Emergencies & Omissions
– the evolution of UK communicable disease administration and pandemic preparedness (1939-2019)

Expert Report for the UK COVID-19 Inquiry

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Executive Summary

i. This high-level historical report surveys the evolution of UK public health systems in all four administrations as well as the development of pandemic preparedness planning and response capabilities between 1939 and 2019.

ii. While UK public health systems evolved continuously, particularly pronounced periods of change occurred during the 1970s National Health Service (NHS) restructuring, following the introduction of the internal market in 1990, and in the two decades following the start of devolution in 1997.

iii. Until 2003, the Public Health Laboratory Service (PHLS) and its integrated network of public health laboratories and Communicable Disease Surveillance Unit (CDSU, est. 1976) provided important organisational continuity across England and Wales and functioned as a focal point for services in Scotland and Northern Ireland.

iv. The dissolution of the PHLS and significant health and public health systems reforms in all four administrations resulted in an increasing divergence of UK communicable disease control arrangements:

    a. England experienced the most far-reaching public health and health systems restructuring. Between 2000 and 2005, New Labour reformers decided to concentrate public health powers in the NHS, create a new statutory non-departmental Health Protection Agency (HPA, est. 2003) with responsibility for a wide range of health protection threats including radioactive and chemical incidents, and hand over the long-standing network of local PHLS laboratories to the English NHS. After 2010, responsibilities became fragmented and blurred. The Conservative-Liberal coalition government transferred health improvement functions from the NHS to local authorities. It also created Public Health England (PHE, est. 2013) as a new executive public health agency within the Department of Health with primary responsibility for health protection and discretionary power for health improvement. All administrations maintained the internal market and introduced additional private sector elements to public health and health

services. Meanwhile, reference laboratories in Colindale continued to provide specialist services for other devolved public health organisations.

b. Scotland decided to first consolidate existing NHS structures and then abolish the internal market in 2004 with the creation of 14 NHS health boards. Decision-makers refocused on a long-standing distinctive Scottish model of collaborative public health and health provision via primarily NHS-based organisations with strong central oversight from Edinburgh. While most public health microbiology was performed by NHS Scotland hospital laboratories, epidemiological oversight was initially provided by the Scottish Centre for Infection and Environmental Health (est. 1993). In 2005, surveillance and health protection capabilities were integrated within Health Protection Scotland (HPS) and expanded to include health promotion with the establishment of Public Health Scotland (PHS) in 2020.

c. In Wales, decision-makers decided to sever the formerly close institutional integration of English and Welsh public health systems. Between 2002 and 2003, public health services were moved into the Welsh NHS and the entire regional PHLS laboratory network and CDSC Cardiff were absorbed by the National Public Health Service (NPHS) Wales, which also employed public health staff in Local Health Boards. Major reforms in 2009 abolished the internal market purchaser-provider split, consolidated NHS structures into seven larger LHBs, and established Public Health Wales (PHW) as a distinct NHS Trust, which would combine health protection and promotion functions. The subsequent decade saw decision-makers emphasise partnership-based sustainable public health agenda setting with the creation of Public Service Boards (PSBs) and a 'health in all policies approach'.

d. Northern Irish public health reform was strongly impacted by repeated breakdowns of power-sharing. Until 2009, Northern Ireland relied on a mix of commissioning of microbiological and infection control services by Health and Social Services Boards (HSSBs). Most public health microbiology was conducted in laboratories run by Health and Social Services Trusts (HSSTs).

Meanwhile, epidemiological and specialist reference services were commissioned from the English PHLS and HPA. In 2009, the creation of a unified Health and Social Care Board (HSCB) resulted in completely integrated commissioning of health and public health services from Health and Social Care Trusts (HSCTs). Meanwhile, the establishment of a new body corporate in the form of the Public Health Agency (PHA) led to the fusion of health protection and promotion responsibilities and regional control over epidemiological surveillance. Subsequent reforms stagnated due to renewed breakdowns of power-sharing.

v. Administrative divergence between the four UK nations had significant implications on public health systems finance during the decade of austerity that followed the global financial crash of 2008/9. England's PHE and local authorities experienced the most pronounced budget cuts. The relative protection of NHS budgets in comparison to sharp local authority cuts reduced austerity's impact on Scottish and – to a more limited extent – Welsh public health systems. Meanwhile, Northern Irish systems experienced stress both as a result of budget pressures and political uncertainty.

vi. Budgetary pressures were compounded by organisational confusion resulting from the increased pace of public health reforms. In England, two major health systems reforms, the increasing number of public and private actors, and a succession of increasingly large-scale public health organisations created uncertainty about local and national infection control responsibilities. Local infection control competencies were further compromised by a pronounced shift in public health workforce composition, which saw clinical specialities concentrate away from the local level in centralised public health hubs. Meanwhile, the decision to end the long-standing English tradition of non-departmental statutory public health bodies with the creation of PHE as an executive departmental body increased political oversight and decreased the organisation's ability to act as an autonomous public health advocate within Westminster. In smaller nations, flatter hierarchies and collaborative arrangements seem to have reduced organisational dysfunctionality following larger health reforms. However, increasing administrative divergence between devolved administrations also complicated UK-wide infection control responses.

vii. UK pandemic preparedness was negatively impacted by the described budgetary pressures, organisational confusion, and loss of local public health infrastructures. Concerns about pandemic influenza had played an important role in shaping post war public health surveillance. However, formalised UK pandemic planning only evolved fitfully from the 1970s onwards.

viii. In 1997, the first multiphase contingency plan for pandemic influenza specified clear responsibilities for the Westminster Department of Health, PHLS, NHS bodies, and devolved administrations during a series of distinct interpandemic and pandemic phases. A succession of regularly updated pandemic influenza frameworks acknowledged the importance of clear command and control structures, effective local collaboration, and the rapid development and distribution of vaccines and stockpiled antiviral treatments and personal protective equipment (PPE) to slow rather than stop the spread of pandemic strains. Both medical and non-medical interventions such as school closures and border controls were considered and a clear strategic emphasis was placed on maintaining essential services and business continuity. Influenza-based contingency plans were applied to other viral threats such as Severe Acute Respiratory Syndrome (SARS) in 2003 and tabletop exercises assessed responses to various emerging diseases such as Ebola and Middle Eastern Respiratory Syndrome.

ix. While the SARS and the 2009 H1N1 pandemics did not lead to systems failures, they exposed the significant pressures respiratory pathogens could place on UK public health, health, and social care systems. The outbreaks and contemporary tabletop exercises also highlighted significant weaknesses resulting from confused infection control responsibilities at the local and national level, lacking surge capacity, and making relevant epidemic intelligence accessible to local responders. Despite these deep-seated structural problems, significant improvements in molecular typing, the integration of surveillance systems, and new vaccine platform capabilities engendered ongoing confidence in UK preparedness.

x. Between 2010 and 2019, significant budgetary and political pressures on PHE led to a degradation of UK pandemic preparedness stockpiles. In line with contemporary

political priorities, planning documents emphasized using behavioural nudges and modelling to optimise non-medical interventions such as social distancing during early stages of a pandemic. Major tabletop exercises such as Exercise Cygnus (2016) highlighted that existing arrangements would prove insufficient during a prolonged pandemic surge. However, no major structural adjustment or strengthening of preparedness plans, stockpiles, and infection control infrastructures occurred.

xi. Overall, the report identifies four key long-term challenges for UK infection control:

a. **Attention:** despite current generations' lived experience of multiple pandemics, the decades after 1945 have seen a consistent decline of societal awareness for infectious disease threats and corresponding investment in infection control infrastructures. Retaining and strengthening core infection control capabilities requires effective public health advocacy both in- and outside government. Moving forward, UK public health organisations require the scientific and political independence to robustly defend and improve infection control systems once societal attention fades and political priorities shift.

b. **Alignment:** public health is a collaborative multi-speciality endeavour that functions best when there is effective administrative alignment between concerned services at the local, regional, and national levels. Over the past 84 years, attempts to align services have become increasingly difficult as a result of broadening public health remits, the redirection of resources away from local services into specialist hubs, and administrative divergence in the wake of devolution. Meanwhile, the specific constitutional nature of UK devolution means that a *de facto* English public health body dominates key aspects of contingency planning for the entire UK. Creating a more sustainable alignment of UK-wide and national public health systems will require greater input from public health workers at all administrative levels and meaningful consultation between devolved administrations and Westminster.

c. **Emergency Priorities**: In contrast to the decentralised networked model of British public health surveillance and control capabilities, the last two

decades have seen UK contingency planners prioritise an increasingly top-heavy mode of preparedness planning. This centralised model relies on specialist hubs to provide integrated surveillance, epidemic intelligence, and rapid response capabilities to identify and quell emerging health threats. However, it also creates vulnerabilities should hubs of excellence experience bottlenecks or collapse during health emergencies. Moving forward, creating more evenly distributed and networked surveillance and infection control capabilities may be a more sustainable way of building resilient surge capabilities for the next pandemic.

d. **Selective Memories**: drawing on the past to create a robust evidence framework for future contingency planning is crucial for pandemic preparedness. However, work on this report has revealed an unsystematic, unrepresentative, and often uncritical way in which the UK public health system has so far engaged in memory capture. Official witness seminars have excluded critical voices, government inquiries have been selective in their choice of witnesses, data from across the devolved administrations is difficult to compare, and existing memory collection efforts have favoured English over Scottish, Northern Irish, or Welsh experiences. Institutionalising memory capture, creating comparable forms of data collection, and integrating independent and transparent academic research to create a robust and diverse historical dataset is extremely desirable. Regular and independent reviews of how UK health protection systems are addressing weaknesses identified by memory capture exercises can improve official accountability, maintain visibility for infectious disease threats, and prepare for the next pandemic.

Introduction

1. In January 2020, the UK's response to the COVID-19 pandemic relied on a public health infrastructure whose various components, in part, dated back to the 19th century. Understanding the heterogenous and often politicised evolution of this public health infrastructure as well as its wider societal context is crucial to assessing the overall state of UK preparedness and constraints it imposed on early-stage responses to the spread of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2).

2. This historical report provides a narrative high-level overview of the evolution of the UK's public health infrastructures, its various public health bodies, as well as of planning for pandemic events between 1939 and 2019. In line with the major shifts of public health policy that took place across all four UK nations during this time, the report is divided into three major parts. Each part assesses the evolution and performance of UK public health in light of contemporary developments in health legislation and funding, administrative structures, technology, and significant disease events that impacted on planning.

3. While public health is now widely held to be a multidisciplinary field that focuses on non-communicable and communicable diseases and is involved in both prevention and managing provision for existing health problems, the report is primarily concerned with the evolution of infectious disease control capabilities.[1]

4. Part One provides an overview of the post-war evolution of UK public health arrangements and infrastructures prior to the major health security-oriented regulatory reconfigurations that took place following the 1990s BSE crisis and the 2001 attacks on the World Trade Center and anthrax letters.

5. Part Two focuses on the period between 2002 and 2010 and the performance of new integrated health protection bodies at the level of the UK and the devolved nations, relations to local health services, and evolving pandemic preparedness planning amidst the 2003 and 2009 outbreaks of SARS-CoV-1 and A/H1N1 ('swine flu').

[1] Berridge, Virginia. *Public health: A very short introduction* (Oxford: Oxford University Press, 2016), 2-10; Hunter, D. J., L. Marks, and K. E. Smith, *The Public Health System in England* (Bristol: Policy Press, 2010).

6. Part Three analyses the period between 2012 and December 2019 with a specific focus on the impacts of new doctrines of localism amidst austerity-related cuts to local and public health budgets and the influence of new molecular technologies on laboratory infrastructures. Part Four summarises and discusses emerging trajectories from the period between 2002 and December 2019 in light of the subsequent SARS-CoV-2 outbreak.

Part One: From wartime emergency to internal market (1939-2002)

7. The UK's post-war public health infrastructure was a continuation of structures established in preparation for the wartime emergency. Since the late 19th century, national disease reporting requirements,[2] the hiring of fulltime Medical Officers of Health (MOHs), the creation of a Ministry of Health in 1919 (for England and Wales), the passage of the 1911 National Insurance Act, and the handing over of poor law services to local authorities by the 1929 Local Government Act had resulted in a heterogeneous and localised public health landscape.[3] While officials and experts could draw on increasingly detailed statistics of national, regional, and local disease incidence, local MOHs had powers of investigation to obtain information on outbreaks of disease, and powers of control over individuals and premises to curb or prevent outbreaks. However, despite overall health gains, local public health performance and access to high-quality services varied.[4] Ahead of the Second World War, concerns about decentralised structures' ability to respond to projected epidemics resulting from mass displacement or bacteriological sabotage led to plans for a dedicated network of public health laboratories to complement local services and integrate surveillance capabilities.

1939-1972: England and Wales

8. In England and Wales, an Emergency Public Health Laboratory Service (EPHLS) was to provide free local microbiology services to MOHs and other civilian and military authorities as well as more specialised epidemiological and typing services at the national level.[5] Mobilised in the summer of 1939, the EPHLS' wartime success in controlling disease outbreaks and boosting routine infection control and

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[2] Public Health Act 1875; Infectious Disease (Notification) Act 1889.

[3] Gorsky, Martin, 'Local leadership in public health: the role of the medical officer of health in Britain, 1872–1974', *Journal of Epidemiology & Community Health* 61/6 (2007), 468-472; Steere-Williams, Jacob. *The Filth Disease: Typhoid Fever and the Practices of Epidemiology in Victorian England* (Rochester: University of Rochester Press, 2020), 172-223; Webster, Charles, *The Health Services since the War.* Vol. 1 *Problems of Health Care. The National Health Service before 1957* (London: HSMO, 1988), 1-24; Berridge, *Public Health*, 65.

[4] Gorsky, Martin, 'Public health in interwar England and Wales: did it fail?', *Dynamis* 28 (2008), 175-198; Wilson, Graham Selby, 'Public Health Laboratory Service—Part II', *BMJ* 1 (1948), 678; Rowland, David, *Mapping Communicable Disease Control Administration in The UK. Between Devolution and Europe* (London: The Nuffield Trust, 2006), 14.

[5] Kirchhelle, Claas, 'Giants on Clay Feet—COVID-19, infection control and public health laboratory networks in England, the USA and (West-) Germany (1945–2020)', *Social History of Medicine* 35/3 (2022), 703-748.

surveillance capabilities led to its transformation into a permanent Public Health Laboratory Service (PHLS) under section 17 of the 1946 NHS Act.[6] The new PHLS was initially managed by the Medical Research Council (MRC) and its headquarters were in Colindale in north London. In the decades after 1945, the service played an important role in maintaining effective infectious disease control at the local level despite the split of community-level public health provision created by the new National Health Service (NHS): local authority MOHs retained responsibilities for communicable diseases and environmental health; General Practitioners (GPs) assumed responsibility for primary care and immunisation services (arranged with local authorities); and NHS Hospital Boards organised hospital care.[7]

9. Although there was no formal requirement to send samples or report disease outbreaks to the PHLS, public health laboratories' free microbiological testing service and easy access to specialised typing centres enabled them to act as local epidemic intelligence hubs. In London, accumulating data enabled reference laboratories and the small cadre of PHLS employed epidemiologists within the Central Public health Laboratory (CPHL) to create national disease surveys, assist local authorities during outbreaks, and assess and advise on the rollout of post-war vaccination programmes.

10. As a result of their perceived usefulness, the years between 1947 and 1969 saw the number of PHLS laboratories more than double from 28 to 63 – with many of the new laboratories located in local hospitals next to NHS pathology services. Although laboratory coverage privileged southern England due to the wartime priorities of the EPHLS, the extent of the PHLS network, its successful horizontal integration into local public health and health services, and strong vertical integration achieved by centralised microbiological reporting was unparalleled in Western Europe or North America.[8] Following prolonged negotiations, the 1960 PHLS Act established the

[6] National Health Service Act 1946.
[7] Rowland, *Mapping Communicable Disease Control Administration*, 15-16.
[8] Williams, *Microbiology for the Public Health. The Evolution of the Public Health Laboratory Service 1939-1980* (London: PHLS, 1985), 86; Kirchhelle, 'Giants on Clay Feet', 718; Howie, James, 'The Public Health Laboratory Service', *The Lancet* 265 (1965), 501-505.

PHLS as a statutory body corporate subject to ministerial direction with an appointed board.[9]

11. Its origins within academic hubs and initial management by the MRC enabled the PHLS to evolve a unique fusion of independent public health work and academic research. According to its later Director James Howie, the "MRC's name and reputation ensured a good quality of staff recruitment and a non-rigid type of central administration, sufficiently removed from day-to-day ministerial control to ensure that instant answers could be given to questions as they arose, and would be based upon expert technical direction."[10] PHLS directors – and the later PHLS Board – fostered an active internal research culture. At the local level, PHLS microbiologists were encouraged to work with MOHs and "apply methods of modern bacteriology and immunology in the field".[11] In national reference laboratories, PHLS microbiologists and epidemiologists studied viral growth cycles, discovered new pathogens, and analysed outbreak dynamics. Parallel technical innovations included but were not limited to the mechanisation of phenotypic typing procedures, development of new sampling devices for the surveillance of sewage and airborne pathogens, and early experiments with computer-based type identification. Centralised reporting and processing of unusual specimens also led to insights regarding the danger posed by horizontal antimicrobial resistance transfer and important guidelines for hospital design, food safety, and infection prevention and control. During a time of rapid decolonisation, the provision of microbiological reference services, technical expertise, and training by the PHLS also enabled the UK to exercise significant soft power, retain control of (post)colonial microbiological networks, and gain international recognition for academic excellence.[12]

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[9] PHLS Act 1960.

[10] Howie, James, 'Public Health Microbiology Services', in McLachlan, Gordon (ed.) *Improving the Common Weal. Aspects of Scottish Health Services 1900-1984* (Edinburgh: Edinburgh University Press/ Nuffield Provincial Hospitals Trust, 1987), 448.

[11] Williams, *Microbiology for the Public Health*, 19.

[12] Williams, *Microbiology for the Public Health*, 101-114; 135-142; Hardy, Anne, *Salmonella Infections, Networks of Knowledge, and Public Health in Britain, 1880-1975* (Oxford: Oxford University Press, 2015), 83, 131-133; 150-153, 179-198; Kirchhelle, Claas, and Charlotte Kirchhelle, 'Northern Normal–Laboratory Networks, Microbial Culture Collections, and Taxonomies of Power (1939-2000)', *SocArXiv* (2022) [under review ESTS], doi:10.31235/osf.io/yv5ck.

1939-1972: Scotland

12. Experiences in Scotland differed from those in England and Wales. By 1945, Scotland already had a longstanding tradition of independent public health legislation and independent health systems such as the Highlands and Islands Medical Service (est. 1913).[13] Between 1939 and 1945, senior Scottish microbiologists had advised decision-makers not to join the Emergency Public Health Laboratory Service (EPHLS) and instead establish a distinct emergency health service with affiliated public health laboratories, which were situated in universities as well as Glasgow's municipal laboratory (est. 1899).[14]

13. Scottish distinctiveness of health and public health services persisted after 1945. Following the passage of the 1947 National Health Service (Scotland) Act, Scottish health services were controlled by the Secretary of State for Scotland. This cabinet-level position outranked that of the Minister of Health for England and Wales and enabled Scotland to secure higher levels of funding for its own health services. It also resulted in greater central control over health services than in England. As a result of the 1947 Act, the heterogeneous landscape of public, private, and charitable health care institutions was merged into five regional hospital boards – which also controlled teaching hospitals. The new hospital boards administered hospital services on a regional basis including the co-ordination of diagnostic and laboratory facilities and associated research. At the local level, twenty-five local health authorities coordinated a variety of community-based services including immunisation and other aspects of preventative medicine. MOHs retained responsibility for public health services while GPs provided primary care.[15]

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[13] Public Health (Scotland) Act 1897; Whatley, Patricia E, *The Development of Medical Services in the Highlands and Islands of Scotland, 1843-1936* (Dundee: PhD diss., University of Dundee, 2013).
[14] Howie, 'Public Health Microbiology Services', 449.
[15] Stewart, John, 'Scotland and the National Health Service', *People's History of the NHS,* https://peopleshistorynhs.org/encyclopaedia/scotland-and-the-national-health-service/ [accessed: 05.05.2023]; Stewart, John, 'The national health service in Scotland, 1947–74: Scottish or British?', *Historical Research* 76/193 (2003), 389; Stewart, John, 'The Devolved Nations', in Exworthy, Mark; Russell Mannion, and Martin Powell (eds), *The NHS at 75. The State of UK Health Policy* (Bristol: Policy Press, 2023), forthcoming; Lothian Health Service Archive, *A History of the NHS. A New National Health Service for Scotland,* https://www.lhsa.lib.ed.ac.uk/exhibits/history_nhs_1.htm [accessed: 30.05.2023].

14. In contrast to England and Wales, most routine public health microbiology services continued to be performed by four Scottish university laboratories, NHS hospital laboratories, and municipal bacteriological laboratories in Glasgow and Edinburgh.[16] Despite many personal and scientific connections between Scottish and English public health workers, there were few formal links between the Scottish laboratories and the PHLS – except when reference laboratories in London were consulted to type rare pathogens. A Scottish Salmonella Reference Laboratory was established in Glasgow during the 1950s.

