being created was that as the organisation developed and transformed, it would 'do things differently, and do different things, to make a difference'. In the medium to longer term, this would involve stopping the organisational activities that were less effective in improving health outcomes to free up resources to focus on more impactful activities. In the short term however, the very act of developing the AOP forged links between teams working in

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

[4] PHS. Annual Operational Plan for 2020/21. March 2020.

different parts of the legacy organisations and created greater strategic alignment between related areas of work. For example, the work on improving health outcomes for children and young people in NHS Health Scotland was brought more closely together with the work underway in ISD on maternal, child and adolescent health indicators.

1.1.8 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 (PHS/5 - INQ000147835).[5] 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.'

1.1.9 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. This is reflected in a number of areas of PHS's work including notably: pandemic messaging (see section 9.2), the use of PHS data and intelligence in the Scottish Parliament (see section 3.3) and PHS's contribution to expert advisory groups (see chapter 6).

1.1.10 When PHS was launched at the outset of the pandemic, on 1st April 2020 (see chapter 6 of the Corporative Narrative: PHS April 2020 – November 2022), the benefits of the creation of one unified public health agency were immediately apparent. Whilst the organisation's response to the pandemic was led very much by former HPS staff, by that time in the Clinical and Protecting Health Directorate (CPH), teams and resources in other parts of the organisation were able to pivot to bolster and support the health protection response. Corporate staff in the Strategy, Governance and Performance (GGP) area took on temporary work assignments in CPH in order to lend programme and project management support. Health improvement experts in the Place and Wellbeing Directorate led on work to reduce the wider harms associated with COVID-19, with a particular focus on work to reduce the inequalities associated with the pandemic. Data and intelligence specialists in the Data and Digital Innovation (DDI) Directorate worked with colleagues across the organisation to develop the necessary data reporting mechanisms at pace. This ensured that the Scottish Government was provided with data to inform decision-making at a national level and similarly to local

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

partners for the local decision-making described in section 3.4. 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. Internally, the links between the different teams and directorates were crucial to the speed and agility with which the organisation was able to respond.

1.2 Joint accountability

1.2.1 PHS is jointly accountable to national and local government. This means that PHS is sponsored both by the Scottish Government and by COSLA (PHS/6 - INQ000235097),[6] which represents the views of Scotland's 32 local authorities to central government. This arrangement is unique amongst Health Boards in Scotland. Please see section 3.3 of the Corporate Narrative on Joint accountability for more information.

Liaison function

1.2.2 The Scottish Government set up a liaison function in late January 2020, which operated until May 2022. The small team within the COVID-19 Public Health Directorate helped to coordinate requests and ensure facilitated, streamlined communication channels were established and maintained between the Scottish Government and PHS. This was in recognition of the high volume of requests for specialist public health advice from across the Scottish Government reflecting the pace of change and urgency of decision-making.

1.2.3 This involved setting up agreed processes and terms of engagement with clarity around expectations and roles and responsibilities. The liaison function worked to:

- Manage demands on the PHS CPH Directorate from across the Scottish Government, in particular by co-ordinating requests for the review of Scottish Government guidance and operationalisation of Scottish Government pandemic policies for the use of public services and businesses and to inform wider societal behaviours during the different phases of the pandemic.
- Help Scottish Government policy teams to access PHS support in a timely way and help PHS teams to quickly identify which Scottish Government policy teams to engage with.

[6] COSLA. About COSLA. Accessed February 2023.

- Draw in public health advice and facilitate infection prevention control advice via ARHAI to inform decisions within Scottish Government about how to respond to COVID-19.
- Ensure that PHS was kept informed of key policy developments on COVID-19 that affected PHS written guidance, advice to the health protection sector and NHS Inform advice to the public.
- Facilitate regular dialogue between the senior PHS colleagues leading the incident response and policy leads within Scottish Government who were responding to COVID-19 to share information and help to overcome challenges in the response.
- Ensure that health protection guidance on responding to COVID-19 was in alignment with Scottish Government policy and Four Nations CMO advice by facilitating an efficient Policy Alignment Check (PAC) of draft guidance (see section 4.4).

1.3 Operational autonomy

1.3.1 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 (PHS/7 - INQ000235173).[7] This means PHS:

- Operates within a framework of controls determined by the Scottish Government.
- Is subject to the legal direction of Scottish Ministers.
- Is subject to Scottish Ministers' decisions about functions and funding.
- Has Board Members who are appointed by and directly accountable to Scottish Ministers and through Ministers to the Scottish Parliament.

1.3.2 This means that:

- The scope of the organisation's work at a strategic level is determined by the Cabinet Secretary for Health and Social Care and is subject to an Annual Review of performance.
- PHS's work proceeds at the discretion of Ministers.

[7] Scottish Government. Public Body Guidance. Accessed January 2023.

- Board members and in particular the Chair may be asked by Ministers to account for the organisation's actions and may be required by Ministers to make changes to strategic approach or operational delivery.

1.3.3 Whilst PHS must operate within a framework of controls determined by the Scottish Government and is subject to the legal direction of Ministers and Ministers' decisions about functions and funding, PHS has operational autonomy in the way in which services are delivered. The strength of PHS's authoritative voice for the public's health and wellbeing is linked to this operational autonomy.

Emergency powers

1.3.4 The NHS in Scotland was placed on an emergency footing (PHS/8 - INQ000235164)[8] on 17th March 2020, and this remained in place until 30th April 2022. This impacted on PHS's operational autonomy, along with that of all other Health Boards. The Cabinet Secretary for Health and Sport made a statement (PHS/9 - INQ000235161)[9] in the Scottish Parliament on 17th March 2020 setting this out. This was followed by a letter (PHS/10 - INQ000145709)[10] to NHS Chairs and Chief Executives on 18th March 2020 from the Director General Health and Social Care and Chief Executive of NHS Scotland. The letter provided further detail about what the emergency footing would mean for Health Boards, explaining that the National Health Service (Scotland) Act 1978 sets out:

'…both the direction making and emergency powers that allow Scottish Ministers to secure the effective continuance of services through the unprecedented challenge of responding to the COVID-19 pandemic. This means that the Cabinet Secretary will be utilising the direction making powers, where necessary, to instruct NHS boards to carry out certain actions. Where directions are issued on behalf of the Cabinet Secretary, I must stress that these will not be for local interpretation. They must be implemented in full and without delay in order to maintain the resilience of our NHS through these challenges.'

1.3.5 The Cabinet Secretary made a further statement (PHS/11 - INQ000235159)[11] to the Scottish Parliament on 2nd June 2020, to inform the parliament that the NHS in

[8] Scottish Government. NHS Scotland placed on emergency footing. March 2020.
[9] Scottish Parliament. Official Report - Meeting of the Parliament 17 March 2020. Accessed February 2023.
[10] Scottish Government. Letter from NHS Chief Executive. March 2020.
[11] Scottish Parliament. Official Report - Meeting of the Parliament 2 June 2020. Accessed February 2023.

Scotland would remain on an emergency footing for a further 100 days. The letter from the Chief Executive of NHS Scotland to Chairs and Chief Executives on 4th June 2020 emphasised that 'the Cabinet Secretary will be utilising the direction making powers, where necessary, to instruct NHS boards to carry out certain actions. Where directions are issued, these will not be for local interpretation. They must be implemented in full and without delay in order to maintain the resilience of our NHS' (PHS/12 - INQ000145710).[12]

1.3.6 The Cabinet Secretary for Health and Social Care announced in the answer to a written question in the Scottish Parliament on 28th September 2021 that the emergency powers would remain in place until at least 31st March 2022. This was in order to 'continue to balance the capacity of the NHS to recover from the COVID-19 pandemic against increasing demands of emergency, urgent and planned care and delayed discharges' (PHS/13 - INQ000228415).[13]

1.3.7 One consequence of the emergency powers brought was the change in lead role for the offer of public health advice which transferred from HPS/PHS to Scottish Ministers. This meant that while PHS continued to offer Scottish Government advice on the wording on guidance documents relating to COVID-19 public health matters (see section 4.4), the Scottish Government was under no obligation to accept the suggested wording contained in guidance documents. Public health advice about Harm 1 was considered by the Scottish Government alongside advice relating to Harms 2-4 as set out in section 4.2 below.

1.4 Statistical autonomy

1.4.1 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.

1.4.2 The Head of Profession (HOP) for statistics at PHS is Scott Heald, the Director of DDI. This role also covers the Official Statistics provided by NSS, the Scottish Ambulance Service (SAS), NHS24, and NHS Education for Scotland (NES), all of which are named in legislation as producers of Official Statistics alongside PHS. As HOP, Scott Heald is

[12] Scottish Government. Letter from NHS Chief Executive. June 2020.

[13] Scottish Parliament. Chamber and committees. Question reference: S6W-03408. September 2021.

responsible for ensuring compliance with the Statistics and Regulation Services Act 2007 (PHS/14 - INQ000235190)[14] and implementing the provisions set out in the UK Code of Practice for Statistics (PHS/15 - INQ000235110).[15]

1.4.3 The Code of Practice for Statistics is based on three pillars:

- Trustworthiness: confidence in the people and organisations that produce statistics and data through commitments to clear, orderly publication of statistics.
- Quality of outputs: by ensuring the use of suitable data sources and the best available methods that produce assured statistics.
- Value of the insight provided: ensuring that statistics support society's needs for information.

1.4.4 The HOP is professionally responsible to the UK National Statistician in order to discharge their professional responsibilities while remaining in the formal line management of PHS. The HOP has sole authority for statistical methods, standards, procedures and timing of statistical releases. The National Statistician, Sir Ian Diamond, is also head of the UK Government Statistical Service and Chief Executive of the UK Statistics Authority. The regulatory arm of the Statistics Authority is the Office for Statistics Regulation, whose Director General is Ed Humpherson (see also paragraphs 3.3.4 – 3.3.5).

1.5 Funding arrangements

1.5.1 The Scottish Government funds the NHS in Scotland, including PHS (see section 6.4 of the Corporate Narrative: Finance and Budget). 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 around resources should not be a hindrance to the effective delivery of the pandemic response.

1.5.2 PHS submitted a Business Case (PHS/16 - INQ000147530)[16] to the Scottish Government in October 2020 setting out the additional resource PHS estimated would

[14] National Archives. Statistics and Registration Service Act 2007. 2007.
[15] UK Statistics Authority. UK Code of Practice for Statistics 2018. Accessed March 2023.
[16] PHS. Additional COVID-19 Funding Business Case. October 2020.

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

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 (PHS/17 - INQ000147556).[17]

1.5.4 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 (PHS/18 - INQ000147559)[18].

1.5.5 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 response as described in section 5.16: Strategic Framework Update and 5.17: Test and Protect Transition Plan set out below.

1.6 Current Position

1.6.1 PHS published its latest three-year strategic plan on 7th November 2022 (PHS/19 - INQ000101035)[19] (see Section 7.2 of the Corporate Narrative: Public Health Scotland 2022 – 25). The plan reaffirms the organisation's vision of a Scotland where everybody

[17] Scottish Government. PHS Allocation Letter and Schedule. April 2021.
[18] Scottish Government. PHS Allocation Letter and Schedule. April 2022.
[19] Public Health Scotland. A Scotland where everybody thrives: Public Health Scotland's three-year plan: 2022–25. November 2022.

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.

1.6.3 New 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:
    - preventing disease
    - prolonging healthy life
    - promoting health and wellbeing
- Seven are internally focused ('Transforming PHS') to deliver internal improvements and growth that will:
    - enable PHS staff and the organisation to thrive
    - deliver PHS's strategic objectives.

2. PHS's COVID-19 response: structure and governance

2.1 Background

2.1.1 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. Section 6.5 of the Corporative Narrative provides an overview of the following key areas of the PHS response:

- Providing expert advice to the Scottish and UK Governments.
- Collaborating with national and local partners to help to coordinate the response.
- Working across the UK to agree effective infection prevention and control guidance, and producing specific guidance tailored to Scotland, 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 Directors of Public Health (DsPH) on the development and roll out of the Test, Trace, Isolate and Support programme.
- Supporting the public health response to care home outbreaks by leading on the analysis of testing data.
- 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.

2.1.2 Staff and teams from across the organisation contributed to this work. Please see section 6.2 of the Corporative Narrative: Day one staffing and structure, and Appendix A of the Corporate Narrative: PHS organisational structure as at January 2023 for details of the organisation's structure and directorates.

2.1.3 Key staff involved in supporting Scottish Government decision-making, including staff who represented PHS on expert advisory groups, and who engaged with civil servants informally are listed in Appendix C. Key staff involved in the operational response are listed in Appendix D.

2.2 Leadership

2.2.1 The Senior Leadership Team (SLT) was the key decision-making body within PHS (see Appendix A) 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 (see Corporative Narrative section 6.6). The precursor to SLT was the Shadow Executive Management Team (see Corporative Narrative section 5.2.1), which was established in June 2019 to lead the transition from the legacy bodies to PHS.

2.3 COVID-19 Response Group

2.3.1 The Shadow Executive Management Team established the COVID-19 Response Group in March 2020 to provide leadership to PHS's response to the pandemic. The group was comprised of the SLT and key members of staff leading the delivery of the organisation's response to COVID-19. Chaired by Angela Leitch, the group addressed issues escalated through the PHS response structure (see section 2.4 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. In addition to SLT members, the following post-holders attended the daily meetings of the COVID-19 Response Group:

- Strategic Incident Director.
- Clinical and Response Cell Lead.
- Research and Intelligence Cell Lead.
- Health Protection management and Admin Cell Lead.
- PHS Employee Director.
- Corporate support staff.
- Communications Lead.

2.3.2 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 2.5 below.

2.4 Response structure

2.4.1 HPS initiated the Incident and Emergency Response Plan (IERP) (PHS/20 - INQ000147543)[20] on 27th January 2020. This implemented response arrangements including the structure and governance of the incident response going forward and the establishment of the Incident Room at the Meridian Court offices in Glasgow.

2.4.2 The response structure was split into overarching programme areas, each of which consisted of a number of 'cells'. The cells were made up of a temporary group of people working together to respond rapidly to the emerging situation. The groups had a mix of subject matter experts, professionals, service managers and support staff. 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.

2.4.3 The COVID-19 Response Portfolio Dossier (PHS/21 - INQ000147563)[21] 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

2.5 COVID-19 Strategic Coordinating Group

2.5.1 The COVID-19 Strategic Coordinating Group (SCG) (PHS/22 - INQ000147562)[22] was established in April 2021 to enhance PHS's governance and oversight arrangements for the pandemic response. The SCG, which replaced the COVID-19 Response Group, met weekly and provided oversight and direction to the PHS response to the pandemic. Specific responsibilities included:

- Determining and sharing strategic objectives.
- Receiving progress reports on the incident and providing oversight of the response.

[20] HPS. Incident and Emergency Response Plan (IERP) v4. May 2017.
[21] PHS. COVID-19 Response Portfolio Dossier. June 2020.
[22] PHS. PHS COVID-19 Strategic Coordinating Group Terms of Reference. June 2021.

- Identifying the level of support needed to respond to the incident and allocate personnel and resources accordingly.
- Formulating and implementing media and public communication plans
- Direct planning and operations beyond the immediate response to manage the recovery process.
- Providing assurance across the organisation on the management of the emergency.
- Facilitating requests and responses for mutual aid, new developments, requests, commissions and other strategic resources.
- Seeking assurance on the financial and governance arrangements of the incident response, including keeping the Board appraised.
- Monitoring and providing assurance on financial and business planning activities related to response expenditure.

2.5.2 The SCG was chaired by Angela Leitch and membership included the COVID-19 Strategic Responsible Owner (the Director of Public Health Science, Dr Nick Phin), each of 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 group was responsible for providing assurance to the SCG of the governance, finance arrangements and other aspects of the pandemic response.
- The COVID-19 Incident Management Team: chaired by Dr Jim McMenamin, the group oversaw delivery of PHS's clinical response and escalated issues of significance to the SCG.
- The COVID-19 Remobilisation, Recovery and Redesign Group: chaired by Claire Sweeney, Director of Place and Wellbeing, the group was responsible for overseeing the wider work of the organisation on COVID-19, and escalated issues of significance to the SCG.

2.5.3 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 outlines the principal challenges faced by PHS in discharging its functions in the response to the pandemic and the changes

that have been identified and implemented to overcome these challenges (PHS/23 - INQ000187754).[23]

[23] PHS. Learning Lessons from COVID-19. March 2023.

3. Political governance in Scotland: the context of PHS's support for decision-making

3.1 Devolution

3.1.1 Following the devolution referendum held in Scotland on 11th September 1997, where 74% of the Scottish public voted in favour of a Scottish Parliament, the Scotland Act 1998 (PHS/24 - INQ000235189)[24] made provision for a Scottish Government of Ministers and a Scottish Parliament to which they would be accountable. Elections were held on 6th May 1999 and powers previously exercised by the Secretary State for Scotland and other UK Ministers were transferred to Scottish Ministers on 1st July 1999, the same day that the Scottish Parliament was officially convened.

3.1.2 The Scotland Act specifies those matters that are reserved to the UK Parliament. Those matters not reserved are devolved to the Scottish Parliament. Devolved matters include health and social care, education and training, local government and housing, and economic development. The act has been amended twice with further powers devolved to the Scottish Parliament, first in 2012 (PHS/25 - INQ000235191)[25] and then in 2016 (PHS/26 - INQ000235192).[26] The Scotland Act 2016 devolved a range of further powers to the Scottish Parliament and set out a range of financial powers and measures including the power to set rates and bands on earned income. The Scottish Parliament has full legislative powers over devolved matters.

3.2 The Scottish Government

3.2.1 The Scottish Cabinet (PHS/27 - INQ000235109)[27] is the main decision-making body of the Scottish Government and is collectively accountable to the Scottish Parliament for the policies and actions of the Scottish Government. The members of the Scottish Cabinet most relevant to the pandemic response – and therefore key customers for PHS's expertise and intelligence – are the First Minister, the Deputy First Minister and Cabinet Secretary for Finance, the Cabinet Secretary for Health and Sport/Social Care, the Cabinet Secretary for Education and Skills, and the Minister for Public Health, Women's Health and Sport.

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[24] National Archives. The Scotland Act 1998. November 1998.
[25] National Archives. The Scotland Act 2012. April 2012.
[26] National Archives. The Scotland Act 2016. March 2016.
[27] The Scottish Government. Cabinet and Ministers. Accessed February 2023.

3.2.2 The civil service (PHS/28 - INQ000235187)[28] supports the Scottish Government develop and implement its policies as well as deliver public services. PHS works with civil servants to support their advice to Ministers as opposed to directly advising members of the Scottish Cabinet. Examples are shared in the following chapters of occasions when PHS staff engaged with Scottish Ministers in meetings and other events.

3.2.3 The Scottish Government is structured into a number of directorates (PHS/29 - INQ000235147),[29] which are managed by eight Directors General. The Director General with whom PHS engaged most frequently over the course of the pandemic was the Director General of Health and Social Care and Chief Executive of NHS Scotland. This engagement related both to the sponsorship of PHS and to the delivery of pandemic response functions. With regards to the latter, the directorates with which PHS had the most engagement were the Population Health Directorate, and the directorates of the Chief Medical Officer (CMO), the Chief Scientist Officer (CSO) (see sections 4.5 – 4.7 below) and the Chief Nursing Officer (CNO).

Other Scottish Government agencies

3.2.4 In addition to working directly with the Scottish Government, PHS also engaged with executive agencies of the Scottish Government to support decision-making during the pandemic (PHS/30 - INQ000235165).[30] Executive agencies are part of the Scottish Government and are staffed by civil servants. A key executive agency PHS engaged with is Education Scotland (see chapter 10: Collaboration with other agencies).

3.2.5 PHS also engaged with Executive and Advisory Non-Departmental Public Bodies (NDPBs) during the pandemic response. Executive NDPBs carry out functions at arm's length from government, while Advisory NDPBs carry out advisory functions and give advice to Ministers and others. PHS worked closely with the Care Inspectorate (around COVID-19 deaths in care homes and quality assurance support) and the Scottish Environment Protection Agency (around wastewater monitoring).

[28] Scottish Government. How government is run: civil service. Accessed February 2023.
[29] Scottish Government. How government is run: directorates. Accessed February 2023.
[30] Scottish Government. Organisations. Accessed February 2023.

3.3 The Scottish Parliament

3.3.1 The Scottish Parliament scrutinises Scottish Government decision-making and holds Scottish Ministers to account. This includes:

- Asking questions of Ministers in parliament.
- Posing written parliamentary questions.
- Debating issues in parliament.
- Looking at specific issues in Committees, including holding inquiries.
- Examining and proposing amendments to legislation.

Scottish Parliament inquiries

3.3.2 PHS supported the Scottish Parliament's scrutiny of pandemic decision-making by participating in relevant inquiries held by Scottish Parliament Committees. This included providing written and oral evidence to the COVID-19 Recovery Committee's inquiries into:

- Effective communication of public health information (PHS/31 - INQ000235146)[31]
- Pre-budget scrutiny: COVID-19 strategic framework (PHS/32 - INQ000147573) (PHS/33 - INQ000235143)[32] [33]
- The effect of the pandemic on the labour market (PHS/34 - INQ000235145)[34]
- The cause of excess deaths in Scotland (PHS/35 - INQ000147572) (PHS/36 - INQ000235144).[35] [36]

3.3.3 Dr Jim McMenamin gave evidence on 19th May 2020 to the Justice Committee to support their consideration of the challenges in restarting jury trials in Scotland's courts. The Committee's questions focussed on the science and risk assessments behind the current social distancing advice given to public bodies (PHS/37 - INQ000235156).[37]

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[31] Scottish Parliament TV. COVID-19 Recovery Committee 26th May 2022. Accessed March 2023.
[32] PHS. Response to COVID-19 Recovery Committee - Pre-Budget scrutiny. Accessed March 2023.
[33] Scottish Parliament TV. COVID-19 Recovery Committee 8th September 2022. Accessed March 2023.
[34] Scottish Parliament TV. COVID-19 Recovery Committee 10th November 2022. Accessed March 2023.
[35] PHS. Response to inquiry into excess deaths in Scotland since the start of the pandemic. Accessed February 2023.
[36] Scottish Parliament TV. COVID-19 Recovery Committee 10th March 2022. Accessed March 2023.
[37] Scottish Parliament TV. Justice Committee 19th May 2022. Accessed March 2023.

3.3.4 Scott Heald provided oral evidence to the Health, Social Care and Sport Committee on data and technology in health and social care on 23rd November 2021 (PHS/38 - INQ000235153).[38] Scott Heald appeared alongside Ed Humpherson, the Director General of the Office for Statistics Regulation, and discussed why robust data is so important to improving services and policy responses, and data gaps in Scotland.

3.3.5 PHS submitted a statement with background information in advance of the session, which was published with the papers for the session (PHS/39 - INQ000235152).[39] This covered PHS's role as the official statistics provider for the NHS in Scotland and explains that PHS published 400 statistical outputs in 2020/21, covering a broad range of areas of health and social care. The statement discussed the robust nature of the statistical governance arrangements that the Head of Profession is responsible for, set out the role PHS had in the production and sharing of statistics on COVID-19, and the valuable lessons learned from the way the public and stakeholders engaged with data over the course of the pandemic.

Coronavirus (Recovery and Reform) (Scotland) Act 2022

3.3.6 PHS responded to the Scottish Government consultation on their review of the impact of COVID-19 on the Scottish statute book (PHS/40 - INQ000235129)[40] in August 2021. The consultation sought views on proposals for greater public health resilience to protect Scotland against future public health threats. The PHS response (PHS/41 - INQ000147582)[41] was supportive of the need to ensure Scottish Ministers could respond effectively and rapidly to any future threats to public health in Scotland. It was furthermore supportive of the proposal to extend the power to make regulations to protect health beyond March 2022, the proposal to make the regulations permanent, and the proposal that they apply beyond COVID-19. The consultation received almost 3,000 responses, which were considered alongside other evidence and supported the development of the Coronavirus (Recovery and Reform) (Scotland) Bill (PHS/42 -

[38] Scottish Parliament. Health, Social Care and Sport Committee. Accessed March 2023.

[39] Scottish Parliament. Health, Social Care and Sport Committee papers (page 10-13). November 2021.

[40] PHS. Response to COVID-19 recovery: a consultation on public health, public services and justice system reforms. August 2021.

[41] PHS. Response to COVID-19recovery: a consultation on public health, public services and justice system reforms. Accessed February 2023.

INQ000235126),[42] which resulted in the Coronavirus (Recovery and Reform) (Scotland) Act 2022 (PHS/43 - INQ000235106).[43]

3.3.7 Dr Diane Stockton, PHS Consultant in Public Health, provided oral evidence to the Education, Children and Young People's Committee on 2nd March 2022 to support their scrutiny of the measures relating to educational settings in the Coronavirus Recovery and Reform Scotland Bill (PHS/44 - INQ000235149).[44]

3.3.8 It should be noted that while PHS supported the development of the legislation through the provision of evidence, PHS had no role in the surveillance of compliance with the legislation and regulations over the course of the pandemic.

Use of PHS data and intelligence in the Scottish Parliament

3.3.9 The daily data PHS published was frequently referenced in the Scottish Parliament, both by government Ministers and by opposition MSPs. Similarly, the work PHS undertook to support the local and national delivery of the pandemic response was often mentioned in the Scottish Parliament, either to illustrate the efforts being made to protect the Scottish public, or to demonstrate the impact of initiatives that the Scottish Government had put into place. By way of illustration, the work of PHS was referred to:

- 41 times by the First Minister, including 22 references during a statement on COVID-19 and 17 mentions of PHS during First Minister's Questions (PHS/45 - INQ000147550)[45]
- In 424 written answers on COVID-19 provided by the Scottish Government (PHS/46 - INQ000147564)[46]
- In 16 parliamentary debates on COVID-19 (PHS/47 - INQ000147552)[47]
- In 82 committee discussions on COVID-19 (PHS/48 - INQ000147551).[48]

[42] Scottish Parliament. Coronavirus (Recovery and Reform) (Scotland) Bill. Accessed March 2023.
[43] National Archives. Coronavirus (Recovery and Reform) (Scotland) Act 2022. Accessed March 2023.
[44] Scottish Parliament TV. Education, Children and Young People Committee 2nd March 2022. Accessed March 2023.
[45] PHS. Mentions of PHS by the First Minister in the Scottish Parliament April 2020 – April 2022. March 2023.
[46] PHS. Mentions of PHS in Written Answers in the Scottish Parliament April 2020 – April 2022. March 2023.
[47] PHS. Mentions of PHS in Scottish Parliament COVID-19 Debates April 2020 – April 2022. March 2023.
[48] PHS. Mentions of PHS in Scottish Parliament COVID-19 Committee Discussions April 2020 – April 2022. March 2023.

3.4 Local Government

3.4.1 Local government in Scotland is made up of 32 local authorities. Local authorities vary considerably in size and population, but all are responsible for providing a range of public services to the communities in their area. This includes education, social care, roads and transport, economic development, housing and planning, waste management, cultural and leisure services, and environmental protection (Environmental Health Officers work alongside local health board Health Protection Teams and other public bodies to protect the public from the harmful exposures they may encounter in the environment).

3.4.2 Each local authority is governed by a council made up of councillors directly elected by the residents of the area they represent. Scotland has 1,227 elected councillors who are elected every four years, most recently in May 2022. Within a council, a group of councillors able to command majority support will form the 'administration' which controls the running of the council and makes decisions at a local level.

3.4.3 National and local government in Scotland signed a concordat (PHS/49 - INQ000235095)[49] in 2007, which set out the terms of the relationship between the Scottish Government and local government. The concordat included an agreement to work together to develop policy that would see the Scottish Government setting the direction of policy and the overarching outcomes, while local government and their partners (see Community Planning Partnerships in section 3.4 of the Corporative Narrative) would decide how best to meet the varying local needs of populations across Scotland.

3.4.4 Local Authorities used data, intelligence and evidence produced by PHS to inform their decision-making. One of the most significant differences between PHS and the legacy bodies is the emphasis within PHS of providing information disaggregated to a local level in a format most useful for local areas. Examples of intelligence for pandemic decision-making at a local level are given in paragraph 6.5.20 of the Corporative Narrative and include the public-facing dashboard with neighbourhood level data and the Geospatial Connections Tool developed with NSS.

3.4.5 Local authorities are Category 1 responders under the Civil Contingencies Act 2004 (PHS/50 - INQ000147860)[50] and key partners in Resilience Partnerships (see

[49] Scottish Government. Local government concordat. November 2007.

[50] National Archives. Civil Contingencies Act 2004. 2004.

paragraphs 3.4.27 – 3.4.35 of the Corporate Narrative). Under the Public Health etc (Scotland) Act 2008 there is a duty for local authorities and health boards to co-operate and regularly review their Joint Health Protection Plans (section 6 and 7 of the Act).

4. PHS's support for Scottish Government decision-making

4.1 Background

4.1.1 PHS's support for decision-making is based on operating principles including:

- The importance of working collaboratively.
- Understanding and respecting the political decision-making process and the role and accountability of Scottish Ministers.
- Providing advice based on best available data and evidence to inform Scottish Government policy colleagues in advising Ministers on decision-making.
- Innovating and collaborating where necessary to ensure that the decisions made by the Scottish Government could be implemented at pace.

4.1.2 This chapter sets out PHS's experience of the range of structures in place to enable effective communication amongst key staff in PHS, decision-makers in the Scottish Government and those who support them. A variety of informal and formal approaches were used as appropriate to the context. In most cases PHS was not directly involved in relaying advice to Ministers, nor had sight of the written Ministerial Advice that incorporated PHS's evidence or expertise. This was appropriate in the context of the Four Harms approach set out below. PHS understood that under this approach, advice and evidence provided by PHS, which focussed on the direct and indirect health harms, was balanced by the Scottish Government against the harm to wider society and economic harms.