15. Concerns about the lack of vertical integration of Scottish laboratories and effective epidemiological oversight grew in the wake of two typhoid and paratyphoid outbreaks.[17] Caused by contaminated tinned meat from Argentina, the 1964 Aberdeen typhoid outbreak resulted in over 500 typhoid cases and had necessitated requesting external epidemiological and microbiological support from London's PHLS.[18] Shortly afterwards, a paratyphoid outbreak in central Scotland had been in progress for over two weeks before it was brought to the notice of the Scottish Home and Health Department (SSHD) as a result of bacteriological typing conducted in London. In response, Scotland established a dedicated Communicable Diseases (Scotland) Unit (CD(S)U) at Ruchill Hospital in Glasgow in 1967 to pool and analyse flows of Scottish microbiological and epidemiological data and support the investigation, control, and prevention of disease outbreaks.[19] In addition to helping local public health officials, CD(S)U would also act as a formal liaison with the PHLS in London and other international partners such as the World Health Organization (WHO).[20] Together with the Scottish Home and Health Department, the CD(S)U also

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[16] Williams, *Microbiology for the Public Health*, 28, 92 & 166; Smith, Charles, J., *Edinburgh's Contribution to Medical Microbiology* (Glasgow: Wellcome Unit for the History of Medicine, 1994), 69-120; 159-171, 176-182; Howie, 'Public Health Microbiology Service', 449, 451-452.

[17] Howie, 'Public Health Microbiology Service, 446; Rowland, *Mapping Communicable Disease Control Administration*, 21.

[18] Diack, Lesley, T. Hugh Pennington, Elizabeth Russell and David F. Smith, 'Departmental, professional, and political agendas in the implementation of the recommendations of a food crisis enquiry: the Milne report and inspection of overseas meat plants', in Smith, David F. and Jim Philips (eds.), *Food, Science, Policy and Regulation in the Twentieth Century. International and Comparative Perspectives* (London and New York: Routledge, 2000), 189-205.

[19] Howie, 'Public Health Microbiology Services', 450.

[20] *The BSE Inquiry: The Report; The Inquiry into BSE and Variant CJD in the UK*. Volume 9 (London 2000), Part 2 paragraph 9.24; Rowland, *Mapping Communicable Disease Control Administration*, 21.

fostered improved coordination across the human, animal, and environmental health domains with the creation of medical, veterinary and environmental health liaison committees from 1969 onwards.[21]

1939-1972: Northern Ireland

16. Northern Ireland was governed by its own executive and legislative body from 1922 until March 1972 when 'direct rule' from Westminster was imposed which remained in place, almost without interruption until 1999.[22] Although the evolution of health services in Northern Ireland mostly paralleled that in the rest of the UK, there were several differences. Following the creation of comprehensive health services following significant pressure from Westminster in 1948,[23] a major programme of hospital construction and investment in mental and dental health led to a relative improvement of health services across the province. A special centralised tuberculosis authority was charged with lowering high Northern Irish tuberculosis incidence. However, in contrast to the rest of the UK, constitutional differences led to an emphasis on devolved administration, with the government exercising general supervision of health systems, but day-to-day operations resting in the hands of distinct statutory authorities such as the Northern Ireland General Health Services Board and the Northern Ireland Hospitals Board, which also owned hospitals.[24] In 1967, the Public Health Act (Northern Ireland) dictated that powers to control infectious disease should be handed from local authorities to county health authorities.[25] Until 1973, County Medical Officers in eight Northern Irish health authorities (two urban and six county health bodies) oversaw the provision of public health via a County Public Health Inspector, whose duties were replicated by officers at the district level.[26]

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[21] Campbell, D.M., 'Public health liaison the Scottish Model', *International Journal of Environmental Health Research* 7/2 (1997), 156.
[22] Torrance, David, 'Northern Ireland: Direct Rule', *House of Commons Library* (London: Commons Library, 2022); *Expert Report to the Infected Blood Inquiry: Public Health and Administration* (August 2022), 31-32.
[23] Stewart, John, 'The Devolved Nations'.
[24] Health Services Act (Northern Ireland) 1948; Elder, A. T., 'Health Services of Northern Ireland', *British Journal of Preventive & Social Medicine* 7/3 (1953), 105-111; *The BSE Inquiry,* Volume 9, Part 3, paragraphs 13.1-5.
[25] Public Health (Northern Ireland) Act 1967; these powers were transferred to Health and Social Services Boards following their creation in 1973; Rowland, *Mapping Communicable Disease Control Administration*, 46; Privilege, John, *Four Decades of Public Health. Northern Ireland's Health Boards* (Londonderry: University of Ulster, 2010), 3.
[26] Privilege, *Four Decades of Public Health*, 4.

17. Similar to England and Wales, the wartime creation of emergency public health laboratories led to a significant improvement of local and national microbiology services. In 1953, a new large-scale Northern Ireland Central Public Health Laboratory (NI-CPHL) was opened in Belfast to coordinate laboratories performing public health work. Specialist microbiological and epidemiological work at the NI-CPHL was complemented by a network of subsidiary laboratories across Northern Ireland as well as collecting depots, which enabled practitioners to leave specimens for daily collection and transportation to the NI-CPHL in Belfast.[27] Although overall access to health and public health services improved during the post-war decades, escalating intercommunity violence from the late 1960s negatively impacted gains.[28]

1972-2002: UK

18. NHS, local authority, and public health services were fundamentally reorganised in all four UK nations between 1972 and 2002 amidst concerns about growing costs, worsening labour relations, and competing political and ideological visions of healthcare provision. Resulting reforms included attempts to streamline the provision of services with new and centralised structures, the introduction of management tiers, and a growing emphasis on cost-efficiency. In 1990, major reforms in England, Wales, and Scotland also saw the introduction of a purchaser-provider split of health services to encourage managed competition within an internal market.[29] Meanwhile, the accelerating epidemiological transition led to a growing focus on non-communicable diseases and environmental health and a relative deemphasis of infectious disease control by planners and the wider public health discipline. Although important institutions such as the PHLS survived, previously close-knit local-level infection control relations suffered as a result of the loss of MOH posts, budget cuts, and the introduction of the internal market.

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[27] Elder, 'Health Services of Northern Ireland', 109.

[28] McKenna, James; Manzoor, Farhat and Jones, Greta, *Candles in the Dark. Medical Ethical Issues in Northern Ireland during the Troubles* (London: Nuffield Trust, 2009); Privilege, *Four decades of public health*, 4; Stewart, John, 'The Devolved Nations'.

[29] Gorsky, Martin, 'The British National Health Service 1948–2008: a review of the historiography', *Social History of Medicine* 21/3 (2008), 437-460; Webster, Charles, *The National Health Service: A Political History* (Oxford: Oxford University Press, [1998] 2002).

1972-2002: England and Wales

19. In 1974, a major reorganisation of NHS and local authority services led to the abolition of the office of MOH in England and Wales. MOHs had played an important role in public health at the local level since the 19th century. However, with about 550 officers spread out over 1,244 local authorities, there were concerns about MOHs' capacity and ability to perform increasingly complex public health duties across the areas of communicable and non-communicable disease control.[30] As a result of the reorganisation, local community services were transferred to the NHS while duties for environmental health and communicable disease control remained with the local authority. The MOHs' functions for infection disease notification and control were transferred to 'proper officers' of local authorities – who typically appointed NHS-employed community physicians to the role – or to the authorities directly.[31] The vacuum created by the sudden abolition of a cadre of highly experienced public health workers with detailed knowledge of local politics, problems, and health, public health, and social services proved difficult to fill.[32] Rather than join the new NHS area health authorities, a significant number of public health workers sought early retirement.[33]

20. Communicable disease control was further weakened by regulatory misalignment resulting from the decision to leave intact local authorities' statutory powers and duties for infectious diseases despite moving most operative competencies to the NHS.[34] Occurring amidst budget pressures resulting from the 1970s recession, the ensuing lack of clear institutional 'ownership' for communicable disease control negatively impacted public health performance. It also decreased the attractiveness of relevant degrees with public health and medical education increasingly

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[30] 'The Medical Officer of Health', *British Medical Journal* 2/5513 (1966), 537; Copus, Colin, *The Political and Governance Implications of Unitary Reorganisation* (Local Government Association, 2023); Gorsky, Martin, 'The British National Health Service 1948-2008', 449.

[31] Lancaster, James, Peter Roderick, Allyson M. Pollock, 'The development of the system for communicable disease control in England from 1974 to 2019', in preparation.

[32] *Expert Report to the Infected Blood Inquiry*, 8; Gorsky, Martin; K. Lock, and S. Hogarth, 'Public Health and English Local Government: Historical Perspectives on the Impact of "Returning Home"', *Journal of Public Health* 36 (2014), 548.

[33] Pollock, George, *Fevers and Cultures. Lessons for Surveillance, Prevention and Control* (Abingdon: Radcliffe Medical Press, 2003), 27.

[34] Rowland, *Mapping Communicable Disease Control Administration*, 16.

emphasizing environmental health and social and community medicine.[35] In 1982, a review of communicable disease control capabilities complained:

> Most district medical officers (in Wales and Scotland, the chief administrative medical officers) have (…) little training or experience in this work and some virtually none; furthermore with the heavy burden of management responsibilities they have to bear for their districts they have little time to devote to this work. One wonders, therefore, if this original function of public health will pass from community physicians to microbiologists, infectious disease physicians or environmental health officers or perhaps wither altogether as even in these disciplines experience in infection control is less than in previous years.[36]

21. Neglect of infection control capabilities proved dangerous. During the 1980s, the HIV/AIDS pandemic, fatal outbreaks of salmonellosis at a mental health unit at Wakefield's Stanley Royd Hospital (1984) and of legionella at Stafford General Hospital (1985), and rising concerns about antimicrobial resistance (AMR) triggered repeated reviews of British public health and infectious disease control.[37]

22. In 1984, the Public Health (Control of Disease) Act consolidated disease control requirements. Reacting to further administrative fragmentation and workforce losses resulting from the 1982 abolition of NHS area health authorities, the Secretary of State initiated an inquiry into the future of the public health function. Headed by Chief Medical Officer (CMO) Donald Acheson, the inquiry's report was published in 1988. The Acheson Report recommended significant changes in regulatory arrangements: each health authority should employ a dedicated Consultant in Communicable Disease Control (CCDC) – initially to be called District Control of Infection Officer –, who should be accountable to the newly created, but non-statutory, office of Director of Public Health (DPH) of the district NHS health authority level. Regional DPHs would coordinate health protection across districts in their region and report annually on the health of the population. Meanwhile, NHS district health authority CCDCs should take over as local authority appointed

[35] Warren, M. D., 'The creation of the Faculty of Community Medicine (now the Faculty of Public Health Medicine) of the Royal Colleges of Physicians of the United Kingdom', *Journal of Public Health* 19/1 (1997), 93-105; public health education was reformed during the 1970s with the creation of new degrees in community medicine in London, Edinburgh, and Glasgow in close collaboration with the Royal College of Physicians.
[36] 'Communicable Disease Report – UK – January to March 1982', *Community Medicine* 4 (1982), 238.
[37] Kirchhelle, 'Giants on Clay Feet', 726.

'proper officers' to investigate and control disease. CCDCs would thus act as a key liaison between local authority staff such as environmental health officers, district and regional NHS services, and the PHLS. Importantly, they would also be able to draw on resources from NHS regional authorities for contact tracing and outbreak control.[38]

23. The Acheson Report provided a boost to public health morale and led to improvements in the organisation of communicable disease control. However, its overall impact was limited by subsequent failure to invest in increased clinical posts and by the introduction of the internal market and contracting with formal service charges. The new rules left CCDCs "[straddling] the purchaser-provider split"[39] and constrained their ability to act as effective liaisons across multiple NHS and local government levels. In the absence of significant public health reform, new guidance from 1993 merely stipulated that NHS bodies should establish clear plans for day-to-day and outbreak responsibilities and collaborate when necessary with the PHLS and other authorities.[40]

24. The PHLS also underwent repeated rounds of cost saving and rationalisation. During the 1970s, a series of slow and uncoordinated responses to serious infectious disease outbreaks such as the accidental release of smallpox at the London School of Hygiene and Tropical Medicine in 1973 highlighted the need for better integration of public health responses via centralised epidemic intelligence. Following the recommendations of the 1974 Cox report, the PHLS began to establish a US-inspired Centre for Disease Surveillance and Control (CDSC) in 1976. The purpose of the CDSC was to boost national surveillance mechanisms and provide rapid specialist help in the case of outbreaks while the PHLS' already existing Epidemiological Research Laboratory would focus on surveillance of

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[38] Berridge, Virginia, Christie, D.; and Tansey, E., *Public Health in the 1980s and 1990s: Decline and Rise?* (London: Wellcome Trust Centre for the History of Medicine at UCL, 2006), xxi–xxv; *Expert Report to the Infected Blood Inquiry*, 9.

[39] O'Brien, J. Michael, Sarah J. O'Brien, Alasdair M. Geddes, Bryan J. Heap, and Richard T. Mayon-White, 'Tempting fate: control of communicable disease in England', *BMJ* 306/6890 (1993), 1461-1464.

[40] Rowland, *Mapping Communicable Disease Control Administration*, 15-17; *Expert Report to the Infected Blood Inquiry*, 9; Pollock, *Fevers and Cultures*, 30; Kisely, Steve, and J. Jones, 'Acheson revisited: public health medicine ten years after the Acheson Report', *Public health* 111/6 (1997), 361-364.

vaccination programmes and hepatitis control.[41] According to the CDSC's first director, Nicol Spence Galbraith, the CDSC had the following characteristics:

> First, it is a national unit without executive powers, legal responsibility for disease control remaining local; second, it is part of the NHS with a medical staff of community physicians with the same status as their locally-based colleagues; third, it is a service unit with a national responsibility for communicable disease surveillance and control and a commitment to support local community physicians; fourth, it has the ability to deploy staff to meet local needs for disease control.[42]

25. Although an expansion of competences to environmental health was blocked,[43] the CDSC's popularity and national visibility as the PHLS' "epidemiological 'nerve centre'"[44] resulted in a rapid growth of its services: several CDSC epidemiologists were appointed across England and Wales, the formerly distinct Epidemiological Research Laboratory was subsumed into the CDSC in 1985, epidemiological training began to be offered in 1988, and an additional regional CDSC branch with control over the five Welsh laboratories was established in Cardiff in 1989.[45]

26. By contrast, the PHLS microbiology network contracted. The establishment of new PHLS laboratories in NHS hospitals had already been halted around 1970. Despite significant increases in the volume of processed microbiological samples, the 1970s saw 11 of the PHLS' 63 laboratories close amidst inflationary pressures – although staff were reassigned to other parts of the service. By the early 1980s, competition for limited public health resources amidst a growing emphasis on non-communicable diseases and government cost-cutting reviews posed an even graver threat to the service. In 1985, a Department of Health and Social Services (DHSS) review suggested that significant efficiency gains could be achieved by handing over all PHLS area and regional laboratories, which were jointly managed by PHLS and the hospitals they were based in, to NHS health authorities.[46] The

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[41] Williams, *Microbiology for the Public Health*, 135-136; Kirchhelle, 'Giants on Clay Feet', 726.
[42] Galbraith, N.S., 'A national public health service', *Journal of the Royal Society of Medicine* 74 (1981), 16–21.
[43] Williams, *Microbiology for the Public Health*, 119.
[44] *Public Health in England. The Report of the Committee of Inquiry into the Future Development of the Public Health Function* (London: House of Commons, 1988), 17.
[45] The five Welsh laboratories also continued to report to the main PHLS network, Kirchhelle, 'Giants on Clay Feet', 720; *Expert Report of the Infected Blood Inquiry*, 11; Lancaster et al., 'The development of the system for communicable disease control'.
[46] Kirchhelle, 'Giants on Clay Feet', 720-721.

proposal encountered significant public and parliamentary opposition. Critics alleged that stripping the PHLS of its laboratory network would undermine UK public health capabilities and that NHS authorities would be unable to maintain core public health laboratory services.[47] In response, the UK's Secretary of State for Health & Social Services rejected the proposal in 1985 and the PHLS maintained control of its network of now 52 microbiology laboratories.[48]

27. During the 1990s, organisational and financial strains on the remaining PHLS network were exacerbated by funding cuts and the implementation of the 1990 NHS and Community Care Act. Over previous decades, the PHLS had received grants from the Department of Health and Social Security and Department of Health to perform its work.[49] However, from 1990 onwards, a new internal market was established within the NHS whereby 'purchasers', which arranged services, commissioned them from 'providers' that delivered them. The new split and a growing government emphasis on 'value for money reviews' posed significant challenges to the PHLS network.[50] All but two of PHLS' peripheral laboratories were based in NHS hospitals and run jointly with them while diagnostic tests requested by doctors provided crucial data for the PHLS' national surveillance role. Certain laboratories also tested food and water samples for local authorities. Now, though, PHLS would have sole management of the laboratories and charge health authorities and GPs for diagnostic tests, in competition with hospital services and a rising number of commercial diagnostic laboratories. Implementing business-derived models of public health testing required the diversion of local PHLS human resources into creating accounting bureaucracies. More importantly, formalised charging also undermined long-standing economies of trust and well-honed working arrangements that had enabled the rapid informal exchange of information, samples, and laboratory labour between PHLS laboratories, NHS services, and local authorities.[51]

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[47] Howie, James, 'Threat to the PHLS', *BMJ* 290/6468 (1985), 579.
[48] Lancaster et al., 'The development of the system for communicable disease control'.
[49] Williams, *Microbiology for the Public Health*, 120-121.
[50] Kirchhelle, 'Giants on Clay Feet', 727.
[51] Bartlett, C.L.R., 'The Communicable Disease Surveillance Centre 1977-2002: an overview', *Communicable Disease and Public Health* 6/2 (2003), 94; *Witness seminar on the reform of communicable disease control*

28. To better align services and commissioning, the PHLS network was divided into 10 regional groups with devolved budgets between 1994 and 1996 – with the number of groups reduced to eight by 2002.[52] The PHLS also agreed a contract with the NHS Management Executive to continue the regional epidemiology function established jointly with regional health authorities in 1994. Regional PHLS epidemiologists in all eight NHS regional offices led the coordination of communicable disease control and prevention that crossed local boundaries. Accountable to the NHS regional director of public health, they were tasked with collecting and analysing data from laboratory and other notification sources, carrying out specialised surveillance, and aiding NHS regional offices and health authorities to implement new infection control schemes.[53]

29. The transition to the new business model was made even more challenging by government cuts to PHLS core funding. On paper, PHLS government revenue remained static only through transfers from its capital budgets. However, by 2002/2003, the switch to income from service provision meant that government funding accounted for only 41 percent of PHLS income (figure 1).

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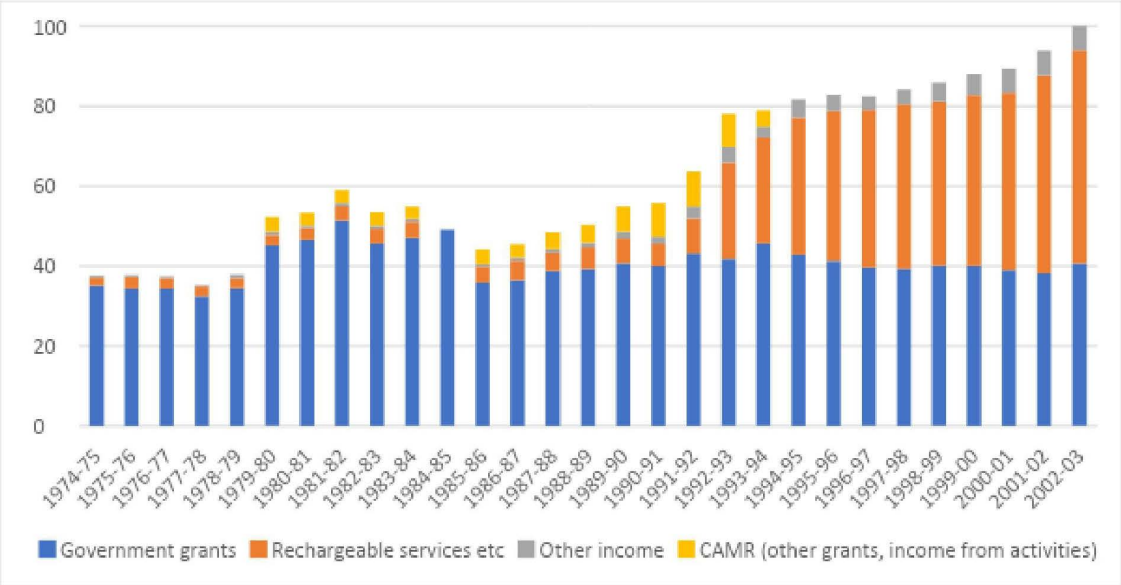
systems 1980s to 2019 (18.05.2023), forthcoming; Lancaster et al., 'The development of communicable disease'.

[52] The National Archives (TNA) JA 397/132-1 PHLS board meetings – papers + minutes: PHLSB 96/17, 25 April 1996. PHLS business plan 1996/97, 11; *Getting Ahead of the Curve – A Strategy of Infectious Diseases (including other aspects of health protection). A report by the CMO* (London: Department of Health, 2002), 105.

[53] Lancaster et al., 'The development of communicable disease control'*; Getting Ahead of the Curve*, 5.39.

Figure 1. PHLS income, 1974/75 - 2002/03, real terms, 2002/03 = 100



PHLSB annual report and accounts, 1974/75 to 2002/03; values calculated using HM Treasury deflator (HM Treasury 2022). Government grants include all Department of Health and Welsh Office funding; rechargeable services are broadly diagnostic services charged to the NHS; other income includes commercial work, laboratory media and culture services, occasional income, etc. Figure: James Lancaster, Lancaster et al., 'The development of communicable disease control'.