Informal support for decision-making

4.1.3 Working closely with colleagues in the Scottish Government is part and parcel of the delivery of many of PHS's functions. Staff from the legacy organisations brought with them into PHS close working relationships with their counterparts in the Scottish Government and indeed other bodies with which the organisation collaborates. These relationships were a significant strength throughout the pandemic, and new relationships were formed, particularly among health protection professionals, as roles changed both within PHS and within the government.

4.1.4 Colleagues in PHS and the Scottish Government had frequent informal discussions about the optimal response to the challenges presented by COVID-19. During the height of the pandemic these discussions took place with great regularity and enabled PHS to contribute timely public health perspectives and expertise to the advice

provided by civil servants to Ministers and therefore to support decision-making. This included being part of WhatsApp groups with senior civil servants. WhatsApp groups, and to a lesser extent one-to-one WhatsApp messages, were effective in enabling informal discussions between key advisers in PHS and civil servants. The groups tended to focus on specific issues (for example the emergence of Omicron as a variant of concern in late 2021) and provided a channel through which developing thinking could be shared between key people. Given the amount of email traffic these significant figures in the response received, the use of WhatsApp in this way provided a focused place for the sharing of information and was appropriate as a means of communication alongside more formal channels.

4.1.5 Increasingly as the pandemic progressed, advice was specifically requested by civil servants, sometimes planned, sometimes at very short notice, for updates of Scottish Government Guidance (i.e., guidance published on Scottish Government websites for the public and for public bodies such as educational institutions and businesses).

Formal support for decision-making

4.1.6 PHS provided support for Scottish Government decision-making through various formal mechanisms and arrangements. This included:

- Providing input to the Scottish Government Resilience Room (SGoRR) and other Ministerial briefings on request. For example, when the reporting of data relating to COVID-19 deaths in Scotland changed in April 2020, Angela Leitch, Scott Heald, and Dr Jim McMenamin attended a briefing with the First Minister to explain the changes in reporting of death data.
- Contributing to Deep Dives as requested by the Scottish Government (meetings that enabled a focussed, detailed discussion of a single topic thereby allowing informed debate and consideration of the actions required in relation to the topic under consideration – see section 6.3.2 below).
- Undertaking analysis of a specific issue as requested by the Scottish Government. For example, the analysis undertaken on discharges from hospitals to care homes (see –section 4.9).
- The provision of written health protection guidance operationalising, as best as possible, policy decisions by the Scottish Government (see section 4.6 below).
- Membership of – and ad hoc contributions to – expert advisory groups (see chapter 6).
- The provision of data and intelligence (see chapter 7).

4.1.7 In addition, the Interim Chair, Jim McGoldrick, (see paragraph 5.2.1 of the Corporative Narrative) attended regular meetings (first weekly and then fortnightly) with the Minister for Public Health and other NHS Board Chairs. This was a forum for Chairs to update the Minister on work underway across NHS Scotland, and to be appraised of developments in the Scottish Government's approach to managing the pandemic. The Interim Chair was provided with briefings on matters of key strategic significance to PHS ahead of these meetings and fed back to Angela Leitch on discussions and Ministerial direction afterwards.

4.1.8 The mechanics by which significant meetings were conducted between PHS and the Scottish Government varied. In many cases PHS provided briefing documents to civil servants beforehand, which would be used by the civil servants as part of the briefing provided to Ministers. PHS frequently presented on the data and evidence at meetings. The Scottish Government would usually set the agenda for the meeting, identify the matters for discussion or decision, and communicate the implications of the decisions to be made to Ministers and other decision-makers. In some cases, the agenda and matters for discussion would be informed by discussions that had taken place with PHS, and in other cases on the basis of advice from the National Incident Management Team (NIMT) (see section 4.3) or on the basis of input from expert advisory groups (see chapter 6). The Scottish Government was responsible for taking minutes and notes of these meetings, and in most cases PHS did not keep a separate formal record. In many instances, particularly when working up operationalisation of Scottish or UK Government policy through PHS guidance, informal conversations and emails were used as the quickest form of discussion.

4.2 Strategic context

4.2.1 The Scottish Government set out the decisions made on the handling of the pandemic in a series of strategic documents (PHS/51 - INQ000235119)[51] published between April 2020 and February 2022 (see chapter 5). Discussions in the expert advisory groups and analysis of the evidence, along with ad hoc input from experts – including PHS staff – contributed to and informed the decisions set out in the framework documents. The advice provided by the National Incident Management Team (see section 4.3) was also key to decision-making.

[51] Scottish Government. Coronavirus (COVID-19): strategic approach. Accessed February 2023.

4.2.2 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.

4.2.3 To PHS's knowledge, the concept of 'herd immunity' did not at any time form part of the Scottish Government's strategy for the management of COVID-19. PHS did not provide advice to the Scottish Government around the implementation of a herd immunity strategy, and nor was any data or analysis requested or provided relating to such a strategy.

The Four Harms Approach

4.2.4 The Framework for Decision-Making (PHS/52 - INQ000235128)[52] published on 23rd April 2020 outlined the 'Four Harms' approach to the Scottish Government's decision-making. This involved balancing:

- Harm 1: The direct harm to life and health.
- Harm 2: The harm the virus does to wider health and care services, and indirectly to health and wellbeing.
- Harm 3: The harm to wider society.
- Harm 4: The damage to the economy, employment, and Scotland's prosperity.

4.2.5 The Scottish Government considered a range of sources of evidence, expertise and analysis in the course of their consideration of the Four Harms. This included input from other Health Boards (local and national), executive agencies, non-departmental public bodies (NDPBs), civil society and academia. This approach is set out in COVID-19: framework for decision making - assessing the Four Harms (PHS/53 - INQ000235135),[53] published on 11th December 2020. The paper explains that during the decision-making process around the gradual easing of restrictions from the initial lockdown of March and April 2020, the Scottish Government made decisions about which restrictions to ease and when (and also about which new measures to implement such as the use of face coverings) on the basis of a range of factors. The paper explains that potential options were assessed for their impacts on the Four Harms and for their viability, for example taking account of how easy they are to communicate and

[52] Scottish Government. Coronavirus (COVID-19): framework for decision making. Accessed March 2023

[53] Scottish Government. COVID-19: framework for decision making - assessing the four harms. December 2020.

understand, the likelihood of public compliance, the proportionality of any impact on human rights and other legal considerations.

4.2.6 The paper explains the Scottish Government's approach to considering the impact of restrictions – including the first lockdown – on vulnerable and at-risk groups. The Scottish Government recognises in the paper that the restrictions had unintended consequences for population health and emphases that 'balancing these considerations has been a key aspect of informing decisions around the nature and extent of restrictions and the mitigations in place to help to reduce harm.' Evidence cited on this point in the paper are the health inequalities impact assessment that PHS worked on with partners (see section 9.4.1) and the Scottish Government's health and social impact assessment[i] that 'explores the ways in which particular groups (based on Equality Act protected characteristics and socioeconomic disadvantage) are disproportionately affected' by COVID-19.

4.2.7 Assessments for each of the measures helped to inform the Scottish Government's decisions, which were made by Cabinet and then implemented through regulations and guidance as appropriate.

4.2.8 On occasions a decision might be made by the Scottish Government that did not reflect all aspects of the advice provided by PHS. Inevitably, in addition to advice from PHS, Scottish Government had to take account of the impact on the Four Harms and other factors and to balance these in determining the most appropriate course of action for Scotland.

Elimination Strategy

4.2.9 The Scottish Government's strategic priority in the initial phases of the pandemic was to eliminate the COVID-19 virus. As described by the First Minister in June 2020 (PHS/54 - INQ000235122)[54] in a COVID-19 update to the Scottish Parliament, this meant:

'Suppressing the virus, driving it as far as we can towards total elimination has to be our overriding priority.'

4.2.10 The language of 'elimination' was frequently used by the First Minister, the Cabinet Secretary for Health and Sport and the CMO in statements both to the Scottish

[54] Scottish Government. COVID-19 update: First Minister's speech 26 June 2020. Accessed March 2023.

Parliament and to the media, while the language of the Framework for Decision-Making (see section 5.3) was 'containing and supressing the virus in order to minimise the harm it can do' (PHS/55 - INQ000235128).[55]

4.2.11 The use of different language to express policy intent led to challenges for PHS in the development of guidance. As set out in section 4.4, PHS's role was to operationalise Scottish Government policy. In some instances, the nuances of language could lead to delays in publishing guidance when clarity had to be sought from Scottish Government officials and/or Scottish Government officials felt that PHS had not accurately captured policy intent. Due to the speed of policy changes, with little forewarning of where discussions had landed and the uncertainty on whether a policy would be adopted across the four nations, media briefings were in many cases the arenas through which PHS learnt of decisions that would impact on PHS guidance. This indirect route, coupled with the nuances of language, the time to develop and offer professional PHS public health advice, and inadvertent delays within the Ministerial sign-off in the Policy Alignment Check (PAC) process (PHS/56 - INQ000147529)[56] (see paragraph 4.4.4), contributed to the challenges around the timely production of guidance.

Test and Protect

4.2.12 As set out in section 5.4 below, one of the Scottish Government's early strategic documents was COVID-19: Test, Trace, Isolate, Support (PHS/57 - INQ000235141).[57] Published on 4th 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.'

[55] Scottish Government. Coronavirus (COVID-19): framework for decision making. Accessed March 2023

[56] Scottish Government and PHS. Policy Alignment Check (PAC) Process V6. June 2020.

[57] 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.

4.2.13 The language of 'Test, Trace, Isolate, Support' was replaced with 'Test and Protect', but the goal remained the same; reduce population-wide transmission of the virus. 'Test and Protect' became the language of public communications, including the specific marketing campaign that PHS led on behalf of the Scottish Government (see section 9.2.4). Test and Protect 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.

4.3 The National Incident Management Team

4.3.1 HPS set up a National Incident Management Team (NIMT) that met for the first time on 13th 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 CMO, and representatives from local government and PHS teams. Attendees changed over time between the initial set up in January 2020 to the formalisation of the group and the agreement of the Terms of Reference (PHS/58 - INQ000147555)[58] in September 2020. This is particularly true of Scottish Government attendees due to the structural changes within the civil service as the Scottish Government put in place their response structure.

4.3.2 Usually chaired by the PHS Head of Infections Service and Strategic Incident Director for COVID-19, Dr Jim McMenamin, and accountable to the CMO, one of the key functions of the NIMT is to provide strategic public health leadership and advice to Scottish Government Ministers on measures to control the pandemic. The NIMT reports to the Scottish Government through the provision of written advice from the NIMT Chair following the meetings. In addition to the role of PHS in chairing and providing secretariat for the meeting, representation of other PHS staff in the NIMT reflected standing agenda items on epidemiology, national testing, risk assessment and response, and guidance as well as focussed contributions from PHS colleagues leading on education, communication, immunisation and evaluation of effectiveness of vaccination.

4.3.3 The remit and responsibilities of the NIMT and its members – as set out in the Terms of Reference – was to:

[58] PHS. National Incident Management Team Terms of Reference v2. September 2021.

- Co-ordinate/manage national developments in a consistent manner to improve the prevention and control of COVID-19 disease threats in Scotland.
- 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.

4.3.4 The language of 'recommendations' was latterly removed from the vocabulary of the NIMT on the request of the Scottish Government. The Chair provided written advice to the Scottish Government via email following the meetings.

4.3.5 Meetings were initially held daily but this reduced in frequency to twice weekly, then weekly, then monthly until the NIMT was stood down on 27th April 2023. Ad hoc meetings of the NIMT were arranged as required in the event of high impact risks, issues or opportunities arising.

4.3.6 PHS is coordinating a lessons learned debrief from the NIMT, the report of which is expected towards the end of 2023.

4.4 The role of guidance in supporting Scottish Government decision-making

4.4.1 One of the key ways in which PHS contributed to Scotland's response to the pandemic was providing guidance that operationalised Scottish Government policy. The pandemic required a cross-government and whole system response, with rapid policy and delivery development and implementation. A wide range of guidance has, and continues to have, a significant role to play. The formulation of guidance also plays an important role in supporting Scottish Government decision-making.

4.4.2 PHS guidance, ultimately agreed and signed off by the Scottish Government before it could be issued, operationalises policy intent by setting out the necessary public health and health protection action to combat COVID-19 infection in Scotland (including surveillance, case detection, control and prevention). The guidance addresses the key topics of COVID-19 risk assessment, risk management and risk communication and incorporates elements of both health protection and infection prevention and control advice, with the latter provided by ARHAI (see section 10.4).

4.4.3 Whereas 'advice' may be verbal or written, informal or formal, 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 (PHS/59 - INQ000147832).[59] Guidance documents are live documents that are updated as the situation develops. PHS published and maintained 50 pieces of guidance relating to COVID-19 (PHS/60 - INQ000235197)[60] and supported the review of hundreds of documents produced by other organisations, including the sectoral guidance for businesses and workplace settings produced by the Scottish Government (PHS/61 - INQ000235115).[61]

Policy Alignment Check

4.4.4 As described above, PHS has a professional role to provide guidance that operationalises Scottish Government policy. PHS guidance is therefore aligned to and reflects Scottish Government policy, and also 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 PAC process (PHS/62 - INQ000147529)[62] in June 2020.

4.4.5 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 (see section 3.1 above), it was for Scottish Ministers to determine policy within Scotland if there were differences

[59] National Archives. Public Health etc. (Scotland) Act 2008. 2008.
[60] PHS. COVID-19 Guidance Documents. Accessed March 2023.
[61] Scottish Government. Coronavirus (COVID-19): guidance. Accessed February 2023.
[62] Scottish Government and PHS. Policy Alignment Check (PAC) Process V6. June 2020.

and PHS was therefore to ensure that guidance aligned with Scottish Government policy.

4.4.6 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. The PAC process required that the development of guidance by PHS had to wait until the clarification to the Scottish Government policy had been made. Similarly, if additions or amendments to the policy were required or officials did not agree that the wording used reflected policy, the guidance would undergo further revision once this has occurred. It is important to note that guidance could not be issued until signed off by Scottish Government. The Scottish Government Liaison Function (see paragraphs 1.2.2 – 1.2.3) managed this process, which is set out in a flowchart in Appendix G.

4.4.7 The PAC process introduced additional layers into the existing process of developing and issuing health protection guidance (on which frontline teams and services relied when pandemic policy changed), which in some cases delayed its publication.

4.4.8 In some cases delays were caused by the nuances of language used in policy documents and announcements such as 'elimination of the virus' and 'maximum suppression of the virus'. In order to operationalise the policy intent in the context of the scientific evidence and the professional view of PHS experts and other expert professional stakeholders, PHS would seek clarity from Scottish Government officials. There were also instances, when Scottish Government officials felt that PHS had not accurately captured policy intent, and this too would cause delays whilst the nuances were clarified.

4.4.9 Due to the speed of policy changes, with little forewarning of the outcome of discussions and the uncertainty on whether a policy would be adopted across the four nations, media briefings were in many cases the arenas through which PHS learnt of decisions that would impact on PHS guidance. This indirect route, coupled with the nuances of language, the challenges in outlining risk assessment as an effective public health approach, the time to develop and offer professional PHS public health advice, and inadvertent delays within the Ministerial sign-off in the Policy Alignment Check (PAC) process, contributed to the challenges around the timely production of guidance.

4.4.10 The correspondence between PHS and the Scottish Government relating to the PHS care homes guidance was the subject of a Freedom of Information (FOI) request in February 2021. The FOI release (PHS/63 - INQ000235151)[63] illustrates the issues covered by the PAC process and the associated delays.

4.4.11 The PAC process came to an end in May 2022, following the end of the emergency powers referred to in paragraph 1.3.3 above.

4.4.12 The experience of the PAC process is an important part of the lessons learned and likely recommendation for preparing for and responding to future pandemics.

4.5 Engagement with the Chief Medical Officer

4.5.1 The CMO Directorate is responsible for providing policy advice to Scottish Ministers on healthcare and public health. PHS works closely with the CMO, Deputy CMOs and officials, sharing expertise and evidence, and supporting the provision of advice to Ministers and the implementation of Scottish Government policy. This includes through the NIMT (see section 4.5), through informal dialogue, and through expert advisory groups such as the Scottish Government COVID-19 Advisory Group (see chapter 6).

4.5.2 An example of PHS's working relationship with the CMO was around the Nike conference held in Edinburgh at the end of February 2020. PHS set up and led an Incident Management Team (IMT) (PHS/64 - INQ000147544)[64] of experienced public health professionals in response to being alerted by international public health authorities that an individual had tested positive for COVID-19 following their attendance at the conference. PHS undertook analysis of molecular sequencing of the strains of the virus in Scotland, including the strain associated with the conference. The CMO described the work being undertaken at the Scottish Government daily briefing on 9th June 2020 (PHS/65 - INQ000235123)[65] and he explained that genomic sequencing had shown that the specific viral lineage associated with the conference had been eradicated in Scotland by the end of March 2020.

[63] Scottish Government. FOI Response 202000090557. February 2021.

[64] PHS. Incident management team report conference outbreak. October 2021.

[65] Scottish Government. Media Briefing. 9 June 2020.

4.5.3 PHS's engagement with the CMO around the letter he wrote (PHS/66 - INQ000235194)[66] to all NHS boards on 23rd June 2020 provides an example of how the organisation worked with the CMO to support the implementation of Scottish Government policy. The letter to key health delivery agencies across Scotland including NHS Boards, DsPH, GPs, and pharmacies provided an update on Scotland's approach to COVID-19 antibody testing. The CMO stated that 'there is currently insufficient clinical evidence to absolutely conclude that people who have recovered from COVID-19 are protected from either a second infection or from infecting others.' This meant that the only clinically safe option was to assume no meaningful immunity from a positive result. The advice was therefore to focus on using antibody tests to improve understanding of the virus and in the clinical management of patients and not offer on-demand antibody testing. The letter referred to the work PHS was leading on enhanced surveillance, which suggested that only a small proportion of the population had been exposed to the virus at that time.

4.5.4 A further example is PHS's work with the CMO to encourage pregnant women to take up the COVID-19 vaccine. The CMO wrote (PHS/67 - INQ000235116)[67] to NHS Boards and GP practices on 18th August 2021 to seek their assistance and cited a number of sources of evidence-based advice for women on the benefits of vaccination in pregnancy for them and their babies including the PHS public information pages on NHS Inform (PHS/68 - INQ000235171)[68] and the learning resources for healthcare professionals that PHS developed with NHS Education for Scotland (NES).

4.6 Engagement with the Chief Scientist Office

4.6.1 The Chief Scientist Office (CSO) sits within the Scottish Government's Health and Social Care Directorates and is led by the Chief Scientist for Health. The CSO provides funding to support and encourage research to improve the health of people in Scotland, and as such is a key PHS stakeholder. PHS colleagues engaged regularly with the Chief Scientist for Health – Professor David Crossman – over the course of the pandemic. This engagement was both through expert advisory groups, including the Scottish Government COVID-19 Advisory Group and the Scientific Advisory Group on Testing (see chapter 6) and directly through engagement on specific issues and

[66] Scottish Government. Letter from Chief Medical Officer on Use of Serology Testing for COVID-19 in Scotland. June 2020.
[67] Scottish Government. Coronavirus (COVID-19): letter from Chief Medical Officer on pregnancy and vaccines. August 2021.
[68] NHS 24. Pregnancy, breastfeeding and the coronavirus vaccine. Accessed March 2023

research projects. Examples of issues on which PHS worked with the CSO include testing, wastewater testing, and Whole Genomic Sequencing.

4.6.2 A major initiative on which PHS works with the CSO is the Knowledge and Research Hub. The Hub was set up in May 2020 with an ambition to galvanise and coordinate the research community in Scotland to contribute to the pandemic response. This included:

- Connecting academia to local and national organisations in order to contribute expertise and bring additional capacity and skills to bear.
- Responding to requests for information about specific topic areas.
- Identifying, summarising, and sharing knowledge resources so that researchers and policy makers can quickly access high-quality research.
- Undertaking horizon scanning to identify research and innovation needs.
- Creating a central repository of COVID-19 research in Scotland.

4.7 Engagement with the Chief Scientific Adviser

4.7.1 The Chief Scientific Adviser for Scotland (CSA) is the Scottish Government's primary source of science and engineering advice and sits within the Directorate for Economic Development. PHS's engagement with the CSA was through membership of expert advisory groups (see chapter 6) such as SAGE, the Scottish Government COVID-19 Advisory Group and Education and Children's Issues Sub-Group, rather than direct engagement.

4.8 Evaluating national policies and strategies

4.8.1 PHS has a specific role in evaluating national policies and strategies in order to establish their effectiveness in improving population health outcomes. This includes:

- Measuring the impact of policies and programmes in improving the population's health and reducing health inequalities.
- Undertaking process evaluations to understand how well services were delivered, what happened when a policy, programme or action was implemented and why it had the impact (intended or unintended) that it did.
- Supporting the Scottish Government and other organisations to clarify what they are trying to achieve and put in place ongoing monitoring and learning to inform and enable change.

- Providing evidence and recommendations to support ongoing improvement in policy and practice.

4.8.2 Two examples of how PHS's evaluation work supported Scottish Government decision-making around the pandemic are the evaluation of the shielding programme and the evaluation of the COVID-19 vaccination programme.

Evaluation of the shielding programme

4.8.3 PHS was commissioned by the Scottish Government in 2020 to develop an evaluation framework for the shielding programme (PHS/69 - INQ000235167).[69] The shielding programme operated during the first phase of the pandemic to protect people who were clinically at high risk from COVID-19 by supporting them to self-isolate and minimise all interaction with others. PHS developed an evaluation framework (PHS/70 - INQ000147581)[70] to:

- Evaluate the effectiveness of the shielding programme.
- Inform the advice, information and support offered to individuals in the shielding group during the pandemic.
- Inform the advice, information and support offered to at risk people more widely during the pandemic.
- Identify lessons learnt for future pandemic planning.
- Identify lessons learnt for work with at risk groups.

4.8.4 The evaluation adopted a number of different outreach mechanisms to ensure that individuals from a range of backgrounds were offered an opportunity to have their voice heard. This included establishing a Lived Experience Panel to advise on the design and implementation of the evaluation. The panel had ten members including a Black or Minority Ethnic individual, people with mobility and sensory impairments, three older people, and the carer of a disabled person.

4.8.5 The panel also had practitioner representation – a social worker who was supporting three shielding clients including someone with a history of criminal justice involvement and substance use, and an older person in sheltered housing. This enabled the

[69] Scottish Government. Coronavirus (COVID-19): advice for people who were on the Highest Risk List. Accessed March 2023.

[70] PHS. Scottish Government shielding programme – Evaluation Framework. May 2020.

evaluation to capture the voice of individuals who would have struggled to engage directly with PHS, including those from disadvantaged socioeconomic backgrounds.

4.8.6 Eight members of the panel attended an initial online meeting in July 2020 to help identify those evaluation questions that mattered most to individuals who were shielding or caring for someone who was shielding. The two members who could not attend the meeting were consulted one-on-one. The panel was also latterly asked for specific input on the wording of questions in the survey. One of the key impacts of working with the Lived Experience Panel was that the mental health impact of shielding became a more prominent feature of the evaluation.

4.8.7 There were three components to the evaluation of the shielding programme:

- Phase one of the Impact and Experience Survey: an online survey that ran between 1st and 14th June 2020, with the findings published on 23rd September 2020 (PHS/71 - INQ000147532)[71]
- A rapid evaluation: undertaken between March and November 2020, this used mixed methods (a survey, focus groups, interviews, collection of monitoring data) and was published on 27th January 2021 (PHS/72 - INQ000202564)[72]
- Phase two of the Impact and Experience Survey: an online survey that ran between 25th October 2021 and 7th November 2021 and was published on 30th March 2022 (PHS/73 - INQ000147531).[73]

4.8.8 The Impact and Experience Survey was a survey of individuals on the shielding list. These were individuals identified through analysis undertaken by PHS of a range of data sources. Both phases of the survey explored shielding behaviour, negative impacts of shielding, shielding support and unmet needs. The results suggested that the (self-reported) negative impacts of shielding were pronounced and that there was scope to target the shielding support offer more towards those who need it most.

4.8.9 The rapid evaluation found clear evidence that the shielding advice changed people's behaviour and that the shielding support addressed real need. The evaluation found evidence that the free food box scheme addressed real need – some people who received these boxes would have struggled without them. However, this was not the case for all recipients. The PHS evaluation also found that the shielding guidance was

[71] PHS. COVID-19 Shielding Programme (Scotland) Impact and Experience Survey. September 2020.
[72] PHS. COVID-19 Shielding Programme (Scotland) rapid evaluation. January 2021.
[73] PHS. COVID-19 shielding programme (Scotland) impact and experience survey – part two. March 2022.

neither necessary nor sufficient to change behaviour in all instances. The conclusion was that a repeat of shielding, in its initial form, was not recommended and that future approaches would need to give greater consideration to personal choice, the multifaceted nature of risk, and hospital-onset infections. The evaluation thereby helped the Scottish Government to shape and evidence their support for people on the Highest Risk List. PHS was advised that Scottish Government colleagues used findings from the evaluation to input into Cabinet papers around the removal of legislative COVID-19 restrictions.

Evaluation of the COVID-19 vaccination programme

4.8.10 PHS worked with the Scottish Government, NSS, NES and local boards from summer 2020 to design the COVID-19 vaccine programme. The Scottish Government led on the policy, legislative and regulatory aspects, local boards led on the delivery of the vaccine to their residents, and NSS led on vaccine storage and distribution. PHS worked with NES to develop workforce education and training materials and with a range of partners to develop the necessary surveillance measures, modelling, dashboards and real time epidemiology. In addition, PHS provided clinical advice and public health leadership, and led specifically on:

- Vaccine safety: minimising the risk of harm from the vaccines.
- Marketing: designing, developing and distributing a comprehensive and targeted suite of information for public and professional audiences based on research insights across print and digital media.
- Vaccine confidence and consent: undertaking equality impact assessments and research into vaccine hesitancy and societal influences to inform public messaging and the design of service delivery models to optimise and encourage access to vaccination.
- Surveillance and epidemiology: data analysis and reporting of vaccine uptake, research into the effectiveness of the different COVID-19 vaccines and the impact of vaccination on the pandemic.
- Evaluation of the different types of service models used to deliver vaccination across Scotland to inform continuous improvement in their design and whether or not the programme met its intended outcomes and inequality considerations.

4.8.11 The evaluation framework (PHS/74 - INQ000147536),[74] which covered both COVID-19 vaccination and influenza vaccination, explained the following different reasons for conducting the evaluation:

- Health Boards developed delivery plans which met their local circumstances, which meant there were a range of different models being implemented across the country. The evaluation would show if, how, and why different models of service delivery achieved different uptake rates for different population groups.
- Capturing and sharing learning in a timely, accessible and useful fashion and supporting stakeholders' information needs for improvement and planning so as to help Health Boards refine their service delivery models to increase uptake.
- Collecting data and intelligence to test the assumptions that are being made by Health Boards and national stakeholders in their planning of both the flu and COVID-19 vaccination programmes.

4.8.12 The evaluation methodology involved:

- Documentary analysis of Health Board plans, NHS Inform patient pathway information, local and national documentation (planning documents, modelling work, reports, risk logs, etc.), evidence reviews carried out by others, health inequalities impact assessment, and user insights desk research.
- Qualitative and survey research with staff and delivery partners involved in planning, delivering, and receiving the vaccine.
- Qualitative and survey research with the public (attendees and non-attendees).
- Analysis of routine data including descriptive analysis of uptake by population group, eligible cohort, delivery model, local contextual factors and comparison with historical uptake data.
- Cost effectiveness analysis of extending the flu vaccination using various delivery models and delivering the COVID-19 vaccination using different delivery models.

4.8.13 The main outputs from the evaluation were all published in June 2022, but the first two reports were shared with the Scottish Government and other key stakeholders in September 2021. These were:

[74] PHS. Evaluation framework for influenza and COVID-19 vaccination programmes V1.2 16.10.20. October 2020.

- Learning from interviews with health board vaccination leads about their experience of the COVID-19 vaccination programme: semi-structured interviews with 17 health boards leads from all 14 health boards in Scotland (PHS/75 - INQ000147518)[75]
- Evaluation of the flu and COVID-19 vaccination programmes in Scotland - interim report: summary of progress to date (PHS/76 - INQ000147516)[76]
- Factors affecting uptake of the COVID-19 vaccine: report summarising factors affecting uptake including booking method, delivery model, ethnicity and deprivation (PHS/77 - INQ000147517).[77]

4.9 Undertaking specific analysis as requested by the Scottish Government

4.9.1 PHS undertook a number of specific pieces of analytical work on the request of the Scottish Government. These analyses were directly used to inform policy and decision-making.

4.9.2 For example, on 18th August 2020 the Cabinet Secretary for Health and Sport commissioned PHS to carry out work to identify and report on discharges from NHS Hospitals to care homes during the first wave of the pandemic. PHS worked with the universities of Edinburgh and Glasgow in the production of the report, which was initially published on 28th October 2020 (PHS/78 - INQ000147514),[78] with an update to the report published on 21st April 2021 to aid understanding of the statistical analysis (PHS/79 - INQ000101020). [79] The First Minister referred to the report at First Minister's Questions on Thursday 29th October 2020 (PHS/80 - INQ000235114),[80] saying that the report contained lessons for the Scottish Government.