30. While navigating the new business models and shift of income streams, PHLS authorities continued to make significant investment in updating surveillance infrastructures. Responding to rising international concern about (re-)emerging infectious diseases and advances in molecular diagnostics, the PHLS began to replace phenotypic phage- and serotyping systems with pulsed-field gel electrophoresis (PFGE) capabilities.[54] In 1996, the service established a new integrated surveillance system for nosocomial infections.[55] In an attempt to move to real-time surveillance, the service launched a new National Surveillance Group in 1994, and the Epidemiology Information Technology Strategy to upgrade IT systems and replace paper-based reporting.[56] To ensure consistent data, the PHLS also organised national and international quality assessment schemes for food, water, and clinical microbiology covering 220 NHS laboratories and all 46 PHLS laboratories

[54] Kirchhelle, 'Giants on Clay Feet', 727.
[55] Cooke, E. M., R. Coello, J. Sedgwick, V. Ward, J. Wilson, A. Charlett, B. Ward, and A. Pearson, 'A national surveillance scheme for hospital associated infections in England', *Journal of Hospital Infection* 46/1 (2000), 1-3.
[56] Kirchhelle, 'Giants on Clay Feet', 727.

in England and Wales.[57] Resulting investment in new specialist IT, molecular, and training capabilities enabled the PHLS to remain in the vanguard of public health research and play a leading role in shaping emerging European infectious disease surveillance initiatives.[58] However, resources for more routine infection control at the local level became increasingly stretched.

1972-2002: Scotland

31. In Scotland, a distinctive 'communitarian' approach to health and welfare policies remained intact. The 1972 NHS (Scotland) Act led to a significant rearrangement of Scottish public health and health services. Similar to subsequent reforms in England and Wales, the 1972 Act led to the abolition of the office of MOH and the separation of what were once conjoined responsibilities for environmental and community health. Local authorities remained responsible for environmental health but responsibilities for community health were handed over to a new system of 15 NHS health boards under the Secretary of State for Scotland. The recently founded CD(S)U (see above) became part of a new Common Services Agency (est. 1972), which was designed to manage and coordinate NHS ancillary services across Scotland.[59] Although the separation of statutory responsibilities for community and environmental health strained infection control arrangements, negative fallouts were less pronounced than in other parts of the UK. According to historian John Stewart, the 1972 Act's design had been marked by a relatively high degree of political and professional consensus. Meanwhile, the smaller size of the Scottish health service enabled more effective governance and coordination of the reformed services.[60] Scottish authorities actively fostered collaboration between different specialities. At the level of Scottish Health Boards, chief administrative medical officers promoted collaborative working relations between community

[57] *Getting Ahead of the Curve*, 5.61.
[58] *Witness seminar on the reform of communicable disease control systems 1980s to 2019* (18.05.2023).
[59] Lothian Health Service Archive, *A History of the NHS. NHS Re-organisation in Scotland*, https://www.lhsa.lib.ed.ac.uk/exhibits/history_nhs_3.htm [accessed: 02.06.2023]; Rowland, *Mapping Communicable Disease Control Administration*, 21.
[60] Stewart, John, 'The national health service in Scotland, 1947–74', 390, 399-400.

medicine specialists, clinicians and microbiologists, and local and regional authorities.[61]

32. Collaboration also extended between the human and animal health domains. During the 1970s, CD(S)U officials actively facilitated the establishment of liaison and zoonoses committees (regional medical/ veterinary committees) across multiple health domains in all Scottish Health Boards.[62] Ties were further strengthened by the 1975 Zoonoses Order, which led to the secondment of a veterinary officer to CD(S)U headquarters in Glasgow.[63] By 1984, CD(S)U's weekly reports were based on information and microbiological work commissioned from 71 NHS Trust, academic, and private laboratories from across Scotland – 11 of which were veterinary laboratories.[64] This did not mean that there were no tensions. Contemporary observers noted that collaboration was strongest at the CD(S)U level but more episodic amongst senior Scottish microbiologists. There were also warnings that the ongoing performance of routine public health and diagnostic microbiological work at some universities occurred to the detriment of research.[65]

33. Applying to Scotland as well as England and Wales, the 1990 NHS and Community Care Act's internal market and formalisation of service provision challenged Scotland's long-standing emphasis on collaborative health services and proved deeply unpopular with the Scottish public and health care professionals.[66] Scottish authorities reacted to the new purchaser-provider split and resulting strains on communicable disease control arrangements by further integrating national-level competences for communicable and non-communicable health threats. Prefiguring

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[61] Brotherston, John, 'The NHS in Scotland 1948-1964', in McLachlan, Gordon (ed.), *Improving the Common Weal. Aspects of Scottish Health Services 1900-1984* (Edinburgh: Edinburgh University Press/ Nuffield Provincial Hospitals Trust, 1987), 134-136, 140-141, 145; Wilson, Scott, 'The Public Health Services', in McLachlan, Gordon (ed.), *Improving the Common Weal. Aspects of Scottish Health Services 1900-1984* (Edinburgh: Edinburgh University Press/ Nuffield Provincial Hospitals Trust, 1987), 316; Campbell, 'Public health liaison the Scottish Model', 155-159; Rowland, *Mapping Communicable Disease Control Administration*, 38-39.

[62] Campbell, 'Public health liaison the Scottish Model', 156-157.

[63] Reilly, W. J., J. C. Sharp, and P. W. Collier, 'Interprofessional liaison in Scotland', *The Veterinary Record* 111/17 (1982), 384-385.

[64] Howie, 'Public Health Microbiology Services', 450; by 2005 all of Scotland's microbiology services were provided by laboratories managed by NHS Trusts, Duerden, Brian, 'Twenty-first century medical microbiology services in the UK', *Nature Reviews Microbiology* 3/12 (2005), 979.

[65] Howie, 'Public Health Microbiology Services', 445, 451-452.

[66] Health reform became a major focus of the devolution and later independence movement, John Stewart, 'Scotland and the National Health Service'.

developments in the rest of the UK, the CD(S)U absorbed the recently founded Environmental Health (Scotland) Unit (est. 1989) in 1993 and was renamed Scottish Centre for Infection and Environmental Health (SCIEH).[67] With no local laboratories of its own, the new centre had four core functions: monitoring and surveying communicable disease and environmental hazards in Scotland, providing operational advice and support at both national and local levels, conducting research, and providing education and training.[68] Collaboration and service agreements with the PHLS ensured coordination of activities at the UK level and led to the provision of certain specialist reference work by Colindale.[69] At the policy level, SCIEH's coordinating function was complemented by the establishment of a new Public Health Policy Unit in 1995, which was charged with improving alignment of Scottish public health and health policies.[70] In line with growing concerns about infectious diseases and AMR, a new centralised Scottish Reference Laboratory was established in 1997 (MRSA Control Unit).[71]

1972-2002: Northern Ireland

34. The return of Northern Ireland to direct rule from Westminster coincided with major health systems reforms. In 1973, a large-scale restructuring of local and health administrations resulted in a merger of Northern Ireland's NHS with the broader social care system. The reforms were driven not by a theoretical model of integrated healthcare but by an urgent need to reform the discredited system of local governance amidst significant political tension.[72] Although the resulting system remained recognisably part of the "NHS family of systems,"[73] its integration of health and social care functions and reliance on commissioning was unique in the

[67] 'Scotland celebrates 50 years of its national unit for health protection', *HPS Weekly Report* 19/50 (17.12.2019); Campbell, 'Public health liaison the Scottish Model', 155-159; Rowland, *Mapping Communicable Disease Control Administration,* 21; *BSE Inquiry* Vol. 9, Part 2: Scotland, 9.24-25.
[68] Jones, I.G., 'The Scottish Centre for Infection and Environmental Health (SCIEH)', *Health Bulletin* 57/2 (1999), 94-98.
[69] *Getting Ahead of the Curve*, 5.34.
[70] *BSE Inquiry* Vol. 9, Part 2: Scotland, 9.22.
[71] National Health Service Scotland, 'Explore the history of the NHS in Scotland', *National Records of Scotland*, https://webarchive.nrscotland.gov.uk/20230324104912/http://www.ournhsscotland.com/history/timeline [accessed: 31.05.2023].
[72] Heenan, Deirdre, 'Northern Ireland', in Ham, Chris et al. (eds.), *Integrated care in Northern Ireland, Scotland and Wales. Lessons for England* (London: *The King's Fund*, 2013), 2, 4-5.
[73] Greer, Scott, L., 'Devolution and health in the UK: policy and its lessons since 1998', *British Medical Bulletin* 118 (2016), 18.

UK. Four integrated Health and Social Services boards (HSSBs) were created to function as agents of the Department of Health and Social Services, identify health and social care needs of people in their area, and organise services from a variety of health and social services trusts, hospital trusts, a separate ambulance trust, as well as voluntary and private organisations.[74] The overall idea was to rationalise the delivery of hospital, local authority, welfare, and specialist services across Northern Ireland.[75] However, similar to the rest of the UK, the new structures and the post-1967 separation of responsibilities for community medicine, which were now headed by chief administrative medical officers of the regional HSSB, and environmental health (remaining with local authorities) complicated public health responsibilities and enforcement remits. In the absence of formal cooperation structures, informal relations between former colleagues played an important role in maintaining public health service provision.[76] Meanwhile, infectious disease burdens remained high with half of all infant deaths attributed to infection resulting from poor living conditions.[77] Amidst the wider contemporary turn of public health activities towards health promotion and disease prevention,[78] Northern Irish authorities focused on targeted interventions such as closing immunisation gaps. However, overall work was compromised by 1980s administrative reforms that removed both district administrative medical officers and nursing management, budget cuts, and public health staff shortages. Amidst rising levels of poverty, community health activities declined, vaccination rates stagnated, and infectious disease burdens increased in poor urban communities.[79]

35. Public health morale was gradually restored from the mid-1980s onwards as a result of efforts by Northern Ireland CMOs, the reconfiguration of public health efforts via new DPH posts, and the creation of a new Health Promotion Agency (1990).[80] Northern Ireland was also spared some of the turmoil that other UK health

[74] *Review of Public Administration* [Research Paper 07/02] (Belfast: Northern Ireland Assembly, 2022), 6-7; Heenan, 'Northern Ireland', 5.
[75] Heenan, 'Northern Ireland', 5; Stewart, John, 'The Devolved Nations'.
[76] Privilege, *Four Decades of Public Health*, 15-16; 1967 Public Health Act (Northern Ireland).
[77] Privilege, *Four Decades of Public Health*, 19.
[78] Clark, Peder, 'Problems of today and tomorrow': prevention and the National Health Service in the 1970s', *Social History of Medicine* 33/3 (2020), 981-1000.
[79] Privilege, *Four Decades of Public Health*, 22-25.
[80] Privilege, *Four Decades of Public Health,* 27-31.

systems underwent following the introduction of the internal market (see above). Northern Irish HSSBs already had extensive experience in organising services from numerous providers and were familiar with target-led commissioning in the wake of Westminster's introduction of five year strategies from around 1980.[81] In response to political demands for locally sensitive commissioning and the introduction of GP fundholding (1993), HSSBs tried to maintain good relations between the public health and health workforce and formed a Regional Medical Services Consortium (1991) to collaborate in and lead commissioning initiatives for hospital services.[82]

36. However, integrated surveillance capabilities remained weak. Despite ongoing work by the CPHL in Belfast, service agreements for PHLS microbiology reference services, immunisation drives, and the introduction of new computerised health systems, concerns remained about Northern Ireland's ability to handle large infectious disease outbreaks.[83] In 1998, a review of communicable disease arrangements recommended establishing a regional epidemiology unit outside of the renamed Northern Irish Department of Health Social Services and Public Safety (DHSSPS). In a significant divergence from Wales and Scotland, the decision was made to contract out surveillance functions to the PHLS.[84] As a consequence, the PHLS established a Northern Ireland CDSC outpost (CDSC-NI) in Belfast in 1999. Based in Belfast City Hospital alongside the renamed Northern Ireland Public Health Laboratory, the CDSC-NI regional epidemiologist was a direct employee of the PHLS and reported to London while also being accountable to the Northern Ireland's DHSSPS and CMO.[85]

Summary

37. Despite the described legislative and administrative variations, the overall trajectory of health service and public health provision across all four nations of the UK was thus remarkably similar. As a result of the wartime emergency, the decades between 1940 and 1970 saw the establishment of integrated yet often quite

[81] Privilege, *Four Decades of Public Health*, 33; Donnelly, Michael, and Ciaran O'Neill, 'Integration–reflections from Northern Ireland', *Journal of Health Services Research & Policy* 23/1 (2018), 1-3.
[82] Privilege, *Four Decades of Public Health*, 38.
[83] Privilege, *Four Decades of Public Health*, 34 and 40; *Getting Ahead of the Curve*, 5.34.
[84] Rowland, *Mapping Communicable Disease Control Administration*, 20.
[85] Rowland, *Mapping Communicable Disease Control Administration*, 20.

informal local systems of infectious disease control based on MOHs, NHS services, and the autonomous network of PHLS laboratories in England and Wales, mostly NHS laboratories in Northern Ireland, and a mixed laboratory network in Scotland. In case of rare diseases or larger outbreaks, public health authorities in England and Wales could call in specialist epidemiological and microbiological assistance from the PHLS hub in Colindale. Similar hubs of expertise existed in Northern Ireland (Central Public Health Laboratory, 1953) and Scotland (Ruchill Hospital/ CD(S)U, 1969). Scottish and Northern Irish networks were connected to Colindale via informal contacts and formal reference service provision arrangements. In addition to standardising surveillance and improving infectious disease control, these microbiological and epidemiological hubs functioned as important locations of biomedical research. The overall result was a bottom-up system of infection control that could rapidly detect, react to, and provide surge capacity for classic infectious diseases but whose often informal arrangements could also complicate integrated regional or national responses to emerging threats. The described horizontal arrangements for infectious disease control came under increased pressure from ca. 1970 onwards. Amidst declining attention for infectious disease, reforms across the UK led to the abolition of MOHs, a stagnation of local public health and laboratory capacity building, and an increasing strain on informal work arrangements via cost-effectiveness reviews and internal markets. New ideals of epidemic intelligence also led to a growing emphasis on integrated intelligence gathering and specialist response capabilities in regional and national hubs away from the local level. In parallel to the slimming down of local infectious disease control infrastructures, centralised health protection bodies acquired a growing number of responsibilities for both communicable and non-communicable diseases. The increasing divergence between well-resourced centralised hubs and routine public health work at the local level marked an end to the wartime bottom-up model of horizontally integrated local infection control.

Part Two: Centralisation and Fragmentation (2002-2010)

38. The first decade of the 2000s saw the introduction of some of the most significant shifts in the structure and extent of British public health services since the creation of the EPHLS. In the wake of the 1997-8 devolution referendums, health services and public health capabilities were further devolved across the UK with significant differences emerging regarding local responsibilities and laboratory capabilities for communicable disease control. The creation of new national health protection bodies for communicable and non-communicable diseases in all four UK nations reflected the fusion of public health and national security agendas – with national security, unlike public health, being a 'reserved matter' in devolution legislation. Mirroring the prominence of preparedness thinking in international health as well as heightened domestic terrorism fears amidst the 2001 US anthrax letters and UK military interventions in Afghanistan and Iraq,[86] planners hoped that contingency planning, rapidly improving information technology and molecular typing capabilities, and integrated surveillance would enable them to counter emerging threats. The result was a technology- rather than personnel-intensive focus on strengthening new non-departmental hubs of epidemic intelligence as well as a shift of core-executive public health competencies from the Department of Health to the Cabinet Office with emergency powers enshrined in the 2004 Civil Contingencies Act. The fact that these new hubs rested on an increasingly fragmented system of slimmed down local communicable disease control infrastructures created significant vulnerabilities should centres fail to 'get ahead of the curve'.

2002-2010: England

39. Public health and health services reforms were most pronounced in England. Following the 1997 election, the Blair government engaged in a concerted effort to move power over health services back to the local level, improve the integration between health, social, and environmental services, and open parts of the health

[86] After the 2001 US anthrax letter episode, CDSC-NI had investigated 60 hoaxes involving white powder; Privilege, *Four Decades of Public Health*, 53.

services to the private sector.[87] In 1995, District and Regional Health Authorities had already been abolished and replaced with health authorities by the Health Authorities Act.[88] Between 2000 and 2002, more radical changes occurred. While some 300 Primary Care Trusts (PCTs) were set up via individual orders under the 1999 Health Act, health authorities transformed into 28 Strategic health Authorities (SHAs) under the 2002 NHS Reform and Health Care Professions Act.[89] SHAs were tasked with managing the performance of PCTs – including health protection services –, NHS Acute Trusts, and other NHS bodies within their area. PCTs were charged with improving the health of the community, securing high-quality services, and integrating health and social care. In the case of infectious disease control, this included assuming functions from former health authorities by employing non-statutory DPHs and delivering or commissioning immunisation and sexual health programmes alongside infection control services (e.g. infection control nurses, hospital control and isolation facilities, microbiological testing).

40. At the regional level, the performance and coordination of public health surveillance and response capabilities would be overseen by nine Regional Directors of Public Health (RDPH), who remained employed by the Department of Health and were answerable to the CMO.[90] Employing a doctrine of "constructive discomfort",[91] the government focused on setting performance targets and created incentives to promote the integration of private sector elements into the NHS. In 1997, NHS Trusts were empowered to enter into private finance agreements under the NHS (Private Finance) Act.[92] Public-private partnerships were introduced with the 2001 Health & Social Care Act.[93] Two years later, the 2003 Health and Social (Community Health and Standards) Act enabled trusts to become more commercial as NHS Foundation Trusts.[94]

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[87] Gorsky, Martin, 'The British National Health Service 1948–2008', 447-449.
[88] Health Authorities Act 1995.
[89] Health Act 1999; National Health Service Reform and Health Care Professions Act 2002.
[90] Lancaster et al., 'The Development of the system for communicable disease control; Rowland, *Mapping Communicable Disease Control Administration*, 28-30.
[91] Quoted according to Greer, 'Devolution and health in the UK', 19.
[92] National Health Service (Private Finance) Act 1997.
[93] Health & Social Care Act 2001.
[94] Health and Social (Community Health and Standards) Act 2003; Lancaster et al., 'The Development of the system for communicable disease control'.

41. The significant rearrangement of health services was coupled with major reforms of England's public health infrastructure. During the 1990s, public health challenges such as salmonella contaminated eggs, the Bovine Spongiform Encephalitis (BSE) crisis, the Scottish *E. coli* 0157 outbreaks, rising antimicrobial resistance (AMR), and the 2001 Foot and Mouth epidemic had revealed weaknesses in existing disease control arrangements. One issue identified by contemporary reviews was the poor integration of surveillance networks for human and zoonotic infections and unclear responsibilities for infection control.[95] Resulting reforms focused on creating independent specialist agencies capable of pooling and rapidly acting on surveillance data, conducting or commissioning effective research, and providing unconstrained advice and long-term guidance to ministers.

42. The first area to be targeted by English reformers was food security. Between 1997 and 2001, the Blair administration reacted to the described crises and new European standards by dissolving the Ministry of Agriculture Fisheries and Food (MAFF) and creating a new Food Standards Agency (FSA, est. 2001). The FSA was tasked with supervising and enforcing food safety provisions. To avoid conflicts of interest, the non-departmental FSA reported not to the newly created Department for Environment, Food, and Rural Affairs a (DEFRA, est. 2001) but to the Secretary of State for Health in England and health ministers in Scotland, Northern Ireland, and Wales with each devolved nation electing one board member. Additional executive bodies were established in each devolved administration.[96]

43. The FSA model of a specialist body operating at "arm's length"[97] from existing departmental structures and responsible for multiple areas of environmental, animal, and human health proved influential. In 1998, public health minister Tessa Jowell requested an infectious disease strategy from the UK and England's CMO Liam Donaldson (1998-2010). The resulting strategy document led to some of the

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[95] *Pennington Group: report on the circumstances leading to the 1996 outbreak of infection with E. coli 0157 in Central Scotland, the implications for food safety and the lessons to be learned* (Edinburgh: Stationary Office, 1997); House of Lords Select Committee on Science and Technology, *Resistance to Antibiotics and other antimicrobial agents.* 7th Report. Session 1997-1998 (London: House of Lords, 1998), 5.18; see also Bartlett, 'The Communicable Disease Surveillance Centre 1977-2022', 93-94.

[96] Food Standards Act 1999; Rowland, *Mapping Communicable Disease Control Administration*, 23-24.