4.9.3 The report is presented in three sections. Section one explains the methodology in defining the cohort of patients who were discharged and describes their demographics and COVID-19 testing status. Section two defines and describes care home outbreaks of COVID-19 with an analysis of the factors associated with those outbreaks,

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[75] PHS. Learning from interviews with health board vaccination leads about their experience of the COVID-19 vaccination programme. June 2022.

[76] PHS. Evaluation of the flu and COVID-19 vaccination programmes in Scotland - interim report. June 2022.

[77] PHS. Factors affecting uptake of the COVID-19 vaccine: report summarising factors affecting uptake including booking method, delivery model, ethnicity and deprivation. June 2022.

[78] PHS. Discharges from NHS Scotland hospitals to care homes between 1 March and 31 May 2020. October 2020.

[79] PHS. Discharges from NHS Scotland hospitals to care homes between 1 March and 31 May 2020 (Revised). April 2021

[80] Scottish Government. Coronavirus (COVID-19): First Minister's statement - 29 October 2020. October 2020.

specifically including hospital discharges. Section three provides further analysis on classification of discharges based on residency prior to their admission to hospital, analysis of the outcomes of all those who were discharged from hospital to a care home and analysis of those discharged from hospital to a care home whose last test was positive (including viral genomic sequencing).

4.9.4 The analysis found that hospital discharge was associated with an increased risk of an outbreak when considered on its own. The report is clear that after accounting for care home size and other care home characteristics, the estimated risk of an outbreak due to hospital discharge reduces. No statistically significant association was found between hospital discharge and the occurrence of a care home outbreak. However, due to the uncertainty observed, PHS was unable to rule out a small effect, particularly for those patients who were discharged untested or discharged positive. Care home size was found to be much more strongly associated with the risk of an outbreak than other care home characteristics, including the different types (negative test, untested, positive test) of hospital discharge.

5. PHS's support for the development and implementation of Scottish Government strategies

5.1 Background

5.1.1 The Scottish Government set out their approach to the handling of the pandemic in Scotland in a series of strategic documents (PHS/81 - INQ000235119)[81] published between April 2020 and March 2022. The formal and informal support PHS provided for decision-making set out in the preceding chapter contributed to the development of these strategies. In addition to the key strategic documents set out below, the work of PHS was mentioned or referenced in over 200 documents published by the Scottish Government on the handling of the pandemic (PHS/82 - INQ000235162).[82]

5.1.2 The Nike conference in Edinburgh on 26th and 27th February 2020 and the Scotland versus France Six Nations rugby match at Murrayfield Stadium in Edinburgh on 8th March 2020 took place prior to the publication of the first strategic document. HPS was not involved in any discussions with the Scottish Government prior to the Nike conference nor had HPS been aware of this relatively small business meeting prior to it taking place. HPS/PHS set up and lead an Incident Management Team (IMT) following the conference and undertook analysis of molecular sequencing of the strains of the virus in Scotland, including the strain associated with the conference (please see section 4.5.2 for more detail and a link to the report).

5.1.3 HPS reviewed their initial series of COVID-19 cases in advance of the Scotland versus France Six Nations match at Murrayfield Stadium and contributed to the risk assessment conducted by the Scottish Government which concluded that the match should continue as planned.

5.1.4 When the first lockdown was imposed in March 2020, the criteria that the Scottish Government could consider by way of exit strategy were evolving rather than firmly concluded. This was the period during which the Scottish Government was developing its first strategic framework, to which HPS/PHS and other Scottish stakeholders were contributing. HPS was not involved in discussions with the Scottish Government about an exit strategy at this time. The strategic documents outlined below, most notably the COVID-19 Framework for Decision Making (PHS/83 - INQ000235128) and subsequent

[81] Scottish Government. Coronavirus (COVID-19): strategic approach. Accessed February 2023

[82] PHS. Mentions of PHS in Scottish Government strategic documents April 2020 – April 2022. March 2023.

framework updates, demonstrate how the exit strategy evolved and the evidence – including PHS data and intelligence – on which it was based.

5.2 Underpinning understanding of the nature and spread of SARS CoV-2

5.2.1 In PHS's view, the Scottish Government's strategies were based on an accurate understanding of the features of the virus and of the disease caused by it. Early in the pandemic there were significant uncertainties about the potential for asymptomatic infection or spread from such asymptomatic individuals. This evidence base only increased as the widespread availability of intelligence improved and specific data 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 the Scottish Government's understanding of the epidemiology of SARS CoV-2, including enhanced surveillance, diagnostics, whole genome sequencing, and wider analytical and research work described in chapter 7.

5.2.2 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 below and it is the organisation's view that this – together with analysis and modelling undertaken by the Scottish Government's own analysts – gave the Scottish Government a significant understanding of these matters.

January to March 2020: Early understanding

5.2.3 Throughout the course of the pandemic HPS and then PHS obtained epidemiological evidence from a number of reliable sources, including surveillance data, outbreak investigations, and research studies conducted within Scotland, the UK, and worldwide. The evidence emerged rapidly, sometimes as preliminary findings, and later supported by more extensive evidence.

5.2.4 In January 2020, HPS (as this was the period before the formation of PHS) relied on information provided in the main to PHE (in their UK role as the National Focal Point under the terms of the International Health Regulations) from sources such as the World Health Organization (WHO) and European Centre for Disease prevention and Control (ECDC) along with reports from Chinese authorities to understand – to the extent that it was known – the underlying epidemiology of transmission and spread.

5.2.5 The initial information from the WHO suggested that the novel coronavirus may have originated from animals, as many of the early cases were linked to a market with various animals. However, by 23rd January there was growing evidence of the virus spreading from person to person, including cases unrelated to the market. This understanding of person-to-person transmission increased as more cases were identified worldwide. Before the first case was reported in Scotland on 1st March 2020, it was recognised that the virus mainly spreads through respiratory routes.

5.2.6 As more information about cases became available from China and other countries like Italy and the UK in the first few months of 2020, HPS's understanding of the nature and spread of the SARS CoV-2 virus evolved rapidly. Established links with key experts such as the Chair of the Advisory Committee on Dangerous Pathogens (ACDP) and expert committees in the UK and Scotland were also used to keep abreast of the epidemiological characteristics of the virus.

5.2.7 In the early stages of the pandemic, based on the understanding of SARS (to which this virus is closely related), it was assumed by public health experts that it was unlikely people could spread the virus before showing symptoms or that asymptomatic individuals could transmit the virus.

5.2.8 On 23rd January the WHO published an early estimate of the infectiousness of the virus, referred to as R0, ranging from 1.4 to 2.5. During the pandemic, various groups in the UK worked on modelling 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) (see chapter 6).

5.2.9 Early information from China suggested that around 25% of COVID-19 cases were severe. However, like mortality rates among those infected, it can be difficult to accurately assess rates of severe illness among people who are infected because the likelihood of identifying a case changed throughout the pandemic. For example, more testing was done for close contacts and asymptomatic individuals in different settings later in the pandemic, which means that severity of disease may appear lower because of increased testing.

5.2.10 As set out in Chapter 7, HPS and then PHS provided datasets throughout the pandemic, including information on cases, tests, and deaths, to support the wider UK modelling work on short term forecasting of incidence and the estimation of R0. Some

of these datasets to inform the wider UK modelling work were updated daily to provide the most current information for analysis.

5.2.11 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,[ii] which continued to contribute across the pandemic to the epidemiology of COVD-19.[iii]

5.2.12 Surveillance and research studies also played a key role in developing early understanding. The Scottish Intensive Care Society Audit Group (SICSAG) developed a surveillance system in March 2020 to monitor trends in the number of COVID-19 patients in hospitals and intensive care units (ICUs). SICSAG rapidly repurposed its reporting systems, which usually operate on a monthly basis, to develop a daily flow of data from all intensive care units in Scotland. This allowed daily reports to be issued by 9am reporting the number of patients in ICUs across Scotland. This was then linked with data from testing laboratories to identify ICU patients with a positive PCR test for SARS CoV-2, allowing a more detailed daily report to be issued by 12 noon providing national information on the numbers of patients in Scottish ICUs, their COVID-19 test status, the number of people requiring mechanical ventilation and other life support therapies.[iv]

5.2.13 Additional information from other countries conducting similar studies, alongside the availability of testing, case and morbidity and mortality data from international studies, mathematical modelling, and routine surveillance complemented HPS's understanding in this early period.

Early development of microbiology capacity and capability

5.2.14 The Public Health Microbiology (PHM) team in HPS worked on testing preparedness from January 2020 onwards. As no commercial or experimental tests for SARS CoV-2 testing were available, capacity and capability was a key consideration in developing an effective understanding of the epidemiology of the virus. Capacity for PCR testing had to be established in the Glasgow and Edinburgh Specialist Virus Laboratories. HPS worked to ensure all necessary support was provided to facilitate those laboratories developing in-house laboratory tests. In 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.[v]

5.2.15 PHE hosted its first SARS CoV-2 Laboratory Cell meeting on 16th January. The HPS PHM team attended the meeting in order to ensure that plans for testing in Scotland were aligned with the four nations from the very early stages.

5.2.16 Through discussions with PHE and senior colleagues in HPS, the PHM team worked to define the anticipated PCR testing capacity for diagnostic need in Scotland. The PHM team recognised NHS Scotland Health Boards and Labs were in differing states of readiness to respond to the pandemic. Concerns were raised with HPS by NHS Scotland laboratories about sample transportation, safety around sample handling in both microbiology labs and blood sciences, patient pathways, and diagnostics in rural areas. The virus was classified as a category three pathogen and laboratories were required to have stringent safety measures in containment level three laboratories. This limited where testing could be carried out and the operations of testing within labs.

5.2.17 On 23rd January 2020 HPS published 'Wuhan novel coronavirus (WN-CoV) Guidance for sampling and laboratory investigations v1.0'[vi] in line with PHE guidance[vii] and with input from NHS Scotland Reference Laboratories. Initially, it was recommended that suspected patient samples should be tested locally for common respiratory pathogens and sent to the National Reference Laboratory's Respiratory Virus Unit (RVU) at PHE Colindale for specialist SARS CoV-2 testing. This document was updated to reflect agreed changes in response and published a further seventeen times during the first year of the pandemic, and nineteen times in total, until it was incorporated into 'COVID-19: guidance for Health Protection Teams (HPTs) version 2.2'[viii] on 31st May 2022.

5.2.18 The PHM team established the Laboratories and Diagnostics Cell at the beginning of February 2020. The purpose of the cell, as outlined in the terms of reference,[ix] was 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, Dave 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.

5.2.19 The Laboratories and Diagnostic Cell worked with NHS Scotland Reference labs in Glasgow and Lothian, the Scottish Microbiology and Virology Network, the National

Laboratories Programme (NLP), and NSS Procurement to build up an initial PCR test infrastructure and to explore scale up of testing.

5.2.20 The role of the Laboratories and Diagnostic Cell evolved over the course of the pandemic. From an initial focus on the establishment of PCR testing and dataflow in Scotland, the focus shifted to assessing quality, developing new testing technologies, and building an end-to-end Whole Genome Sequencing (WGS) service for Scotland. Data gathering of results became more complex over time as testing increased and involved capturing results from UK Lighthouse laboratories, Regional Hub laboratories, and private laboratories, as well as capturing DNA sequencing data.

5.2.21 As the Laboratories and Diagnostic Cell developed, additional colleagues from Glasgow and Lothian Specialist Virology Laboratories, Highland Microbiology Reference laboratory, National Laboratories Programme (NLP), NSS Procurement, ARHAI Scotland, Scottish Microbiology and Virology Network (SMVN), NSS National Services Division (NSD), NHS Health Board teams, PHS Public Health teams, and Scottish Government representatives were invited to join the cell.

5.2.22 On 14 February 2020, the cell published 'COVID-19 Laboratory testing frequently asked questions V1.3.'[x] This document was updated and published a further four times during the pandemic.

5.2.23 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 worst-case scenario for COVID-19.

5.2.24 The Laboratory and Diagnostics 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.

5.2.25 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 testing to epidemiological studies and surveillance of spread of disease.

5.2.26 PHS thereafter established the serology stream of its Enhanced Surveillance of COVID-19 in Scotland programme. The programme helped determine the proportion of the population exposed to the virus and monitored the spread of COVID-19 infection through the population in Scotland. Data gathered as part of this enhanced surveillance programme informed scientific modelling and helped the Scottish Government make decisions on public health measures. Residual samples from biochemistry laboratories (submitted from primary care) were tested.

5.2.27 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.

5.2.28 The Scottish Government asked HPS about the potential demand for PCR testing in mid-March 2020. HPS's analysis found that the numbers for anticipated admissions would overwhelm existing planned capacity. An emergency meeting was held to discuss laboratory capacity on 16th March[xi] and a warning provided to Health Boards that there would be a substantial increase for the demand for laboratory testing for healthcare workers.

5.2.29 The Joint Diagnostic Group (JDG) was established by the National Laboratories Programme (NLP), SMVN and HPS on 19th March 2020. The meetings were held twice weekly and chaired by the clinical lead for NLP to deal with the roll out of PCR testing and procurement issues. Roll out of commercial tests to assist in upscale of testing capacity also commenced, in partnership with SMVN, the SMVN Operational Group (SMOG), and Diagnostic Steering Group (DSG). The Laboratories and Diagnostics 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.

5.2.30 Following the receipt of COVID Testing UK expansion plans on 22nd March 2020, Dr Michael Lockhart, co-chair of the Laboratories and Diagnostic Cell, sent the Scottish Government proposals for Scotland to take forward.[xii]

5.2.31 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 (see section 5.3) and there was closer alignment between capacity and demand by 2021.

April 2020 – December 2020: Evolving understanding of the epidemiology of SARS CoV-2

5.2.32 As stated above, in the early stages of the pandemic, it was assumed to be unlikely that people could spread the virus before showing symptoms or if asymptomatic individuals could transmit the virus. However, the WHO stated in their Situation Report on COVID-19 published on June 5, 2020[xiii] that there was evidence suggesting that both pre-symptomatic and asymptomatic individuals could contribute to the spread of the virus. This recognition of the role of pre-symptomatic and asymptomatic transmission further emphasised the importance of preventive measures such as wearing masks, practicing physical distancing, and maintaining good hand hygiene to control the spread of the virus.

5.2.33 As the pandemic progressed, testing policies in Scotland also evolved, facilitating an improved understanding of more mild and asymptomatic transmission.

5.2.34 PHS was invited to the Scottish Government COVID-19 Advisory Group on 6th April[xiv] to discuss analysis and modelling of testing demand. Mary Black, PHS Director of Clinical and Protecting Health, presented a paper setting out the work to match PCR testing supply to demand in order to enable flexible planning. The paper, 'Strategic approach to testing capacity and deployment of PCR COVID-19 virus detection programme in Scotland'[xv] and associated analysis[xvi] set out how PHS was coordinating testing, collaborating with NHS Board specialist virus and diagnostic laboratories, how Scotland was increasing its laboratory capacity and trying to manage demand, and shared modelling scenarios for the short, medium and long term. Dr Black explained 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. The balance between these factors may not have always been aligned during the early stages of building testing capacity.

December 2020 onwards

5.2.35 With the introduction of COVID-19 vaccination in December 2020, research was conducted to assess the effectiveness of the vaccines against infection, severe disease, and death. Scotland, through collaboration with academic partners through the EAVE-II study, documented some of the earliest findings on how vaccines

mitigated severe disease. This work also added to our understanding of how the virus spreads and presented clinically with the introduction of widespread vaccine uptake and boosters. For further detail see section 7.5 on EAVE-II.

5.2.36 PHS was aware of possible reinfections when they were first reported by Hong Kong in August 2020. The ECDC also highlighted the need for further research and a standard approach to classifying reinfections as it can be difficult to distinguish between viral persistence and true reinfection. Following discussions on a four nations basis and agreement of the definition of an episode, 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 thereafter reported on reinfections in its weekly statistical reports.[xvii] In Scotland, a possible reinfection is defined as a positive test 90 days or more after a previous positive test.

5.2.37 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. With the stand down in mass population testing in Scotland and the end of the UK ONS COVID-19 infection survey, it is no longer possible to estimate reinfection rates in the population.

Whole Genome Sequencing

5.2.38 There was very little infrastructure or investment in Whole Genome Sequencing (WGS) in Scotland prior to the pandemic. The HPS/PHS Laboratories and Diagnostics cell aspired 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.

5.2.39 The COVID-19 Genomics UK (COG-UK) Consortium was set up in March 2020[xviii] 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 nation's public health bodies, NHS organisations and academic institutions. PHS was a member of COG-UK and contributed to the development of the UK service and to the publication of findings.[xix]

5.2.40 WGS was found to provide vital intelligence to inform the nature and spread of the virus in UK, and PHS sought funding from the Scottish Government for a Scottish NHS-

based end to end WGS service. WGS proved essential in the detection of new and emerging variants and mutations and supporting the response to future variants of concern.

5.2.41 Following the provision of Scottish Government funding in July 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. Launched on 2 December 2020,[xx] 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 this information 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

5.2.42 The service was used by infection prevention control 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 (VOCs) and Variants under Investigation (VUIs).

5.2.43 The updated Testing Strategy[xxi] published on 17th March 2021 included a commitment to invest £13 million in 2021-22 to build a Whole Genome Sequencing 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 COVID WGS service PHS developed with NHS Boards in 2020. PHS set up an Operational Coordination Group to oversee the Whole Genome Sequencing Upscaling Delivery Programme.[xxii] [xxiii]

5.2.44 A major issue for the WGS service in Scotland was an inability to gain rapid access to isolates of Scottish patients tested through the Glasgow Lighthouse laboratory. The infrastructure and system that was set up by the UK Government to sequence samples tested through the Glasgow Lighthouse Laboratory was not designed to be able to identify Scottish samples. The Glasgow lighthouse laboratory tested samples from English and Scottish patients (mainly English) and at the point they were tested it was not possible to identify whether the sample was from a Scottish or English patient. All

isolates had to be sent to the Sanger Institute in England and it was only at this point that the identity became apparent. This led to delays in understanding whether an isolate contained a mutant or variant of concern and significantly hampered efforts within Scotland to improve testing turnaround time and the effective use of the evolving Scottish service. Despite extensive efforts to change the system no progress was made on this issue, possibly reflecting the predominant use of this laboratory by English patients.

5.2.45 PHS's discussions with the Lighthouse Laboratory and the Sanger Institute identified that new systems and processes would have to be designed, built and implemented to identify and target the sequencing of Scottish samples. PHS had extensive engagement with the Department for Health and Social Care in the UK Government about how to facilitate this, but ultimately no progress was made. One of the key factors that emerged was that due to the contracts that underpinned the PCR testing at the Lighthouse Laboratory 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. This applied to both potential solutions: redirecting Scottish samples to NHS sequencing service for sequencing in Scotland and enabling the targeted sequencing of Scottish samples in the Sanger Institute.

Transmission within healthcare settings

5.2.46 The evidence base for transmission within healthcare settings evolved rapidly during the early stages of the pandemic. One of the first reports of transmission within a healthcare setting was reported in the WHO statement of 23 January 2020 which reports amplification had occurred in one health care facility.[xxiv]

5.2.47 Within Scotland, PHS contributed to studies that investigated the risk of COVID-19 in healthcare staff, including a collaboration with Glasgow University on a study comparing risk of COVID-19 hospitalisation among healthcare workers, their households and other members of the general population.

5.2.48 PHS co-opted and collaborated with Caledonian University colleagues to deliver the Scottish arm of the four Nations SIREN study.[xxv] This found that individuals working in healthcare settings had a higher risk of COVID-19 infection compared to the general population. This highlighted the importance of implementing strict infection control measures and providing appropriate personal protective equipment (PPE) to protect healthcare workers from acquiring the virus in their workplace. The results of these

studies fed into considerations around the priority groups for the vaccination programme made by the JCVI.

5.2.49 The emergence of new variants happened after the introduction of the vaccination programme and therefore the infectiousness and severity of these variants occurred in a population with much higher levels of immunity than the original variants.

Hospital admissions

5.2.50 PHS monitored and published information on COVID-19 hospital admissions using the Rapid and Preliminary Inpatient Data (RAPID) tool.[xxvi] RAPID provides timely monitoring of hospital admissions and from April 2020 the dataset was linked to COVID testing data to identify people admitted to hospital with a positive COVID test within an agreed timeframe. NHS Boards' submissions of RAPID data to PHS were stepped up from weekly to daily, and linkage to testing data was done each day. This enabled monitoring of COVID-19 admissions with a lag of around three days. The rules around how records were linked, and the frequency of submissions and linkage were adjusted as the pandemic and testing regime evolved. These data were also used to identify possible hospital acquired COVID infections. PHS and ARHAI worked closely in this area.

5.2.51 Hospital admissions data provided a crucial indicator both epidemiologically in relation to the severity and spread of the virus and from a planning and secondary care resilience perspective. It can help signal whether population-level changes in public health measures may be warranted, such as a tightening or easing of restrictions. It can also help predict whether future pressures on hospital systems are likely based on recent patterns of infections in the surrounding community.

5.2.52 At the outset of the pandemic, before mass testing, data from hospital admissions was the main source of intelligence on positive cases.[xxvii] The official source of published data on hospital admissions is the Scottish Morbidity Record 01 (SMR01) dataset. Prior to the pandemic data on the reason for admission was not routinely recorded on RAPID. Instead it was recorded as a discharge diagnosis on SMRO1. There was up to a three-month lag in data becoming available through SMR01, which meant that it was not suitable for real-time monitoring of COVID-19 related admissions. RAPID was therefore used to provide a more limited but up to date management information flow which provided broadly comparable figures on numbers of admissions.

Hospital Admissions 'because of' COVID-19

5.2.53 The PHS weekly statistical report published on 1st December 2021[xxviii] included analysis for the first time of the proportion of people in hospital 'because' of their COVID-19 infection. This covered the period of March-August 2021. To calculate this proportion, patient discharge data from the national Scottish Morbidity Records (SMR01 - acute inpatient and day case activity) dataset for six Boards were analysed to ascertain the primary reason for admission. Findings from the report concluded that, at a time when the Delta variant of COVID-19 was responsible for nearly all circulating infections in Scotland, 68% of hospitalised SARS CoV-2 positive patients were in hospital 'because of' their COVID-19 infection.

5.2.54 Using data from SMR01 did not support timely analysis due to the aforementioned two-to-three-month lag in receiving SMR01 discharge summaries from NHS boards. PHS therefore developed a new approach based on clinical auditing of hospital admission records. PHS and NHS Greater Glasgow and Clyde conducted a clinical audit of case notes of people admitted with a recent COVID-19 diagnosis at acute care hospitals during the first two days of January 2022. NHS Grampian carried out a similar review using daily admission data routinely provided by acute care hospitals in the region and data from NHS Grampian was obtained over the course of a six-day period from 30th December 2021.

5.2.55 People admitted to hospital were included if they had a COVID-19 PCR-confirmed diagnosis within 14 days prior to or in the 48 hours following their admission date. Admissions that were either confirmed or probable 'because of' COVID-19 include those who met a clinical definition or who were admitted onto a COVID-19 ward, where available. Hospital-acquired infections, defined as outwith the 48 hours following admission, were excluded from the analysis. The findings were published in PHS's weekly statistical report on 7th January 2022,[xxix] along with a detailed description of methods and definitions. As of 2nd January 2022 in NHS Greater Glasgow and Clyde and 04 January 2022 in NHS Grampian, 60% of SARS CoV-2 positive acute hospital admissions were determined to be 'because of' COVID-19 as opposed to coincidental 'with' COVID-19, and reasonably similar between the two Boards.

5.2.56 The timeliness of the analysis was important as this was when there was a rapid increase in COVID-19 case numbers in Scotland, of which more than 90% were estimated to be the Omicron variant. This work featured prominently in the questions that followed the First Minister's statement to Parliament on 5th January 2020,[xxx] during

which the First Minister repeatedly emphasised the importance of robust and reliable information about hospital admissions.

5.2.57 PHS worked with NHS Boards to continue to develop and refine the method used to monitor and report on hospital admissions and on 5th July 2022 published 'Changes to the severity of COVID-19 and impact on hospitals in Scotland'.[xxxi] This report highlighted the importance of being able to differentiate between patients in hospital who are admitted to hospital 'because of' COVID-19 as opposed to patients who are admitted to hospital coincident 'with' their COVID-19 diagnosis in order to inform Scotland's public health response.

5.2.58 The report discusses changes in PHS's understanding of the severity of COVID-19 and the impact on hospitals in Scotland and how this had implications for the type of robust epidemiological evidence required to inform future COVID-19 policy and decision making in Scotland. This report aimed to inform future approaches to COVID-19 reporting and surveillance.

5.2.59 Two of the reports' main findings were that during the first wave of the pandemic (March-June 2020), in those deaths where there was a positive COVID-19 result, 94% were considered to be caused by the virus. However, from January to April 2022 this has decreased to 43%. As a result, PHS stopped reporting deaths where there was a positive COVID-19 result and National Records Scotland became the source of information of COIVD-19 related deaths in Scotland.

5.2.60 Data from Intensive Care Unit (ICU) admissions shows that the percentage of patients positive for SARS CoV-2 in ICU with a clinical diagnosis of COVID-19 disease declined from over 80% in the early phases of the pandemic to 29% since 01 January 2022. With less than 30% of people who are SARS CoV-2 positive being admitted because of the virus, ICU clinical auditors have concluded that a positive PCR test on its own is insufficiently accurate to identify patients suffering with COVID-19 disease and will over-estimate the number of cases. A clinical diagnosis of COVID-19 disease should be used going forward.

Deaths linked to COVID-19

March to April 2020

5.2.61 Mortality data provided crucial intelligence on the spread and severity of the virus, and together with hospital admission data, was key to the analysis that fed into planning for healthcare capacity and resilience.

5.2.62 From the start of the pandemic to 2nd April 2020 HPS/PHS recorded deaths manually. The initial process used by HPS to report COVID-19 mortality figures relied upon the compilation of data on deaths from the 14 territorial Health Board Health Protection Teams (HPTs). The data reported on deaths where a laboratory had confirmed a positive test for COVID-19 in the patient.

5.2.63 HPS data on cases of COVID-19 deaths could not be passed to the Scottish Government to announce the number of confirmed COVID-19 deaths until family liaison/notification checks were cleared. This was due to the small number of deaths in the early stages.

April 2020 onwards

5.2.64 From 2nd April 2020 the recording of COVID-19 deaths by HPS changed from the previous system of reporting manual returns of deaths with a laboratory positive test for COVID-19 to a new process where a death registered was cross-checked with a COVID-19 laboratory positive test. HPS/PHS thereafter reported statistics on deaths within 28 days of a positive COVID-19 test. This continued until 6th June 2022.

5.2.65 A new process of reporting also commenced at this time, with National Record Scotland (NRS) publishing weekly death statistics where COVID-19 was mentioned on the death certificate.

5.2.66 Angela Leitch, Scott Heald, and Dr Jim McMenamin attended a briefing with the First Minister to explain the changes in reporting of death data and PHS contributed alongside NRS to an FAQ document. The First Minister explained the changes at her daily briefing on 2nd April 2020[xxxii] and a news item was shared on the Scottish Government website.[xxxiii]

5.2.67 The new process led to quicker compilation of statistics as the death could be reported once the death had been registered with NRS as opposed once family liaison had been completed.

5.2.68 A further change was that from 8th April 2020 PHS began to report on all registered deaths where COVID-19 was a probable or suspected cause. NRS published COVID-19 death statistics for Scotland based on death registrations. This included any deaths

where COVID-19 was mentioned on the death certificate. These deaths did not have to have a lab positive result for COVID-19. This meant that the NRS data included deaths where the certifying doctor recorded that COVID-19 was a probable or suspected cause of death, whether it is the underlying cause or a contributory factor. This is in line with the approach of the Office for National Statistics (ONS).

5.2.69 The main differences between the NRS and HPS statistics were that:

- Data provided to the Scottish Government from HPS/PHS are updated daily, whereas figures published by NRS provided a weekly summary.
- HPS/PHS data only included deaths which had a confirmed laboratory positive test, whereas NRS data included suspected or probable cases. This could be based on a clinical diagnosis and did not need to be lab confirmed. This meant there was a larger number than the only lab confirmed deaths reported by PHS.
- HPS/PHS data providing information on deaths by age group and location while the NRS weekly reporting included a detailed breakdown by age, gender and Health Board.

5.2.70 The NRS weekly statistics always included a higher number of deaths as these include cases where COVID-19 was mentioned on the death certificate but was not confirmed with a test, either because no test was done or because the results were unavailable when the doctor completed the death certificate. There was some confusion about different reported numbers of deaths due to COVID-19, which required PHS to respond to enquiries and to clearly define the measures we were using.

5.2.71 PHS shared its data on COVID-19 deaths with UKHSA to contribute to the national evidence base.

5.2.72 The data was published on the daily COVID-19 dashboard (see section 7.8) until May 2022.

5.2.73 PHS updated the approach in January 2022 to include positive Lateral Flow Device (LFD) tests and then in March 2022 to include re-infection periods (90 days or more after their last positive test).

5.2.74 PHS ceased reporting of COVID-19 deaths within 28 days of a first positive test on 6th June 2022, instead signposting to NRS death certificate data as the single data source for COVID-19 deaths data in Scotland.[xxxiv]

Mortality rate

5.2.75 Throughout the pandemic, PHS regularly published data on the number of COVID-19 deaths linked to tests within 28 days, but not mortality rates among those infected. Owing to changes in testing policy coupled with challenges in detecting asymptomatic infection, the estimation of mortality rates among those infected (also known as a case fatality rate) will inevitably be overestimated in the population. In line with this conclusion, PHS conducted studies in collaboration with other organisations to investigate mortality amongst specific groups like those with diabetes, and these findings were published in peer-reviewed journals.

5.2.76 PHS was also aware of estimates of mortality rates in the population overall but not necessarily among those infected, in the early stages of the pandemic from China, where they reported 17 deaths on 23rd January 2020. Other countries with early severe epidemics, including Italy and Spain, also produced reports of the numbers of deaths with probable or confirmed COVID-19 infection.

Enhanced Community Surveillance of COVID-19

5.2.77 PHS established a Community Surveillance programme to identify the proportion of people across Scotland with mild to moderate symptoms of COVID-19 who were unwell at home (following self-care advice) who were positive for COVID-19 infection. This was an adaptation of PHS's existing GP Influenza surveillance scheme.

5.2.78 The enhanced surveillance programme aimed to:

- Inform understanding of the epidemiology and transmission of COVID-19.
- Evaluate and inform national control measures and current and future diagnostic strategies.
- Describe and quantify the clinical features of COVID-19 and to monitor the overall health impact of COVID-19.
- Fulfil duties for mandatory international reporting for Scotland and allow data sharing with equivalent surveillance programmes in Europe.
- Inform national health care planning and support local health and social care response.
- Understand the rate of positivity and linked clinical presentation including differences between age groups, geographical areas and other demographic factors in those presenting with symptoms (including changes over time).

- Support local intelligence, service planning and patient clinical management, thereby helping to maintain services across a wide range of primary care service providers.
- Support identification and triaging of patients in communities who were at higher risk of infection.

5.2.79 The Community Surveillance pilot scheme was launched on 13th April 2020 with the programme becoming fully operational from 27th April 2020. From this date, 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 across Scotland from people who have mild to moderate COVID-19 like symptoms. The aim was to gather 500 samples per week from people who had attended clinical assessment centres, and 500 samples from people who had been triaged by COVID-19 telephone triage hubs. Data was shared on a weekly basis with front line practitioners and an infographic[xxxv] was produced to improve accessibility of the statistical release.

5.2.80 The programme of data collection was initially to run for 12 weeks. However the Scottish Government confirmed on 20th July 2020 that the programme would be extended into October 2020. On 12th October 2020 the government extended it further, to May 2021 with the addition of testing for influenza and Respiratory Syncytial Virus (RSV). This was outlined in a letter to NHS Boards from the CMO on 28th October 2020.[xxxvi]

5.2.81 A total of 13,832 samples were analysed in the first 26 weeks of the community surveillance data collection (13th April 2020 to 11th October 2020). An important finding from the subsequent report[xxxvii] 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. This reinforced the change that had been made to the clinical case definition for adults to include loss of smell or taste on 18th May 2020.

5.3 Scottish Government strategies for managing the pandemic

Framework for Decision Making

5.3.1 On 23rd April 2020 the Scottish Government published the COVID-19 Framework for Decision Making (PHS/83 - INQ000235128)[83] which outlined the principles that would

[83] Scottish Government. Coronavirus (COVID-19): framework for decision making. Accessed March 2023

guide decision making around transitioning out of lockdown and introduced the Four Harms Approach (see section 4.2). The framework set out the three pillars of 'respond, recover and renew'. Alongside continued work on the clinical response to the pandemic, focus was increasingly being given to recovery and renewal, which PHS supported through the Social and Systems Recovery work programme (see section 8.6).

5.3.2 The framework also emphasised the need to 'Protect against this and future pandemics, including through effective testing, contact tracing and isolation'. PHS worked in collaboration with the Directors of Public Health and local health protection teams to develop a national approach that would be delivered locally (see section 8.2). The proposal was considered at a Deep Dive with the First Minister just prior to the publication of the framework and the Scottish Government accepted PHS's recommendation to focus on establishing and growing local contact tracing capacity in NHS Boards, with PHS supporting the work nationally. It was agreed that all local Boards would have contact tracing programmes in place by mid-May 2020. The Scottish Government subsequently published Covid-19 – Test, Trace, Isolate, Support (see following section).

COVID-19: Test, Trace, Isolate, Support

5.3.3 The Scottish Government published COVID-19: Test, Trace, Isolate, Support - A Public Health approach to maintaining low levels of community transmission of COVID-19 in Scotland on 4th May 2020 (PHS/84 - INQ000235141).[84] Please see section 8.2: The initial development of test and protect for a description of PHS's contribution.

5.3.4 As described above in section 4.2, the goal of Test, Trace, Isolate, Support (TTIS) and latterly Test and Protect, was to reduce population wide transmission of the virus. The approach focussed 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.'

[84] 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.

Re-mobilise, Recover, Re-design: Framework for NHS Scotland

5.3.5 The Scottish Government set out the NHS approach to recovery on 31st May 2020 in Re-mobilise, Recover, Re-design: the Framework for NHS Scotland (PHS/85 - INQ000235174).[85] This detailed how health boards would safely and incrementally prioritise the resumption of some paused services, while maintaining COVID-19 capacity and resilience. PHS data and intelligence is cited as a source of information to support the modelling of safe and effective mobilisation.

5.3.6 PHS Chief Executive Angela Leitch was a member of the NHS Scotland Chief Executives Group subgroup leading work around recovery. Chaired by John Burns, NHS Scotland's Chief Operating Officer, the group considered the next steps to support the remobilisation and recovery of health and care services for the period up to March 2021.

5.3.7 PHS was also represented on the subgroup of NHS Chief Executives looking at renewal. Working with Carol Tannahill and Malcolm Summers from the Scottish Government, the group's ambition was to understand the impacts of COVID-19 and develop a 12-18 month programme of work that would set out the programme of reform required for a healthier Scotland in the future.

5.3.8 The Scottish Government announced (PHS/86 - INQ000228598)[86] on 29th June 2020 that a new expert group had been set up to advise on the recovery and renewal of health services. The Mobilisation Recovery Group was led by the Cabinet Secretary for Health and Sport and advised on the next steps for safe and effective service delivery, as informed by the Re-mobilise, Recover, Re-design framework for NHS Scotland plan. This included emergency care, diagnostics, cancer services, scheduled care, mental health, social, primary and community care.

5.3.9 PHS was represented on the group by Chief Executive Angela Leitch, alongside representatives from COSLA, the Royal College of Nursing, the British Medical Association, the Royal College of General Practitioners, the Health and Social Care Alliance Scotland, the Care Inspectorate, and the Scottish Social Services Council. The Group's focus was to generate system wide input into decisions around resuming paused services and supporting continuing services for which activity has

[85] Scottish Government. Re-mobilise, Recover, Re-design: the framework for NHS Scotland. Accessed March 2023

[86] Scottish Government. Next steps for NHS to be discussed. Accessed March 2023

been intense, such as care homes and care at home services for older people throughout the pandemic.

Surveillance and Response

5.3.10 On 15th July 2020 the Scottish Government published Surveillance and Response (PHS/87 - INQ000235127),[87] which 'Sets out how existing planning arrangements, structures and national health protection guidance is 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 Network, production of the weekly statistical work and PHS's work on early warning dashboards.
- PHS's work to develop a Scottish COVID-19 Workbook (PHS/88 - INQ000235180)[88] 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.

5.3.11 The document also referred to the interim update of the Management of Public Health Incidents Guidance (PHS/89 - INQ000147512),[89] 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 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.

[87] Scottish Government. Coronavirus (COVID-19): Surveillance and Response - position statement. Accessed February 2023

[88] Scottish Government. Coronavirus (COVID-19): Scottish workbook 2020. Accessed March 2023

[89] PHS. Management of public health incidents: guidance on the roles and responsibilities of NHS led incident management teams Version 12.1. July 2020.

Scotland's Strategic Framework

5.3.12 The Scottish Government published a five-level framework on 23rd October 2020, which provided a refreshed strategic approach to suppressing COVID-19 outbreaks across Scotland (PHS/90 - INQ000235175).[90] Levels 1, 2 and 3 were broadly equivalent to the levels set by the UK Government in the COVID-19 recovery strategy published on 12th May (PHS/91 - INQ000235188).[91] The Scottish Government's five level system had a level above and a level below the UK levels, offering a level closer to lockdown (level 4) and a level below with fewer restrictions (level 0). The framework included five indicators used to establish the appropriate level for a local authority area, two of which were based on PHS data: the number of new cases per 100,000 people, and the test positivity rate. PHS's Community Surveillance programme described above provided the Scottish Government with the evidence required to fulfil one of the criteria for the country to move from phase 2 to phase 3 in the routemap out of lockdown, namely that the number of infectious cases is showing a sustained decline.

Strategic Framework Update

5.3.13 The Scottish Government published an updated Strategic Framework on 23rd February 2021(PHS/92 - INQ000235185),[92] which included an indicative timeline for incremental changes between February and April 2021. The changes were incremental to ensure any easing of restrictions did not have a significant impact on virus transmission. The Strategic Framework refers to taking decisions informed by:

- Local intelligence and evolving epidemiology.
- The public health advice of Directors of Public Health and the National Incident Management Team chaired by PHS.
- Assessment of that advice and the recommendations of senior advisors and policy officials, considering the wider health, social and economic harms alongside the harm caused directly by the virus.

[90] Scottish Government. Scotland's Strategic Framework. October 2020.

[91] UK Government. Our plan to rebuild: The UK Government's COVID-19 recovery strategy. Accessed February 2023.

[92] Scottish Government. Coronavirus (COVID-19): Strategic Framework update - February 2021. February 2021.

5.3.14 PHS expertise, data and intelligence were therefore key to evidencing the conditions that needed to be met to start lifting restrictions in a safe way, and thereby key to decision-making within government.

Updated Testing Strategy

5.3.15 The Scottish Government published an updated Testing Strategy on the 17th March 2021 (PHS/93 - INQ000235140).[93] The strategy included a commitment to invest £13 million in 2021-22 to build a Whole Genome Sequencing Service for Scotland. The new sequencing service was predicated on the end-to-end COVID-19 whole genome sequencing service for NHS Boards in Scotland developed by PHS in 2020 with funding from the Scottish Government.

Updated Strategic Framework

5.3.16 The First Minister signalled an evolution of the national strategic approach to the pandemic in her COVID-19 update on 25th May 2021 (PHS/94 - INQ000228597).[94] Until then, the driving priority in Scotland had been maximum suppression of the virus. The First Minister said in her statement on 25th May that there were indications that the vaccination programme was breaking the link between rising case numbers and significantly rising cases of serious illness and death. She said that if the link had been broken then the Scottish approach to the pandemic will change from maximum suppression of the virus through restrictions to managing outbreaks with enhanced public health measures and good public health practices on the part of the public. PHS's work with others to build the evidence base around vaccine effectiveness played a significant role in this strategic shift (see section 7.5). For example, findings from the EAVE-II study had recently been published in the Lancet that indicated that four weeks after the first dose, the Pfizer and Oxford-AstraZeneca vaccines reduced the risk of hospitalisation from COVID-19 up to 85% and 95% respectively.

5.3.17 As a result of the evidence of the effectiveness of the vaccine, the revised framework (PHS/95 - INQ000235137)[95] published on 22nd June 2021 set out the change in strategic approach signalled by the First Minister the previous month. This meant that the elimination strategy (see section 4.2) had been replaced with working to

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[93] Scottish Government. COVID-19: testing strategy: update - March 2021. March 2021.

[94] Scottish Government. COVID-19: update: First Minister's statement -25 May 2021. May 2021.

[95] Scottish Government. COVID-19: Scotland's Strategic Framework update - June 2021. June 2021.

'…suppress the virus to a level consistent with alleviating its harms while we recover and rebuild for a better future.'

5.3.18 In addition to the EAVE-II collaboration, PHS had been working at pace to provide enhanced analysis of vaccine effectiveness including:

- New cases disaggregated by vaccine status, sex, and age.
- Hospital admissions and ICU data disaggregated by vaccine status, age, and gene status.
- Vaccination data by age group, ethnicity and sex.

5.3.19 The framework referenced the PHS surveillance work to monitor and manage the spread of the virus and determine outbreak management strategies, and to PHS's work monitoring NHS24 respiratory calls, swab positivity testing in primary care settings, and antibody tests of residual blood samples.

Move Beyond Level Zero

5.3.20 The First Minister confirmed on 3rd August 2021 that Scotland would move beyond level zero on 9th August 2021, with the further easing of a number of restrictions (PHS/96 - INQ000235125)[96]. PHS's work to support national decision-making and local implementation contributed to this important milestone in a number of ways, including:

- Leadership of the National Incident Management Team (NIMT) and continual engagement with local boards' Health Protection Teams and support for local Incident Management Teams.
- Extensive discussions with stakeholders and Scottish Government policy leads around changes to policy on self-isolation, contact tracing and testing for under 18s.
- Advising on the health protection content of the government's updated guidance on reducing risks in schools.

[96] Scottish Government. COVID-19 update: First Minister's statement – 3 August 2021. August 2021.

Updated Testing Strategy

5.3.21 The Scottish Government published its COVID-19 Testing Strategy on 17th August 2021, which included whole population testing of anyone with symptoms, testing in outbreaks and preventing outbreaks in high-risk settings by routine testing (PHS/97 - INQ000235139).[97]

NHS Recovery Plan

5.3.22 The Scottish Government published the NHS Recovery Plan on 25th August 2021 (PHS/98 - INQ000228406).[98] The plan set out the government's ambitions for the recovery of the NHS and a series of actions to be developed and delivered over the next 5 years. The twin aims were to address the backlog in care and meet the ongoing healthcare needs of the population. The Primary and Community Care section of the plan highlighted the need to increase primary care capacity including urgently seeking to fully restore face to face consultations in GP surgeries and other primary care services as a priority.

COVID-19 Recovery Strategy: For a fairer future

5.3.23 The Scottish Government published the COVID-19 Recovery Strategy: For a fairer future on 6th October 2021 (PHS/99 - INQ000235142).[99] The strategy commits to a 'renewed focus on prevention, greater partnership working, workforce development, and a more transparent focus on performance'. The creation of PHS is given as an example of this, highlighting that the organisation is 'built on reducing health inequality and increasing healthy life expectancy through close partnership work with a focus on prevention and locality.'

5.3.24 The section on children and young people makes reference to the PHS COVID-19 Early Years Resilience and Impact Survey (CEYRIS) (PHS/100 - **INQ000235168**[100] in the context of concern about the impact of the pandemic on pre-school children. PHS developed this survey to address a gap in knowledge about the experience and impact of the pandemic on young children (2–7 year-olds) in Scotland. This age range covers crucial developmental stages as well as challenges to accessing key children's

[97] Scottish Government. COVID-19: Scotland's testing strategy - adapting to the pandemic. August 2020.
[98] Scottish Government. NHS Recovery Plan. August 2021.
[99] Scottish Government. COVID-19 Recovery Strategy: for a fairer future. October 2021.
[100] PHS. COVID-19 Early Years Resilience and Impact Survey (CEYRIS). Accessed March 2023.

services during periods of lockdown. Please see also paragraph 6.3.22 on PHS's involvement in the COVID Recovery Strategy, Joint Programme Board.

Refreshed Scottish Pandemic Strategy

5.3.25 The Scottish Government published an updated strategic framework for managing the pandemic on 16th November 2021 (PHS/101 - INQ000235138).[101] This refreshed the framework published in April 2021 and reinforced the government's strategic ambition to suppress the virus through compliance with physical distancing and hygiene measures and re-confirmed the 'Four Harms' approach (see section 4.2).

Strategic Framework Update

5.3.26 The final Strategic Framework update was published by the Scottish Government on 22nd February 2022 (PHS/102 - INQ000235158).[102] PHS fed into the development of the framework, recommending that the focus of the new phase of 'adapting to living with COVID-19' should be two-fold:

- Enabling and supporting individuals and communities to take appropriate action to reduce and manage the risk to population health, wellbeing and essential services.
- Taking further action to strengthen the underpinning public health infrastructure in order to equip Scotland to monitor, manage and rapidly respond to future COVID-19 risks and wider infectious diseases.

5.3.27 The framework update included a commitment to work with PHS, Local Government and other partners to develop a plan for responding to future outbreaks. PHS made a significant contribution to this through work with partners to develop a plan for monitoring and responding to new variants and mutations; a core component of managing COVID-19 effectively and responding to future outbreaks. The Variants and Mutations (VAM) Plan (PHS/103 - INQ000101048)[103] sets out how PHS will collaborate to identify SARS CoV-2 variants and mutations as part of routine, national and international surveillance activities. Published alongside the VAM plan, Scotland's national respiratory surveillance plan (PHS/104 - INQ000147522)[104] describes the essential activities of a modern national respiratory surveillance function in Scotland. It

[101] Scottish Government. COVID-19: Scotland's Strategic Framework update - November 2021. November 2021.
[102] Scottish Government. Living safely with COVID. February 2022.
[103] PHS. Variants and Mutations (VAM) Plan. September 2022.
[104] PHS. Scotland's National Respiratory Surveillance Plan. September 2022.

explains how national and local teams will collaborate to deliver an effective and efficient service.

Test and Protect Transition Plan

5.3.28 The Scottish Government published the Test and Protect Transition Plan (PHS/105 - INQ000189651)[105] on 15th March 2022, which set out the government's plans for the endemic phase of COVID-19. The strategic intent was described as:

'To adapt Test and Protect 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.'

5.3.29 The endemic phase of COVID-19 is described by the Scottish Government 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 (see paragraph 8.3.1). 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 VAM plan and respiratory surveillance plan).

[105] Scottish Government. Coronavirus (COVID-19) Test and Protect - transition plan. March 2022.

6. PHS's contribution to expert advisory groups

6.1 Background

6.1.1 PHS was – and continues to be – a member of or contributor to a number of expert advisory groups at a national and UK level. This involved submitting papers, answering specific questions on effective interventions, providing briefing materials, and providing rapid comment on policy proposals. Minutes and related records of these meetings were kept by the relevant secretariat. The PHS representatives on these groups were key figures in PHS's support for decision-making and Appendix C can be used as a reference point for job titles and roles.

6.2 UK advisory groups

6.2.1 PHS was not invited to take part in UK Government Cabinet meetings relating to the UK response to COVID-19. However, the organisation was – and continues to be – represented on a number of UK advisory groups as set out below.

The Four Nations Chief Medical Officers Group

6.2.2 The PHS clinical directors, initially Dr Mary Black, and thereafter Dr Nick Phin, attended the Four Nations CMO Group as advisors to Scotland's CMO, providing public health expertise alongside counterparts from the other nations. This included contributing expertise to discussions that took place in September 2021 when the UK health ministers wrote (PHS/106 - INQ000235157)[106] to the CMOs of the four nations to request that they consider the recommendation given by the Joint Committee on Vaccination and Immunisation (JCVI) in August 2021 (PHS/107 - INQ000235154).[107]

6.2.3 The JCVI had recommended that children and young people aged 12-15 who were at increased risk of severe COVID-19, including those living with certain medical conditions, should receive two doses of the vaccine. They did not recommend a universal vaccine offer for healthy 12–15-year-olds on grounds that the health benefits only marginally outweighed the risks. The JCVI suggested that the UK Government may wish to take further advice, including on educational impacts, from the CMOs of the four nations.

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[106] UK Government. Letter from UK Health Ministers to UK CMOs on COVID-19 Vaccination of 12 to 15 year olds. September 2021.

[107] UK Government. JCVI statement, August 2021: COVID-19 vaccination of children and young people aged 12 to 17 years. August 2021.

6.2.4 PHS was involved in the subsequent discussions around the potential wider benefits of vaccination beyond health considerations. It was the view of PHS that a universal vaccine offer to all 12-15 year olds could not be justified given the limited evidence of health impact in this group, and the need to prioritise vaccination for the at-risk groups. that the adverse impact on children's education was a consequence of school closure and remote working rather than on children contracting COVID-19. This position was not shared by all within the Four Nations CMO Group and on 13th September 2021 the UK CMOs recommended a universal vaccine offer to all 12-15 year olds.

The New and Emerging Respiratory Virus Threats Advisory Group

6.2.5 The New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) advises the UK Government on the threat posed by new and emerging respiratory viruses. Dr Jim McMenamin has been a member of the NERVTAG in a personal capacity since its inception.

The Scientific Advisory Group for Emergencies

6.2.6 SAGE provides independent scientific advice to support decision-making in the UK Government Cabinet Office Briefing Room (COBR) in the event of a national emergency. The advice provided by SAGE is limited to scientific matters and is a cross-disciplinary consensus view based on the best available evidence at the time.

6.2.7 Dr Jim McMenamin was variably a SAGE member/observer during the COVID-19 response, making largely verbal contributions to reference a specific Scottish dimension relating to items under consideration by the group.

The Scientific Pandemic Influenza Group on Modelling, Operational Sub-group

6.2.8 The Scientific Pandemic Influenza Group on Modelling, Operational sub-group (SPI-M-O) is a sub-group of SAGE that gives expert advice to the UK Government on COVID-19 based on infectious disease modelling and epidemiology. PHS is represented on SPI-M-O by Chris Robertson, Professor of Public Health Epidemiology in the Department of Mathematics and Statistics at the University of Strathclyde. Professor Robertson has an honorary contract with PHS for the provision of statistical expertise.

Joint Committee on Vaccination and Immunisation

6.2.9 The Joint Committee on Vaccination and Immunisation (JCVI) advises UK health departments on immunisation. Dr Claire Cameron, PHS Consultant in Health

Protection, is a designated observer on the main committee and a member of the Pneumococcal Sub-committee. Clare Walker, Senior Nurse, Travel and International Health at PHS, represents the organisation on the Travel Sub-committee.

6.3 Scottish advisory groups

The Scottish Government COVID-19 Advisory Group

6.3.1 The Scottish Government COVID-19 Advisory Group was a time-limited expert group chaired by Professor Andrew Morris, Professor of Medicine at the University of Edinburgh and Director of Health Data Research UK. The group considered the evidence and applied the advice from SAGE and other appropriate sources of evidence and information to inform decisions in Scotland. Initially PHS was represented on the group by Angela Leitch, Chief Executive, PHS and Dr Jim McMenamin, Incident Director PHS. Dr Nick Phin, Director of Public Health Science, PHS represented Angela Leitch, as an observer on 19th November 2021 but was subsequently sent a personal invitation by the secretariat of the Covid-19 Advisory Group to attend meetings from 9th December 2021 and at that point Angela Leitch stepped down from the group. Further information about Dr Nick Phin and Dr Jim McMenamin's involvement in the Scottish Government COVID-19 Advisory Group can be found in their responses to the questionnaires issued by the UK Public Inquiry on this subject (PHS/108 - INQ000147537)[108] (PHS/109 - INQ000147539).[109]

6.3.2 In addition to the regular meetings of the Scottish Government COVID-19 Advisory Group, a number of briefing meetings with Ministers were arranged, referred to as 'Deep Dives'. Professor Morris chaired these meetings and agreed the agendas for them with the secretariat, focused on issues of current interest to the Scottish Government where a better understanding of the science could be helpful to Ministers. These meetings provided the opportunity for the independent members of the group to speak directly to Ministers and for Ministers to question experts – including PHS colleagues – about the science. The usual format was short presentations by group members, based on the briefing papers provided for that meeting by the secretariat and members, followed by discussion and questions from Ministers. On occasion, these meetings were arranged through the Scottish Government Resilience Room (SGoRR) and SGoRR officials received copies of meeting agendas and papers, in addition to

[108] PHS. Jim McMenamin answers to questionnaire by module 2a. February 2023.

[109] PHS. Nick Phin answers to questionnaire by module 2a. February 2023.

those who regularly received Scottish Government COVID-19 Advisory Group meeting papers.

6.3.3 The papers from the group indicate the range of areas in which PHS contributed:

- PHS requested input from the group on contact tracing and testing (4th May 2020) (PHS/110 - INQ000235178).[110]
- A presentation was given on data from the EAVE-II study on changing patterns of the epidemic (7th September 2020) (PHS/111 - INQ000235179)[111] (see section 7.5).
- The evidence papers for the June and July 2020 meetings refer to PHS's work on data and intelligence to support local outbreak management (PHS/112 - INQ000235131)[112] (PHS/113 - INQ000235130).[113]
- On 30th December 2020 the group discussed the new 'Kent' variant and noted that PHS data shows a likely rapid move to near-dominance within Scotland (PHS/114 - INQ000235177).[114]
- PHS data and analytical work was discussed on 14th October 2021: 'Very good flu data is available from PHS – no flu at the moment so coinfection is not currently impacting on hospitalisation or other indicators' and 'The group heard that university return has gone well and PHS would be releasing an analysis soon showing the difference from last year.' (PHS/115 - INQ000235176).[115]

Public Health Threat Assessment Subgroup

6.3.4 The Public Health Threat Assessment subgroup of the COVID-19 Advisory Group was a time-limited expert group chaired by Professor Sir Harry Burns. It provided advice to the Chief Medical Officer and to Scottish Ministers by:

- Determining the likelihood and impact of significant and concurrent clinical risks to public health that may occur during the next 12 months.

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[110] Scottish Government. COVID-19 Advisory Group minutes: 4 May 2020. May 2020. Accessed August 2023.
[111] Scottish Government. COVID-19 Advisory Group minutes: 7 September 2020. September 2020. Accessed August 2023.
[112] Scottish Government. COVID-19 Advisory Group evidence papers: June 2020. June 2020. Accessed August 2023.
[113] Scottish Government. COVID-19 Advisory Group evidence papers: July 2020. July 2020. Accessed August 2023.
[114] Scottish Government. COVID-19 Advisory Group minutes: 30 December 2020. December 2020. Accessed August 2023.
[115] Scottish Government. COVID-19 Advisory Group minutes: 14 October 2021. October 2021. Accessed August 2023.

- Identifying data that will be critical to signalling in advance this emerging risk and also monitoring the response of the health and social care system in addressing these.
- Identifying and describing high value and evidence-based interventions that healthcare systems can begin to plan and make contingency for should these threats arise.

6.3.5 PHS was represented on the group by Dr Claire Cameron and Dr Jim McMenamin. PHS was invited to give formal input on occasions, such as the briefing provided on 4th August 2020 on the methods and challenges related to Point of Care testing.

Advisory Sub-Group on Education and Children's Issues

6.3.6 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.

6.3.7 The papers from the group indicate the range of areas in which PHS contributed:

- PHS led a discussion on 30th 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 (PHS/116 - INQ000235111).[116]
- The group published an advisory note on face coverings in colleges and universities on 1st December 2020, which reflects 'PHS's current advice, namely that face coverings should be worn by adults in all circumstances where they cannot keep two metre distance from other adults and / or young people.' (PHS/117 - INQ000235108).[117]

[116] Scottish Government. COVID-19: Advisory Sub-Group on Education and Children's Issues minutes: 30 June 2020. June 2020. Accessed August 2023.
[117] Scottish Government. COVID-19: Advisory Sub-Group on Education and Children's Issues – advisory note on face coverings in college and university. December 2020. Accessed August 2023.

- The group published an advisory note on 3rd February 2021 on the phased return to in-person learning in schools and early learning and childcare settings (PHS/118 - INQ000189087)[118]. 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 (PHS/119 - INQ000147577).[119]

The Scottish Government COVID-19 Education Recovery Group

6.3.8 The Scottish Government COVID-19 Education Recovery Group (CERG) provided leadership and advice to Ministers and local government leaders in developing the strategic approach to the response and recovery of the Early Learning and Childcare (ELC) and education system (PHS/120 - INQ000235132).[120] CERG was co-chaired by the Cabinet Secretary for Education and Skills and the COSLA Children and Young People spokesperson.

6.3.9 PHS was represented on CERG by Dr Diane Stockton, and Dr Eileen Scott also regularly attended. PHS's role was to provide public health leadership, evidence and advice around the recovery of the education system. A key part of this was to contribute to and monitor the evidence base around children and young people's role in the transmission of COVID-19 and the wider impacts of the pandemic and the related restrictions on children, young people and their families, as well as risk and mitigations for the education workforce. PHS produced two comprehensive management information reports on education each week, which were presented weekly at CERG meetings and sub-groups of CERG, as well as at the NIMT. This surveillance data, together with evidence reports and verbal advice fed into advice notes for the CMO, Scottish Government policy teams and Ministers.

6.3.10 The papers from the 26th August 2021 meeting provide a good illustration of the PHS contribution. PHS colleagues provided an overview of the data, including the high rate of cases recorded in Scotland at the time, with the greatest increase being in the 18 – 21 age group. PHS explained that the proportion of cases in children and young

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[118] Scottish Government. COVID-19: Advisory Sub-Group on Education and Children's Issues – advice on phased return to in-person learning in schools and early learning and childcare (ELC) settings. February 2021. Accessed August 2023.

[119] PHS. Report of record linkage study of COVID-19 among teachers, healthcare workers and other working-age adults. December 2020. Accessed August 2023.

[120] Scottish Government. COVID-19 Education Recovery Group. Accessed August 2023.

people within the overall population had remained broadly the same and confirmed that the highest number of cases in the population were amongst those who were unvaccinated. Following a discussion within the group, the Cabinet Secretary agreed to convene a meeting with PHS and Scottish Government officials to discuss the matters raised and to look at what needed to be done to address the concerns.

COVID-19 Advisory Sub-Group on Universities and Colleges

6.3.11 The COVID-19 Advisory Sub-Group on Universities and Colleges was a sub-group of CERG set up in May 2021. The group supported Scottish Ministers and relevant Scottish Government senior officials to interpret SAGE and COVID-19 Advisory Group outputs as well as other emerging scientific and public health evidence, in relation to university and college issues in the context of Scotland (PHS/121 - INQ000235113).[121] Dr Diane Stockton and Dr Eileen Scott represented PHS on the group.