[97] *The Food Standards Agency. A Force for Change*. (London: HMSO, 1998), paragraph 1.2.

most significant UK public health reforms since 1939. As a former DPH for the Northern Regional Health Authority and Regional Director for the NHS Region of Northern and Yorkshire, Donaldson was concerned that there "had been no real strategy in the history of the NHS for communicable diseases and infectious diseases."[98] To develop such a strategy, Donaldson initially resorted to the traditional approach of establishing and chairing an expert group (Communicable Diseases Strategy Group) and jointly writing a resulting strategy. However, little progress was made and the group fell into abeyance after some months.[99] In a subsequently criticised move,[100] Donaldson instead shifted to holding a series of expert meetings and using resulting "wisdom, ideas, views and proposals"[101] to co-author a strategy document with his deputy Patricia (Pat) Troop. Drafting was influenced by scoping exercises for public health emergencies and analyses of other public health systems such as the US Centers for Disease Control and Prevention (CDC), which relied on centralised epidemic intelligence and specialist assistance to coordinate public health and respond to outbreaks across autonomous US States.[102]

44. Published in January 2002, *Getting Ahead of the Curve – A strategy for combating infectious diseases* reflected Donaldson and Troop's ideals of a new integrated approach to public health alongside concerns about pandemic threats and post-9/11 anxiety about terrorism.[103] The strategy document's dark depiction of health threats to national security strongly resembled that of a similarly titled 1995 article titled *Emerging Infectious Diseases – Getting Ahead of the Curve* by former CDC chief and then US Surgeon General David Satcher.[104] Focusing on pandemic preparedness in England and the UK, it criticised the informal nature with which UK-wide infectious disease surveillance was coordinated, gaps in disease reporting,

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[98] 'Statement by Liam Donaldson', in Snow, Stephanie, Anthony Kessel, Buckley, Emmeline (eds.), *The History of the Health Protection Agency* 2003-2013. *Report of the Witness Seminar held at the HPA on 15.01.2013* (London: PHE, 2013), 25.
[99] 'Statement by Liam Donaldson', *The History of the Health Protection Agency*, 25.
[100] O'Brien, Michael J., 'Memorandum', *House of Lords Select Committee on Science and Technology Written Evidence* (October 2002).
[101] 'Statement by Liam Donaldson', *The History of the Health Protection Agency*, 25.
[102] 'Statement by Liam Donaldson', *The History of the Health Protection Agency*, 25; for information on the US system see: Kirchhelle, 'Giants on Clay Feet', 711-715.
[103] *Getting Ahead of the Curve*, 51-53.
[104] *Getting Ahead of the Curve*, 17-53; Satcher, David, 'Emerging infections: getting ahead of the curve', *Emerging infectious diseases* 1/1 (1995), 1-6.

and inadequate integration of disease control and emergency functions.[105] Overcoming these weaknesses would require breaking with the wartime model of an organisationally distinct communicable disease control infrastructure and creating a "modern system to prevent, investigate and control the infectious diseases threat and address health protection more widely."[106] A new "National Infection Control and Health Protection Agency"[107] should absorb and integrate the functions not only of the PHLS, but also of the National Radiological Protection Board, the Centre for Applied Microbiology and Research at Porton Down,[108] and the only recently established National Focus for Chemical Incidents. According to Donaldson, the idea of integrating all forms of health protection had emerged "part way through the [drafting] process":

> ...on the grounds that we saw foresaw circumstances in which that integration would be needed and we saw opportunities for a common surveillance system. (....) For that reason, mainly we took the policy decision. In theory we were proposing all this to ministers, but in areas which ministers would see as largely technical so they would not really attempt to second guess things a great deal and would be inclined to accept the proposal. The HPA was born out of that feeling that we had a unique opportunity to bring things together.[109]

In addition to centralised hubs of epidemic intelligence, local health protection services delivered by the new Agency would work with the NHS and local authorities to prevent, investigate, and control infectious diseases as well as chemical and radiological hazards.[110]

45. Within fourteen months of the publication of *Getting Ahead of The Curve*, a new Health Protection Agency (HPA) headed by former Deputy CMO, Patricia Troop, assumed responsibility for major incidents resulting from chemical and radioactive incidents alongside the protection against and prevention of communicable

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[105] *Getting Ahead of the Curve,* 101-126.
[106] *Getting Ahead of the Curve,* 14.
[107] *Getting Ahead of the Curve*, 14.
[108] The Centre for Applied Microbiology and Research (CAMR) at Porton Down had already been part of the PHLS between 1979 and 1994.
[109] 'Statement Liam Donaldson', *The History of the Health Protection Agency,* 25.
[110] *Getting Ahead of the Curve,* 14.

disease. Established as a special health authority in April 2003,[111] the organisation had large bases in Colindale, Porton Down, Chilton, and South Mimms and initially comprised six operational divisions (Local and Regional Services, Specialist and Reference Microbiology Services, Communicable Disease Surveillance Centre, Emergency Response Division, Chemical Hazards and Poisons Division, Business Division).

46. Following the passage of the 2004 Health Protection Agency Act, HPA was turned into a statutory non-departmental body and its six divisions were consolidated into three distinct centres (Centre for Radiation, Chemical, and Environmental Hazards (CRCE); Centre for Emergency Preparedness and Response; Centre for Infections (CfI)) and a Local and Regional Services (LaRS) division.[112] Responsibility for infectious disease control was divided between CfI, LaRS, and the Centre for Emergency Preparedness and Response. While the latter centre was charged with devising plans for public health emergencies, responsibility for routine infection control rested with CfI and LaRS. As part of the CfI, HPA's Specialist and Reference Microbiology Division subsumed the former PHLS' reference laboratory functions and international surveillance duties. However, in a significant change, it ceded control over the service's 32 local public health laboratories to NHS hospital trusts.[113]

47. Now directing only nine specialist public health laboratories – two of which were located in London –, HPA began to commission local public health microbiology work from NHS pathology services, whose laboratories were also supposed to report routine public health data back to the HPA. Complementing CfI, LaRS was established to serve as the 'eyes and ears' of the HPA, liaise with local and NHS authorities, and respond to emerging outbreaks. Stationed in nine regional offices across England's government regions, LaRS' 35 HPA Health Protection Units consisted of a mix of HPA specialists and former health authority communicable

[111] The Health Protection Agency Bill was published in November 2003 and Health Protection Agency Act was passed in July 2004; HPA Timeline, *The History of the Health Protection Agency*; Kirchhelle, 'Giants on Clay Feet', 735-736.
[112] CRCE was only created following the merger of the National Radiological Protection Board (NRPB) with the HPA Chemical Hazards and Poisons Division in April 2005; HPA Timeline, *The History of the Health Protection Agency*.
[113] *Public Health Laboratory Service Board. Account 2002-2003* (London: House of Commons, 2004), 3.

disease control staff including CCDCs. Should infectious disease outbreaks exceed LARS and CfI capabilities, the HPA chief executive's office would delegate responsibilities across the HPA.[114]

48. Closing England's longstanding network of local public health laboratories led to public controversy and serious reservations from a wide range of medical and professional bodies.[115] Proponents of the HPA's streamlined public health network highlighted the uneven historic performance of PHLS laboratories, the duplication of microbiological services at the local level, and problems resulting from varying NHS and PHLS testing and reporting protocols.[116] In an indication of animosities between the Department of Health and PHLS, Liam Donaldson later noted that there had been concerns within the Department that the "laboratory side and the epidemiology side of PHLS did not get on particularly well (...). There was also a tension on the laboratory side with the role of the PHLS labs in the NHS (...) [and] that over the years it was felt by the finance people in the DH that the PHLS had gained increases in funding relatively easy"[117] – a statement which is not borne out by a reconstruction of PHLS funding (see above).

49. By contrast, critics of the merger warned that the hasty handing over of PHLS laboratories would compromise UK public health: PHLS laboratories functioned as anchors for a variety of local public health services and as important nodes of national disease surveillance and response capabilities. Particular concern centred on whether PCTs could be relied on to continue commissioning public health laboratory work formerly performed by the PHLS following the expiry of ring-fenced government funding in 2005:

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[114] HPA Timeline, *The History of the Health Protection Agency*; Rowland, *Mapping Communicable Disease Control Administration,* 26; Kirchhelle, 'Giants on Clay Feet', 734-735; Lancaster et al., 'The Development of the system for communicable disease control'.

[115] Pennington, T. Hugh, 'Memorandum', *House of Lords Select Committee on Science and Technology Written Evidence* (October 2002); O'Brien, J. Michael, 'Memorandum', *House of Lords Select Committee on Science and Technology Written Evidence* (October 2002); Cartwright, Keith A.V., 'Letter from PHLS South West Group', *House of Lords Select Committee on Science and Technology Written Evidence* (October 2002); Faculty of Public Health Medicine, 'Memorandum', *House of Lords Select Committee on Science and Technology Written Evidence* (October 2002); Lancaster et al., 'The Development of the system for communicable disease control'.

[116] House of Lords Select Committee on Science and Technology, *Fighting Infection,* Session 2002-03 4th Report (London: House of Lords, 2003), Paragraphs 5.7-15.

[117] 'Statement Liam Donaldson', *The History of the Health Protection Agency*, 31.

> There is real and general concern about the capacity to deliver enhanced surveillance or to mount an acute response. (...). There appear to be no plans as yet for providing any material incentive for NHS laboratories to rise to the public health challenge, and a fear that in local tussles about funding, money will be diverted from public health purposes.[118]

Additional criticism was levelled at the HPA's varying geographic remits, which covered England in the case of infectious disease but the entire UK in the case of chemical and radiological incidents.[119]

50. The combined and rapid introduction of NHS, HPA, and civil contingencies reforms between 2000 and 2004 resulted in a period of public health upheaval. The 1988 Acheson report had tried to compensate for the removal of MOHs by creating a new chain of responsibility whereby local CCDCs would be accountable to a DPH of the local NHS body, who could mobilise specialist support from within the NHS or PHLS. This chain was now broken. Local authorities retained for now their responsibility for infectious disease protection and notification whilst their 'proper officers' were to become typically employed not by the NHS but by HPA.[120] The fracturing of the post-Acheson CCDC nexus between local authority and NHS services and the move of CCDCs into the more removed regional HPA Units clouded responsibilities during outbreaks. While joint planning between PCTs, HPA, and local authorities was encouraged, lack of funding and clarity meant that this did not occur uniformly.[121] Contemporary surveys also indicated that staff in PCTs, SHAs, and the HPA had different understandings of who was responsible for particular health protection functions and who was currently carrying them out.[122] The situation was made worse by the reduced communication between public health specialists in the different organisations.[123]

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[118] House of Lords Select Committee on Science and Technology, *Fighting Infection*, Paragraphs 5.7-15; Public Health Laboratory Service, 'Memorandum', *The Minutes of Evidence, House of Lords Select Committee on Science and Technology Tuesday 17.12.2002* (London: House of Lords, 2003).
[119] Rowland, *Mapping Communicable Disease Control Administration*, 6.
[120] Department of Health, *Health Protection Regulations: A Consultation* (London: Department of Health, 2009), 11.
[121] Rowland, *Mapping Communicable Disease Control Administration*, 33.
[122] Cosford, Paul A., Mary O'Mahony, Emma Angell, et al., 'Public Health Professionals' Perceptions toward Provision of Health Protection in England: A Survey of Expectations of Primary Care Trusts and Health Protection Units in the Delivery of Health Protection', *BMC Public Health* 6/1 (2006), 1–11.
[123] Keeble, Brian, 'Sleep Walking to Another Stanley Royd?', *BMJ* 333/7567 (2006), 557.

51. In the case of national emergencies, it was moreover unclear whether the HPA's status as a non-departmental authority would lead to parallel hierarchies with the NHS, whose SHAs were supposed to play a key role in coordinating pandemic influenza responses, the Department of Health, and the Cabinet Office.[124] Misunderstandings about the HPA's exact role were compounded by the new organisation's name, which gave rise to frequent misunderstandings that the HPA was responsible for "every nook and cranny of public health."[125] Although the non-departmental HPA had a wide-ranging remit to "do anything which it thinks is appropriate"[126] to protect the community and provide assistance, officials found that their actual powers were circumscribed by both the NHS and Department of Health.[127]

> On more of a day to day basis there was the parallel hierarchy within the NHS with the HPA and the local public health teams. If it was a straightforward outbreak it was usually okay but then with more complicated problems and forward-looking, the parallel hierarchies do give rise to dysfunctions.[128]

52. Organisational confusion was compounded by public health recruitment problems, low staff morale, and funding problems. The dispersal of the existing public health workforce across smaller PCTs and the HPA resulted in a significant loss of expertise and shortage of DPHs, who often had to be shared across several PCTs. Reacting to the difficulties small-scale PCTs experienced in commissioning appropriate services, the 2005 *Commissioning a Patient Led NHS* document halved the number of PCTs to 152 and reduced the number of SHAs from 28 to 10. However, there were ongoing concerns that PCTs were prioritising investment in social care and acute health services over the prevention and control of infectious diseases and that NHS laboratories were deprioritising public health testing.[129]

53. Contemporary data shows that these concerns were justified. Throughout the early 2000s, the overall increase in NHS England funding was paralleled by a stagnating

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[124] *History of the Health Protection Agency*, 32-3.
[125] 'Statement by William Stewart', *The History of the Health Protection Agency*, 27.
[126] Health Protection Agency Act 2004.
[127] 'Statement by Michael Harker', *The History of the Health Protection Agency*, 40.
[128] 'Statement by Liam Donaldson', *The History of the Health Protection Agency*, 33.
[129] Rowland, *Mapping Communicable Disease Control Administration,* 29-32; Kirchhelle, 'Giants on Clay Feet', 734-737.

public health workforce and an overall decline of resources dedicated to public health.[130] In 2005 and 2006, CMO Donaldson's annual reports warned that "public health budgets are regularly 'raided' to find funding to reduce hospital financial deficits or to meet productivity targets in clinical services".[131] Meanwhile, HPA officials complained that many of the newly employed CCDCs were NHS doctors as well and that the "needs of the NHS often trumped the needs of the HPA who actually paid their salary."[132] Capacity and funding problems extended to NHS microbiology services. In 2005, almost 10 percent of consultant medical microbiologist posts were unfilled. In 2006 – one year of the end of ring-fenced funding for PCT commissioned public health work – the NHS Pathology Services review warned that it was not obvious what accountability NHS Trusts had for financing local public health microbiology services in the medium- to long term.[133]

54. HPA itself only slowly developed its functional capabilities and an institutional identity. Later remembered as a "painful birth,"[134] fusing 80 in part long-standing organisations in 140 locations into a single customer-focused entity proved challenging. In the case of IT systems, administrators recalled that HPA inherited over 400 distinct applications, 40-50 websites, and at least 24 email systems.[135] With a shadow-management team only installed in January 2003, Troop initially estimated that it would take up to five years to fully integrate all HPA services.[136] Staff experienced this integration as challenging. The dissolution of local PHLS structures was described as "traumatic."[137] Internal relations between HPA Divisions and Centres were characterised as "territorial" with an "overriding lack of trust within component parts, which led to a lot of wasted energy on positioning small

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[130] Rowland, *Mapping Communicable Disease Control Administration*, 32.
[131] *The Chief Medical Officer on the state of public health. Annual Report 2005* (London: Department of Health, 2005), 40; *On the State of Public Health, 2006 Annual Report of the Chief Medical Officer* (London: Department of Health, 2007), 12.
[132] 'Statement by Stephen Gillespie', *The History of the Health Protection Agency*, 53.
[133] Duerden, Brian, 'Twenty-first century medical microbiology services in the UK', 980; Report *of the Review of NHS Pathology Services in England. Chaired by Lord Carter of Coles* (London: Department of Health, 2006), 43.
[134] 'Statement by Patricia Troop', *The History of the Health Protection Agency,* 26.
[135] 'Statement by Tony Sannia', *The History of the Health Protection Agency*, 45.
[136] 'Statement by Patricia Troop', *The History of the Health Protection Agency*, 27; see also accounts of PHLS opposition: 'Statement by Liam Donaldson', 31 and 'Statement by Michael Harker', 49.
[137] 'Statement by Brian Duerden', *The History of the Health Protection Agency*, 36.

politics and defending."[138] HPA staff nonetheless continued to engage in active infection control and prevention across England. Concerned about losing touch with local laboratories, senior HPA microbiologists toured HPA regions and NHS SHAs to "ensure that laboratories realised that they still had a major role in public health and in health protection."[139] A Regional Microbiology Network was established in 2006 to guarantee that there was one regional microbiologist to coordinate and link Colindale with NHS laboratories. Meanwhile, HPA Units engaged PCTs, SHAs, and local authorities to create relations of trust and awareness of services.[140]

55. With other international services studying the English model of integrated health protection, HPA officials later highlighted particular achievements such as HPA investment in syndromic surveillance, field epidemiology training (est. 2010), health-care associated infection control programmes, mathematical disease modelling, and HPA's involvement in shaping and evaluating UK vaccine policy as well as developing new vaccines.[141] HPA staff and research also continued to play a prominent role in European and international health bodies and as a form of UK soft-power projection with HPA's 2006 international strategy specifically focusing on capacity building in the so-called BRICS (Brazil, India, China, and South Africa).[142]

56. Work on many HPA projects was financed by external funding. Despite heightened anxiety about public health security, government support for the new agency was erratic. According to data presented at a 2013 witness seminar, HPA had received £116 million of funding from the Department of Health in its first year of existence.[143] Subsequent core government grants in aid (GIA) income rose to £193 million amidst the 2009 A/H1N1 pandemic before falling back down to £142 million in 2012/2013 – with staffing levels rising from 3,300 staff in 2003 to 4,100 in the

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[138] 'Statement by Peter Borriello', *The History of the Health Protection Agency,* 39-40; see also: 'Statement by Michael Harker', *The History of the Health Protection Agency,* 49.
[139] 'Statement by Brian Duerden', *The History of the Health Protection Agency*, 36.
[140] 'Statement by Mary O'Mahoney', *The History of the Health protection Agency*, 38.
[141] 'Statement by Mike Catchpole', *The History of the Health Protection Agency*, 64; Statement by David Heymann', 108.
[142] *The History of the Health Protection Agency*, 17.
[143] 'Statement by Patricia Troop', *The History of the Health Protection Agency*, 27; 'Statement by Tony Sannia', 44.

pandemic year and then declining to 3,700 in 2012/2013.[144] To supplement core GIA support, HPA planners focused on attracting external funding, which made up over half of HPA income in its final year of existence.[145] Similar to the PHLS (see Part One), external income resulted from charging for HPA services but was also generated by winning additional government and research grants. Despite initial internal resistance, HPA's Business Division used Business Development Managers and Opportunity Assessment Groups to professionalise relations with HPA service customers and encourage staff to apply for grants and schemes. Additional income was generated by commercialising HPA-generated intellectual property as in the case of the HPA-established company Syntaxin Ltd (est. Nov 2005).[146] Senior executives justified the intensified focus on generating external funding as a moral obligation that helped retain essential public health capabilities, saved taxpayer money, and incentivised a competitive research culture within HPA.[147] However, similar to well-known problems in international health,[148] increased reliance on earmarked and time-limited grant funding also risked distorting management priorities away from routine health protection towards more lucrative activities. Grant-facilitated capabilities could disappear following the end of funding and resulting differences in income could lead to internal animosities. According to the HPA's Chairman William Stewart (2003-2009), HPA infectious disease workers were disadvantaged by the new focus on grants:

> The NRPB [National Radiological Protection Board] did quite well out of it because they did not have a nuclear emergency every day, but in infectious diseases they had emergency after emergency and you simply could not drop what you were doing because somebody wanted you to do research full-time. (…). I remember speaking to Mark Walport, the Director of Wellcome Trust, and

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[144] 'Statement by Tony Sannia', *The History of the Health Protection Agency*, 44; we have been unable to verify senior officials' claim that actual core support declined year-on-year; 'Statement by Alan Stapley', *The History of the Health Protection Agency,* 57.

[145] 'Statement by Tony Sannia', *The History of the Health Protection Agency*, 44; 'Statement by Roger Gilmore', 53.

[146] 'Statement by Roger Gilmore', *The History of the Health Protection Agency*, 53; 'Statement by David Rhodes', 78.

[147] 'Statement by Justin McCracken', *The History of the Health Protection Agency,* 55; 'Statement by Peter Borriello', 56

[148] England, Roger, 'The dangers of disease specific programmes for developing countries', *BMJ* 335/7619 (2007), 565-565.

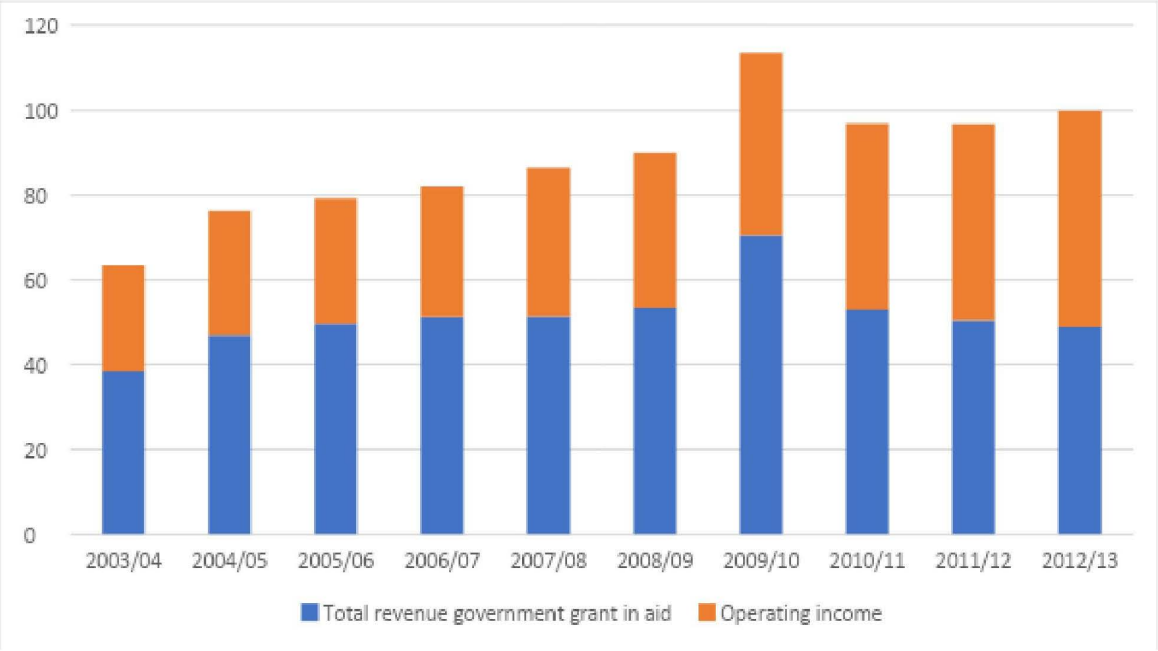
he said, 'I have given up on the HPA.' I said 'Why is that?' He said, 'It is because you cannot devote enough attention to what we want to do."[149]

57. After HPA had played a major role in the UK's pandemic response to the 2009 A/H1N1 Swine Flu response (see below), an internal reform programme developed by HPA's new Chief Executive Justin McCracken aimed to strengthen HPA's frontline responses and internal ties between microbiologists and epidemiologists. The agency's existing centres were to be reorganised into four divisions: a Microbiology Services Division, the CRCE, the recently joined National Institute for Biological Standards and Control (NIBSC), and a new Health Protection Services Division (incorporating the dissolved CfI's epidemiology staff and LaRS). After over 65 years in north London, microbiology and epidemiology staff were to relocate to a new public health sciences campus on Glaxo Smith Kline's New Frontiers Science Park in Harlow.[150]

58. The planned reforms were announced shortly before the newly elected coalition government under David Cameron decided to replace the HPA with a new public health organisation. Published in December 2010, the Department of Health's White Paper *Healthy Lives, Healthy People* (see below) set out a vision of a new public health body with joint responsibility for health protection and promotion. Plans for the creation of Public Health England (PHE) as an executive body within the Department of Health were confirmed in 2011. HPA was dissolved in April 2013.