6.3.12 The PHS representative provided a summary of the latest figures at the outset of each meeting, including vaccine uptake, testing outcomes, incidents in further and higher education, seroprevalence of antibodies, symptom surveillance, and outcomes. PHS also contributed data and evidence to advice notes published by the group such as the advice note for winter preparations for 2021-22 (PHS/122 - INQ000235112).[122]

The Compliance and Adherence Advisory Group

6.3.13 The Scottish Government established the COVID-19 Compliance Advisory group to look at the evidence around public compliance and adherence with NPIs and consider where action could be taken to enhance compliance including through the use of evidence from behavioural science. George Dodds, Director for Contact Tracing, represented PHS on the group, which included Local Authority representatives, Police Scotland, COSLA, Solace, Directors of Public Health and the behavioural science expert Professor Steven Reicher from St Andrews University.

Scottish Government Four Harms Advisory Group

6.3.14 As set out in section 4.2 above, the Scottish Government assessed the Four Harms associated with the pandemic in the course of their decision-making. Dr Jim

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[121] Scottish Government. COVID-19 Advisory Sub-Group on Universities and Colleges: terms of reference and remit. August 2021. Accessed August 2023.

[122] Scottish Government. CERG Advice Note for winter preparations for the 2021/22 academic year. November 2021. Accessed August 2023.

McMenamin represented PHS on the Four Harms Advisory Group, with Dr Nick Phin joining in April 2022. As the Chair of the NIMT, Dr McMenamin's role was to contribute to the epidemiology update provided by the CMO and relay the advice provided by the NIMT, as well as provide input from a PHS perspective.

Scientific Advisory Group on Testing

6.3.15 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.

Mobilisation Recovery Group

6.3.16 The Mobilisation Recovery Group was an advisory group established under Re-mobilise, Recover, Re-design, the Framework for NHS Scotland (PHS/123 - INQ000235174)[123]. The group's aim was to generate key expert, stakeholder and system-wide input into decisions on resuming and supporting service provision, in the context of the pandemic. This included emergency care, diagnostics, cancer services, scheduled care, mental health, social, primary and community care. Angela Leitch represented PHS on the group, members of which included representatives from COSLA, the Royal College of Nursing, the British Medical Association, the Royal College of General Practitioners, the Health and Social Care Alliance Scotland, the Care Inspectorate, and the Scottish Social Services Council. The Group generated system-wide input into decisions around resuming paused services and supporting continuing services for which activity has been intense, such as care homes and care at home services for older people throughout the pandemic.

Scottish COVID-19 Data and Intelligence Network

6.3.17 The Scottish COVID-19 Data and Intelligence Network was set up by the Scottish Government to bring together epidemiological expertise and analytical capability to

[123] Scottish Government. Re-mobilise, Recover, Re-design: the framework for NHS Scotland. May 2020. Accessed August 2023.

provide real-time analysis and to harness the power of data in a trustworthy way to reduce the number of infectious people with COVID-19 in Scotland, avoiding or quickly addressing outbreaks, and enabling Scotland to move through the phases of the roadmap. PHS was represented on the group by the DDI Director (initially Phil Couser, and then Scott Heald). Priority projects included:

- Interactive dashboards at local, regional and national level to support scenario modelling, cluster identification and public information (led by PHS – see section 7.9).
- Minimising the time from test result to shared data of that result.
- Impact of COVID-19 on health and social care inequalities.
- Geospatial and network analysis tools for local resilience partnerships.

The Standing Committee on Pandemic Preparedness

6.3.18 The Scottish Government established an expert group of leading scientists and medical specialists in August 2021 to advise on preparations for the threat of a future pandemic. Dr Nick Phin is a member of the committee in a personal capacity and Dr Jim McMenamin first attended as an observer on 29th April 2022 and was then formally invited to become a member on 10th May 2022.

COVID-19 Nosocomial Review Group

6.3.19 The COVID-19 Nosocomial Review Group was a time-limited expert group chaired by Professor Jacqui Reilly, Nurse Director and Healthcare Associated Infection Executive Lead at NSS. The advisory group considered the scientific and technical concepts and processes that are key to understanding the potential impacts of COVID-19 in hospitals in Scotland. Dr Colin Ramsay and Dr Maria Rossi represented PHS on the group. PHS and provided public health expertise and evidence. For example, the minutes of the Nosocomial Review Group's meeting on 31st July 2020 state: 'The group noted the report from PHS on Healthcare Worker hospitalisation from COVID-19 and the national guidance and advice implemented since these data included in these analyses were done.' (PHS/124 - INQ000235134).[124]

[124] Scottish Government. COVID-19 Nosocomial Review Group minutes: 31 July 2020. August 2020. Accessed August 2023.

COVID Recovery Strategy, Joint Programme Board

6.3.20 The Deputy First Minister and Minister for COVID Recovery, John Swinney, and President of COSLA, Alison Evison, wrote to Angela Leitch on 3rd December 2021 to extend an invitation to join the newly formed COVID Recovery Strategy, Joint Programme Board. The board is a committee of senior representatives tasked with overseeing the delivery of the COVID Recovery Strategy published on 6th October 2021 (see section 5.13) and ensuring progress towards the strategy's three key outcomes:

- Financial security for low-income households.
- Wellbeing of Children and Young People.
- Good, green jobs and fair work.

Care and Wellbeing Portfolio Board

6.3.21 The Scottish Government's Care and Wellbeing Portfolio Board provides oversight and strategic direction to the delivery of health and social care reform in Scotland and the ongoing recovery and mobilisation of health and social care. The aim is to ensure coherence, sustainability and improved outcomes both within health and care, and across government, with the overall goal of improving population health and reducing health inequalities. PHS is represented on the Board by its Chief Executive.

7. Data and intelligence to support decision-making

7.1 Background

7.1.1 PHS had a central role in the provision of surveillance reports and evidence briefings for use by the Scottish Government to assist in informing decision-making. As the primary source for data and intelligence on the pandemic, PHS published daily figures on the number of tests conducted, the number of people tested, the number of confirmed COVID-19 cases, the test positivity rate, and mortality figures. Public reporting took place seven days a week, 365 days a year on both the PHS and Scottish Government websites. Initially, the Scottish Government published figures from 25th January 2020, and then PHS also began reporting through its daily dashboard released from 22nd April 2020 and the first weekly statistical report, which was published on 6th May 2020.

7.1.2 PHS developed a range of COVID-19 outputs during the pandemic that were shared with the Scottish Government and with agencies such as NHS boards, Local Authorities, UKHSA (and Health Protection teams in the other Devolved Administrations), SAGE, SPI-M-O, JCVI and NERVTAG and internationally with agencies such as WHO, the European Centre for Disease Prevention and Control (ECDC), and the Centre for Disease Control (CDC) in the United States of America (PHS/125 - INQ000147554).[125]

7.1.3 These outputs included robust estimates of the number of people who had COVID-19 in Scotland, hospitalisations and deaths and were presented in dashboard form as well as in written reports (see section 6.5.20 in the Corporate Narrative: Shaping the digital infrastructure and developing tools that support the pandemic response). The data was disaggregated where possible in order to facilitate consideration of the impact of COVID-19 on vulnerable and at-risk groups. Data on age and gender were provided as a minimum, together with deprivation and ethnicity data and information relating to underlying health conditions where possible (see also section 9.12 on racialised health inequalities).

7.1.4 As well as PHS's public daily dashboard, open data was released each day. This was used widely, including feeding the UK COVID-19 dashboard. Open data is data that can be freely used, re-used and redistributed by anyone, subject only to the requirement to attribute the source and retain as freely used and shareable. PHS

[125] Public Health Scotland. Table of Response to draft Rule 9 request re Module 2/2A for PHS. 2023.

produces open data for many of its data sets and continues to work across the health and social care sector to make health and care data available via the open data platform (PHS/126 - INQ000235196).[126]

7.1.5 All changes in definitions (e.g., to testing, or to vaccination cohorts) were clearly communicated at the time of the change, and trailed in advance so users knew what to expect. For example, on 9th February 2022, PHS explained forthcoming changes to the daily dashboard following the change in case definition of those who had recorded a first positive Polymerase Chain Reaction (PCR) or Lateral Flow Device (LFD) test (PHS/127 - INQ000235193).[127]

7.1.6 Throughout the pandemic PHS supported decision-making around whether or not schools should be open to pupils, informed by evidence from the programme of enhanced surveillance of COVID-19 in educational settings (PHS/128 - INQ000228387)[128].

7.1.7 PHS supported the Scottish Government's shielding programme both through the evaluation described in section 4.8 and through the use of data to define the people who were required to shield. PHS used nationally held data supplemented with additional data from NHS Boards to define the shielding cohort.

7.2 Management information

7.2.1 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.

7.3 Development of the data

7.3.1 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

[126] PHS. Scottish Health and Social Care Open Data. Accessed March 2023.
[127] PHS. Update on enhancements to COVID-19 reporting. February 2022. Accessed August 2023.
[128] PHS. Enhanced surveillance of COVID-19 in education settings. Accessed January 2023.

clinicians providing more in-depth analysis and setting direction for analysis at different stages of the pandemic.

7.3.2 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 Electronic Communication of Surveillance in Scotland (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 28th 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 the Community Health Index (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.

7.4 Data sources, structures and processes

7.4.1 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 reporting system, Intensive Care Unit (ICU) data provided through the Scottish Intensive Care Society Audit Group (SICSAG) and National Records of Scotland (NRS) death data linked to COVID-19 testing data.

7.4.2 Structures and processes that were most critical for the provision of this data on a routine basis included:

- The Real Time Epidemiology (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 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.
- Data was presented to the NIMT to inform recommendations made to the Scottish Government and CMO about managing the health impact of the pandemic.

7.4.3 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. 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.

7.5 EAVE-II Consortium

7.5.1 Early on in the pandemic PHS was able to work with partners at Edinburgh University, with the support of the Scottish Government, to re-start the Early Estimation of Vaccine and Anti-Viral Effectiveness (EAVE) project, a data reporting system originally created to support the 2009 swine flu pandemic response. In order to inform the national response to COVID-19, PHS worked closely with the University of Edinburgh's Usher Institute, to bring together:

- General practice records for almost all of the population of Scotland.
- NHS Scotland hospital, laboratory test results for SAR-CoV-2, vaccine and National Records for Scotland death data.
- Researchers from the universities of Glasgow, Strathclyde and St Andrews
- Funding from the Medical Research Council and National Institute for Health Research.
- Support from the Scottish Government.

7.5.2 The project was re-named Early Pandemic Evaluation and Enhanced Surveillance of COVID-19 (EAVE-II) and went on to generate vital intelligence. The project garnered international attention when it published one of the first evaluations into the effectiveness of COVID-19 vaccinations. First published on a pre-print server on 22nd February 2021 (PHS/129 - INQ000147534),[129] and then in the Lancet on 23rd April 2021 (PHS/130 - INQ000147546),[130] EAVE-II findings showed that the Oxford-AstraZeneca and Pfizer-BioNTech vaccines reduced the number of people being hospitalised with COVID-19. Randomised controlled trials had already shown the vaccines were safe and effective, but EAVE-II provided the first evidence that it had an effect at a national level. Scotland's size and data infrastructure, plus the speed of the rollout of the UK-wide vaccination programme, meant that the EAVE-II consortium was the first in the world to be able to publish such findings.

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[129] EAVE-II Consortium. Effectiveness of First Dose of COVID-19 Vaccines Against Hospital Admissions in Scotland: National Prospective Cohort Study of 5.4 Million People. February 2021. Accessed August 2023.

[130] Vasileiou E, Simpson C R, Shi T, et al. Interim findings from first-dose mass COVID-19 vaccination roll-out and COVID-19 hospital admissions in Scotland: a national prospective cohort study. The Lancet. 1 May 2021; 397(10285): pp1646-1657.

7.5.3 PHS published a statement (PHS/131 **INQ000235195**)[131] highlighting how welcome and encouraging the results were and Dr Jim McMenamin was featured on the national news. There was extensive coverage in the media and the First Minister highlighted the study in her COVID-19 statement on 22nd February saying 'this is exceptionally encouraging news' (PHS/132 - INQ000228391).[132]

7.5.4 The consortium subsequently addressed further high-profile issues around subsequent waves of COVID-19 infection and the effectiveness of re-vaccination including:

- The waning effectiveness of the vaccine, which supported the delivery of boosters for vulnerable individuals for focused protection and informed discussions around prioritisation for boosters (PHS/133 - INQ000147588).[133]
- Immunocompromised groups, which show that some specific clinically extremely vulnerable groups experience lower vaccine effectiveness, but that this is not the case for all clinically extremely vulnerable groups (PHS/134 - INQ000147535).[134]
- Demographic information about unvaccinated adults in Scotland, which found that those who were unvaccinated were more likely to be male, live in urban areas with high deprivation or have more than three pre-existing medical conditions (PHS/135 - INQ000147525).[135]
- The effectiveness of Scotland's vaccination programme in preventing deaths from the Delta variant (PHS/136 - INQ000147585).[136]

7.6 REACT-SCOT Consortium

7.6.1 PHS also worked with the Usher Institute at the University of Edinburgh along with other academic partners including the University of Glasgow, Glasgow Caledonian

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[131] PHS. Vaccine linked to reduction in risk of COVID-19 admissions to hospitals. February 2021. Accessed August 2023.

[132] Scottish Government. COVID-19 update: First Minister's statement - 22 February. February 2021. Accessed August 2023.

[133] McKeigue PM, McAllister DA, Hutchinson SJ, et al. Efficacy of vaccination against severe COVID-19 in relation to Delta variant and time since second dose: the REACT-SCOT case-control study. Medrxiv. 15 September 2021. Accessed August 2023.

[134] McKeigue PM, McAllister DA, Robertson, C. Efficacy of two doses of COVID-19 vaccine against severe COVID-19 in those with risk conditions and residual risk to the clinically extremely vulnerable: the REACT-SCOT case-control study. Medrxiv. 16 September 2021. Accessed August 2023.

[135] Shahul Hameed S, Hall E, Grange Z, et al. Characterising adults in Scotland who are not vaccinated against COVID-19. The Lancet. 24 September 2022; 400(10357): pp993-995. Accessed August 2023.

[136] Simpson C R, Robertson C, Vasileiou. Temporal trends and forecasting of COVID-19 hospitalisations and deaths in Scotland using a national real-time patient-level data platform: a statistical modelling study. The Lancet Digital Health. August 2021; 3(8):e517-e525. Accessed August 2023.

University, and the University of Strathclyde on the REACT-SCOT case control study (Rapid Epidemiological Analysis of Comorbidities and Treatments as risk factors for COVID-19 in Scotland). This is a population-based case-control study that works to identify risk factors for severe COVID-19 and to lay the basis for risk stratification based on demographic data and health records. It involves examining the health outcomes of people who have had COVID-19 and comparing each person with a set of 10 'controls' selected from the general population. The study reports periodically, with findings published in scientific journals.

7.6.2 In October 2020 the REACT-SCOT consortium published Rapid Epidemiological Analysis of Comorbidities and Treatments as risk factors for COVID-19 in Scotland (REACT-SCOT): A population-based case-control study (PHS/137 - INQ000147574).[137] The study showed that, along with older age and male sex, severe COVID-19 is strongly associated with past medical conditions across all age groups, many beyond the risk conditions designated by public health agencies contributing to this. This meant that the risk to younger individuals without any recent history of hospital admission or use of prescription drugs is very low.

7.6.3 As part of the shielding evaluation described in section 4.8, PHS led a follow-up study through the REACT-SCOT consortium to explore the risk of severe COVID-19 specifically among shielding people (PHS/138 - INQ000147576).[138] This demonstrated that the shielding programme correctly identified people at higher risk of severe COVID-19. The risk of severe COVID-19 varied between the different clinical shielding conditions. The study also looked at the effectiveness of the shielding programme and found that the efficacy of shielding vulnerable individuals was limited by the inability to control transmission in hospital and from other adults in the household.

7.6.4 PHS also used the REACT-SCOT study to examine vaccine efficacy. Vaccine efficacy against severe COVID-19 in relation to delta variant (B.1.617.2) and time since second dose in patients in Scotland (PHS/139 - INQ000147588)[139] was published in February

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[137] McKeigue P M, Weir A, Bishop J, et al. Rapid Epidemiological Analysis of Comorbidities and Treatments as risk factors for COVID-19 in Scotland (REACT-SCOT): A population-based case-control study. PLOS Medicine. 20 October 2020. Accessed August 2023.

[138] McKeigue P M, McAllister D A, Caldwell, et al. Relation of severe COVID-19 in Scotland to transmission-related factors and risk conditions eligible for shielding support: REACT-SCOT case-control study. BMC Medicine. 23 June 2021. Accessed August 2023.

[139] McKeigue P M, McAllister D A, Hutchinson S J, et al. Vaccine efficacy against severe COVID-19 in relation to delta variant (B.1.617.2) and time since second dose in patients in Scotland (REACT-SCOT): a case-control study. The Lancet Respiratory Medicine. 25 February 2022. Accessed August 2023.

2022. This study was conducted following reports that suggested that the efficacy of vaccines against COVID-19 might have fallen since the delta variant replaced the alpha variant as the predominant variant. The study examined whether efficacy against severe COVID-19 has decreased since delta became the predominant variant and whether the efficacy of two doses of vaccine against severe COVID-19 wanes with time since second dose. The findings supported the case for additional protective measures for those at risk of severe disease, including, but not limited to, booster doses, at times when transmission rates are high or expected to rise. The REACT-SCOT consortium therefore provided key evidence of the impact of COVID-19 on vulnerable and at-risk groups.

7.7 Modelling

7.7.1 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 (PHS/140 - INQ000228399).[140] 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.

7.7.2 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 Directors of Public Health, Directors of Planning and academic modellers as well as Scottish Government and PHS.

7.7.3 The Modelling Collaboration worked to:

- Develop and share high level models including short-term modelling undertaken by PHS and longer-term modelling undertaken by the Scottish Government.
- Develop COVID-19 pathway mapping and a demand/capacity model.
- Identify latent non-COVID-19 demand and scenario planning to understand resource capability for recovery.
- Develop a single national and board level SitRep/dashboard with early warning capability.

[140] Scottish Government. COVID-19: protection levels - reviews and evidence. Accessed January 2023.

- Share a resource compendium of local methods and approaches.

7.7.4 Within this collaboration, PHS, through Professor Chris Robertson working with Professor Adam Kleczkowski at Strathclyde University developed a Susceptible-Exposed Infectious-Recovered (SEIR) model for disease incidence, hospitalisations, ICU admissions and deaths fitted to Scottish positivity data in the period May 2020 to November 2020. This gave Health Boards short-term forecasts of hospital admissions. The use of the model was discontinued when vaccination started in December 2020 as it was superseded by Scottish Government models.

7.7.5 Statistical modelling was undertaken to assess the impact of policies such as vaccine effectiveness, vaccine failures, vaccine safety, impact of new variants, forecasting of hospital admission and deaths, through the EAVE-II Collaboration (see section 7.5).

7.8 Dashboards

7.8.1 PHS made data available for partners and the public through a variety of dashboards including:

- A public-facing dashboard launched in April 2020 with data on confirmed cases updated on a daily basis. An enhanced version (PHS/141 - INQ000228400)[141] was launched in October 2020, which included neighbourhood level data and new interactive features. The dashboard has had over 51 million hits since its launch.
- In May 2020 PHS launched a new dashboard on the wider impact of COVID-19 on the healthcare system (PHS/142 - INQ000228401),[142] 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.
- In December 2020 PHS launched a Serology Surveillance Dashboard (PHS/143 - INQ000228402).[143] 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.

[141] PHS. COVID-19 Daily Dashboard. Accessed March 2023.
[142] PHS. Covid-19 Wider Impacts Dashboard. Accessed January 2023.
[143] PHS. Serology Surveillance Dashboard. Accessed January 2023.

- In March 2021 PHS launched an Education Surveillance Dashboard (PHS/144 - INQ000228403)[144] 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.

7.9 Information from other parts of the care system

7.9.1 Access to reliable, timely data was not available to PHS from care homes. PHS undertakes an annual Care Home Census (PHS/145 - INQ000147520)[145] but this data is neither complete nor available in real time. All care homes are invited to participate in the annual Care Home Census, but of the 1,051 care homes for adults open on 31st March 2022, only 70% submitted data for at least part of the Census and 30% of care homes did not submit any data.

7.9.2 Having up to date intelligence on care home residents (who they are, when they moved to a care home, and when they left) would have allowed for linkage of laboratory data to care home residents, and enable quicker understanding of care home outbreaks, and therefore supported an effective response.

7.9.3 The data available around care homes had implications for PHS's analysis of discharge of patients from hospitals into care homes (see section 4.9). It is not currently possible to identify all discharges from hospital to care homes from hospital records alone. Identifying the cohort of patients was therefore not straight-forward and required linking together data from a variety of sources to create as accurate a register of discharges from hospital to care homes as possible. The first section of the report (PHS/146 - INQ000147514)[146] outlines in detail the challenges of accurately identifying the cohort of people affected by means of data held by PHS, and how PHS resolved this to present as accurate a picture as possible.

7.9.4 To support the epidemiology of care home outbreaks throughout the pandemic in real-time, information was gleaned from various sources including selective information

[144] PHS. COVID-19 education surveillance dashboard. Accessed March 2023.
[145] PHS. Care home census for adults in Scotland. Accessed March 2023.
[146] PHS. Discharges from NHS Scotland hospitals to care homes between 1 March and 31 May 2020. October 2020. Accessed August 2023.

from Health Protection Teams' incident management systems (HPZone), (initially) daily response meetings between HPTs and PHS, a daily calendar of invitations for PHS to support incident management team (IMT) meetings held by HPTs, the Test and Protect Case Management System adaptation for outbreak logging and reports collated by the Scottish Government Outbreak Team to support Ministerial awareness of outbreaks. These all assisted in estimating numbers of outbreaks in care homes (and many other settings) for operational use.

8. PHS's support for decision-making relating to non-pharmaceutical interventions

8.1 Background

8.1.1 Prior to mid-March 2020 when national decision making on public heath non-pharmaceutical interventions (NPIs) became a central response of Government, HPS advised local NHS board led IMTs on which NPI to use in each setting. Thereafter the Scottish Government made all decisions relating to the use of NPIs in Scotland. As described above, PHS's role was to contribute evidence, intelligence, and expertise; a role that was undertaken through a variety of means across all NPIs. PHS provided data and intelligence and public health expertise to support Scottish Government decision-making around lockdowns, local restrictions, working from home, reduction of person-to-person contact, social distancing, and repatriation, when requested. ARHAI led on supporting decision-making around the use of face coverings and wider PPE in health and social care settings (see 4.2.12 – 4.2.14 of the PHS Corporate Narrative and paragraph 10.4.2 – 10.4.3 below).

8.1.2 PHS had a specific role around the initial development of Test and Protect, the certification and app systems rolled out by the Scottish Government, and travel in and out of Scotland, all of which are covered below.

8.1.3 PHS's approach to NPIs evolved over the pandemic as the evidence base – and the understanding of the effectiveness of NPIs – evolved. The best available data and evidence was the foundation of discussions in expert advisory groups (see chapter 6) and in the NIMT.

8.1.4 The effectiveness of NPIs was assessed at a UK level through SAGE. PHS has not undertaken any specific work to assess the effectiveness of the first lockdown in controlling the spread of COVID-19 in Scotland. However the data suggests that the first lockdown helped to break chains of transmission and reduce community spread:

'There were over 300 7-day average daily cases of COVID-19 throughout much of April 2020, during the first lockdown. Cases then declined and by early July 2020 there were fewer than 10 7-day average cases, even in the context of increased testing. Cases then rose, reaching over 1,328 7-day average cases on 25 October 2020.'[xxxviii]

8.1.5 As stated at 7.7.1 above, the Scottish Government had the overall remit for modelling the pandemic and its impact in Scotland informed by UK estimations from SPI-M, SAGE and by internal Scottish Government modelling. PHS contributed to SPI-M and Scottish Government modelling output as data emerged to assist this process. Some of

these modelled scenarios allowed consideration either of the impact of timing of introduction of a range of societal measures or the effects of different combination of these measures. The decision on which of these measures in combination and when to apply them was a policy decision for Scottish Government, the other devolved administrations and UK Government. . Based solely on public health Harm 1 consideration HPS/PHS would always advocate early public health intervention to reduce the direct consequences of COVID-19. This advice however had to be taken against what came to be considered under indirect health harm, societal and economic harms later termed Harms 2-4 (see section 4.2.4 above).

8.2 The initial development of Test and Protect

8.2.1 Contact tracing was an existing (pre-pandemic) method of NPI for communicable diseases, but 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 22nd April 2020. This followed a Ministerial Deep Dive the previous week. 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 27th April 2020.

8.2.2 The Scottish Government subsequently published COVID-19: Test, Trace, Isolate, Support - A Public Health approach to maintaining low levels of community transmission of COVID-19 on 4th May 2020 (PHS/147 - INQ000228406).[147] The document outlined plans to test people in the community who have symptoms of COVID-19, to use contact tracing to identify the close contacts of those cases and to support those close contacts to self-isolate so that if they do develop COVID-19 there is less risk that they will pass it on to others. It includes plans for a locally delivered, but nationally supported, service for COVID-19 contact tracing.

8.2.3 The Scottish Government set up a Test, Trace, Isolate, Support (TTIS) Steering Group to provide leadership and oversight for the implementation of the strategy, on which PHS was represented by Angela Leitch. Chaired by Elinor Mitchell, Interim Director General Health and Social Care in Scottish Government, the purpose of the group was to:

[147] 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.

- Maintain oversight of the design and delivery of the TTIS 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 TTIS 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 TTIS and in turn, seek endorsement from colleagues for related initiatives and developments.

8.2.4 PHS convened a meeting on 5th May 2020 with NHS Board Chief Executives, DsPH, and Directors of Planning in order 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 delivery of the programme and reported to Scottish Ministers on related outcomes, benefits and risks.

8.2.5 In the initial stage of the contact tracing programme, 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.
- 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.

8.2.6 It was acknowledged that this approach would need to be kept under review due to the number of assumptions being made around the prevalence and predictability of the virus.

8.2.7 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 28th 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.

8.2.8 PHS chaired a network of clinical and policy colleagues (referred to as 'CoTIN') to provide the best available information about the spread of the virus and to lead discussions and agree system wide operational requirements in response. This national leadership from PHS was intended to influence a degree of consistency across Scotland and to secure best value from collective resources available. Initially, PHS set the agendas; this progressed to a rotating Chair between PHS and Local Boards to strengthen collaborative leadership.

8.2.9 Scottish Government policy leads attended and contributed to CoTIN, to allow awareness of the system-wide views on proposed approaches and take account of that in developing policy advice to Ministers. 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. 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.

8.2.10 As the pandemic progressed, the TTIS Steering Group – then known as the Test and Protect Steering Group – established the Executive Delivery Group to lead on operational decision-making on contact tracing matters. 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 National Contact Tracing Centre (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.
- 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.

8.2.11 PHS published contact tracing data as part of the weekly COVID-19 statistical report (PHS/148 - INQ000228407)[148] from 10th June 2020. This data was used to assess the effectiveness of the TTIS strategy.

8.3 PHS's role in app systems rolled out by the Scottish Government

Protect Scotland

8.3.1 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.

Check In Scotland

8.3.2 The Check In Scotland app was launched in April 2021 to support businesses in collecting contact details for contact tracing purposes. The Scottish Government led the development of Check In Scotland, with NSS developing the digital infrastructure. The app linked to the Case Management System 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.

8.4 Travel in and out of Scotland

8.4.1 Border control and restricted entry guidance were mainly set by the UK Government during the pandemic, as a reserved matter. A UK-wide approach to International Travel Regulations was taken at the outset of the pandemic, although this diverged as Scotland made different decisions in relation to the countries to which entry restrictions would apply. PHS and the Scottish Government worked closely in liaison with the UK Home Office and UKHSA with regards to International Travel Regulations. This also involved working closely on aspects such as flight contact tracing, border health monitoring, Passenger Location Forms (PLF) and guidance to travellers (including quarantine and self-isolation).

[148] PHS. All releases of COVID-19 statistical report. Accessed March 2023.

8.4.2 On 7th 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 8th 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.

8.4.3 PHS was concerned that if non-respondents' personal details were passed to Police Scotland for enforcement purposes, this could detrimentally impact on the public's trust in PHS. Clarity on this point was important to PHS as the organisation does not have a statutory enforcement role but rather a role in data collection, contact tracing, provision of public health advice and when indicated individual risk assessment to inform wider protection of the public.

8.4.4 The Scottish Government provided clarity in a letter of instruction to Angela Leitch received on 20th July 2020 (PHS/149 - INQ000147533).[149] The letter sets out the First Minister's request that public health officials contact a sample group of those self-isolating for the purposes of information rather than enforcement. The letter explains that the Scottish Government was concerned people were providing false or misleading passenger information on the PLFs and that this could pose a COVID-19 public health risk. The instruction made to PHS was therefore to amend its passenger contact tracing activity as follows:

- Contact, by email, all travellers who are subject to self-isolation to inform them of their duty to self-isolate and to offer advice, information and guidance as appropriate.
- Contact a sample of around 20% or 450 passengers per week by telephone to offer advice, information and guidance. Call handlers should try to contact the passenger within three working days of arrival and up to three times.
- Passengers who fail to respond to attempts to contact them by telephone should be emailed and asked to call back within 48 hours. A voicemail should also be left if available asking the passenger to make contact.
- If those attempts at contact do not receive a response and Public Health Scotland has a reasonable suspicion that an offence has been committed under regulation 5(1) or (2) of the Health Protection (Coronavirus) (International Travel) (Scotland)

[149] Scottish Government. Letter of Instruction to PHS 200720. July 2020.