Figure 2: HPA income, 2003/04 – 2012/13, real terms, 2012/13 = 100

[149] 'Statement by William Stewart', *The History of the Health Protection Agency,* 77
[150] HPA Timeline, *The History of the Health Protection Agency*; 'Statement by Justin McCracken', 47-48.



HPA annual report and accounts, 2003/04 to 2012/13; values calculated using HM Treasury deflator (HM Treasury 2022), Figure James Lancaster, 'Lancaster et al., 'The Development of the system for communicable disease control'.

2002-2010: Scotland

59. The new millennium also brought major changes for Scottish health and public health services. Following devolution, the years between 1999 and 2004 saw the Scottish government re-emphasize a collaborative approach to health service provision by abolishing the unpopular internal market alongside GP fund holding and service contracting – although it also undertook Private Finance Initiatives (PFIs).[151] The collaborative approach and need to tackle health inequalities was emphasized in official planning documents such as the 1999 white Paper *Towards a Healthier Scotland*.[152] Initial reforms saw the merging of Scotland's 47 NHS trusts into 28 local health care cooperatives to better integrate local services and clinical networks. However, in 2004, the NHS Reform (Scotland) Act by the Labour-Liberal Democrat coalition abolished trusts altogether and absorbed them into 14 unified NHS health boards as a single tier of governance alongside the 32 unitary local authorities.[153] A series of parallel reviews and reforms aimed to specifically

[151] Stewart, John, 'The Devolved Nations'; Hellowell, Mark and Allyson M. Pollock, 'New Development: The PFI: Scotland's plan for expansion and its implications', *Public Money and Management* 27/5 (2007), 351-354.
[152] *Towards a Healthier Scotland* (Scottish Executive, 1999).
[153] National Health Service Reform (Scotland) Act 2004.

strengthen collaboration between Scottish health and public health services. In 1999, a *Review of the Public Health Function in Scotland* had recommended establishing a new Public Health Institute for Scotland and improving long-term planning and collaboration across authorities via health impact assessments.[154] In 2003, a new paper titled *Improving Health in Scotland – The Challenge* led to the fusion of the Public Health Institute for Scotland with the Health Education Board for Scotland.[155]

60. Integration of responsibilities extended to the area of health protection. While national consultations revealed no desire to transfer the SCIEH's public and environmental health competencies to the new English HPA, decision-makers nonetheless decided to merge public health responsibilities for a wide range of communicable and non-communicable health threats.[156] Established in 2005 and reporting to the Scottish Executive and Scottish Health Protection Advisory Group, Health Protection Scotland (HPS) would act as a centre of epidemic intelligence capable of rapidly reacting to major incidents while liaising with other UK and European public health hubs. The new organisation integrated microbiological and surveillance capabilities formerly provided by the SCIEH and Common Services Agency. Rather than creating a parallel public health system and employing its own health protection teams, HPS worked as a division within NHS National Services Scotland to coordinate and assess health protection across individual NHS Boards via audits, advice, and operational support. A typical NHS board's public health department would consist of a DPH, consultants in public health medicine, and other specialists and support staff. Despite contemporary concerns about quality assurance and standardisation, Scotland's network of eight public health reference laboratories also remained managed by NHS Scotland Trusts. Now based in Scottish hospitals, the commissioned laboratories reported relevant microbiological data to

[154] *Review of Public Health Function in Scotland* (Scottish Executive, 2001); Rowland, *Mapping Communicable Disease Control Administration*, 39.
[155] *2015 Review of Public Health in Scotland: Strengthening the Function and Re-focusing Action for a Healthier Scotland* (2016), Annex D 'Public health policy: recent history' page 3.
[156] Rowland, *Mapping Communicable Disease Control Administration*, 36.

both the HPS and local infectious diseases consultants while new standardised operating procedures were meant to provide quality assurance.[157]

61. In line with the 2004 HPA Act in England, Scottish ministers had the right to confer certain functions to the HPA with the agreement of the Secretary of State for Health. This was done twice. In 2006, HPA acquired chemical and poisons advisory services functions from Scotland. One year later, HPA was also made the focal point for Scotland's implementation of the new International Health Regulations (IHR).[158] The 2008 Public Health etc. (Scotland) Act updated disease notification requirements and set out duties of Scottish Ministers, Health Boards and Local Authorities to make provision to protect public health in Scotland.[159] While the above-mentioned reforms reinforced the traditional collaborative Scottish approach to health and public health provision, systems' performance was also aided by lower population densities, fewer administrative tiers, and direct accountability to the Scottish Health Department.[160]

2002-2010: Wales

62. Between 2002 and 2010, Welsh public health arrangements diverged significantly from those in England. Health policy and the increasing rejection of the internal market emerged as important areas in which to establish political demarcations between Labour-led Cardiff and Westminster administrations.[161] Although the Welsh Assembly did not initially enjoy the power to introduce primary health legislation, the 1984 Public Health (Control of Disease) Act had already entitled it to make arrangements for the control of infectious disease that were distinct from England. The 2002 NHS Reform and Healthcare Professions Act further empowered the Welsh Assembly to replace five regional health authorities with 22 new Local Health Boards (LHBs), whose boundaries were coterminous with local authority

[157] Rowland, *Mapping Communicable Disease Control Administration*, 36-38; Duerden, 'Twenty-first-century medical microbiology services in the UK', 979.
[158] 'Statement by Jim Brown', *The History of the Health Protection Agency*, 37.
[159] Public Health etc. (Scotland) Act 2008.
[160] Rowland, *Mapping Communicable Disease Control Administration*, 39; Stewart, John, 'The Devolved Nations'.
[161] Farrell, Catherine, Jennifer Law, and Steve Thomas, 'Public health and local government in Wales: every policy a health policy–a collaborative agenda', in Bonner, Adrian (ed.), *Local Authorities and the Social Determinants of Health* (Bristol: Policy Press, 2020), 385-400; Stewart, John, 'The Devolved Nations'.

boundaries. In the field of public health, LHBs absorbed former regional functions including appointing DPHs and CCDCs. To improve coordination between local authorities and the national NHS organisation, most public health services – including employing the proper officer for public health – would be provided by a new National Public Health Service for Wales (NPHS).[162]

63. The institution of the NPHS marked a major departure from the formerly integrated English-Welsh public health system and was established in April 2003 after Welsh law-makers rejected the centralised health protection architecture set out in the 2002 *Getting Ahead of the Curve* strategy document (see above). Welsh officials highlighted that CMO Donaldson's plan had been developed without consulting them as well as the PHLS' track record in providing high quality local and regional disease surveillance and surge capacity.[163] The new NPHS was part of the Velindre NHS Trust from where it operated via a service level agreement. Its responsibilities included providing advice and support on health protection, communicable disease control, as well as other health issues and it was jointly accountable to the NHS and the Welsh Assembly Government Office of the CMO. In a noted difference to England's HPA, NPHS absorbed all five Welsh PHLS laboratories as well as associated field teams and CDSC Wales into its Infection and Communicable Disease Service. In Cardiff, CDSC continued to act as an epidemiological hub and advise the Welsh CMO on the control of communicable disease. At the LHB level, NPHS-employed DPHs (usually consultants in public health medicine) could call on the NPHS Infection and Communicable Disease Service when it came to accessing microbiological services and specialised health protection teams consisting of CCDCs, public health nurses, and other specialties.[164]

64. The decision to maintain former PHLS public health laboratories and integrate local and national level public health services within the NPHS avoided many of the coordination problems experienced by HPA in England (see above). However, the

[162] Rowland, *Mapping Communicable Disease Control Administration*, 41-45; Longley, Marcus, *Health Care Systems in Transition: the Welsh report* (Copenhagen: WHO Regional Office for Europe/ European Observatory on health Systems and Policies, 2004), 4-5; Farrell et al., 'Public health and local government in Wales', 386-7.
[163] Rowland, *Mapping Communicable Disease Control Administration*, 41-43.
[164] Rowland, *Mapping Communicable Disease Control Administration*, 20, 41-43; Howard, A. J., 'Infection and communicable disease control in Wales', *Communicable Disease and Public Health* 6/4 (2003), 270-271.

rupturing of formerly integrated English-Welsh health protection networks also posed problems. Welsh officials had to put in place new funding flows and service agreements to replace their formerly uncomplicated direct access to London-based specialist reference laboratories. Data flows from Wales to England also faced new administrative divisions – although CDSC Wales continued to function as the Zoonosis Surveillance Reference Unit for England and Wales.[165] It also soon became clear that LHBs' small size made it difficult to provide a critical mass of specialist services.[166]

65. In 2009, Welsh decision-makers therefore decided to abandon both the localist approach to health systems organisation and the unpopular purchaser-provider split by consolidating NHS structures into seven larger LHBs tasked with planning and delivering all services in their areas. Aiming to create a more distinct place for public health within the Welsh NHS, an all-Wales NHS Trust called Public Health Wales (PHW) was established on October 1st, 2009. In addition to managing health protection, epidemiological surveillance, and microbiology laboratory services, PHW was tasked with health improvement, health promotion, and child protection. Amidst stalling local government reforms, PHW employed the seven LHB DPHs and their staff of public health experts. The integrated network of former NPHS/PHLS public health laboratories as well as the CDSC in Cardiff were maintained.[167]

2002-2010: Northern Ireland

66. Following passage of the 1999 Northern Ireland Act, Northern Ireland regained competences for structuring its health and public health services. However, repeated suspensions of executive and legislative competencies (2000, 2001, 2002-2007, 2017-2020, 2022-) and temporary transfers of powers to Westminster via the Northern Ireland Office led to a relative de-prioritisation of health policy.

[165] Rowland, *Mapping Communicable Disease Control Administration*, 43.
[166] Farrell et al., 'Public health and local government in Wales', 387.
[167] Farrell et al., 'Public health and local government in Wales', 387-388.

The result was a period of health systems "drift and conflict-avoiding managerialism"[168] amidst accelerating demand on services.[169]

67. Infection control arrangements remained mostly unchanged until 2009. In 2003, the Northern Irish PHLS outpost (CDSC-NI) was subsumed into the HPA and continued to be run from London. A CDSC-NI representative was also present on a multi-agency Regional Advisory Committee on Communicable Disease Control, which provided advice on infection control to the Northern Irish CMO. Most microbiology services continued to be provided by local HSST laboratories and the designated Public Health Laboratory in Belfast, which could also be commissioned by HPA. Meanwhile, Northern Ireland's four Health and Social Services Boards (HSSBs) continued to act as commissioners of local and regional services from health and social service trusts. DPHs within the HSSBs had the statutory duty for infectious disease control in their region but could delegate this duty to local CCDCs or the Consultant in Public Health Medicine, who could summon help from CDSC-NI and the wider HPA infrastructure in case of larger disease outbreaks.[170]

68. Contemporary attempts to reform this system were slowed by the suspension of the Northern Irish Executive. Launched in 2002 and reporting in 2005 and 2006, a Review of Public Administration concluded that the four HSSBs should be replaced with a single strategic health and social services authority that would commission services from integrated health and social care bodies in Northern Ireland.[171] Although public health relations with London remained close,[172] a 2004 review of Northern Ireland's Public Health Function expressed concern about over-reliance on English services and suggested replacing HPA's CDSC-NI with a new regional

[168] Greer, 'Devolution and health in the UK', 19.
[169] Heenan, Deirdre and John Appleby, 'Health and social care in Northern Ireland: critical care?', *Nuffield Trust Comment* (2017), https://www.nuffieldtrust.org.uk/news-item/health-and-social-care-in-northern-ireland-critical-care [accessed: 31.05.2023].
[170] Rowland, *Mapping Communicable Disease Control Administration*, 46-48; Duerden, 'Twenty-first-century medical microbiology services in the UK', 979.
[171] *Better Government for Northern Ireland. Final Decisions of the Review of Public Administration* (March 2006); Privilege, *Four Decades of Public Health*, 50-54.
[172] 'Statement by Timothy Wyatt', *The History of the Health Protection Agency*, 90.

Northern Irish health protection body.[173] In 2006, a subsequent Health Protection implementation sub-group proposed merging responsibilities for communicable disease control, environmental health, and emergency planning with health promotion and well-being.[174]

69. Following the resumption of power-sharing in 2008, the 2009 Health and Social Care (Reform) Act (Northern Ireland) took forward proposals.[175] A new unified Health and Social Care Board (HSCB) was established alongside five Health and Social Care Trusts (HSCTs) and five Local Commissioning Groups (LCGs).[176] In advance of each year, HSCB would determine, in consultation with LCGs, the range of services to be commissioned from HSCTs, and identify corresponding LCG budgets. Each LCG Board would include one "person registered as a public health medicine specialist.[177] Although Northern Ireland retained the purchaser-provider split, its updated commissioning system differed substantially from England's internal market: commissioning was now located in a single centre of gravity with HSCB, which functioned like an arm of the health department, while HSCTs functioned as integrated territorial monopolies. Taken together, these reforms made Northern Irish commissioning more closely resemble the planning systems adopted in Wales and Scotland.[178]

70. In the case of public health, the 2009 Act foreshadowed developments in the rest of the UK by creating a new Public Health Agency (PHA) for Northern Ireland with integrated health protection and promotion functions. As a statutory body, PHA was subject to DHSSPS directions and was acting on its behalf. However, unlike Public Health England (est. 2013, see below), which was an executive body within the Department of Health and could be set up and dissolved without legislation, the fact that PHA had been created by the legislature indicated a more independent

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[173] DHSSPS, *Review of the Public Health Function in Northern Ireland. Final Report* (06.12.2004) (Belfast: DHSSPS, 2004).
[174] Rowland, *Mapping Communicable Disease Control Administration*, 47-48.
[175] Health and Social Care (Reform) Act (Northern Ireland) 2009.
[176] Health and Social Care (Reform) Act (Northern Ireland) 2009; Stewart, John, 'The Devolved Nations'.
[177] Thompson, Janice, 'Local Commissioning Groups: History, Establishment, Functions and Operation', *Research and Information Service Briefing Paper* 145/11 (2011), 2, 5.
[178] Greer, 'Devolution and health in the UK', 19.

relationship with ministers.[179] At the regional level, PHA was to work closely with HSCB to plan and commission services to meet population needs, provide information, and conduct research. It would also work closely with LCGs to promote both health protection and well-being at the local level.[180] In the case of communicable disease control, PHA's Director of Public Health assumed statutory duties for health protection and discharged these through a dedicated Health Protection Service (est. October 2009). In addition to providing regional surveillance and advice to the CMO, PHA's Health Protection Service would liaise with other UK health protection agencies and international organisations. It would also provide organisational support such as Health Protection Teams to HSCTs and Northern Ireland's 26 district councils. HSCTs in turn had the obligation to manage and prevent the spread of any outbreak of infection while district councils had a key role in managing outbreaks of foodborne illness, and other water and airborne infections associated with certain work activities.[181] In conjunction with HSBC, PHA would also develop emergency and pandemic flu plans, lead and contribute to workstreams under the Regional Pandemic Programme Board, and provide public health response and advice to other HSC bodies during an outbreak.[182] Following PHA's creation, a health protection duty room was established at the PHA Eastern Office in Belfast to act as "a single point for the collection and assessment of health protection information" and provide "a service similar to that offered by health protection units in England."[183] As outlined by PHA's infectious disease incident plan, microbiological investigations were usually the responsibility of consultant microbiologists at local HSCTs but could also be conducted by more specialised

[179] Health and Social Care (Reform) Act (Northern Ireland) 2009, section 12; Privilege, *Four Decades of Public Health*, 50-54.
[180] Donnelly and O'Neill, 'Integration'; Public Health Agency, *Corporate Plan 2009-2010* (Belfast: HSC PHA, 2009), 3-4.
[181] Public Health Agency, *Northern Ireland Infectious Disease Incident/ Outbreak Plan* 2013 *Version 1* (Belfast: HSC Public Health Agency, 2013), Appendix 6: roles and Responsibilities of Organisations; Hawker, Jeremy et al., *Communicable Disease Control and Health Protection Handbook* [4th edition] (Malden et al.: Wiley-Blackwell, 2019), 439.
[182] Public Health Agency, *Corporate Plan 2009-2010*, 11.
[183] 'Structure of the health protection service', *Transmit. Health protection service bulletin* [PHA] (June 2010), 1-2.

public health laboratories such as the Northern Ireland Regional Virus Laboratory and Public Health Laboratory, were both run by the Belfast HSCT.[184]

Pandemic Planning and Responses

71. Pandemic preparedness planning assumed increasing prominence throughout the analysed period. Since the 19th century, pandemic events had played an important role in shaping national health systems and emerging international legal frameworks and health organisations, which were designed to harmonise monitoring of and responses to the spread of pathogens. From the mid-20th century onwards, concerns about pandemic influenza played an increasingly prominent role in structuring these efforts.[185]

Pandemic Planning (1946-2003)

72. In the UK, influenza surveillance was a prominent feature of the post-war restructuring of public health networks. In 1946, the Virus Reference Laboratory of the newly founded PHLS was charged with establishing a diagnostic service for influenza and developing improved tests. By 1951, serological influenza diagnostic services were being offered by 10 PHLS laboratories but virus isolation was only available at Colindale, Nottingham, the University of Sheffield, and the National Institute for Medical Research (NIMR). A corresponding epidemiological intelligence centre was set up at NIMR where the WHO had also established its World Influenza Centre in 1948.[186] During the 1950s, accumulated international data on circulating strains and corresponding antibody levels in different population segments was used to assess outbreak risks. Although the first heat-killed vaccines had been made available to civilians in the US in 1945, researchers and manufacturers struggled to

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[184] 'Laboratory Services', *Belfast Health and Social Care Trust,* https://belfasttrust.hscni.net/service/laboratory-services/ [accessed: 31.05.2023]; Public Health Agency, *Northern Ireland Infectious Disease Incident/ Outbreak Plan* 2013 *Version 1* (Belfast: HSC Public Health Agency 2013), 4.35.

[185] Harrison, Mark, 'Pandemics', in Jackson, Mark, *The Routledge History of Disease* (Abingdon: Routledge, 2017), 129-146; Vagneron, Frédéric, 'Surveiller et s' unir?. Le rôle de l'OMS dans les premières mobilisations internationales autour d'un réservoir animal de la grippe', *Revue d'anthropologie des connaissances* 9/9-2 (2015).