Regulations 2020, PHS should pass the relevant personal contact details on to Police Scotland.

8.4.5 Angela Leitch responded to the letter on 21st July 2020 (PHS/150 - INQ000147579)[150] confirming that PHS had systems and processes in place for a few of the measures outlined in the Scottish Government's letter and explained the requirement for a number of legal and data protection measures to be put in place with the Home Office to allow the sharing of data, including carrying out a Data Protection Impact Assessment. The Chief Executive agreed to undertake the proposed collaboration with Police Scotland set out in the letter of instruction, being clear 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.

8.4.6 Country exemptions to quarantine requirements were introduced in July 2020. This required an amendment to the list of countries exempt from the quarantine requirements set out in the Health Protection (Coronavirus) (International Travel) (Scotland) Regulations 2020 (PHS/151 - INQ000228410).[151] Until their cessation in March 2022, these regulations would be updated over seventy times, reflecting changes in countries, sectoral exemptions, sports exemptions, testing requirements, and isolation and hotel quarantine requirements. This required regular adjustments to messages and call scripts aimed at travellers to ensure they were aware of any new requirements. This was particularly important at the point of regulation change where travellers arriving before 4am on the day regulations were updated were subject to old regulations whilst those arriving from 4am onwards were subject to new regulations.

8.4.7 The country exemptions led to an increase in the number of flights operating and the Scottish Government requested an increase in the number of return travellers

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[150] PHS. Response re the Health Protection (Coronavirus) (International Travel) (Scotland) Regulations 2020 21.07.20. July 2020.

[151] The Health Protection (Coronavirus) (International Travel) (Scotland) Regulations 2020 (SSI 2020/169) [cited August 2023]

contacted by PHS. The original request for PHS to make contact with around 20% of returning travellers, up to a maximum of 450 per week was therefore increased to 2,000 per week.

8.4.8 Scott Heald, Interim Contact Tracing Director and Head of Profession for Statistics, met with the Cabinet Secretary for Justice on 31st August 2020 to discuss the new arrangements and the challenges around border health generally. It was agreed that PHS would start to publish data on the number of positive cases connected to international travel in the weekly COVID-19 statistical report.

8.5 Border with England

8.5.1 The border between Scotland and England was relevant in the implementation of measures where there was a lack of uniformity of approach, public messaging and in some cases timings of regulatory changes between the two countries. When this occurred, it had the potential to lead to confusion and at times, unintended consequences for public health in Scotland.

8.5.2 For example, in Autumn 2020 PHS data indicated an issue with a high number of cases of COVID-19 amongst residents of Scotland who had recently travelled between Scotland and Blackpool. The First Minister made a statement on 14th October 2020 urging Scots to avoid non-essential travel to Blackpool. (PHS/152 - INQ000228411)[152] The statement referred to the Incident Management Team PHS set up to look specifically at cases associated with Blackpool. PHS released a statement on the issue, highlighting the policy in place that people in Scotland should not be travelling to or from their health board areas under local restrictions except for essential reasons (PHS/153 - INQ000228412).[153]

8.5.3 A further example of unintended consequences relating to different approaches north and south of the border was when England and Scotland placed differing requirements for quarantine on returning travellers. Scotland's requirements were more stringent, which could be avoided by travellers from red list countries flying into England and then travelling by other means to Scotland, rather than entering the country through a Scottish airport.

[152] Coronavirus (Covid-19) update: First Minister's speech 14 October 2020. October 2020. Accessed August 2023.
[153] PHS. Avoid non-essential travel to Blackpool and other high-risk areas. October 2020.

8.5.4 A final example relates to sectoral exemptions for seafarers and repatriation. The Scottish Government had a stricter sectoral regulatory exemption for seafarers than the UK Government. This was used by some employers to repatriate seafarers home without a requirement to isolate. While certain exemptions were in place, the Scottish Government was clear that seafarers who were returning at the end of their contract were exempt from quarantine hotel restrictions, but those returning on leave were not. This distinction was not made in in England, meaning that the checks applied at English sea and airports where seafarers were returning before travelling to Scotland were less stringent, compared to those applied at Scottish sea and airports.

9. Consideration of health inequalities

9.1 Strategic context

9.1.1 NHS Health Scotland (NHSHS), one of PHS's legacy bodies, was Scotland's national health improvement agency. Its work focused on what could be done to improve population health in Scotland and reduce the unfair and avoidable health inequalities that persist in Scotland. It did this by seeking to influence policy and practice, informed by evidence, and promote action across public services to deliver greater equality and improved health for all in Scotland.

9.1.2 A review of NHSHS's contribution to public health in Scotland was published in September 2019 (PHS/154 - INQ000101027).[154] 'Building our Future: NHS Health Scotland's Contribution to Public Health' discusses the organisation's change in strategic direction in 2012 to focus on actions to tackle the structural and social determinants of health. It describes the growing body of evidence about what was needed to reduce health inequalities. This includes the sociology research carried out by Columbia University that introduced the idea that some social conditions may be 'fundamental causes' of disease' (PHS/155 - INQ000228414)[155] and the WHO Commission on Social Determinants of Health, which was clear that 'the unequal distribution of power, income, goods, and services' (PHS/156 - INQ000228415)[156] was the root cause of health inequalities.

9.1.3 NHSHS undertook work in 2013 to assess whether the strategy set out in 'Equally Well: the Report of the Ministerial Task Force on Health Inequalities' (PHS/157 - INQ000228387)[157] and associated policies was effective and whether anything else might be needed. The work culminated in the publication of the 'Health Inequalities Policy Review for the Ministerial Taskforce on Health Inequalities' (PHS/158 - INQ000101030).[158] This set out the current understanding of how health inequalities

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[154] NHS Health Scotland. Building our Future: NHS Health Scotland's Contribution to Public Health. September 2019.

[155] Link B G, Phelan J. Social conditions as fundamental causes of disease. J Health Soc Behav. 1995; Spec No: 80-94.

[156] World Health Organization. Commission on Social Determinants of Health. Closing the gap in a generation Health equity through action on the social determinants of health. July 2008.

[157] Scottish Government. Equally Well: Report of the Ministerial Task Force on Health Inequalities. June 2008.

[158] NHS Health Scotland. Health Inequalities Policy Review for the Ministerial Taskforce on Health Inequalities. June 2013.

arise, including building on and testing the fundamental causes theory and putting it into a new conceptual framework, known as the 'Theory of Causation'. NHSHS was clear in the Policy Review that action was required on the social determinants of health in order to reduce health inequalities. This has underpinned national strategies in Scotland since this time and has been reinforced subsequently in subsequent reviews including both the 2015 (PHS/159 - INQ000228397)[159] and 2022 (PHS/160 - INQ000228399)[160] Scottish Parliament inquiries into health inequalities and more recently the Health Foundation's review of health inequalities in Scotland (PHS/161 - INQ000228398).[161] PHS's approach is similarly focussed on the social determinants of health and taking action to prevent the causes of ill health (see chapter 7 of the PHS Corporative Narrative) (PHS/162 - INQ000203075).[162]

9.2 Pre-pandemic health inequalities and mortality trends

9.2.1 Scotland went into the pandemic with the worst health inequalities in western and central Europe and the lowest life expectancy in western Europe (PHS/163 - INQ000233598).[163] Life expectancy in Scotland had been increasing since the 1950s but then stalled in 2012 and by 2020 was decreasing in Scotland's poorest areas.

9.2.2 PHS leads the Scottish Public Health Observatory (ScotPHO) collaboration, which includes the Glasgow Centre for Population Health, National Records of Scotland, the Scottish Learning Disabilities Observatory, and the MRC/CSO Social and Public Health Sciences Unit at the University of Glasgow (jointly funded by the Medical Research Council and Scottish Government Chief Scientist Office). ScotPHO aims to provide a clear picture of the health of the Scottish population and the factors that affect it, including understanding the factors that contribute to adverse mortality trends. The best available evidence suggests that such trends are due to austerity and that pressure on health and social care services are also contributing.

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[159] Scottish Parliament. Report on Health Inequalities. January 2015.

[160] Scottish Parliament. Tackling health inequalities in Scotland. September 2022.

[161] The Health Foundation. Leave no one behind. The state of health and health inequalities in Scotland. January 2023.

[162] PHS. A Scotland where everybody thrives: Public Health Scotland's strategic plan 2022 to 2025. Accessed August 2023.

[163] McCartney G, Walsh D, Whyte B, et al. Has Scotland always been the 'sick man' of Europe? An observational study from 1855 to 2006. European Journal of Public Health. December 2012; 22(6): pp 756–760.

9.2.3 PHS worked with the Glasgow Centre for Population Health (GCPH) to produce an update of the work NHS Health Scotland previously undertook in 2016 with GCPH, the University of the West of Scotland and University College London, which resulted in the report 'History, politics and vulnerability: explaining excess mortality in Scotland and Glasgow' (PHS/164 - INQ000228396).[164] The 2016 report reviewed the evidence for the likely causes of the high levels of excess mortality seen in Scotland and Glasgow compared with elsewhere in the UK. The research produced 26 specific policy recommendations aimed primarily at Scottish Government and local government.

9.2.4 The 2020 report 'Policy recommendations for population health: progress and challenges' (PHS/165 - INQ000228409)[165] looked at progress against the original policy recommendations and found a mixed picture with several positive developments in relation to national and local policy, but also a number of areas where there has been little progress.

9.3 Four Harms Approach

9.3.1 As described in section 4.2 above, the Scottish Government's approach to decision-making was to balance the Four Harms associated with COVID-19. PHS's Clinical Response and Guidance programme focussed on the direct health harms associated with the pandemic according to Scottish Government policy and regulations, while the organisation's Social and Systems Recovery (SSR) programme assessed and advised on the wider (non-viral, non-healthcare related) population health consequences of COVID-19.

9.3.2 PHS set up a steering group for the Social and Systems Recovery programme, which included representatives from health boards, academia, COSLA and the third sector. The aim was to work with national and local policy makers to identify immediate, medium and long-term mitigation priorities and feasible mitigation actions in relation to wider population health impacts. PHS worked in collaboration throughout the pandemic to consider evidence about the implications of the Scottish Government's strategic approach to managing COVID-19. Discussions took place around the NPIs and their impact on inequalities and there was substantial debate about the scale of the

[164] Walsh D, McCartney G, Collins C, et al. History, politics and vulnerability: explaining excess mortality. Glasgow Centre for Population Health. May 2016.
[165] Walsh D, Lowther M, McCartney G, et al. Policy recommendations for population health: progress and challenges. Glasgow Centre for Population Health. July 2020.

health harms resulting from lost employment, disruption to education, and social isolation, and how this compared to the benefits from lower COVID-19 transmission.

9.3.3 The SSR programme was led from within PHS by colleagues with expertise in health improvement and the reduction of health inequalities who had joined PHS from NHSHS. As set out in paragraphs 4.1.9 – 4.1.12 of the PHS Corporative Narrative, NHSHS had worked for 17 years to improve health through work on the social determinants of health, including supporting Scottish Government decision-making with regards actions effective in reducing inequalities.

9.4 Health Impact Assessment

9.4.1 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 (PHS/166 - INQ000228407)[166] and then as a peer-reviewed publication on 27th April 2020. (PHS/167 - INQ000147553)[167] The pre-print was considered at the 2nd April meeting of the Scottish Government COVID-19 Advisory Group (PHS/168 - INQ000228395)[168] and the impact assessment was referenced in the paper outlining supporting evidence for the Framework for Decision-making, published in May 2020 (PHS/169 - INQ000235128):[169]

'PHS and collaborators have published a paper on the risks of distancing measures negatively impacting on people's health, and how to mitigate these wider harms. It finds 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.'

9.4.2 The analysis was further explored through the Scottish Health and Inequalities Impact Assessment Network (SHIIAN) and published as 'The Health Impacts of Physical

[166] Douglas M, Katikireddi S V, Taulbut M, et al. Mitigating the wider health effects of COVID-19 pandemic. [Pre-publication manuscript]. March 2020.
[167] Douglas M, Katikireddi S V, Taulbut M. et al. Mitigating the wider health effects of COVID-19 pandemic. 27 April 2020. BMJ: 369:m1557.
[168] Scottish Government. COVID-19 Advisory Group evidence papers: April 2020.
[169] Scottish Government. COVID-19: Framework for decision making - supporting evidence. May 2020.

Distancing Measures in Scotland: rapid health impact assessment' on 26th May 2020 (PHS/170 - INQ000147586).[170]

9.5 Supporting the early consideration of inequalities by the Scottish Government COVID-19 Advisory Group

9.5.1 PHS undertook analysis early in the pandemic to calibrate the impacts of COVID-19 with the impacts of its control measures in order to inform decision-making on NPIs. The paper (PHS/171 - INQ000101030),[171] authored by Dr Gerry McCartney, inequalities expert and Consultant in Public Health at PHS, was considered at the 9th April 2020 meeting of the Scottish Government COVID-19 Advisory Group. The three key findings of the analysis outlined in the paper were:

- While COVID-19 represented a substantial mortality challenge, when considered in terms of age-standardised mortality and impact on life expectancy, the impact is comparable to other mortality risks Scotland faces, most of which are risks that impact on the population every year. We need to ensure that we are consistent in responding to mortality risks of similar magnitude and that we calibrate our response to the size of the risk.
- There are numerous unintended consequences of COVID-19 which have very substantial impacts on the economy, education, social relations, and through these pathways, on population health and inequalities in the short, medium and long-term. Ensuring the unintended negative impacts of NPIs are sufficiently mitigated is vital.
- There are difficult decisions to be made on when and how to reduce the NPIs. These will need to balance the potential impacts on COVID-19 mortality and morbidity, pressures on health and social care services, and the unintended consequences across society (including on population health and health inequalities). Further work can and should be done to estimate the intended impacts of NPIs on COVID-19 and the unintended impacts on health and other outcomes urgently to inform this decision-making. There is a risk that, on many measures, the impact of the NPIs for COVID-19 could be more deleterious than the impact of a less mitigated approach to COVID-19. This balance requires careful ongoing monitoring and consideration.

[170] The Scottish Health and Inequalities Impact Assessment Network. The Health Impacts of Physical Distancing Measures in Scotland: rapid health impact assessment. May 2020.
[171] McCartney, G. Informing actions to reduce the unintended consequences of the Non-Pharmacological Interventions (NPIs). April 2020.

9.5.2 The Scottish Government COVID-19 Advisory Group noted that 'government is considering points raised in the paper and expressed that the paper should feed into broader thinking' and that 'while long-term issues are clearly incredibly important, there are urgent issues also to address. In the last week of full reporting there were almost 800 care home outbreaks in England. It is important that we address the issues of today as well as tomorrow' (PHS/172 - INQ000228413).[172]

9.5.3 This work was further developed and published first as a pre-print (PHS/173 - INQ000228392)[173] on 7th May 2020 and then as a peer-reviewed article in November 2020 as 'Scaling COVID-19 against inequalities: should the policy response consistently match the mortality challenge?' (PHS/174 - INQ000147580).[174] The mortality impact of COVID-19 had thus far been described in terms of crude death counts. The paper calibrated the scale of the modelled mortality impact of COVID-19 using age-standardised mortality rates and life expectancy contribution against other, socially determined, causes of death to inform governments and the public and concluded that:

'Fully mitigating COVID-19 is estimated to prevent a loss of 5.63 years of life expectancy for the UK. Over 10 years there is a greater negative life expectancy contribution from inequality than around six unmitigated COVID-19 pandemics. To achieve long- term population health improvements it is therefore important to take this opportunity to introduce post-pandemic economic policies to 'build back better'.'

9.6 Joint work with the Directors of Public Health (DsPH)

9.6.1 Following on from the Scottish Government COVID-19 Advisory Group's paper from PHS on 9th April (see paragraph 9.5.2), PHS proposed (PHS/175 - INQ000228410)[175] in May 2020 working in partnership with stakeholders to develop 'an options appraisal method (and ultimately the evidence, modelling and quantification that it would involve)

[172] Scottish Government COVID-19 Advisory Group minutes: 9 April 2020. April 2020.
[173] McCartney G, Leyland A, Walsh D, et al. Scaling COVID-19 against inequalities: should the policy response consistently match the mortality challenge? Medrxiv. 7 May 2020. Accessed August 2023.
[174] McCartney G, Leyland A, Walsh D, et al. Scaling COVID-19 against inequalities: should the policy response consistently match the mortality challenge? Journal of Epidemiology and Community Health. 2020 Nov 3; 75(4): pp315-320. Accessed August 2020.
[175] McCartney, G. Towards an options appraisal for managing the next phase of the pandemic: a proposal for discussion and amendment. May 2020.

to inform decision-making on the appropriate strategy for controlling the COVID-19 pandemic in the weeks and months to come.'

9.6.2 The proposal was discussed at the joint PHS/DsPH/CMO meeting on 26th June where the focus was on the challenges ahead for managing the pandemic and getting safely out of lockdown. It was agreed that a joint piece of work would be taken forward between PHS and the DsPH to identify the strategic options, the balance of risks of each, and the underlying assumptions. The intention was to inform the Public Health Threat Assessment Subgroup (see 6.3.4 – 6.3.5), the CMO, and other decision-makers and expert advisory groups. A proposals paper (PHS/176 - INQ000147542)[176] was shared with PHS's Scottish Government and COSLA sponsors on 25th August 2020 and with the PHS/DsPH/CMO meeting the following day. Advice from the Scottish Government was that publication was not necessary as it was already under consideration by the key decision-makers.

9.6.3 A proposal (PHS/177 - INQ000147542)[177] was taken to a subgroup of the NIMT to further explore and test the assumptions and uncertainties identified in the paper and quantify the risks and benefits for each of the different strategic options. The intention was to achieve a clearer understanding of the trade-offs in terms of direct COVID-19 health impacts, health service impacts, wider social impacts and economic impacts (the Scottish Government's 'four harms'). This work was not progressed under the auspices of the NIMT but work continued within PHS as described elsewhere in this chapter.

9.7 Providing analysis on request to support decision-making

9.7.1 Scottish Government economists requested an urgent briefing in May 2020 outlining the evidence PHS had around the impact of the economy on health. The resultant paper 'The impact of the economy on population health: briefing for the Office of the Chief Economist' (PHS/178 - INQ000147524)[178] set out the evidence that the lockdown measures in place at the time were causing a severe economic recession. The paper

[176] Baird E, Ramsay C, Mackie P, et al. Minimising health harms during the COVID-19 pandemic: highlighting future strategic options, and underlying assumptions, to facilitate assessment of trade-offs for decision-making. July 2020.
[177] McCartney G. Proposal to explore the assumptions and trade-offs of high level strategic options for managing the pandemic. September 2020.
[178] PHS. The impact of the economy on population health: briefing for the Office of the Chief Economist. May 2020.

explained that this was likely to lead to significant impacts on health as economic factors are the biggest determinants of population health.

9.7.2 In June 2020, PHS published a paper produced at the request of the Scottish Government's Mental Health Research Advisory Group which provided a rapid review of the impact of COVID-19 on mental health (PHS/179 - INQ000147575).[179] The limited evidence available at the time indicated that a number of key groups could be at higher risk of adverse mental health outcomes, including frontline staff working with COVID-19 patients, women, those with a low educational level and individuals with underlying mental health conditions. PHS recommended that measures to mitigate this potential impact should be considered as a matter of urgency.

9.8 Excess mortality

9.8.1 Also in June 2020, PHS published information (PHS/180 - INQ000147513)[180] on excess mortality (the number of deaths over and above what would be expected under 'normal' conditions) relating to the pandemic. This showed that about a quarter of the excess deaths between the beginning of the pandemic and the week beginning 1st June 2020 were not directly due to COVID-19.

9.8.2 Accompanying analysis (PHS/181 - INQ000228391)[181] of COVID-19 and non-COVID-19 mortality rates by Scottish Index of Multiple Deprivation (SIMD) compared age-sex standardised all-cause, COVID-19 and non-COVID-19 mortality rates by Scottish Index of Multiple Deprivation (SIMD) for weeks 1 to 23 of 2020 (30 December 2019 to 7 June 2020) against a pooled average for the same period in the previous five years (2015-19). The analysis found that:

- from the beginning of the pandemic to 7 June 2020, larger relative inequalities were observed for COVID-19 deaths than for non-COVID-19 deaths
- an excess of both COVID-19 and non-COVID-19 deaths contributed to increased absolute inequality in weekly all-cause mortality in Scotland between April and May 2020.

9.8.3 The analysis in conclusion proposed the following policy actions:

[179] PHS. Rapid review of the impact of COVID-19 on mental health. June 2020.
[180] PHS. COVID-19 statistical report. June 2020.
[181] PHS. COVID-19 weekly excess deaths – Health inequalities briefing. June 2020.

- Messages from government and the NHS should continue to make clear that the NHS remains open and should be used to meet health care needs.
- Health boards should ensure that health care services remain in place and accessible for all those who may need them in the face of additional demands on services.
- Social mitigation efforts to reduce the unintended consequences of the social distancing measures should continue and be intensified. In particular, actions to reduce income insecurity should be prioritised as a means of addressing the fundamental causes of health inequality.

9.9 Scottish Burden of Disease study

9.9.1 ScotPHO leads Scottish work on the Burden of Disease, an internationally recognised framework for assessing the comparative importance of diseases, injuries and risk factors in causing premature death, loss of health and disability in different populations. Disease burden is described in terms of disability-adjusted life years (DALYs) which represent the number of years of live lost (YLL) to premature mortality and ill health, compared to aspirational health. The study aims to support local planning and national decision-making by providing analysis of health and social care need at a national and local level.

9.9.2 In September 2021 ScotPHO released the results of a study on inequalities in population health loss by multiple deprivation (PHS/182 - INQ000147545).[182] The aim was twofold: to estimate inequalities in the population health impact of COVID-19 in Scotland in 2020, measured by DALYs, and to scale COVID-19 DALYs – and inequalities therein – against the level of pre-pandemic inequalities in all-cause DALYs. The conclusion was that the substantial population health impact of COVID-19 in Scotland was not shared equally across areas experiencing different levels of deprivation. Overall ill-health and mortality due to COVID-19 was, at most, a fifth of the annual population health loss due to inequalities in multiple deprivation. The implication for decision-making was that implementing effective policy interventions to reduce health inequalities should be at the forefront of plans to recover and improve population health.

[182] Wyper G M A, Fletcher E, Grant I, et al. Inequalities in population health loss by multiple deprivation: COVID-19 and pre-pandemic all-cause disability-adjusted life years (DALYs) in Scotland. 26 September 2021. Int J Equity Health 20: 214 (2021). Accessed August 2023.

9.10 Supporting Scottish Parliament scrutiny

9.10.1 PHS published 'What explains the spatial variation in COVID-19 mortality across Scotland?' on 30th September 2020 (PHS/183 - INQ000147584).[183] The origin of the work was an exchange in the Scottish Parliament between the Cabinet Secretary for Health and Sport and Neil Bibby MSP on 7th May 2020 (PHS/184 - INQ000235160).[184] Mr Bibby asked 'Does the cabinet secretary know why the west of Scotland appears to be disproportionately affected by the virus? If not, will she investigate why that appears to be the case?' and the Cabinet Secretary said in response that PHS had been asked to look at the figures and the factors that might contribute to them, and then advise the Scottish Government of its conclusions. The analysis found that between 1st March and 30th June 2020, the highest age-standardised mortality rates with COVID-19 recorded as the underlying cause on the death certificate have been experienced in West Dunbartonshire, Glasgow City, Midlothian and Inverclyde local authority areas. Potential reasons for the spatial variation were differences in rurality / population density, income deprivation, household overcrowding and the timing of first COVID-19 death.

9.11 Informing ongoing work

9.11.1 PHS continued to undertake analysis of inequalities throughout the period in scope for Module 2A and continues to do so to this day. This included both the ways in which the pandemic was impacting on existing inequalities and the routes through which existing inequalities impacted on morbidity and mortality.

9.11.2 PHS produced a paper in early 2021 to set out the issues and act as a catalyst for further action. 'How do socio-economic inequalities impact on inequalities in health during the COVID-19 pandemic and what can we do about it?' (PHS/185 - INQ000228401)[185] summarises how socioeconomic inequalities have exacerbated the impacts of the COVID-19 pandemic and worsened the pre-existing health inequalities in Scotland. The paper is clear that people living in more deprived circumstances had been more likely to be exposed, infected, become unwell and to die from COVID-19 because of socioeconomic inequalities. The paper is also clear that the NPIs put in place to control the pandemic were also likely to have had disproportionate impacts on

[183] PHS. Spatial variation in COVID-19 mortality in Scotland. September 2020.

[184] Scottish Parliament. Official Report 7 May. May 2020.

[185] McCartney, G, Craig, P, Pulford A, et al. How do socio-economic inequalities impact on inequalities in health during the COVID-19 pandemic and what can we do about it? Public Health Scotland. April 2021.

the most deprived groups. The paper was presented at a PHS Board Seminar on 17th March 2021 (PHS/186 - INQ000228400)[186] and informed the development of the organisation's 2022 – 25 Strategic Plan.

9.12 Racialised health inequalities

9.12.1 PHS published five reports outlining analysis of variations in outcomes by ethnic group of those who have tested positive for COVID-19, starting on 20th May 2020 (PHS/187 - INQ000233597).[187] The availability and completeness of data was a challenge but, based on the available data, PHS found that the proportion of ethnic minority patients among those seriously ill with COVID-19 appeared no higher than the relatively low proportion in the Scottish population generally. PHS was clear that further work was required to improve the analysis.

9.12.2 An update using more complete data on ethnicity was published on 15th July 2020. Since May, further cases had accumulated and improvements had been made to ensure ethnicity data was available for a higher proportion of patients. Our analyses showed emerging evidence of increased risks of serious illness due to COVID-19 in people of South Asian origin. There was evidence that some of the increased risk of the most severe outcomes may have been accounted for by diabetes. Quantifying the raised risk is difficult however as estimates are uncertain due to small numbers. For other minority ethnic groups, numbers were too small to for differences in risk to be compared with confidence. Further analysis using data for additional emerging cases may help to increase certainty in estimates and clarify risks.

9.12.3 On 12th August 2020 PHS published a further update to the analysis (PHS/188 - INQ000228389).[188] The update focussed on comparisons of the risk of more serious outcomes due to COVID-19, requiring hospitalisation or intensive care or dying within 28 days following a positive swab test result. It provided further evidence of increased risks of serious illness due to COVID-19 in those of South Asian origin, with a two-fold increase in risk of needing critical care or dying within 28 days of a positive test. This increase was still apparent after accounting for diabetes and when COVID-19 deaths in those never testing positive are included. There was also evidence of an increased risk

[186] PHS: Socioeconomic inequalities and the COVID-19 pandemic PHS Board Seminar. March 2021.
[187] PHS. COVID-19 Statistical report. May 2020
[188] PHS. Public Health Scotland COVID-19 Statistical Report. August 2020.

of hospitalisation due to COVID-19 among those of Black, Caribbean or African ethnicity.

9.12.4 Further analysis published on 2nd December 2020 (PHS/189 - INQ000228390)[189] found further evidence of around a two-fold increase in risk of admission to critical care or death due to COVID-19 among those of South Asian origin. This increased risk was particularly evident among the Pakistani group and was still apparent after accounting for deprivation, residential care home status and diabetic status. There is evidence of an increased risk of hospitalisation due to COVID-19 among those of Caribbean or Black ethnicity.

9.12.5 The final updated analysis of COVID-19 outcomes by ethnic group, which was published by PHS on 3rd March 2021 (PHS/190 - INQ000147523)[190] included a comparison of the impact between the first and second wave of the pandemic. The results provided continued evidence of increased risks in some ethnic minority groups, which persisted during the second wave, rising to around a three-fold increase in risk for some ethnic groups. PHS found that while rates of hospitalisation or death were higher during the second wave across all of Scotland's population, those of South Asian ethnicity appear to have been at proportionally greater risk.

Expert Reference Group on COVID-19 and Ethnicity

9.12.6 The First Minister announced the establishment of an expert group to consider the impact of COVID-19 on minority ethnic communities on 9th June 2020. The media release included the following quote from PHS Chief Executive Angela Leitch:

'Understanding whether minority ethnic communities are at greater risk from COVID-19 is a crucial part of our response to the virus, particularly in light of reports from other parts of the UK and across the world. PHS is undertaking work to review the available evidence to understand emerging patterns including comparisons between the situation in Scotland and other parts of the UK. We are also working with National Records of Scotland and the Scottish Government to analyse and report on the impact of COVID-19 by ethnicity. Working with other members of the expert group, our evidence and data will enable the development of an effective evidence-based response and ensure the health of all of Scotland's communities is protected.' (PHS/191 - INQ000235098)[191]

[189] PHS. Public Health Scotland COVID-19 Statistical Report. December 2020.
[190] PHS. Updated analysis of COVID-19 outcomes by ethnic group. March 2021.
[191] Scottish Government. Press Release: Action against inequality. June 2020.

9.12.7 The Expert Reference Group on COVID-19 and Ethnicity made interim recommendations to the Scottish Government on 18th September 2020 (PHS/192 - **INQ000236308**[192] Recommendation 13 focussed on reporting data by ethnicity:

'The COVID-19 pandemic has highlighted the need for ongoing monitoring of health (and other) data by ethnicity. The lack of reporting of datasets that are available by ethnicity can serve to make ethnic inequalities in health hidden and threatens the case for maintaining data quality. It is therefore crucial that data when available and robust enough for analysis are published and disseminated to policymakers, practitioners and communities.'

9.12.8 One of the specific recommendations in this area was for PHS to publish an annual monitoring report on racialised health inequalities in Scotland.

Monitoring racialised health inequalities in Scotland

9.12.9 PHS published the first such annual monitoring report on 8th March 2022. (PHS/193 - INQ000203066)[193] The key messages were:

- Scottish data have consistently shown an increased risk of serious illness and death from COVID-19 among many ethnic minority groups. This mirrors similar trends seen in other countries of the UK.
- COVID-19 vaccination uptake rates have been persistently lower in some ethnic minority groups compared to the rest of the population. PHS continues to work to support all of Scotland's communities to increase vaccine uptake.
- The need for timely and accurate data at the onset of the pandemic highlighted the inadequacies in the availability of ethnicity data for health monitoring. Improvements have since been made to ensure ethnicity recording is mandatory on hospital admission data.
- Further work initiated by PHS has identified requirements for improving data collection within primary care to be taken forward within the Race Equality Immediate Priorities Plan.
- PHS is committed to publishing more data which meets the needs of policymakers, service providers, and the patients and communities they serve to monitor and reduce ethnic health inequalities.

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[192] Expert Reference Group on COVID-19 and Ethnicity. Recommendations to Scottish Government. September 2020.

[193] PHS. Monitoring ethnic health inequalities in Scotland during COVID-19. March 2022.

- PHS will work with the Scottish Government to support the delivery of the recommendations of the Expert Reference Group on COVID-19 and Ethnicity to tackle the health inequalities that minority ethnic communities face.

9.12.10 The second annual monitoring report on racialised health inequalities in Scotland was published on 30 May 2023 (PHS/194 - **INQ000236309**).[194] The report provides information on ongoing improvements in ethnicity data collection and analysis to allow routine monitoring of racialised health inequalities across the health and care system. The report:

- Focuses on ongoing work within maternity and early years data. This reflects both the importance of public health advice and interventions during maternity and early years in improving the health of the population and the progress being made in capturing ethnicity information in these key areas.
- Updates on an evaluation of the COVID-19 vaccination programme, looking at factors affecting vaccine uptake among different ethnic groups and the lessons learned to improve uptake in future vaccination programmes.
- Updates on work to refresh the 'Happy to ask, happy to tell' toolkit which seeks to empower health and care professionals to ask data providers about their equality characteristics, including ethnicity.
- Describes work to address the significant health inequalities experienced by the Gypsy, Roma and Traveller community.
- Shows that progress is being made on improving the availability of ethnicity data for monitoring racialised health inequalities but there is still more to do.

9.12.11 PHS is committed to publishing more data which meet the needs of policymakers, service providers, and the patients and communities they serve in order to monitor and reduce racialised health inequalities. PHS is currently leading a short life working group to review recording of ethnicity data and develop a series of recommendations to improve it.

9.13 The impact of COVID-19 on health inequalities and mortality trends

9.13.1 The latest NRS report on life expectancy (PHS/195 - INQ000228405)[195] sets out that:

[194] PHS. Monitoring ethnic health inequalities in Scotland during COVID-19. May 2023.
[195] National Records of Scotland. Life Expectancy in Scotland 2019-2021. September 2022.

- Life expectancy in Scotland was 76.6 years for males and 80.8 years for females in 2019-2021 (compared to 77.1 years for males and 81.1 years for females in 2017-2019) (PHS/196 - INQ000228404).[196]
- Life expectancy in Scotland has decreased by more than 11 weeks for males and almost 8 weeks for females since 2018-2020.
- The majority of this fall is due to mortality from COVID-19.
- Scotland has the lowest life expectancy of all UK countries.
- Male life expectancy in the most deprived areas of Scotland was 13.7 years lower than in the least deprived areas in 2019-2021 (compared to a gap of 13.3 years in 2017-2019).
- Female life expectancy in the most deprived areas of Scotland was 10.5 years lower than in the least deprived areas in 2019-2021 (compared to a gap of 10 years in 2017-2019).

[196] National Records of Scotland. Life Expectancy in Scotland 2017-2019. September 2020.

10. Public health communications

10.1 Arrangements

10.1.1 Timely, clear and consistent (both in terms of method and message) public communication is recognised as essential to the prevention and management of any public health emergency. Long-standing arrangements exist for informing the public of incidents in their area and this formed the basis of the approach to public communications around COVID-19. This approach is set out in the' Management of Public Health Incidents Guidance' (PHS/197 - INQ000147512)[197] and 'Communicating with the Public about Health Risks' (PHS/198 - INQ000147511).[198] Communicating aspects of the response that involve Ministerial decision-making is the responsibility of the Scottish Government. This included messaging relating to restrictions, Test and Protect and the vaccination programme, and taking any necessary action to combat any impact on clarity of messaging because of different approaches in other parts of the UK.

10.1.2 PHS continually works to ensure that its evidence and information is effectively communicated. However, staff in the Scottish Government were responsible for tailoring the way complex expert, medical and scientific evidence, data and statistical modelling was presented in briefings for Ministers.

10.2 PHS's role in pandemic messaging

10.2.1 Whilst the Scottish Government led on pandemic messaging, PHS had an important supportive role. PHS worked closely with ARHAI and local and national NHS Boards to ensure continuity of and congruence of public health messaging in tandem with Scottish Government direction. PHS worked to:

- Support Scottish Government daily briefings with expert clinical input and the generation of evidence. For example, on 15th July 2020 PHS published 'Enhanced Surveillance of COVID-19 in Scotland: Population-based seroprevalence surveillance', (PHS/199 - INQ000147519)199 the first report from

[197] PHS. Management of Public Health Incidents: Guidance on the Roles and Responsibilities of NHS Led Incident Management Teams. July 2020.
[198] Health Protection Network. Communicating with the Public About Health Risks: Scottish Guidance. September 2008.
[199] PHS. Enhanced Surveillance of COVID-19 in Scotland: Population-based seroprevalence surveillance. August 2022.

the PHS serology surveillance programme. The Deputy Chief Medical Officer Dr Nicola Steedman presented the findings during the Scottish Government's daily briefing on 16th July. (PHS/200 - INQ000235121)[200] Dr Steedman explained that it was likely that only a very small population of Scotland had been exposed to the virus at that point, reinforcing the need for the control measures to be followed.

- Support Scottish Government media briefings through the fielding of technical questions from the media. For example, when the way in which deaths relating to COVID-19 were reported in Scotland changed in April 2020, Scott Heald and Dr Jim McMenamin supported the National Clinical Director, Jason Leitch, field technical questions about the changes from the media.
- Share information with the public and stakeholders through news articles and social media (see below).
- Ensure that the NHS Inform website was kept up to date with information for the public (PHS/201 - INQ000235117).[201]
- Answer enquiries from professionals on guidance and data, and from the general public and educational and business sectors, particularly in the early stages of pandemic.
- Lead marketing campaigns (see below).
- Publish health protection guidance on the PHS website (PHS/202 - INQ000235133)[202] (see Section 4.4).
- Counter misinformation and disinformation with facts presented in a clear and accessible way, including direct to the public through television and radio interviews (see below).

10.2.2 PHS published 95 news items relating to COVID-19 between April 2020 and April 2022, which provided information for the public and for partners. (PHS/203 - INQ000147583) [203] Senior PHS staff – primarily Dr Nick Phin and Dr Jim McMenamin – took part in 13 interviews for television and 7 for radio (PHS/204 - INQ000147587).[204]

[200] Scottish Government. Scottish Government daily briefing. Accessed February 2023.
[201] NHS 24. Coronavirus (COVID-19) Accessed March 2023.
[202] PHS. COVID-19 health protection guidance. Accessed March 2023.
[203] PHS. News stories relating to COVID-19 April 2020 - April 2022. March 2023.
[204] PHS. TV and radio appearances relating to COVID-19 April 2020 - April 2022. March 2023.

In addition, PHS was mentioned in 24 Scottish Government press releases (PHS/205 - INQ000235163).[205]

10.2.3 PHS issued 961 social media posts relating to COVID-19 between April 2020 and April 2022, which supported the delivery of accurate and timely information to the public. PHS's primary social media channel is Twitter, (PHS/206 - INQ000147570) [206] on which the organisation has almost 50,000 followers, but the organisation also uses Instagram (PHS/207 - INQ000147570)[207] and, more recently, LinkedIn (PHS/208 - INQ000147570) [208] in order to reach other audiences. The social media activity comprises:

- 750 posts on Twitter.
- 209 posts on Instagram.
- 2 posts on LinkedIn.

10.2.4 PHS led on or supported several marketing campaigns throughout the pandemic. This included:

- Providing social media materials to be used to raise awareness that some screening services (Breast, Bowel, Cervical, Diabetic Eye Screening and Abdominal Aortic Aneurysm) were temporarily paused during the early part of the pandemic and what to do while waiting.
- On behalf of the Scottish Government delivering and quality assuring campaign 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.
- Providing clinically accurate information for Roll Up your Sleeves vaccine campaign: a Scottish Government-led campaign to encourage people to get their COVID-19 vaccine once invited.

10.2.5 In recognition of the authoritative and trusted nature of the HPS brand, the Scottish Government requested that the HPS brand continue to be used alongside the PHS

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[205] PHS. PHS mentions in Scottish Government media releases relating to COVID-19 April 2020 - April 2022. March 2023.

[206] PHS. Public Enquiry - PHS Social Media - COVID-19 Instagram. March 2023.

[207] PHS. Public Enquiry - PHS Social Media - COVID-19 Instagram. March 2023.

[208] PHS. Public Enquiry - PHS Social Media - COVID-19 Instagram. March 2023.

brand. This continued until 15th March 2022. Please see section 5.1.21 and 5.1.22 of the Corporative Narrative for the background to this.

10.3 Combatting mis- and dis-information

10.3.1 In May 2020 the WHO called on Member States to develop and implement action plans to manage what they referred to as 'the infodemic' by promoting the timely dissemination of accurate information, based on science and evidence, to all communities, and in particular high-risk groups, and by preventing the spread of mis- and dis-information. PHS played a key role in infodemic management including through listening to community concerns and questions and promoting understanding of risk and health expert advice. PHS Director of Public Health Science, Dr Nick Phin, and Strategic Incident Director for COVID-19 and Head of Infections Service at PHS, Dr Jim McMenamin, both regularly helped to promote understanding of risk by sharing public health expertise in an accessible manner with the public on Scottish television and radio.

10.3.2 PHS used blogs to communicate complex information to the public in an accessible way and help combat dis- and mis-information. For example, Dr Diane Stockton, PHS Consultant in Public Health, explained in a blog (PHS/209 - INQ000235170) [209] in January 2022 why simple comparisons of COVID-19 rates in those who are vaccinated and unvaccinated should not be used to assess how effective a vaccine is in preventing serious health outcomes. The blog explains the complexities around interpreting the data, including how the rates of COVID-19 in unvaccinated groups can be under-estimated, how testing behaviours are likely to vary between vaccinated and unvaccinated groups, and how older people who have had two doses but have not had their booster were likely to have a higher risk of severe outcomes.

10.3.3 Listening to community concerns was a key part of PHS's work on vaccine hesitancy. PHS provided information and support for specific communities to support equitable and informed uptake of the vaccine, tailored for different audiences including refugees and asylum seekers and specifically covering the concerns raised by certain communities about the vaccine. This included for example: running a webinar during Ramadan in 2021 to emphasise that having the vaccine does not invalidate fasting and to build confidence around vaccine safety and the ingredients; and supplying bespoke

[209] PHS. Blog: PHS reporting of cases of hospitalisations and deaths from COVID-19 by vaccine status - interpreting the data. January 2022.

materials on blood clotting and pregnancy in African languages to address concerns in that community.

10.4 Monitoring effectiveness

10.4.1 The Scottish Government Strategy and Insights team conducted pre- and post-campaign research as well as regular quantitative and qualitative research into the attitudes and experience of the public, and frequent public opinion polling. For immunisation, this covered topics such as vaccine hesitancy and barriers and motivators to vaccination, specifically focusing on pregnant women and minority ethnic communities where uptake was low. The Scottish Government carried out regular polling to explore public attitudes to COVID-19 which were all made available on the Scottish Government's website. (PHS/210 - INQ000235172)[210] Findings from this research were shared with PHS as they became available and were used to inform Scottish Government campaigns, which PHS contributed to. This provided insight into the motivators and barriers to vaccination or public attitudes towards following Test and Protect guidance, in particular for hesitant or non-compliant audiences.

10.4.2 PHS assessed the success of public health messaging around vaccinations with NHS 24 by reviewing questions asked by citizens via the NHS inform website chatbot feature and using this to update page content in real time to reflect the questions people had. This intelligence was also used to update call scripts for helpline handlers, ensuring consistency across all communication touch points. Over time, questions via the chatbot reduced, potentially indicating more effective public health messaging.

10.4.3 The effectiveness of PHS-led communications was monitored using several measures, depending on the communication or campaign. Examples include traffic to NHS inform, click throughs to campaign landing pages, engagement on social media posts (likes/shares/comments), scans of QR codes and downloads of online pdfs. PHS worked closely with stakeholders representing key audiences such as the Royal College of Midwives and the Scottish Refugee Council and used citizen feedback to inform communications on an ongoing basis.

[210] Scottish Government. Public attitudes to coronavirus (COVID-19). Accessed March 2023.

11. Collaboration with other agencies

11.1 Approach

11.1.1 Collaboration is one of PHS's organisational values, and it is the cornerstone of how PHS works. PHS works with and through partners and stakeholders in all that it does, and no more so than in the pandemic response. Organisations across Scotland mobilised and responded in partnership and at pace to issues in a way never seen before. This collaboration and cooperation extended to cross-UK four nations-working, and to a European level and beyond. It provided valuable additional insights and intelligence to inform PHS's understanding of the evolution of the virus and the pandemic, vaccine efficacy, and variants and mutations.

11.2 International collaboration

11.2.1 PHS developed a range of COVID-19 data and analytical outputs during the pandemic that were shared with international agencies including the World Health Organization (WHO), the European Centre for Disease Prevention and Control (ECDC), and the Centre for Disease Control (CDC) in the United States. This included sharing surveillance data for global reporting purposes, sharing results from the EAVE-II collaboration (see section 7.5), and reporting on international events held in Scotland during the pandemic.

11.2.2 PHS undertook analysis of the impact of the European Football Championship on the prevalence of COVID-19 in Scotland in the summer of 2021, which was published in the weekly statistical report on 30th June 2021 (PHS/211 - INQ000147589) [211] and subsequently in the peer-reviewed scientific paper 'Contributions of the EURO 2020 football championship events to a third wave of SARS CoV-2 in Scotland, 11 June to 7 July 2021' (PHS/212 - INQ000147526).[212]

11.2.3 PHS also shared analysis of the impact of the COP26 summit on COVID-19 infections in Scotland with international partners. The interim report was published on 16th November 2021 (PHS/213 - INQ000147578),[213] and the final report a month later.

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[211] PHS. Weekly national seasonal respiratory report. June 2021.

[212] Marsh K., Griffiths E., Young J. et al. Contributions of the EURO 2020 football championship events to a third wave of SARS-CoV-2 in Scotland, 11 June to 7 July 2021. 5 August 2021. Euro Surveillance:26(31). Accessed August 2023.

[213] PHS. Surveillance of the impact of COP26 on COVID-19 infections in Scotland: preliminary report. November 2021.

(PHS/214 - INQ000147540)[214] The data showed that COP26 did not make a direct contribution to COVID-19 infections across Scotland, and the wider UK, during the summit.

11.2.4 In addition to sharing data and analytical outputs with international agencies, PHS took part in several organised meetings such as those arranged by the WHO European Office where all European region countries were invited to attend to discuss the clinical impact of COVID-19, the success or otherwise of the societal measures to reduce the number of cases, hospitalisations and deaths, and the effectiveness of vaccines.

11.2.5 PHS also engaged with public health colleagues in Israel over the course of the pandemic. This was part of an arrangement to exchange information between the CDC, UKHSA (and the devolved administrations) and Israel. Joint meetings took place from early 2021 onwards when the first vaccines became available and Israel had learning to share from their early roll-out.

11.3 Collaboration within the UK

11.3.1 PHS engaged with UK agencies through a variety of means and found this collaboration to be valuable for general situation awareness and intelligence on topic-specific issues. PHE/UKHSA led daily update meetings for the English regions to which the public health agencies from the three devolved administrations and Ireland were invited. This was a helpful and timeous forum for sharing intelligence. Further examples include:

- Membership of UK advisory groups (see section 6.2).
- Liaising with the UK Home Office and UKHSA with regards to International Travel Regulations (see section 8.4).
- The development of UK-wide guidance: PHS worked with Public Health England (and continuing with UKHSA), the Department of Health and Social Care in the UK Government, Public Health Wales, the Public Health Agency of Northern Ireland, and NHS England to develop and maintain a consistent and resilient UK-wide approach to COVID-19 guidance. This included jointly issuing UK-wide guidance, which was then tailored to the specifics of the Scottish context (see section 4.4).
- Liaising with UKHSA and other partner organisations at a UK level on whole genome sequencing: in January 2021, PHS formed links with the UKHSA Variant

[214] PHS. Surveillance of the impact of COP26 on COVID-19 infections in Scotland. December 2021.

of Concern Assurance group (which was later renamed the Variant Technical Group) and the UK Strategic Public Health COVID-19 Genomics Advisory Board.

- Engaging with other statistics producers across the UK (including NHS England Department of Health, NHS Digital, Office for National Statistics, UK Health Security Agency, Public Health Wales, the Welsh Government, the Northern Ireland Statistics and Research Agency, and the Northern Ireland Department of Health) to share approaches and align where possible planned changes to reporting and/or definition changes.

11.4 Collaboration within Scotland

11.4.1 PHS collaborated with agencies across the public sector, academia and the third sector in the delivery of the pandemic response. What follows is not an exhaustive overview of this collaboration, but rather an illustration of the range of agencies that were key to PHS's pandemic response. Please also see chapter 7, and in particular sections 7.5 – 7.7 where three key academic collaborations are explored.

National NHS Boards

11.4.2 PHS worked daily with the Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) Scotland team within NSS (part of HPS prior to the formation of PHS in April 2020). ARHAI provides a clinical service providing national expertise for infection, prevention and control, antimicrobial resistance and healthcare associated infection for Scotland. PHS collaborated with ARHAI on the development of guidance for Infection Prevention and Control (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 Health Protection Teams (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.

11.4.3 As set out in section 4.2.12 – 4.2.14 of the Corporative Narrative, ARHAI had originally been in scope to transfer to PHS as part of HPS. However, the Cabinet Secretary for Health and Sport decided in light of the issues under review in the Hospitals Inquiry

that ARHAI would remain in NSS pending further consideration. An options appraisal is planned for 2023 to consider the optimal future for the ARHAI service.

11.4.4 PHS also worked closely with NSS on the development and implementation of the Test and Protect programme (see section 8.2) and on data and IT infrastructure, in particular the Corporate Data Warehouse (see section 7.3).

11.4.5 PHS worked closely with NHS24 to develop and share information for the public on NHS Inform, which provides information to the public on health matters (see Chapter 9: Public health communications). There was also engagement with NHS24 on surveillance; data from calls to the 111 unscheduled care line and the separate COVID-19 line provided a source of intelligence for the surveillance programme. This data was linked to other data sets to inform and evaluate pathways of care, working closely with Primary Care Out of Hours and Community Assessment Centres.

11.4.6 Working with the Scottish Ambulance Service (SAS), PHS used SAS data to link COVID-19 pathways to understand the flow of patients and their outcomes. PHS also linked with SAS around health protection advice and guidance to paramedics.

11.4.7 PHS worked closely with NHS Education for Scotland on workforce training, development materials and with their digital function, in particular relating to vaccination data. This included developing training materials at pace over the festive period in 2020 after the Scottish Government announced that the Oxford AstraZeneca vaccine would be rolled out in Scotland from 4th January 2021, and holding three webinars on the new vaccine during the first week in January, which were attended by a total of 5,100 healthcare practitioners across the country.

Local NHS Boards

11.4.8 PHS and DsPH worked closely throughout the pandemic through a range of fora including regular meetings between Angela Leitch and the Chair of the DsPH group, and through the NIMT. Discussions and joint work included education, contact tracing and vaccination. PHS teams worked directly with local Health Protection Teams several times weekly to maintain situational awareness, foster collaborative learning between HPTs and address specific COVID-19 outbreaks in frontline settings. This also facilitated rapid engagement and professional peer support on operational and guidance issues such as for testing and contact tracing and for a variety of settings,

including care homes and schools. PHS also supported – on request – local Incident Management Teams. This totalled several hundred over the course of the pandemic.

11.4.9 PHS and the DsPH worked on a joint position paper (PHS/215 - INQ000147547) [215] on schools reopening during COVID-19 and issued an accompanying joint statement on the re-opening of schools after the first lockdown (PHS/216 - INQ000147549).[216] This was followed by a second joint statement in February 2021, which welcomed the Scottish Government's ongoing commitment to ensuring that children and young people could return to childcare and education as soon as possible. The statement highlighted shared concerns about the wider harms and educational impact of the restrictions in place at the time (PHS/217 - INQ000147548).[217]

11.4.10 In August 2020 PHS and the DsPH produced a paper summarising the main strategic options for managing the pandemic, together with related assumptions, anticipated benefits and risks (PHS/218 - INQ000147542).[218] The intention was to help to clarify the key trade-offs to be made by policymakers and the most important questions for research to focus upon. The paper was shared with the Scottish Government and COSLA.

11.4.11 Other teams within local NHS Boards with which PHS regularly engaged were Information and eHealth Leads to address immediate issues or queries around data submissions or analysis, Primary Care leads and Out of Hours Primary Care, hospital infectious disease and other clinical leads, local and reference laboratories, and communications teams.

Local authorities

11.4.12 PHS worked closely with local authorities throughout the pandemic to support local government with the safe delivery of vital services. This was both at a local level with individual council areas, and nationally through COSLA and Solace (the Society of

[215] PHS and DsPH. Schools reopening during COVID-19: A view from Public Health Scotland and the Scottish Directors of Public Health. June 2020.
[216] PHS. Joint statement on the reopening of schools and other educational settings. June 2020.
[217] PHS and DsPH. Supporting and protecting the health of children and young people through the safe return to school. February 2021.
[218] PHS and DsPH. Minimising health harms during the COVID-19 pandemic: highlighting future strategic options, and underlying assumptions, to facilitate assessment of trade-offs for decision-making. August 2020.

Local Authority Chief Executives and Senior Managers). For example, PHS worked with local authorities around:

- The provision of data, intelligence and evidence to inform decision-making.
- The safe delivery of the 2021 elections, both for people working in polling stations and for voters.
- The registering of COVID-19 deaths at the weekend.
- The provision of guidance for different parts of the local authority workforce.

11.4.13 PHS also provided a range of tools and resources for partners in the local public health system to use to respond to specific public health challenges in their area. For example, PHS led the development and deployment of a Geospatial Connections Tool for NHS Boards and local authorities that allows the rapid identification and investigation of outbreaks in local areas by linking cases, contacts and places. This used visualisations to make it easier to spot patterns between cases and the locations they have visited and drill into the data to identify possible locations of community transmission. The tool helped to inform local and national policy, advice and communications.

11.4.14 PHS worked with the DsPH, the Association of Directors of Education in Scotland, COSLA and Solace and alongside the childcare, education, and youth work sector in Scotland to support the safe return of pupils to school in August 2020. This included:

- Providing infection guidance specific to educational facilities, including residential schools.
- Working to address the broader impacts of the reopening of schools on the health and wellbeing of children and young people, parents and education staff.
- Developing an enhanced surveillance programme to ensure timely intelligence was available to key partners.

11.4.15 PHS also worked with local authorities through Resilience Partnerships (see paragraphs 3.4.27 – 3.4.35 of the Corporative Narrative).

Police Scotland

11.4.16 PHS engaged with Police Scotland around border health measures (see section 8.4) and there were weekly meetings to share knowledge on COVID-19 hotspots to allow Police Scotland staff additional protection. Support was also provided in interpreting

Infection Prevention and Control guidance for the workforce, in particular during COP26.

Scottish Environment Protection Agency

11.4.17 Alongside monitoring and tracking the spread and impact of the virus through its own data, PHS worked with the Scottish Environment Protection Agency (SEPA) on wastewater sampling. SEPA began exploratory work in May 2020 to identify fragments of COVID-19 genetic code in local wastewater samples. PHS supported this work alongside the Scottish Government, Scottish Water, and academic partners. Analysis of samples from across Scotland identified traces of COVID-19 in wastewater and by comparing the results to PHS data, it could be shown that the wastewater analysis was consistent with areas known to have confirmed COVID-19 cases. PHS worked with SEPA to make optimal use of the intelligence to support the pandemic response, including using it to identify the best locations for community testing centres.

Care Inspectorate

11.4.18 In accordance with Paragraph 22 in Part 9 of Schedule 1 to the Coronavirus (Scotland) (No.2) Act 2020, which came into force on 27th May 2020, the Care Inspectorate was required to lay before Parliament a report every two weeks setting out which care home services it inspected during those two weeks, and the findings of those inspections. To meet the duties imposed by the Act and to comply with associated guidance, the Care Inspectorate had to focus and report on infection prevention and control, including Personal Protective Equipment (PPE) and on staffing levels. PHS worked with Healthcare Improvement Scotland to support the Care Inspectorate to develop inspection tools to facilitate the inspections. PHS worked with the Care Inspectorate around care home outbreaks and to share health protection advice for child minders and care homes.

Scottish Prison Service

11.4.19 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 SPS-specific 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.

11.4.20 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.

National Records for Scotland

11.4.21 PHS worked closely with National Records Scotland, both as a partner in the ScotPHO Collaborative (see section 7.7) 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.

Office for Statistics Regulation

11.4.22 PHS engages regularly with the Office for Statistics Regulation, which is the independent regulatory arm of the UK Statistics Authority. The OSR undertook a number of rapid assessments of statistics products produced during the pandemic, including the COVID-19 weekly report produced by PHS (PHS/219 - INQ000235148).[219]

[219] Office for Statistics Regulation. Ed Humpherson to Scott Heald: Rapid Review of weekly COVID-19 and Winter Statistical Report. February 2022. Accessed August 2023.

Statement of Truth

The facts provided in this statement are true and accurate to the best of my knowledge and belief.