[186] Williams, *Microbiology for the Public Health*, 70-71.

update them in time for new pandemic waves.[187] Concerns about response capabilities to influenza led to UK-sponsorship of MRC vaccine trials and the introduction of a PHLS-run "influenza spotting scheme" in 17 large cities where GPs would take and forward blood samples to PHLS laboratories.[188]

73. During the 1957/58 A/H2N2 ('Asian') flu pandemic, the PHLS conducted nation-wide surveillance and supported ultimately unsuccessful MRC trials of new live influenza vaccines. In 1968, the expansion of diagnostic tests throughout the PHLS system and new sickness recording schemes by the Royal College of General Practitioners rapidly picked up the spread of the A/H3N2 ('Hong Kong') variant. Improved mass data also gave rise to predictive mathematical models. However, despite the development of new split and subunit vaccines, the absence of sufficiently quick manufacturing responses meant that the value of testing and models was primarily deemed to be "'for public reassurance', in the context of persisting memories of the 1918-19 pandemic."[189]

74. During the 1970s, technological advances in vaccine production meant that it became possible to use surveillance data to rapidly produce and rollout large amounts of antigenically tailored vaccines in response to outbreaks. In 1976, the US launched a nation-wide rollout of a new influenza vaccine within slightly over nine months of the occurrence of A/H1N1 cases at Fort Dix. The rollout led to the vaccination of 45.65 million people with mostly split vaccines, but was halted in December 1976 following the detection of vaccine-associated adverse effects.[190] The 1976 experience triggered a formalisation of pandemic preparedness planning

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[187] *Influenza Historic Timeline* (Centers for Disease Control and Prevention (CDC)), https://www.cdc.gov/flu/pandemic-resources/pandemic-timeline-1930-and-beyond.htm [accessed: 22.05.2023], the WHO's Global Influenza Surveillance and Response System (GISRS) was established in 1952,
[188] Williams, *Microbiology for the Public Health*, 70-71.
[189] Williams, *Microbiology for the Public Health*, 102-103; see also: Pollock, T. M., 'Prevention of Influenza: Prevention of Influenza by Vaccination', *Proceedings of the Royal Society of Medicine* 60 (1967), 662-664; Stuart-Harris, Charles H., 'Pandemic influenza: an unresolved problem in prevention', *The Journal of Infectious Diseases* 122/ 1/2 (1970), 108-115; Barberis, Ilaria, Puja Myles, S. K. Ault, N. L. Bragazzi, and M. Martini, 'History and evolution of influenza control through vaccination: from the first monovalent vaccine to universal vaccines', *Journal of preventive medicine and hygiene* 57/3 (2016), E115.
[190] Barberis et al., 'History and evolution of influenza control through vaccination', E117; Iskander, John, Raymond A. Strikas, Kathleen F. Gensheimer, Nancy J. Cox, and Stephen C. Redd, 'Pandemic influenza planning, United States, 1978–2008', *Emerging infectious diseases* 19/6 (2013), 879-80.

and research. In the US, a federal interagency group on influenza was formed in 1977 and the first US pandemic plan was released in 1978.[191]

75. Similar developments occurred in the UK. Throughout the 1970s, the PHLS, Department of Health, and MRC had continued to improve UK surveillance infrastructures, trial vaccines, and hone predictive models. In 1969, a PHLS Staff Committee had discussed methods available for case-finding and a joint subcommittee was set up with the Royal College of General Practitioners in 1972.[192] In reaction to the 1976 outbreak, a Pandemic Working Group was established by the MRC (United Kingdom) Committee on Influenza and Other Respiratory Virus Vaccines in March.[193] In the same year, the PHLS Virus Reference Laboratory assumed joint responsibility with NIMR for running the new WHO Collaborating Centre for Reference and Research on Influenza in 1976.[194] However, no formal UK pandemic plan seems to have been published and overall UK emergency vaccine production capabilities remained insufficient to adopt the population-wide vaccine strategy employed in the US. While mid-1970s routine production capabilities for annually updated flu vaccines were estimated to be at slightly over one million doses, emergency capabilities for a monovalent flu vaccine were deemed to be at around three million doses.[195]

76. More proactive forms of contingency planning emerged in the wake of the HIV/AIDS pandemic and rising concerns about (re-)emerging infectious diseases. Originating in US tabletop exercises and a series of high-level reports on infectious disease threats, a new paradigm of pandemic preparedness began to foreground pandemics as national security threats. Formalisation of this new biosecurity

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[191] Iskander et al., 'Pandemic influenza planning, United States, 1978–2008', 880; Dehner, George, 'WHO knows best? National and international responses to pandemic threats and the "lessons" of 1976', *Journal of the History of Medicine and Allied Sciences* 65/4 (2010), 478-513.

[192] PHLS Working Group, 'A programme for collaborative influenza surveillance', *Epidemiology & Infection* 75/1 (1975), 1-6; Pereira, Marguerite S. and Pratima Chakraverty, 'The laboratory surveillance of influenza epidemics in the United Kingdom 1968–1976', *Epidemiology & Infection* 79/1 (1977), 77-87; Williams, *Microbiology for the Public Health*, 156-158.

[193] Pandemic Working Group of the Medical Research Council (United Kingdom) Committee on Influenza and Other Respiratory Virus Vaccines, 'Antibody responses and reactogenicity of graded doses of inactivated influenza A/New Jersey/76 whole-virus vaccine in humans', *Journal of Infectious Diseases* 136/ Supplement_3 (1977), S475-S483.

[194] Williams, *Microbiology for the Public Health*, 157-158.

[195] Dehner, George, 'WHO knows best?', 496-497.

paradigm rested on the transfer of concepts of military intelligence and Cold War civic emergency frameworks to the field of public health. Epidemiological forecasting was used to identify and rank potential public health threats, which would be used to inform the creation of targeted surveillance, intelligence, and response capabilities including stockpiles of vaccines, treatments, and personal protective equipment (PPE).[196]

77. In the UK, a Department of Health Working Group on Pandemic Influenza was established during the 1980s and a formalised PHLS action plan was published by the PHLS Influenza Subcommittee in 1993.[197] The action plan detailed PHLS responsibilities during five distinct inter-pandemic and pandemic phases. National responsibility for inter-pandemic surveillance rested with the CDSC and central reference laboratories in Colindale, who would supply PHLS area and regional laboratories with up-to-date diagnostic techniques for influenza. Should a concerning antigenic shift be detected, a Pandemic Working Group would be convened to consider necessary preparations. Once a pandemic hit the UK, the Pandemic Working Group would coordinate PHLS activities such as the provision of surveillance data, diagnostic testing, and advice on prophylaxis, clinical management, and treatment.[198]

78. In March 1997, relevant health services across the UK received a similarly structured *Multiphase Contingency Plan for Pandemic Influenza*. Released as a result of WHO alerts and fatal avian flu (A/H5N1) cases in Hong Kong, the plan contained information on six distinct pandemic and interpandemic phases, the risk posed by avian influenza, and instructions on how to prepare for and respond to a pandemic including draft information leaflets and briefings. The stated aims of the plan were to: reduce morbidity and mortality from influenza illness, cope with large

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[196] Snowden, Frank M., 'Emerging and reemerging diseases: a historical perspective', *Immunological reviews* 225/1 (2008), 9-26; Caduff, Carlo, *The Pandemic Perhaps: Dramatic Events In A Public Culture Of Danger* (Berkeley: University of California Press, 2015), chapters one and three; Rosner, David and Markovitz, Gerald, *Are we ready? Public Health since 9/11* (Berkeley: University of California Press, 2006); King, Nicholas B., 'The scale politics of emerging diseases', *Osiris* 19 (2004), 62-76.

[197] TNA JA 628/23 Working Group on Pandemic Influenza. Morgan-Capner, P., and PHLS Influenza Subcommittee, 'The PHLS response to a pandemic of influenza: An action plan', *European Journal of Epidemiology* 10 (1994), 497-502.

[198] Morgan-Capner, 'The PHLS response to a pandemic of influenza'.

numbers of sick and dying individuals, ensure essential service continuity, and provide timely information for responders and the media.[199]

79. Predicting a peak of epidemic activity for six to eight weeks, the plan identified priority groups for influenza vaccination and delineated regional and national arrangements for the stockpiling of and delivery of vaccines, antivirals, and other relevant supplies. To cope with rising demand, NHS Trusts should draw on locum pools of medical personnel, which could include both trainee and retired doctors. Effective local liaison was deemed essential to guarantee continuity of health and other essential services. The UK Department of Health would coordinate and facilitate the ordering, production, licensing, and distribution of vaccines. It would also work with NHS Supplies to ensure sufficient supplies of antibiotics and other essential drugs. PHLS CDSC in Colindale would pool and analyse epidemiological information from all relevant sources and communication would be provided by a cascade from the CMO to devolved administrations, doctors, and the public.

80. Devolved administrations were expected to play an important role in tailoring the UK-wide response to national health systems. According to the Northern Irish arrangements, which were based on the UK *Multiphase Plan*, the aim was to slow rather than halt the spread of influenza:

> ...some slowing could possibly be achieved by reducing unnecessary (...) travel, and by encouraging people (...) to stay home. Closing schools is likely to cause some problems, especially for working parents, but would be an option to be considered, particularly if teacher absenteeism reached levels at which schools could not function. The risk of nosocomial spread may be reduced by isolation of cases, cancellation of cold admissions during the epidemic, particularly those with high risk medical conditions, and a policy of, as far as possible, admitting patients with influenza only if they have medical complications.[200]

Following the 2001 anthrax attacks and the 2002 publication of *Getting Ahead of the Curve*, contingency planning also began to encompass the deliberate release of pathogens. Over the following years, authorities began to stockpile antibiotics,

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[199] UK Health Departments, *Multiphase Contingency Plan For Pandemic Influenza* (March 1997).
[200] Public Record Office of Northern Ireland (PRONI) DHSSPS/2/3/9 Dr Elizabeth Mitchell, NI Contingency Arrangements for Pandemic Influenza (03.12.1997), 5.

Hazmat equipment, and chemical antidotes and develop plans for selective smallpox inoculations.[201]

SARS

81. The first major test of the UK's pandemic preparedness frameworks occurred in 2003. Between 2002 and 2004, 8,098 people worldwide were infected with the SARS-CoV virus, of whom 774 died. Although the SARS outbreak had been identified in November 2002, the WHO was only notified in February 2003 and a global alert was issued in March 2003. In contrast to the later SARS-CoV-2 pandemic, SARS-CoV's primarily symptomatic transmission meant that its geographic spread was more limited. China, Hong Kong, Taiwan, Canada, Vietnam, and Singapore bore the highest burdens while the UK experienced a small number of probable cases and no fatalities before the WHO announced that human-to-human transmission had been broken in late July 2003.[202]

82. The outbreak nonetheless revealed the significant strains that even a comparatively small outbreak could place on the UK's public health systems amidst major ongoing reforms (see above). Between March and July 2003, 368 reports of suspected SARS were made to HPA of which nine were classified as probable, and one eventually tested positive following PCR (Polymerase Chain Reaction) confirmation. Although coronaviruses had not been mentioned in any of the UK's preparedness plans, the existing influenza framework proved important in structuring the public health response. On 15 March 2003, HPA was alerted about the need to intercept a flight with a potential SARS patient onboard.[203] A UK SARS Taskforce chaired by HPA was subsequently established with representatives of the NHS, health departments, national surveillance centres, and devolved administrations. The absence of a

[201] Department of Health, *Guidelines for smallpox response and management in the post-eradication era (smallpox plan)* (London: Department of Health, 2003), Privilege, *Four decades of public health*, 53.
[202] CDC, *SARS Basics Fact Sheet* (Atlanta: Centres for Disease Control and Prevention), https://www.cdc.gov/sars/about/fs-sars.html [accessed: 30.05.2023]; WHO, *Summary of probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003 [based on data as of 31.12.2003]*, https://www.who.int/publications/m/item/summary-of-probable-sars-cases-with-onset-of-illness-from-1-november-2002-to-31-july-2003 [accessed: 02.06.2023], Heymann, David L., and Guénaël Rodier, 'Global surveillance, national surveillance, and SARS', *Emerging infectious diseases* 10/2 (2004), 173-175.
[203] Goddard, N. L., V. C. Delpech, J. M. Watson, M. Regan, and A. Nicoll, 'Lessons learned from SARS: the experience of the Health Protection Agency, England', *Public health* 120/1 (2006), 28.

diagnostic test meant that HPA's CfI initially relied on a system of passive reporting by clinics and GPs via fax, email, or telephone and would then conduct a detailed epidemiological history to establish contacts and classify the case as probable or improbable. Following confirmation of the first UK SARS case in May 2003, UK emergency planning experts also conducted a table-top exercise to test contingency responses.[204]

83. UK public health executives later emphasized the success of the national public health response alongside HPA officials' role in the wider international response.[205] Other observers were more sceptical and highlighted coordination problems between different levels of government when it came to isolating flights with potentially infected passengers.[206] At the local level, the closure of PHLS laboratories and rearrangement of DPH and CCDC positions had resulted in confusion. Health services had to be reminded to contact HPA's new regional offices while centralised case recording by CfI had led to frustration about lack of local access to information relevant for track and trace responses. CfI and HPA regional offices had also been forced to spend considerable time liaising with now NHS run local laboratories to ensure proper submission and processing of specimens. Later evaluations moreover highlighted that NHS PCTs did not have sufficient emergency supplies of personal protective equipment (PPE) and that there was a lack of epidemiologists to coordinate local and national level responses. Although HPA had reacted to constraints by redeploying internal staff and utilising personnel undergoing higher medical training, reviews highlighted that there was insufficient capacity to prevent staff burn-out during longer outbreaks.[207] Writing in 2003, the PHLS' former head of virology, Philip Mortimer warned that over-reliance on centralised epidemic intelligence in the absence of sufficient local capacity for testing, contact tracing, and isolation beds could prove costly during future pandemics. What was needed was sustained investment:

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[204] Goddard et al., 'Lessons learned from SARS'; HPA Timeline, *Report of the Witness Seminar held at the HPA on 15.01.2013*, 113 [we have been unable to find this document].
[205] 'Statement Mary O'Mahony', *Report of the Witness Seminar held at the HPA on 15.01.2013*, 38-39; 'Statement Donaldson', 41; 'Statement Catchpole', 63; 'Statement Heyman', 102; Goddard et al., 'Lessons learned from SARS', 28.
[206] 'Statement Anna Cichowska', *Report of the Witness Seminar held at the HPA on 15.01.2013*, 94-95.
[207] Goddard et al., 'Lessons learned from SARS', 27-32.

> . . . it should not be assumed that a recurrence of SARS is therefore unlikely, or that a further outbreak would be controllable. (. . .). If there are weaknesses or deficiencies it should not be thought that they can or should be repaired by quick fixes each time an acute threat materialises. Such expenditures fail to build the infrastructure needed to maintain a comprehensive capacity for rapid and technologically appropriate response to new pathogens, and over time they distort facilities and so hinder the effective management of the laboratory.[208]

Pandemic Planning (2003-2009)

84. Identified problems were only partially addressed by resulting reforms. Passage of the 2004 UK Civil Contingencies Act and the Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005 formalised national and local preparedness and emergency responsibilities.[209] In parallel to the updating of the IHR, the UK Department of Health released a new UK-wide *Influenza Pandemic Contingency Plan* in 2005.[210] The 177-page document had been developed via a consultative process including the WHO and was more extensive than its predecessors. In line with the 2005 *WHO Global Influenza Preparedness Plan*,[211] it once again set out the different phases of a national influenza response but contained far more detailed information on surveillance, stockpiling, vaccine manufacturing and distribution, the maintenance of essential services, and social interventions such as social distancing and hygiene. The 2005 plan also clarified national-level responsibilities. The Department of Health for England would have overall responsibility for developing and maintaining the UK wide contingency plans and co-ordinating the health response. A National Influenza Pandemic Committee would advise UK health departments, while the CMO would alert NHS SHAs and Regional Directors of Public Health to implement pandemic flu contingency plans. Meanwhile, the new Civil Contingencies Secretariat would provide a focal point and coordinate responses across government departments.[212]

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[208] Mortimer, Philip P., 'Stray Thoughts on SARS', *Communicable Disease and Public Health* 6 (2003), 173.
[209] Civil Contingencies Act 2004; Contingencies Act 2004 (Contingency Planning) Regulations 2005; the 2004 Act replaced the 1920 Emergency Powers Act and expanded the definition of an emergency to include "an event or situation which threatens serious damage to human welfare" and could be announced by the Secretary of State or a senior minister without initial reference to Parliament; Martin, Robyn, 'The role of law in pandemic influenza preparedness in Europe', *Public Health* 123/3 (2009), 247-254.
[210] UK Health Departments, *Influenza Pandemic Contingency Plan* (October 2005).
[211] *WHO global influenza preparedness plan: The role of WHO and recommendations for national measures before and during pandemics* (Geneva: World Health Organisation, 2005).
[212] *UK Health Departments' Influenza Pandemic Contingency Plan* (October 2005).

85. An even more comprehensive update was published in 2007 after a report by the newly founded European Centre for Disease Prevention and Control (ECDC, est. 2004) encouraged all member states to make plans operational at the local level and concerns were raised about local preparedness in the UK.[213] Co-authored by the Cabinet Office and Department of Health, the new *National Framework for Pandemic Flu* contained more information on the provision of local services including social care and ambulance services during pandemic events and how to plan and coordinate local responses via 'Local Resilience Fora' and 'Strategic Coordination Groups'.[214] However, observers continued to warn about parallel response hierarchies resulting from HPA's arms-length status and that imposing significant duties for emergency planning and responses on local organisations was unrealistic. According to a 2008 *BMJ* comment, the 2007 framework told local planners what to do but not how to do it. There was also concern about devolved administrations' capability of mounting a coordinated response to a UK-wide emergency.[215] In early January 2007, a large-scale pandemic table-top exercise with some 5,000 participants called 'Winter Willow' also highlighted potential response misalignment resulting from devolution as well as the "need to strengthen linkages between established local and regional resilience structures and their equivalents in the NHS."[216]

A/H1N1

86. The 2009 A/H1N1 (swine flu) pandemic confirmed some of these predictions. After being identified in Mexico and the US on April 23, 2009, the first UK cases of H1N1 were detected four days later. Over the next seventeen months, the UK experienced two pandemic waves. The UK public health response moved from an initial phase of

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[213] ECDC, *Technical Report. Pandemic Influenza Preparedness in the EU. Status Report as of Autumn 2005 and January 2007* (Stockholm: European Centre for Disease Prevention and Control, 2007), 5; House of Lords Science and Technology Committee, *Science and Technology –Pandemic Influenza, House of Lords Session 2005-2006 Fourth Report* (London: House of Lords, December 2005), 8.13-8.17; the Lords also highlighted the need to further refine epidemiological modelling and rapid detection systems to 'nip a pandemic in the bud' (paragraph 4.7-9).

[214] Cabinet Office and Department of Health, *Pandemic Flu. A national framework for responding to an influenza pandemic* (London, 2007).

[215] Coker, Richard, 'UK preparedness for pandemic influenza', *BMJ* 334/7601 (2007), 965-966.

[216] Department of Health, Cabinet Office, HPA, *Exercise Winter Willow. Lessons Identified* (London, 2007), 4 & 11.

containment between April and June 2009 to one focusing on the provision of information and antiviral treatment with Oseltamivir (brand name Tamiflu) amidst the activation of the NHS National Pandemic Flu Service during the pandemic's peak in July. A national flu vaccination programme was launched in October 2009. Cases began to diminish between December 2009 and April 2010 and the National Pandemic Flu Service was wound down in February 2010. Although the 2009 strain was considered to only cause a relatively mild illness, 457 people were known to have died in the UK by March 2010.[217]

87. Published after the pandemic, official reviews and oral history witness seminars painted an overall positive picture of the UK response and praised the use of advanced procurement orders to secure sufficient vaccine doses.[218] Commentators highlighted the significant impact of new molecular technologies on the speeded development and provision of vaccines and diagnostics as well as the role of standardised data streams in improving epidemic intelligence.

88. In the case of vaccines, the National Institute for Biological Standards and Controls (NIBSC) had played a key role in accelerating the national response. Set up in 1972 and merging with HPA on the eve of the pandemic in April 2009, NIBSC had long played an important role as an internationally recognised centre for the production of biological standards and pandemic influenza research. It also had extensive experience in advising vaccine manufacturers on updates of annual influenza vaccines. During the early 2000s, NIBSC workers had used advances in molecular typing and recombinant technologies to prepare a library of genetically engineered candidate vaccine viruses (CVVs) that might match pandemic strains and could be used to speed vaccine production.[219] Although no H1N1 virus had been

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[217] Berridge, Virginia, and Suzanne Taylor, 'The problems of commissioned oral history: the swine flu 'crisis' of 2009', *Oral History* (2019), 86-94; Hine, Deirdre, *The 2009 Influenza Pandemic. An independent review of the UK response to the 2009 influenza pandemic* (London, 2010), Chapter 2.

[218] Hine, *The 2009 Influenza Pandemic*, 1, 3-4, 13, 121; House of Lords Science and Technology Committee, *Science and Technology - Pandemic Influenza: Follow-up. Report with Evidence. Third Report of Session 2008-2009.* (London: House of Lords, 2009), 8; 'Statement Martin Schweiger', *Report of the Witness Seminar held at the HPA*, 92; 'Statement Gillespie', 94; HPA Timeline, *Report of the Witness Seminar held at the HPA.*

[219] 'Ensuring that there are vaccines each winter as well as for pandemics', *NIBSC*, https://www.nibsc.org/about_us/worldwide_impact/influenza_.aspx [accessed: 22.05.2023]; HPA Timeline, *Report of the Witness Seminar held at the HPA.*

incorporated into the library by 2009, NIBSC's reverse genetics experience and extensive practice runs in emergency vaccine development proved crucial in rapidly developing a CVV. Following sequencing and analysis of the H1N1 strain by HPA's Virus Reference Department in early May 2009, NIBSC workers were able to reduce the time between isolation of the outbreak strain and the supply of a suitable CVV to manufacturers for vaccine production from three months to three weeks.[220]

89. Another area of praise centred on the rapid development of a PCR diagnostic test by Colindale, its distribution across the Regional Microbiology Network by June 2009, and the coordination of HPA and NHS laboratories via daily teleconferences. Similar to experiences in the US, the development of a gold standard PCR diagnostic protocol and its distribution to accredited laboratories proved crucial in upscaling testing and overcoming a major traditional public health bottleneck.[221] The resulting surge of molecular data was rendered epidemiologically useful via improved IT systems, new databases, and international reporting standards. In Britain, work on a new database (Q Flu) for recorded diagnoses at every general practice and a first few hundred cases (FF100) database had started in 2006.[222] New IHR reporting standards and ECDC coordination facilitated the rapid international and European exchange of epidemic intelligence. Reflecting on the role that integrated reporting and molecular diagnostics had played in the H1N1 response, the director of HPA's Reference Microbiology Services, Maria Zambon, noted:

> …. years ago people were much more suspicious if you made a PCR diagnosis of something, whereas nowadays it is very much passé and that is the standard of how things should be done. So we are shifting technology from rapid detection

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[220] 'Statement Stephen Inglis', *Report of the Witness Seminar held at the HPA*, 91; HPA Timeline, *Report of the Witness Seminar held at the HPA*; Robertson, James S., and Othmar G. Engelhardt, 'Developing vaccines to combat pandemic influenza', *Viruses* 2/2 (2010), 540.

[221] 'Statement Gillespie', *Report of the Witness Seminar held at the HPA*, 94; HPA Timeline, *Report of the Witness Seminar held at the HPA; Witness Seminar on the reform of communicable disease control systems 1980s to 2019* (18.05.2023); for the US experience see, Kirchhelle, 'Giants on Clay Feet', 742-743.

[222] House of Lords Science and Technology Committee, *3rd Report of Session 2008-2009. Pandemic Influenza: Follow-up. Report with Evidence* (London: House of Lords, 2009), 19; McLean, E., R. G. Pebody, C. Campbell et al., 'Pandemic (H1N1) 2009 influenza in the UK: clinical and epidemiological findings from the first few hundred (FF100) cases', *Epidemiology & Infection* 138/11 (2010), 1531-1541; HPA Timeline, *Report of the Witness Seminar held at the HPA on 15.01.2013*, Influenza Pandemic – Scientific Advisory Group – Minutes of the fourth meeting (22.03.2006), https://webarchive.nationalarchives.gov.uk/ukgwa/20090608132128mp_/http://www.dh.gov.uk/ab/SPI/DH_095908?IdcService=GET_FILE&dID=187397&Rendition=Web [accessed: 31.05.2023].

now to rapid genetic analysis, so there will be another quantum leap in the way we work.[223]

90. The positive tone of official reviews and recollections of the 2009 H1N1 response contrasted with significant difficulties reported by independent observers, historians collecting oral history evidence, and public health workers in the field. It was pointed out that the official independent review had drawn on submissions from a narrow range from national professional bodies, government, and the pharmaceutical industry, and did not invite written or oral evidence from local public health agencies, local authorities, or DPHs.[224] Unpublished witness interviews that historians had conducted with public health workers during the pandemic highlighted initial confusion over responsibilities and significant difficulties in translating improved information and technological capabilities into effective infection control:

90.1. Following the first reports about H1N1 from Mexico, HPA had underestimated the rapid global spread of H1N1 and early modelling had proven unreliable in the field.

90.2. Significant delays in activating the NHS National Pandemic Flu Service (NPFS) meant that the Civil Contingencies Committee had asked the HPA to step in and provide containment via contact tracing, isolation, and therapy logistics instead of the NHS.

90.3. Although the HPA established regional flu centres to coordinate activities, actual interaction between NHS, HPA, and local authorities was characterised by tensions over responsibilities, complaints about central interference, and conflicts arising over school closures and the designation of hotspots.[225]

90.4. At the national level, HPA's arms-length status as a non-departmental agency had caused problems of visibility. Advice to ministers was provided by the Scientific Advisory Group for Emergencies (SAGE, est. 2009), the Joint Committee on Vaccination and Immunisation (JCVI, est. 1962), and the CMO.

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[223] 'Statement Maria Zambon', *Report of the Witness Seminar held at the HPA*, 85.

[224] Chambers, Jacky, Kezia Barker, and Andrew Rouse, 'Reflections on the UK's Approach to the 2009 Swine Flu Pandemic: Conflicts between National Government and the Local Management of the Public Health Response', *Health & Place, Infectious Insecurities* 18/4 (2012), 738.

[225] Berridge and Taylor, 'The problems of commissioned oral history', 86-94; Chambers et al., 'Reflections on the UK's Approach to the 2009 Swine Flu Pandemic', 737-745.

HPA was represented on SAGE and HPA officials presented consensus views of the organisation to the Civil Contingencies Committee (CCC), which was sometimes called COBR or COBRA in reference to the Cabinet Office briefing rooms in which it met. However, HPA interviewees felt that they had less influence than other SAGE members, who were freer to engage and challenge ministers, that SAGE lacked representation from workers involved in the ground-level infection control response, and that advice given should have been more open to the public.[226] Although Liam Donaldson highlighted the importance of HPA's presence in emergency committee meetings, it was felt that HPA's status as a non-departmental agency meant that it was occasionally assigned a scapegoat role for wider systems failings.[227]

90.5. There were also concerns about a misalignment of communication about the severity of the public health threat posed by H1N1 with the CMO briefing worst case scenarios rather than more conservative scenarios preferred by HPA.[228]

91. While the 2009 H1N1 pandemic ultimately proved less severe than feared and showcased the startling potential of molecular diagnostics and recombinant vaccine design, it also revealed that well-known problems of local and national coordination and resourcing had not been resolved.

Summary

92. The decade between 2000 and 2010 saw profound shifts in the way UK public health systems and response capabilities evolved. Under the impression of 1990s public health crises such as BSE, the post-9/11 bioterrorism attacks, and the 2003 SARS-CoV and 2009 H1N1 pandemics, planners across the UK identified the need to improve surveillance and response capabilities to major biological and other health threats. In the wake of the 1997/1998 elections and referendums, there was also a concerted effort to improve the integration between health, social, and

[226] Berridge and Taylor, 'The problems of commissioned oral history', 90.
[227] 'Statement Donaldson', *Report of the Witness Seminar held at the HPA*, 35-36.
[228] Berridge and Taylor, 'The problems of commissioned oral history', 91-92.

environmental services and move power over decision-making back to individual nations and local communities.

93. Over time, this resulted in increasing administrative variation between health and public health services. In Wales and Scotland, reformers began to dismantle the purchaser-provider split introduced by the internal market and re-embed public health and health services at the community level. Northern Irish public health reforms initially stalled due to a suspension of the Northern Ireland Assembly (2002-2007). However, the 2009 creation of PHA as a statutory body marked a decisive turn towards a prevention-focused mode of public health. Meanwhile, English decision-makers introduced further market elements into the NHS and slimmed down local infection control infrastructures in favour of centralised health protection hubs. The cumulative result of reforms was an increasingly complex UK patchwork of public health systems with different resources, organisational structures, and surge capacities.

94. Confusion resulting from this administrative patchwork was exacerbated by the abolition of long-standing public health institutions with significant 'brand recognition' across national health systems. Despite pre-devolution variations of public health arrangements, the now defunct PHLS had acted as a long-standing point of formal and informal contact for large parts of the UK public health workforce. Across England and Wales, local PHLS laboratories had functioned as stable bricks-and-mortar public health hubs connecting local-level PHLS workers with relevant counterparts in the NHS and local authorities amidst increasingly frequent NHS and local authority shakeups. The networked PHLS infrastructure had also been extremely capable of bringing together detailed local-level knowledge of disease challenges with specialist reference, surveillance, and health protection services at the national and regional level. Informal and formal ties to distinct public health systems in Scotland and Northern Ireland – and the 1990s contracting of CDSC-NI – had moreover helped integrate infectious disease surveillance and response capabilities across the UK. This did not mean that there were no problems: during the 1980s and 1990s, ongoing rivalries with NHS laboratories over

microbiology competencies, the imposition of the internal market, widening surveillance remits, and budget cuts had placed increasing strains on the PHLS.

95. As the UK's most important health protection institution, the new HPA, seemingly overcame the weaknesses of its predecessor by ensuring that only one service – the NHS – would oversee local microbiology services and by formally integrating responsibilities for multiple major hazards in one large agency. However, forging what appeared like an efficient model of health protection on paper proved challenging. Founded at short notice, the HPA struggled to combine formerly distinct agencies into a functional super agency. In the case of communicable disease control, HPA's status as a new non-departmental organisation with fewer local contact points, far-ranging competencies beyond communicable diseases, and variable core budget constrained its ability to replace or improve on services provided by its well-known predecessor. Problems were compounded by blurred English public health responsibilities between NHS PCTs, local authorities, and HPA CCDCs at the local level and between the Department of Health, HPA, and Cabinet Office in the case of national health emergencies. Instead of boosting the visibility of health protection, the decade between 2000 and 2010 was therefore characterised by a relative lack of organisational 'ownership' for infectious disease control in England.

96. This lack of ownership had implications for pandemic preparedness. Despite the increasing sophistication of pandemic preparedness planning, core problems surrounding confusion over local responsibilities and parallel hierarchies at the national level were not addressed. Meanwhile, erratic core GIA funding for HPA meant that the agency struggled to maintain infectious disease control capabilities. The 2003 SARS-CoV-1 pandemic had mostly been dealt with by the old PHLS system, and had proven containable via classic track and trace responses. However, it also foreshadowed the significant organisational strains that a more transmissible pathogen would place on the HPA and local public health services.

97. Although new molecular diagnostic and vaccine technologies led to significant improvements of pandemic response capabilities in the six years between 2003 and

2009, the still relatively mild H1N1 outbreak revealed the persistence of many well-known organisational vulnerabilities. Interestingly, warnings about potential emergency coordination problems resulting from increasingly distinct public health systems in England, Wales, Scotland, and Northern Ireland did not materialise. Although there was no formal memorandum of understanding between the four different national surveillance centres as late as 2006,[229] close informal relationships between the relatively small cadre of UK public health leaders seem to have mostly overcome potential problems. During later oral history interviews, senior public health officials highlighted that personal ties, shared educational backgrounds, regular HPA infection update meetings, and the presence of devolved representatives on the HPA Board played an important role in minimising misalignments.[230]

[229] Rowland, *Mapping Communicable Disease Control Administration in the UK*, 51.
[230] *Witness Seminar on the reform of communicable disease control systems 1980s to 2019* (18.05.2023); *Report of the Witness Seminar held at the HPA on 15.01.2013*, 18-20, 94, 103-104, 108.

Part Three: Austerity and Localism (2010-2019)

98. The final period under analysis in this report was characterised by an increasing emphasis by policy makers in all four UK nations on preventative healthcare alongside the creation of new public health bodies explicitly focusing on health protection and promotion. In England, 2012 saw the most complex political restructuring of health and public health services in decades: key public health competences were transferred to local authorities while HPA was replaced by a new super organisation in the form of Public Health England (PHE). Reforms took place amidst a significant reduction of overall funding for public health services during the prolonged austerity policies that followed the 2008/2009 financial crisis. Although impacts varied across the four UK nations, the result was a severe strain on routine and emergency public health capabilities.

2010-2019: England

99. Described by NHS Chief David Nicholson as "so big you could see them from outer space",[231] the 2012 Health and Social Care Act made significant reforms to the provision and operation of English health and public health services. In late 2010, the Department of Health's white paper *Healthy Lives, Healthy People* set out a new vision for public health in England. Employing the rhetoric of individual responsibility that had also characterised the Conservative Party's election campaign,[232] the paper's foreword set out a dark vision of a nation beset by "lifestyle-driven health problems" and called for "a radical shift in the way we tackle public health challenges":

> It is simply not possible to promote healthier lifestyles through Whitehall diktat and nannying about the way people should live. (...). We need a new approach

[231] Quoted according to Dixson, Anna, 'Evolution or revolution: the story behind the Health and Social Care Act 2012', *The Kings Fund Blog* (12.07.2012), https://www.kingsfund.org.uk/blog/2012/07/evolution-or-revolution-story-behind-health-and-social-care-act-2012 [accessed: 23.05.2023].

[232] Pich, Christopher, Dianne Dean, and Khanyapuss Punjaisri, 'Political brand identity: An examination of the complexities of Conservative brand and internal market engagement during the 2010 UK General Election campaign', *Journal of Marketing Communications* 22/1 (2016), 100-117.

that empowers individuals to make healthy choices and gives communities the tools to address their own, particular needs.[233]

The government argued that the existing public health system was too fragmented and structurally inefficient, which led to poor health outcomes. A new focus on the root causes of ill health and a more joined-up system of public health delivery at the local level was to lead to a major improvement of health determinants and resulting efficiencies.[234]

100. In line with the new localist approach, the 2012 Act abolished New Labour's SHAs and around 150 PCTs and replaced them with around 212 clinical commissioning groups (CCGs). It also created a new arms-length commissioning body, NHS England. When it came to health protection and health improvement, the Act created a complicated division of duties between the Secretary of State and local authorities.[235] Health protection duties rested primarily with the Secretary of State, who now also acquired a power to take steps to improve the health of the people of England. Meanwhile, local authorities were charged with taking steps to improve the health of people locally but could also be tasked via regulations to exercise certain protection functions indirectly on behalf of the Secretary of State. These regulations required local authorities to, for example, give advice to CCGs to protect and improve local health and provide information to PHE, NHS, police and fire authorities, and other relevant organisations to promote local preparedness. Acting jointly with the Secretary of State, local authorities were also tasked with appointing an officer of the authority to be their DPH.[236]

101. In line with the division of duties described above, a DPH's responsibilities centred on local authority health improvement and exercising health protection duties on

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[233] Department of Health, *Healthy Lives, Healthy People*: *Our strategy for public health in England* (London: Department of Health, 2010), 2.

[234] Peckham, S., Gadsby, E., Jenkins, L., Coleman, A., Bramwell, D. and Perkins, N., 'Views of public health leaders in English local authorities–changing perspectives following the transfer of responsibilities from the National Health Service to local government', *Local Government Studies*, *43*(5) (2019), 842-844.

[235] *Expert Report to the Infected Blood Inquiry*, 10.

[236] Health and Social Care Act 2012, section 12, inserting a new section 2B into the NHS Act 2006; Health and Social Care Act 2012, section 18, inserting a new section 6c into the NHS Act 2006; The Local Authorities (Public Health Functions and Entry to Premises by Local Healthwatch Representatives) Regulations 2013, Part 2; Health and Social Care Act 2012, section 30, inserting a new section 73A into the NHS Act 2006; Lancaster et al., 'The development of the system for communicable disease control'.

behalf of the Secretary of State – but also comprised an additional 'standalone' responsibility for the exercise of local authority functions that relate to public health emergency planning and response.[237] What sounded complicated on paper proved complicated in practice. The blurred statutory overlap between local authority, Secretary of State, and Civil Contingencies Act duties could create significant operational confusion over prime protection responsibility during emergencies (see below).

102. At the national level, a new mammoth public health organisation in the form of Public Health England (PHE) replaced HPA. PHE would combine previously distinct health protection and promotion functions and merge over 5,000 staff from 120 organisations.[238] The new organisation would initially have four directorates: Health Protection, Health and Wellbeing, Knowledge, and Nursing, with cross-cutting responsibility for strategy operations. To ensure geographic spread, PHE had four regional centres (North of England, Midlands & East of England, South of England, and London) while 15 local PHE centres acted as the 'front door of PHE' and partnered with local government, CCGs, the local NHS, and the voluntary sector. However, in reality, most of the agency's resources remained concentrated in the South of England with significant bases in Colindale, Chilton, Porton Down, as well as the planned new campus in Harlow.[239]

103. Responsibilities for communicable disease control were primarily spread across PHE's Health Protection and Operations directorates. The remit of the Health Protection directorate included responsibility for field epidemiology, infectious disease surveillance and control, and emergency response. Regional units within the Operations directorate were charged with preparing for and responding to

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[237] Lancaster et al., 'The development of the system for communicable disease control'; on the broader political context of the reforms see also: Gorsky et al., 'Public health and English local government', 546-551; Middleton, J. and G. Williams, 'England', in Rechel, B. et al. (eds.), *Organization and Financing of Public Health Services in Europe Country Reports* (Copenhagen: WHO Europe, 2018), 5–22.

[238] *Public Health England*, 'Additional Follow-up Written Evidence (PHE0022),' in House of Commons Health Committee, *Public Health* England, Eighth Report (London: House of Commons, 2013), Annex D.

[239] Public Health England, 'Written Evidence (PHE0002)', House of Commons Health Committee, *Public Health England*, Eighth Report (London: House of Commons Health Select Committee, 2013), Annex C; IANPHI, *Public Health England. Evaluation and Recommendations* (Atlanta: Public Health Institutes of the World/ IANPHI, 2017), 6 and 8; Kirchhelle, 'Giants on Clay Feet', 738.

major incidents and liaising with local health protection.[240] PHE also took over HPA's slimmed down public health laboratory network: Colindale continued to host most specialist reference laboratories, regional public health laboratories remained based in large NHS hospitals, and PHE also maintained a food, water, and environment laboratory in York.[241] Overall, PHE would continue to act as a centre of epidemic intelligence, provide specialist reference, global health, and cost-effectiveness services across the UK, and use its health protection teams to support local Health and Wellbeing Boards (HWBs) and DPHs.[242]

104. Although it absorbed many pre-existing structures, PHE also differed from its predecessors in key ways. In addition to its combination of health protection and promotion functions, PHE broke with the post-1950s English tradition of statutory non-departmental public health bodies that were set up by Parliament by being integrated as an executive body within the Department of Health. This not only resulted in far greater political control over PHE activities by ministers, but also meant that all employees were civil servants and subject to the Official Secrets Act – a cause of concern amongst public health workers (see below).

105. Another difference between PHE and its predecessor bodies lay in the career background of its chief executive. According to a 2013 *Lancet* feature, Duncan Selbie had extensive managerial experience across numerous NHS services, appreciated the value of academic research, but had no medical qualification and little public health experience – Selbie himself joked that his public health experiences could fit "on a postage stamp".[243] Selbie's career background was reflected in the health challenges he prioritised during the *Lancet* interview: "reducing preventable deaths from non-communicable diseases and increasing healthy life expectancy by tackling poor mental health, substance misuse, and

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[240] *Public Health England Annual Report and Accounts 2013/14* (26.06.2014), 53; *Public Health England Annual Report and Accounts 2019/20* (26.11.2020), 55; Public Health England, 'Additional Follow up Written Evidence (PHE0022)', in House of Commons Health Committee, *Public Health England*, Eighth Report (London: House of Commons, 2013), Annex C; Public Health England, *PHE Microbiology Services Colindale. Bacteriology Reference Department User Manual* (London: PHE, 2014); PHE Organogram (MHRA, Annex E).
[241] *Public Health England Annual Report and Accounts* 2019/20 (26.11.2020), 17-18.
[242] IANPHI, *Public Health England,* 5-10.
[243] Das, Pamela, 'Duncan Selbie: the new face of public health in England', *The Lancet* 381/9873 (2013), 1175.

musculoskeletal disorders are among the key priorities for the organisation in the next three years."[244] Communicable disease control was not mentioned.

106. The 2012 reforms and creation of PHE evoked mixed responses from the English public health community. Some applauded the new focus on health promotion and disease prevention, which would enable public health professionals to widen their work and influence. Local government leaders mostly welcomed the arrival of new public health skills and budgets and surveys indicated good relationships between public health officers and elected council members.[245] However, DPHs also warned about confused accountability resulting from the growing number of local-level public health providers and the varying position of public health teams within the organisational structure of local councils.[246]

107. In the case of PHE, commentators expressed concern about the degree of independence PHE would have within the Department of Health. According to HPA Deputy Chairman, Charles Easmon, "one needs a long spoon to sup with the DH. PHE is, and will be, a lot closer to the DH than the HPA has been."[247] The former director of the PHLS' Central Public Health Laboratory and HPA's CfI, Peter Borriello, warned: "[Most] executive agencies are owned by a department; they have owner's boards. In a department: policy is king, delivery is not. Everyone looks to their ambitions through policy."[248]

108. Functioning of the new local and national English public health structures was compromised by austerity politics. At the local level, the abolition of PCTs meant that overall public health performance was strongly dependent on local authority capabilities to commission and deliver effective services. Ministers had promised to ring-fence the public health budget for local authorities. However, an in-year cut of £200 million in 2015 was followed by further reductions over the next 5 years. According to the Local Government Association, this amounted to a real term

[244] Das, Pamela, 'Duncan Selbie', 1175.
[245] Peckham et al., 'Views of public health leaders in English local authorities', 842-863.
[246] Peckham et al., 'Views of public health leaders in English local authorities', 856-857; see earlier warnings by HPA members, 'Statement by Mary Morrey', *The History of the Health Protection Agency,* 106.
[247] 'Statement by Charles Easmon', *The History of the Health Protection Agency*, 103.
[248] 'Statement by Peter Borriello', *The History of the Health Protection Agency*, 107.

reduction of the public health grant from over £3.5 billion in 2015–16 to just over £3 billion in 2020–21 (- 14 percent).[249] Other estimates by the Institute for Public Policy Research spoke of an even more dramatic reduction of £850 million in net expenditure between 2014/2015 and 2019/2020 with the poorest areas in England experiencing disproportionately high cuts of almost 15 percent.[250] Resulting pressures on local public health were exacerbated by an overall 49 percent real term cut in central government funding for local authorities between 2010/11 and 2016/17 and a resulting practice of 'top slicing' whereby authorities reallocated ring-fenced public health budgets to other services broadly impacting health and wellbeing such as trading standards or parks and green spaces.[251] In 2010, *Healthy Lives, Healthy People* had promised to give "local government the freedom, responsibility and funding to innovate and develop their own ways of improving public health in their area." [252] Freedom and responsibility had been granted – but funding was often lacking.