Signed:

Personal Data

Designation: Chief Executive Officer

Date: 02/10/23

Signed:

Personal Data

Designation: Director of Data and Innovation

Date: 02/10/23

Signed:

Personal Data

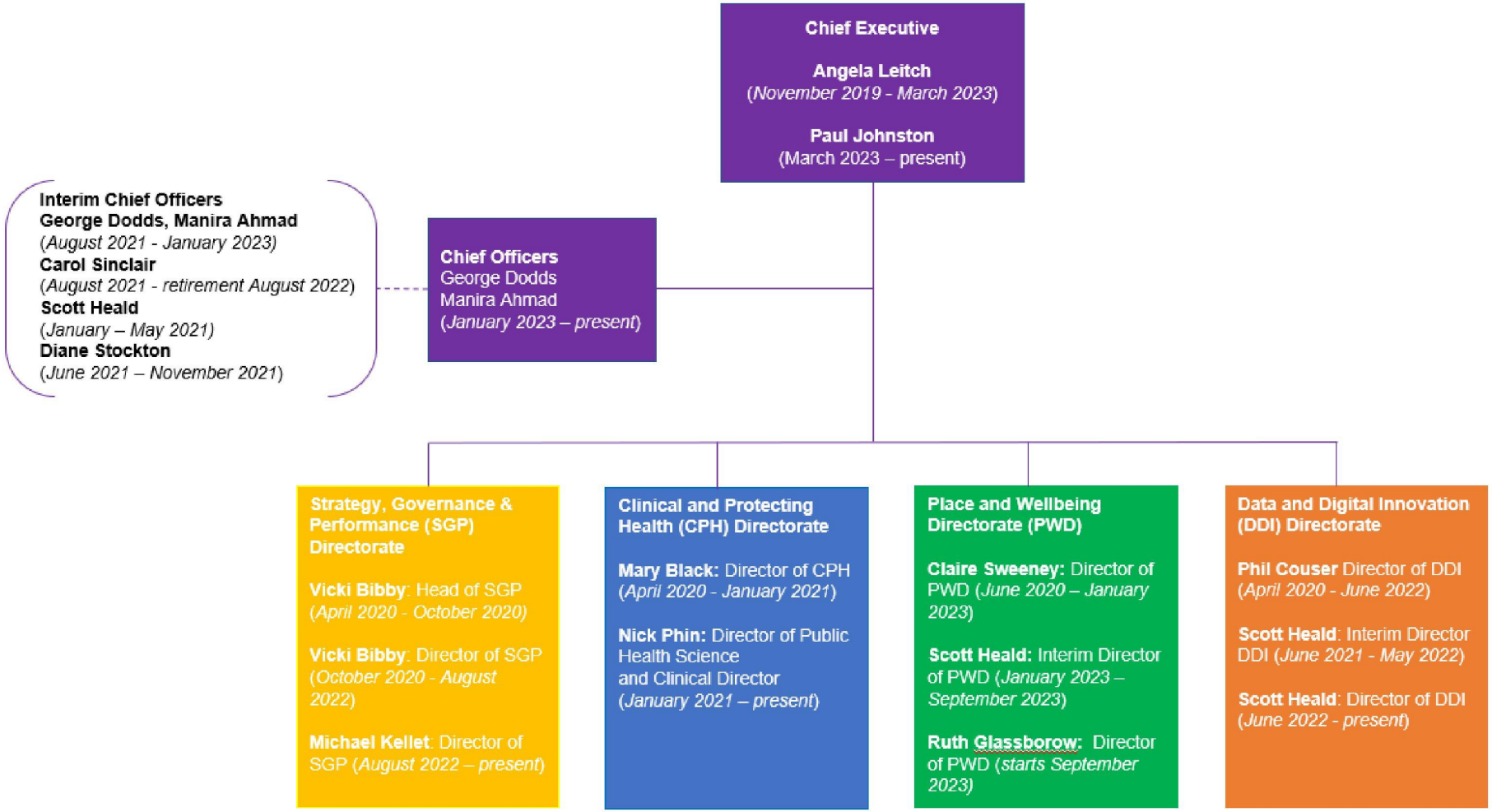
Designation:

Director of Public Health Science

Date:

02/10/23

Appendix A: Senior Leadership / Executive Team structure



Appendix B: PHS Portfolio 2023

OUR PORTFOLIO OF CROSS-ORGANISATIONAL PROGRAMMES

TRANSFORMING SCOTLAND

Cross-organisational programs that will help Scotland thrive by preventing disease, prolonging healthy life and promote health and wellbeing

EARLY YEARS AND YOUNG PEOPLE	ECONOMY & POVERTY	PUBLIC MENTAL HEALTH & WELLBEING	PLACE & PHYSICAL ENVIRONMENT	EQUITY & JUSTICE
RICHMOND DAVIES	PAMELA SMITH	RICHMOND DAVIES	MATT LOWTHER	DIANE STOCKTON

HEALTH HARMING COMMODITIES & PHYSICAL ACTIVITY	VACCINE PREVENTABLE DISEASE	HEALTH PROTECTION INCIDENTS, HAZARDS & RESPONSE	DISEASE REGISTRATION & SCREENING	POPULATION HEALTH MONITORING
GEORGE DODDS	KERRY MCKENZIE	FIONA MACKENZIE	FIONA RUSSELL	DIANE STOCKTON

HEALTH & CARE: ACUTE & EMERGENCY SERVICES	HEALTH & CARE: PRIMARY, COMMUNITY & SOCIAL CARE	LONG TERM CONDITIONS	CLIMATE & SUSTAINABILITY	PARTNERSHIP & COLLABORATION
FIONA RUSSELL	ELAINE STRANGE	GEORGE DODDS	MANIRA AHMAD	JOHN DAWSON

TRANSFORMING PHS

Improvements and growth that will enable our people and organisation to thrive while delivering our strategic objectives

ORGANISATIONAL DESIGN	IMPROVEMENT & FINANCIAL SUSTAINABILITY	RESEARCH FOR POLICY & PRACTICE
MICHAEL KELLET	JOHN DAWSON	CAROLE MORRIS

Updated 29th June

PUBLIC INQUIRY	PEOPLE & WAYS OF WORKING	DIGITAL & DATA TRANSFORMATION	CORPORATE COMMUNICATIONS
MANIRA AHMAD	KYLE CLARK HAY	SCOTT HEALD	JANE WEIR

Appendix C: Key staff involved in supporting Scottish Government decision-making

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 – present)	Dr Phin leads 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.
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 SG (Scottish Government) through representation at SGoRR, ministerial deep dives, and coordinated response from PHS to specific questions posed by SG. 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.

Name	Job Title	Description of role
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, Scott 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.
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.
Carol Sinclair	Associate Director (Data Driven Innovation) (April 2020 – August 2021) Interim Chief Officer (August 2021 – retirement August 2022)	Carol Sinclair led on a number of data-related workstreams during the pandemic including Whole System Modelling, improving social care and primary care data, digital and data innovation including implementation of a PHS innovation hub, and digital and data elements of the vaccination programme.
George Dodds	Contact Tracing Director (January 2021 – 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 the DsPH.

Name	Job Title	Description of role
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.
Dr Maria K Rossi	Consultant in Public Health Medicine (April 2020 – present) Interim Lead for COVID-19 Clinical Response and Guidance Group (November 2020 – September 2022) Interim Head of Health Protection (Environment and Emergency Response) (February 2022 – 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.
Dr Colin Ramsay	Strategic Incident Director for COVID-19 (January 2020 – October 2020) Consultant Epidemiologist (April 2020 – October 2020) Lead for Modelling and Research Cell	Dr Ramsay was one of the Strategic Incident Directors for COVID-19 alongside Dr McMenamin and Professor David Goldberg. Dr Ramsay was the PHS Clinical Response Group (CRG) Lead provided overall accountability and strategic leadership to the PHS Guidance Cell from January 2020 to October 2020 He is a consultant epidemiologist in the field of environmental public health. He retired in autumn 2021. Dr Ramsay had a period of long-term sickness absence between 26 October 2020 until 31 October 2021. Dr McMenamin carried out duties as Strategic Incident Director throughout this period.

Name	Job Title	Description of role
Dr Colin Sumpter	Consultant in Public Health (March 2021 – present) COVID-19 Guidance Lead (May 2021 – Sept 2022)	Dr Sumpter joined PHS as a consultant in March 2021. He was lead Consultant for COVID-19 health protection in education settings, reviewing and contributing to SG education guidance. He prepared guidance documents for policy alignment check (PAC) before sign-off from Scottish Government.
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.
Dr Michael Lockhart	Consultant Microbiologist (January 2020 – present) Co-Chair of Labs and Diagnostic cell (January 2020 – present)	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.
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.

Name	Job Title	Description of role
Dr Diane Stockton	Acting Director of Place & Wellbeing (April 2020 – June 2020) Lead consultant for the education cell (July 2020 – July 2022) Chief Officer (December 2020 – February 2021) Consultant in Public Health (February 2021 – present)	Dr Stockton was responsible for surveillance, evidence and guidance around children and young people, with a specific focus on education settings (Early learning and childcare (ELC), schools and advanced learning (AL)). She led and co-ordinated the work and liaised with the SG education department on a daily (weekly latterly) basis (through a morning daily stand up) providing advice and intelligence, from when she took up the role in July 2020 (when the cell was formed ahead of education settings re-opening) until the cell was stood down in July 2022.
Dr Eileen Scott	Public Health Intelligence Principal (2020-present)	Dr Scott was responsible for supporting the education cell through supporting the design and management of the surveillance and evidence review work streams, with a specific focus on education settings (Early learning and childcare (ELC), schools and advanced learning (AL)). She liaised with the SG education department on a regular basis (through a morning daily stand up) providing advice and intelligence, from when she took up the role in July 2020 (when the cell was formed ahead of education settings re-opening) until the cell was stood down in July 2022. Dr Scott was a member of the World Health Organization Europe Technical Advisory Group on Safe Schooling During the COVID-19 Pandemic. She was also a member of the Scottish Government Coronavirus (COVID 19): Advisory Sub-Group on Education and Children's Issues which provided advice to support and inform the development of operational guidance.

Name	Job Title	Description of role
Dr Claire Cameron	Strategic Lead, Immunisation (Jan 2011- April 2020) Consultant in Health Protection (April 2020 – present)	Dr Cameron has over 20 years' experience at a national level, focusing on immunisation. This includes Covid vaccination and ensuring continued high uptake of other immunisations. She has had lead responsibility for a range of vaccine preventable diseases, chaired national immunisation programme groups and represented PHS at the UK Joint Committee for Vaccination and Immunisation. During the pandemic she was part of the leadership team for covid immunisation at PHS, continued to work within the Scottish Immunisation Programme to ensure high uptake of other vaccines, and represented PHS at JCVI.
Professor Chris Robertson	Honorary Professor PHS Professor of Health Epidemiology in the Department of Mathematics and Statistics at the University of Strathclyde.	Professor Robertson has an honorary contract with PHS for the provision of statistical expertise and represents the organisation on SPI-M-O.
Dr Gerry McCartney	Consultant in Public Health and Head of the Public Health Observatory Honorary Consultant in Public Health (since September 2021)	Dr Gerry McCartney took up post as Head of the Scottish Public Health Observatory (ScotPHO) at NHS Health Scotland in 2010 and then Public Health Scotland. Dr McCartney left PHS to take up the post of Professor of Wellbeing Economy at the University of Glasgow in September 2021.

Appendix D: Key staff involved in PHS's operational response

Name	Job Title	Description of role
Kate Harley	Associate Director (Clinical and Protecting Health) (April 2020 – retirement in June 2021) Health Protection Management and Admin Cell Lead	Kate Harley provided non-clinical leadership and expertise to CPH including staffing matters, and management of the COVID-19 budgets.
Fiona MacKenzie	Interim Head of Clinical and Protecting Health (May 2021 – present)	Alongside Kerry McKenzie, Fiona MacKenzie is responsible for developing and implementing the strategic direction and policy of CPH to ensure it is in line with PHS strategy. She is responsible for the provision of non-clinical leadership and expertise to the Directorate's service areas including Respiratory, Public Health Microbiology. She directs and controls resources of multiple Directorate Service areas. The Interim Heads of CHP are responsible for the operational management of the COVID-19 budgets, ensuring resources were deployed appropriately.
Kerry McKenzie	Interim Head of Clinical and Protecting Health	Alongside Fiona MacKenzie, Kerry McKenzie is responsible for developing and implementing the strategic direction and policy of CPH to ensure it is in line with PHS strategy. Kerry provides leadership and management of the PHS vaccination programme, including the PHS contribution to the development of the Scottish Vaccination and Immunisation Service which PHS will lead from 2023. The Interim Heads of CHP are responsible for the operational management of the COVID-19 budgets, ensuring resources were deployed appropriately.
Dr Stephanie Thomas	Consultant Medical Microbiologist (April 2020 – present)	Dr Thomas provided clinical and technical expertise in laboratory testing and was a lead representative for the lab and diagnostic cell for testing. She was also responsible for diagnostic queries regarding non-NHS laboratory testing, and event management response such as COP26 and EUROs.

Name	Job Title	Description of role
Dr Colin Sumpter	Consultant in Health Protection (March 2021 – present) Lead consultant for PHS Health Protection Team guidance (from June 2021) and non-healthcare / community and workplaces guidance (from December 2021)	Dr Sumpter was lead Consultant for COVID-19 health protection in education settings, reviewing and contributing to SG education guidance. He prepared guidance documents for policy alignment check (PAC) before sign-off from Scottish Government.
Dr Maria Rossi	Consultant in Public Health Medicine (April 2020 – present) Interim Lead for COVID-19 Clinical Response and Guidance Group (November 2020 – September 2022) Interim Head of Health Protection (Environment and Emergency Response) (February 2022 – present)	Dr Rossi contributed throughout 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 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 Colin Ramsay	Strategic Incident Director for COVID-19 (January 2020 – October 2020) Consultant Epidemiologist (April 2020 – October 2020) Lead for Modelling and Research Cell	Dr Ramsay was one of the Strategic Incident Directors for COVID-19 alongside Dr McMenamin and Professor David Goldberg. He is a consultant epidemiologist in the field of environmental public health. He retired in autumn 2021.

Name	Job Title	Description of role
Dr Colin Sumpter	Consultant in Public Health (March 2021 – present) COVID-19 Guidance Lead (May 2021 – Sept 2022)	Dr Sumpter joined PHS as a consultant in March 2021. He was lead Consultant for COVID-19 health protection in education settings, reviewing and contributing to SG education guidance. He prepared guidance documents for policy alignment check (PAC) before sign-off from Scottish Government.
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.
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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.

Name	Job Title	Description of role
Dr Diane Stockton	Acting Director of Place & Wellbeing (April 2020 – June 2020) Lead consultant for the education cell (July 2020 – July 2022) Chief Officer (December 2020 – February 2021) Consultant in Public Health (February 2021 – present)	Dr Stockton was responsible for surveillance, evidence and guidance around children and young people, with a specific focus on education settings (Early learning and childcare (ELC), schools and advanced learning (AL)). She led and co-ordinated the work and liaised with the SG education department on a daily (weekly latterly) basis (through a morning daily stand up) providing advice and intelligence, from when she took up the role in July 2020 (when the cell was formed ahead of education settings re-opening) until the cell was stood down in July 2022.
Dr Eileen Scott	Public Health Intelligence Principal (2020-present)	Dr Scott was responsible for supporting the education cell through supporting the design and management of the surveillance and evidence review work streams, with a specific focus on education settings (Early learning and childcare (ELC), schools and advanced learning (AL)). She liaised with the SG education department on a regular basis (through a morning daily stand up) providing advice and intelligence, from when she took up the role in July 2020 (when the cell was formed ahead of education settings re-opening) until the cell was stood down in July 2022. Dr Scott was a member of the World Health Organization Europe Technical Advisory Group on Safe Schooling During the COVID-19 Pandemic. She was also a member of the Scottish Government Coronavirus (COVID 19): Advisory Sub-Group on Education and Children's Issues which provided advice to support and inform the development of operational guidance.

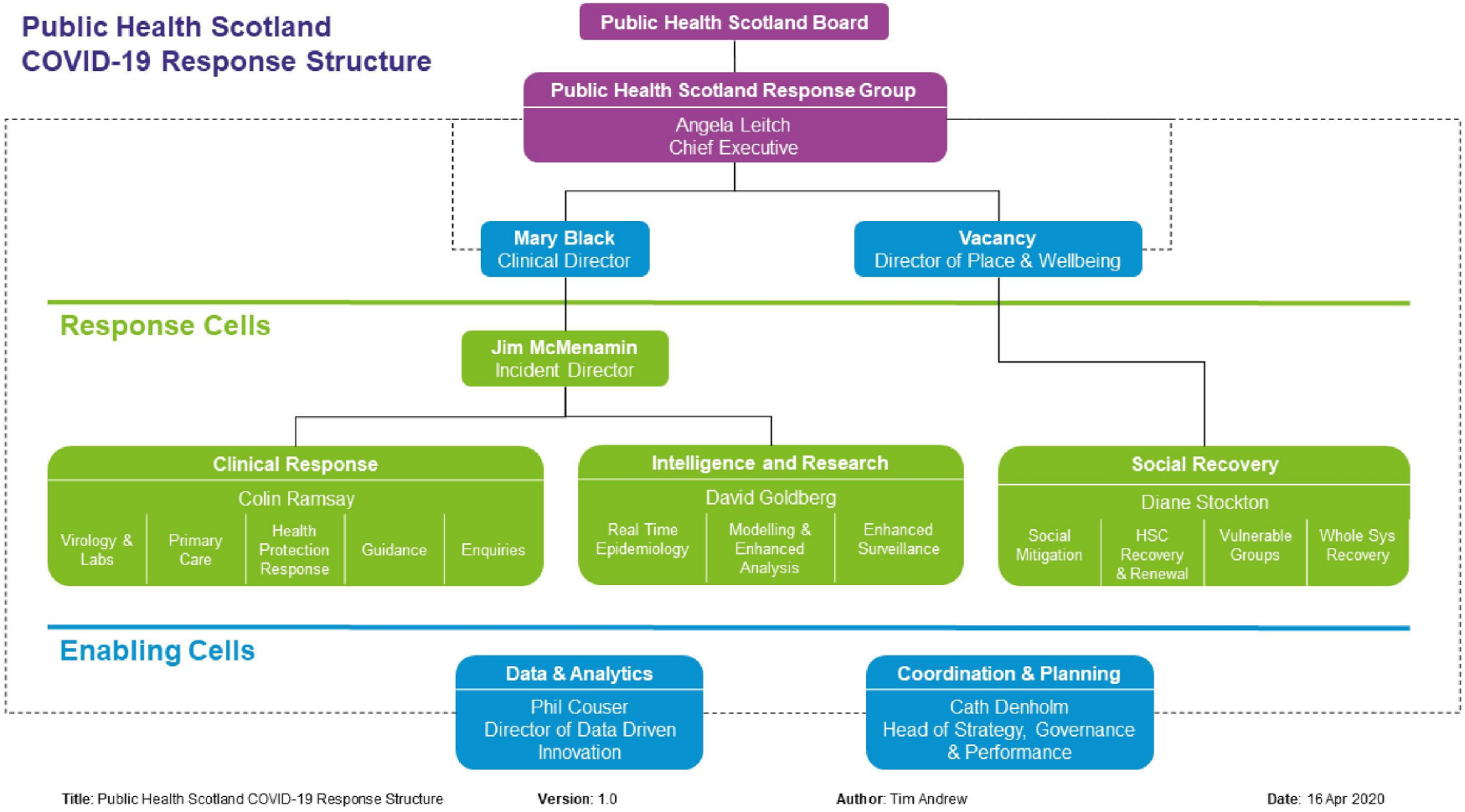
Name	Job Title	Description of role
Dr Claire Cameron	Strategic Lead, Immunisation (Jan 2011-April 2020) Consultant in Health Protection (April 2020 – present)	Dr Cameron has over 20 years' experience at a national level, focusing on immunisation. This includes Covid vaccination and ensuring continued high uptake of other immunisations. She has had lead responsibility for a range of vaccine preventable diseases, chaired national immunisation programme groups and represented PHS at the UK Joint Committee for Vaccination and Immunisation. During the pandemic she was part of the leadership team for covid immunisation at PHS, continued to work within the Scottish Immunisation Programme to ensure high uptake of other vaccines, and represented PHS at JCVI.
Professor Chris Robertson	Honorary Professor PHS Professor of Health Epidemiology in the Department of Mathematics and Statistics at the University of Strathclyde.	Professor Robertson has an honorary contract with PHS for the provision of statistical expertise and represents the organisation on SPI-M-O.
Dr Duncan McCormick	Consultant in Public Health (April 2020 – present)	Dr McCormick was lead contributor on health protection operational and advisory roles to SG policy team on contact tracing and VAM (Variants and Mutations) Planning.

Name	Job Title	Description of role
Dr Alison Smith-Palmer	Consultant Health Care Scientist	Dr Palmer-Smith was Real Time Epidemiology cell lead from start of Pandemic to January 2021. The cell was formed during the initial stages of the pandemic to undertake the real time epidemiological monitoring and reporting of the COVID-19 data. The role and function of the cell expanded as more data sources became available including LFD tests and test and protect exposure data for cases. During summer/autumn 2020, she provided some support to Enhanced surveillance cell as previous cell leads left PHS. Dr Palmer-Smith reduced time in PHS from January 2021, and passed cell lead for RTE to Dr Kim Marsh. From Jan 2021, she has focused in applications of the COVID-19 sequencing data working with academic partners.
Dr Kimberly Marsh	Consultant Health Care Scientist	Dr Marsh initially joined the Real Time Epidemiology Cell, replacing Alison Smith Palmer in January 2021. She worked alone in this role until January 2022, when Dr Maureen O'Leary came in to support and Dr Marsh focused more on VAMs and outbreak surveillance. In June 2022, I was appointed as acting lead of Respiratory Surveillance Unit, at which point the Real Time Epidemiology Cell was brought into the Respiratory Unit officially.
Dr Maureen O'Leary	Consultant Health Care Scientist	Dr O'Leary was co-lead of the Real Time Epidemiology cell from January to June 2022 and Lead of Real Time Epidemiology cell from June 2022 to current.
Dr Janine Thoulass	Consultant Public Health Medicine in the Gastro Intestinal & Zoonotic Infections (GIZ) Team	Dr Thoulass was Cell co-lead for Public Health input to Guidance. Between 28 Jan 2020 – 31 Aug 2020 Dr Janine Thoulass had a phased transition to PHS Surveillance.

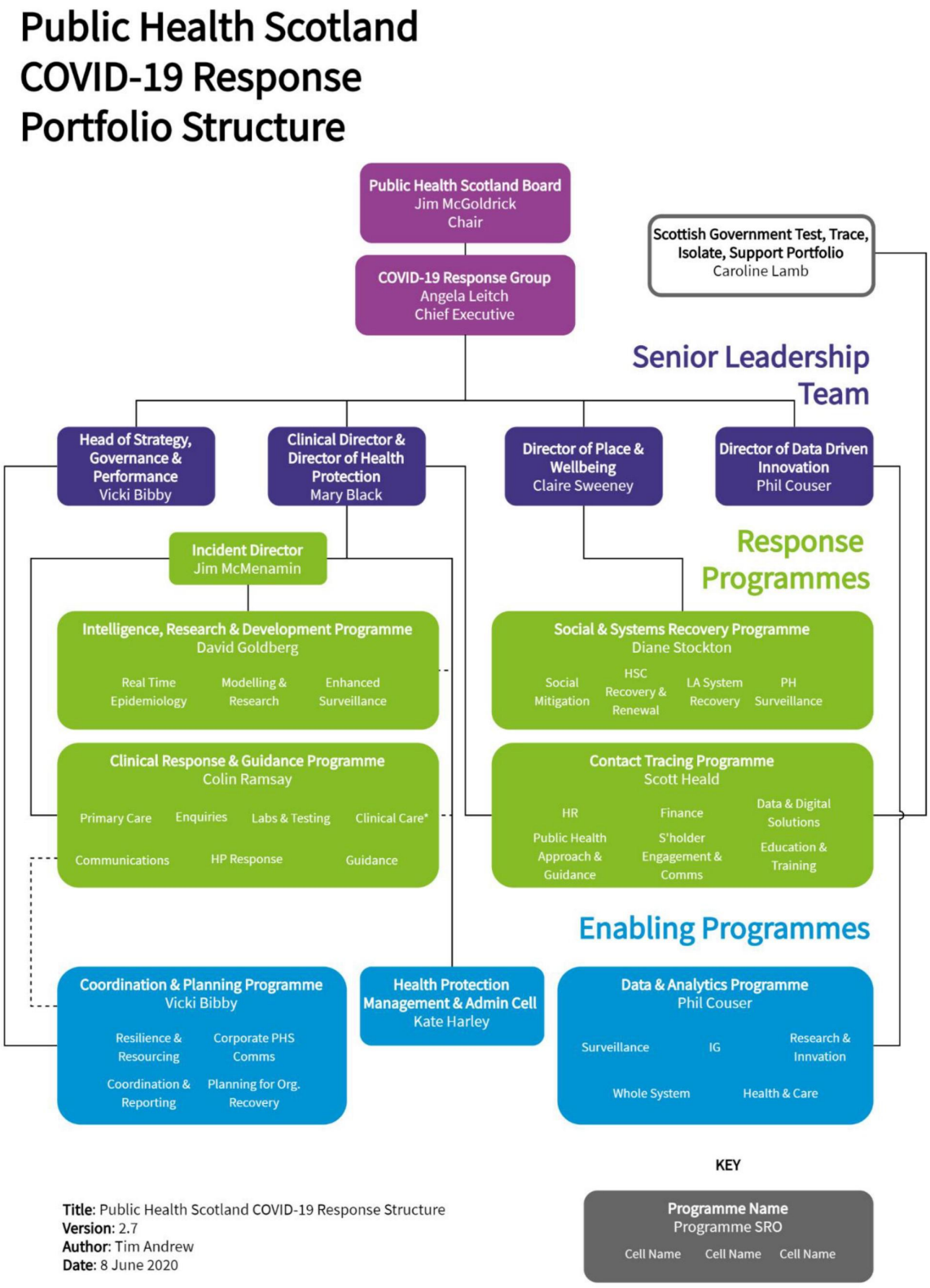
Name	Job Title	Description of role
Dr Gill Hawkins	Consultant Public Health Medicine	Dr Hawkins supported the general incident response, supporting as required by Incident Directors. Between 27 Jan 2020 – 29 Mar 2020 transferred to Chief Medical Office (CMO) Team. She was Cell co-lead for Public Health input to Guidance with Dr Thoulass.
Dr Kirsty Roy	Consultant in Health Protection	Dr Roy was Cell co-lead for Enquiries between 09 Mar 2020 – 31 May 2020 She was co-lead Guidance between 4 May 2020 – 13 Sept 2020 and also involved in contact tracing.
Dr Alex Stirling	Consultant in Public Health	Dr Stirling was cell co-lead for Public Health input to Guidance from 9 March 2020 – 1 December 2020
Dr Oliver Blatchford	Consultant in Public Health	Dr Blatchford was cell co-lead for Public Health input to Guidance with Dr Stirling and covered Health Protection Teams, Justice, Non-healthcare settings until 21 May 2021.
Dr Chris Redman	Epidemiologist	Dr Redman was responsible for Port Health Guidance between 28 Jan 2020 - 30 Sept 2022.
Dr Pauline Craig	Consultant in Public Health	Dr Craig was lead Consultant for non-healthcare / community and workplaces guidance (up to December 2021) and retired in November 2022.
Dr Jessica Baker	Consultant in Public Health	Dr Baker was Consultant for non-healthcare / community and workplaces guidance between April 2021 – January 2022
Dr Kate Smith	Consultant in Public Health	Dr Smith was Cell Lead Public Health input to Guidance between Nov 2020 - April 2021 and clinical lead between Oct 2020 – April 2021.

Name	Job Title	Description of role
Fiona Russell	Head of Data Management	Fiona Russell is the lead for data management. She provides advice on all aspects of data collection and quality, management and monitoring of all data flows (for over 100 datasets) to ensure availability for analysis. Fiona also works with a wide range of data suppliers to resolve local data issues, and IT suppliers for national data issues. Fiona supported the work across Clinical & Protecting Health (CPH) and Data and Digital Innovation (DDI) for COVID-19 reporting. With increasing volumes of testing in Scotland, the original data processing infrastructure and methodology that was established to react quickly to the Covid-19 pandemic became increasingly inefficient. A more viable and long-term solution to modernise our approach was to move all COVID-19 reporting from Electronic Communication of Surveillance in Scotland (ECOSS) to the Corporate Data Warehouse (CDW). ECOSS held all positive microbiology laboratory specimen results and a subset of antimicrobial susceptibility/resistance data in Scotland.
Scott Buchanan	Service Manager for COVID-19, Data & Analytics	Scott supported the work across Clinical & Protecting Health (CPH) and Data and Digital Innovation (DDI) for Covid-19 reporting. With increasing volumes of testing in Scotland, the original data processing infrastructure and methodology that was established to react quickly to the COVID-19 pandemic became increasingly inefficient. A more viable and long-term solution to modernise our approach was to move all Covid-19 reporting from Electronic Communication of Surveillance in Scotland (ECOSS) to the Corporate Data Warehouse (CDW). ECOSS held all positive microbiology laboratory specimen results and a subset of antimicrobial susceptibility/resistance data in Scotland.

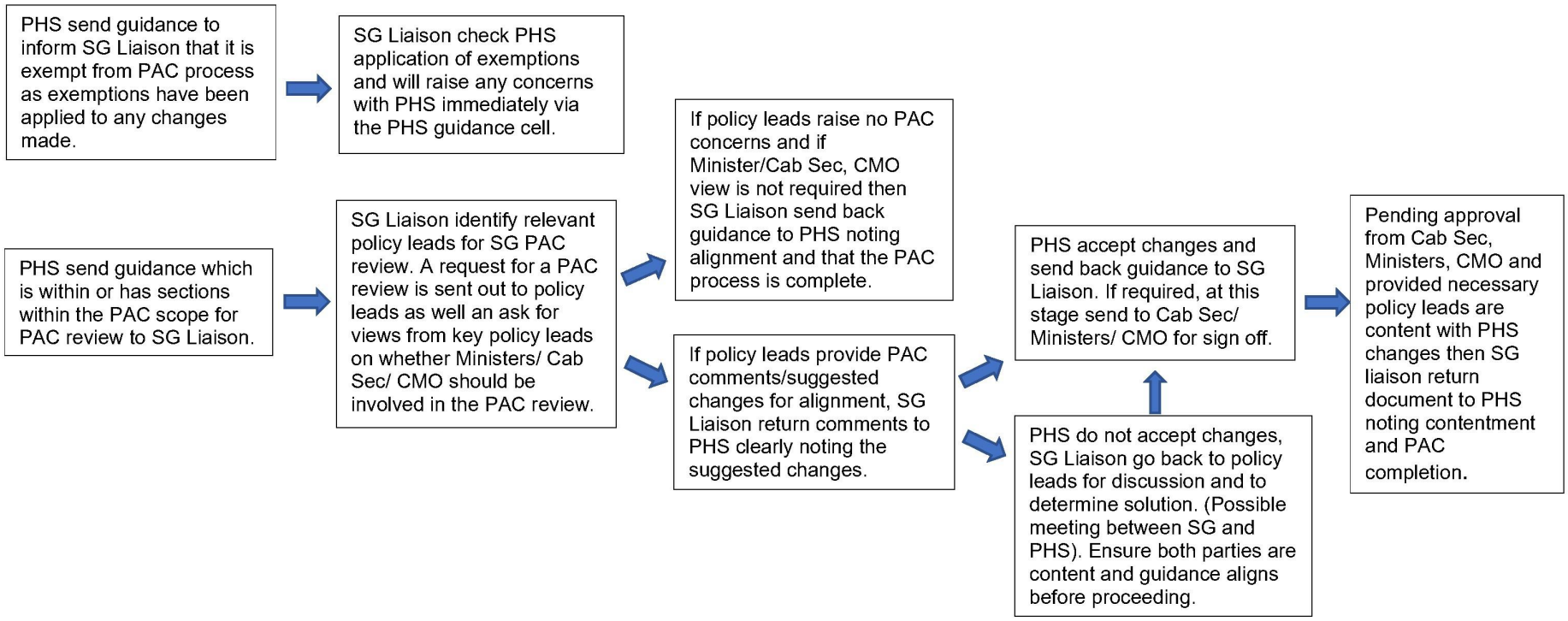
Appendix E: COVID-19 Response Structure as at April 2020



Appendix F: COVID-19 Response Structure as at June 2020



Appendix G: Policy Alignment Check Flowchart



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