109. Described financial problems were accompanied by pressures on the public health workforce. Similar to previous decades (see above), councils established sharing agreements for public health teams. Alongside reduced salaries for some newly appointed specialists, and a wider fall in the number of public health directors, consultants, and specialists, these agreements led to increasingly thin-stretched local public health services. By 2017, the scaling back of public health staffing, retirements, and recruitment problems had left 17 percent of DPH posts vacant.[253] Although DPH vacancies were subsequently reduced, rising pressures also accelerated a shift of workforce composition. Until 2003, the UK's public health speciality had been a branch of medicine but had been formally widened to include

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[249] Local Government Association, *Health and Local Public Health Cuts, House of Commons Briefing 14 May 2019* (London, 2019), 2.
[250] Thomas, Chris, *Hitting the Poorest Worst? How Public Health Cuts Have Been Experienced in England's Most Deprived Communities* (London: Institute for Public Policy Research (IPRR), 2019), https://www.ippr.org/blog/public-health-cuts#anounce-of-prevention-is-worth-a-pound-of-cure [accessed: 30.05.2023].
[251] Buck, David, *The English local government public health reforms. An independent assessment* (The King's Fund, January 2020), 6; Iacobucci, Gareth, 'Raiding the public health budget', *BMJ* 348 (2014), g2274.
[252] Department of Health, *Healthy Lives, Healthy People,* 2.
[253] Middleton, J. and G. Williams, 'England', 16; Peckham et al., 'Views of public health leaders in English local authorities', 850-881.

workforce groups from other disciplinary backgrounds. In view of accelerating pressures on local services, many clinically qualified professionals with core skills in epidemiology, health protection, and health services opted to work at PHE or in the NHS. Over time, this resulted in an increasing preponderance of non-clinical posts in local authorities.[254] By 2021, 69 percent of the service medical workforce were located in the newly established UK Health Security Agency (UKHSA), the Office of Health Improvement and Disparities (OHID), and the NHS. Of non-clinical specialists, which include the majority of DPHs and consultants, 90 percent were in local authorities and largely concerned with health promotion.[255] This shift inevitably compromised local-level infection control capabilities.

110. Austerity and workforce pressures also impacted PHE. Ahead of the formation of the new agency, a 2012 strategy paper had warned of workforce attrition while simultaneously setting out an ambitious vision of maintaining and expanding surveillance capacities as well as of improving oversight and network integration.[256] This vision was difficult to fulfil. Although regular polling of local authorities indicated that PHE's staff, expertise, data, and services were highly valued and that appreciation increased over time,[257] PHE experienced cuts of core funding.[258] In 2013/2014, PHE had received a non-ring-fenced revenue for operating expenses of £405 million.[259] By 2018/2019, operating activities were priced at £395.8 million, which amounted to an over 9 percent budget fall since 2013/14 in real terms.[260] Although allocation of funds for infectious disease control rose during this period, the number of staff employed for the protection from infectious diseases fell from

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[254] Peckham et al., 'Views of public health leaders in English local authorities', 856; Milsom, Rupert, Don Liu, David Chappel, and Anna Sasiak, *A Capacity Review - Public Health Specialists in 2019* (Health Education England, 2019); *Expert Report to the Infected Blood Inquiry*, 7.

[255] *Expert Report to the Infected Blood Inquiry*, 7; Edbrooke-Hyson, Victoria, *A Capacity Review – Public Health Specialists in 2021* (London: Health Education England, 2022).

[256] *Public Health Surveillance. Towards a Public Health Surveillance Strategy for England* (Department of Health/ PHE Transition Team, 2012), 45.

[257] *Public Health England. Stakeholder Review 2018/19* (Ipsos Public Affairs), 6 and 12.

[258] IANPHI, *Public Health England*, 10.

[259] *Public Health England Annual Report and Accounts 2013/2014* (26.06.2014), 73.

[260] *Public Health England Annual Report and Accounts 2019/2020* (26.11.2020), 63 [the decision to focus on 2018/2019 as the comparator year was made to avoid confusion resulting from pandemic related expenses, inflation was calculated using the Bank of England Inflation Calculator [– comparator years 2013/2018].

2,397 to 2,093 (-12.7 percent) while those employed in environmental hazards protection and emergency preparedness fell from 517 to 476 (-7.9 percent).[261]

111. Similar to HPA (see above), efficiency drives and external funding played an important role in supplementing core budgets. In 2013/2014, PHE gained an additional operational income of £180.3 million through research grants, commercial services, and contract income.[262] By 2018/2019, this amount had risen to £240.4 million (a 24.2 percent increase on 2013/14 including inflation).[263]

112. There were also ongoing concerns about PHE's ability to act as an independent advocate for public health from within the Department of Health (from 2018 Department of Health and Social Care (DHSC)). In 2014, the British Medical Association (BMA) warned that "the requirement to adhere to civil service rules and regulations is having an impact on [PHE staff's] ability to do their work. Particular concerns have been raised about (...) the ability to publicly discuss or criticise public health policies."[264] Pressure to conform with decision-making in Downing Street increased over time. After criticising "lack of clarity and consistency around respective roles and responsibilities"[265] within PHE and between the PHE and Department of Health, a 2017 review gave PHE three months to implement reforms designed to maximise political oversight: PHE was to increase cost-savings and income generation from intellectual property assets such as Porton Biopharma Limited (est 2015) and develop new commercial models with Department of Health and Cabinet Office officials;[266] PHE's global health strategy was to be more effectively aligned with government foreign policy and developmental aid objectives;[267] formal governance of PHE and its Board by the Department of Health

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[261] *Public Health England Annual Report and Accounts 2014/15* (15.07.2015), 8; *Public Health England Annual Report and Accounts 2018/19* (11.07.2019), 14.
[262] *Public Health England Annual Report and Accounts 2013/2014* (26.06.2014), 75.
[263] *Public Health England Annual Report and Accounts 2018/2019* (11.07.2019), 62-63; [the decision to focus on 2018/2019 as the comparator year was made to avoid confusion resulting from pandemic related expenses, inflation was calculated using the Bank of England Inflation Calculator – comparator years 2013/2018].
[264] House of Commons Health Committee, *Public Health England. Eighth Report of Session 2013-2014* (London: House of Commons, 2014), 17; see also discrepancies between PHE leadership statements and public health workforce perceptions of top slicing; Iacobucci, 'Raiding the public health budget', g2274.
[265] Department of Health, *Tailored Review of Public Health England. Review Report* (London: Department of Health, 2017), 20.
[266] Department of Health, *Tailored Review of Public Health England*, 35-36, 6.
[267] Department of Health, *Tailored Review of Public Health England*, 31-32.

was to be "exercised more consistently and rigorously".[268] Tighter political control inevitably constrained PHE's ability to challenge government decision-making that was detrimental to public health. In surveys, local authorities noted that PHE could do more to "acknowledge the pressures and constraints facing Local Authorities in its work with them" and "be more vocal around issues such as welfare reform and austerity and what this means for the health of our nation."[269] Problems were exacerbated by a lack of understanding of public health needs in Whitehall ministries. A later witness seminar with senior public health officials highlighted that the increasingly rapid turnaround of civil servants across government departments had created a lack of specialist interlocutors and understanding.[270]

Molecular Diagnostics & Laboratory Reforms

113. The ongoing organisational and budgetary challenges experienced in securing public health service provision were paralleled by dramatic changes in the way microbiological data was being generated and the organisation of English laboratory networks. Organisationally, the previous decade had seen a significant shift of microbiology away from the local level. In 2002, *Getting Ahead of the Curve* had reported the existence of more than 330 clinical laboratories across England undertaking microbiological tests with most hospitals having their own diagnostic laboratory.[271] Over the next two decades, major reviews of NHS pathology services by Lord Carter of Coles in 2006/2008 and 2016 had proposed streamlining clinical microbiology and pathology services by creating larger regional 'hub and spoke' laboratories, which would serve multiple NHS Trusts and improve both efficiency and quality.[272] Although the Carter recommendations were not uniformly implemented, the reports and NHS cost-efficiency guidance resulted in a wave of laboratory consolidation that could also involve public-private partnerships and

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[268] Department of Health, *Tailored Review of Public Health England*, 7.
[269] *Public Health England. Stakeholder Review 2018/19* (Ipsos Public Affairs), 6 & 7, also see 33.
[270] *Witness Seminar on the reform of communicable disease control systems 1980s to 2019* (18.05.2023).
[271] *Getting Ahead of the Curve*, 5.52.
[272] *Report of the Review of NHS Pathology Services in England. Chaired by Lord Carter of Coles* (2006); *Report of the Second Phase of the Review of NHS Pathology Services in England. Chaired by Lord Carter of Coles* (2008); Coles, Lord Carter of, *Operational productivity and performance in English NHS acute hospitals: Unwarranted variations* (February 2016).

outsourcing to commercial providers.[273] Some observers warned that removing diagnostic infrastructures from clinical-level decision-making and expanding the number of public and private actors involved in service provision would pose challenges for infection control and integrated public health surveillance.[274] However, most commentators emphasized the significant economies of scale and diagnostic precision enabled by rapidly improving molecular technology, automation, and artificial intelligence.[275]

114. Organisational changes were paralleled by major technological shifts in the way microbiological data was being generated. Since the late 1990s, molecular typing had become increasingly common across UK clinical and public health laboratory networks: PHLS regional laboratories had offered PFGE services, PCR diagnostics had been employed on a limited basis during the 2003 SARS pandemic, and the networking of PCR platforms had played a major role in overcoming diagnostic bottlenecks across NHS and HPA laboratories in 2009 (see above). The rapid increase of data streams and the parallel fragmentation of public and private sector microbiology service providers necessitated a stronger focus on quality assurance and standard operating procedures as well as an update to the 1984 disease notification requirements, which predated the molecular era.[276] However, despite attention having been drawn as early as 1997 to the inadequacy of voluntary reporting requirements on laboratories, it was not until 2010 that mandatory laboratory reporting was required in England to HPA and its successors (unlike in Wales where reporting was to proper officers, and in Scotland where it was to the health board and common services agency).[277]

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[273] Coles, *Operational productivity and performance in English NHS acute hospitals*; *Pathology networking in England: state of the nation* (NHS England and NHS Improvement, November 2019), 7-8.
[274] Karakusevic, Sasha, Edwards, Nigel, Lewis, Ruth, Dayan Mark, *The future of pathology services. Briefing* (Nuffield Trust, June 2016), 17-22; *The Royal College of Pathologists' response to Lord Carter's report on operational productivity* (February 2016); Lindsell, Paul, 'The prognosis of UK pathology services' *Laboratory News* (07.02.2017); Royal College of Pathologists, *Consolidation of Pathology Services. Lessons Learnt* (London, 2017), 8.
[275] Karakusevic, Sasha, Edwards, Nigel, Lewis, Ruth, Dayan Mark, *The future of pathology services. Briefing* (Nuffield Trust, June 2016), 4-5, 10-13, 17; Satta, Giovanni and John Edmonstone, 'Consolidation of pathology services in England: have savings been achieved?', *BMC health services research* 18/1 (2018), 1-7.
[276] Duerden, 'Twenty-first-century medical microbiology services in the UK', 981-982.
[277] 'Memorandum by Dr R. T. Mayon White. Regional Epidemiologist and Consultant in Communicable Disease Control, 28 October 1997', House of Lords Select Committee on Science and Technology, 7th report, *Resistance to antibiotics and other microbial agents, 17. 03.1998* [HL Paper 91-II, Session 1997-1998]; Health Protection

115. Between 2010 and 2019, the advent of whole genome sequencing (WGS) triggered another step change in the way microbiological data could be generated. The advent of new proprietary whole genome sequencing platforms (WGS) developed by companies such as Illumina and Oxford Nanopore enabled major improvements in the analysis of microbes' genomic structure and relatedness. Although new WGS platforms promised to "enable the analysis of anything, by anyone, anywhere,"[278] integrating them into public health surveillance infrastructures posed a series of logistical and strategic challenges. These included integrating the analysis of the different kinds of genomic data the platforms produced, stockpiling necessary reagents for emergencies, increasing authorities' reliance on closed commercial systems, and deciding how to distribute capabilities.

116. In the case of England, strategic decision-making by PHE and the Department of Health tended to emphasize creating centralised WGS capabilities. CMO Sally Davies' 2016 annual report outlined this approach:

> In the past, (…) genomic services developed as 'cottage industries' built on regional expert presence and local interests and funding. (…). But the scale of the modern NHS and the opportunities offered by genomic medicine mean it is now time to build a first-class genomic service that is scalable, future-proof and delivers value for money. (…..). This will inevitably mean fewer laboratories doing different types of work. Running fewer sequencing machines at full capacity allows sequencing to be affordable, standardised and accessible for updates.[279]

117. English WGS public health capabilities had been created since November 2012 when HPA Birmingham had partnered with the Wellcome Sanger Institute in Cambridge and the NIHR Oxford Biomedical Research Centre to develop a system for *Mycobacteriaceae* causing tuberculosis.[280] Between April 2014 and 2018, PHE developed further WGS capabilities for multiple important pathogens including *E.*

(Notification) Regulations 2010; Health Protection (Notification) (Wales) Regulations 2010; Public Health etc. (Scotland) Act 2008; The Public Health etc. (Scotland) Act 2008 (Commencement No. 3 Consequential Provisions and Revocation) Order 2009; Roderick, Peter, Alison Macfarlane, and Allyson M. Pollock, 'Getting back on track: control of covid-19 outbreaks in the community', *BMJ* 369 (2020), Table One; Lancaster et al., 'The development of the system for communicable disease control'.

[278] Oxford Nanopore Technologies, 'About us', *Oxford Nanopore Homepage*, https://nanoporetech.com/about-us [accessed: 31.05.2023].

[279] *Annual Report of the Chief Medical Officer 2016. Generation Genome* (London: Department of Health, 2017), 4; the public health implications of pathogen genomics were discussed in chapter 9.

[280] HPA Timeline, *The History of the Health Protection Agency.*

coli, *Shigella*, *Listeria*, *Campylobacter*, *S. aureus*, and *Salmonella* – with more than 100,000 bacterial and viral genomes sequenced during this time. Cost-pressures meant that most capabilities were centralised at PHE Colindale. A 2018 implementation review highlighted major advantages of this centralised service in terms of a 17 percent reduction of staff costs, improved quality assurance, and enhanced surveillance and outbreak response capabilities.

118. However, turning it into meaningful public health interventions required a greater emphasis on multi-disciplinary working between specialist scientific advisers, bioinformaticians, clinical, and epidemiological staff.[281] While these skills existed in national and regional hubs, they were increasingly absent at the local level (see above). Running counter to the decentralised surge capabilities that had proven successful during the 2009 Swine Flu pandemic (see above), centralising capabilities also risked creating diagnostic bottlenecks should PHE's genomic hubs be overwhelmed. At a witness seminar on infectious disease control in 2023, participants noted that the right response to testing should not be to test everything that moves but to ensure that testing, epidemiological surveillance, and containment abilities were targeted and strategically aligned.[282]

2010-2019: Scotland

119. In Scotland, the decade between 2010 and 2019 was also marked by attempts to improve the coordination between public health, health, and social services. Responding to concerns about patient care and health quality, a long-term strategy for improving the quality in the Scottish NHS and personalised health care was published in 2010.[283] Four years later, the Scottish government created a new legal framework for health and social care integration through the 2014 Public Bodies (Joint Working) (Scotland) Act.[284] Scottish health boards and local governments were tasked with establishing new integration authorities to plan, coordinate, and

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[281] Grant, Kathie et al., *Implementing pathogen genomics. A case study* (London: PHE/ PHG Foundation, 2018); see also: Ferdinand, Angeline S., et al, 'An implementation science approach to evaluating pathogen whole genome sequencing in public health', *Genome Medicine* 13 (2021), 1-11.
[282] *Witness Seminar on the reform of communicable disease control systems 1980s to 2019* (18.05.2023).
[283] The Healthcare Quality Strategy for NHS Scotland (The Scottish Government, May 2010).
[284] 2014 Public Bodies (Joint Working) (Scotland) Act.

use joint budgets to finance the provision of health and social care services and achieve specified health improvement outcomes. While the new integration bodies were widely adopted, a 2019 review found challenges related to leadership and governance.[285]

120. Echoing earlier trends in England, planners also called for a better integration of public health at the local level and a new emphasis on health promotion in addition to protection. In 2016, a major public health review highlighted the significant cost-effectiveness of preventive approaches and the need for more proactive public health efforts as well as rationalised organisational arrangements.[286] Mirroring the emphasis on health goals by the 2010 health strategy and the 2014 Public Bodies (Joint Working) (Scotland) Act, the Scottish Government defined a series of health improvement-oriented public health priorities for Scotland in 2018 and consolidated both health protection and promotion functions into a new body, Public Health Scotland, whose 2020 launch coincided with the COVID-19 pandemic.[287]

2010-2019: Wales

121. Wales continued to pursue an independent public health policy that emphasized the integrated provision of services via PHW. However, unlike Scotland, where NHS funding had been ring-fenced, a relative reduction of NHS spending impacted both the national PHW and its public health teams within LHBs. Although overall budget cuts to local public health functions were not as severe as in England, there were concerns about compromised disease control capabilities.[288]

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[285] *Ministerial Strategic Group for Health and Community Care. Review of Progress with Integration of health and Social Care. Final Report* (COSLA/ Scottish Government, February 2019); Anderson, Michael, Emma Pitchforth, Nigel Edwards, Hugh Alderwick, Alistair McGuire, and Elias Mossialos, 'United Kingdom: health system review', *Health Systems in Transition* 24/1 (2022), 29.

[286] *2015 Review of Public Health in Scotland*: Strengthening *the Function and Re-Focussing Action for a Healthier Scotland* (Edinburgh: Scottish Government, 2016).

[287] *Public Health Priorities for Scotland* (COSLA/ Scottish Government, 2018), the report noted that communicable disease protection (pp. 6-7) would be maintained but prioritised addressing broader health determinants, Anderson et al., 'United Kingdom', 106, 134-135.

[288] Roberts, Adam and Anita Charlesworth, *A decade of austerity in Wales? The funding pressures facing the NHS in Wales to 2025/26* (Nuffield Trust, June 2014), 7-8; Farrell et al., 'Public health and local government in Wales', 388; Luchinskaya, D., Ogle, J. and Trickey, M., 'A delicate balance? Health and social care spending in Wales'. *Wales Public Services 2025*.

122. In Cardiff, decision-makers reacted to pressures and broader UK trends by deciding to further integrate health protection and promotion services. In 2014, the Social Services and Well-being (Wales) Act led to a focus on partnership to promote disease prevention, early intervention, and health improvement at the local level.[289] Continuing the post-1997 emphasis on cooperation, the Act also introduced a legal duty on local authorities to promote the integration of health and public health services and established Regional Partnership Boards between health boards and local authorities to improve health and well-being.[290]

123. Although reviews highlighted ongoing challenges of collaborative service planning and delivery across the Welsh public sector,[291] the focus on the integrated promotion of well-being was further strengthened by the innovative 2015 Well-being of Future Generations (Wales) Act.[292] The Act required local authorities to establish a Public Service Board (PSB). PSBs included representatives from local governments, health boards (usually the PHW DPH), and other relevant agencies to design and deliver a local well-being plan every five years. Notably, the Act also introduced a duty for public bodies to consider decisions' long-term impact on the health and well-being of future generations with the goal of creating a healthier, more equal, and resilient Wales. Accountability and performance were to be ensured by the creation of a Future Generations Commissioner and the Auditor General of Wales. Two years later, the emerging Welsh 'health in all policies' approach was complemented by new mandatory health impact assessments as a result of the 2017 Public Health (Wales) Act and a new Public Health Outcomes Framework.[293]

2010-2019: Northern Ireland

124. Between 2010 and 2019, the provision of Northern Irish public health services was subject to numerous reviews whilst suffering from stagnating or reduced funding

[289] Social Services and Well-being (Wales) Act 2014.
[290] Anderson, Michael et al, 'United Kingdom: health system review', 141-142; Farrell et al., 'Public health and local government in Wales', 385-400.
[291] *Commission on Public Service Governance and Delivery. Full Report* (Cardiff, January 2014).
[292] Well-being of Future Generations (Wales) Act 2015.
[293] Public Health (Wales) Act 2017; Anderson et al., 'United Kingdom: health system review', 141-142; Farrell et al., 'Public health and local government in Wales', 389-392.

and political stasis. Following its creation, PHA's overall budget for health protection almost halved from £8.4 million in 2009/2010 (15 percent of total programme funds) to £4.5 million in 2012/2013 (7 percent of total programme funds) before rising back to £7.7 million (10.6 percent of total programme funds) in 2014/2015.[294] Budgets during the second half of the 2010s remained relatively static with the PHA at times resorting to voluntary redundancies to save costs, which negatively impacted staff morale.[295]

125. Pressures on PHA were exacerbated by uncertainty about regulatory arrangements amidst the UK's pending exit from the European Union as well as stagnating wider health systems reforms in Northern Ireland.[296] In line with the general shift of public health emphasis towards disease prevention and health promotion, contemporary reviews of Northern Irish health systems tended to suggest the need for greater integration and efficiency of services via centralisation, the need to reduce reliance on acute care, and a greater focus on improving health. However, progress remained fitful.[297] The so-called 2016 Bengoa Review of the Northern Irish health system reacted by diagnosing both a systems fatigue caused by frequent reviews and calling for more long-term planning.[298] Acting on the Bengoa recommendations, Stormont introduced a new 10-year plan titled *Health and Well-being 2026: Delivering Together.*[299] Echoing the language used in reviews of contemporary English, Scottish, and Welsh policy initiatives, the 2017 plan was designed to move beyond planning and managing "around structures and buildings"[300] and instead create inter-organisational partnerships and strengthen

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[294] Public Health Agency, *Corporate Plan 2009-2010* (Belfast: HSC PHA, 2009), 20; Public Health Agency, *Corporate Business Plan* 2011-2012 (Belfast: HSC PHA, 2011), 26; Public Health Agency, *Corporate Business Plan* 2012-2013 (Belfast: HSC PHA, 2011), 25; Public Health Agency, *Corporate Business Plan* 2014-2015 (Belfast: HSC PHA, 2014), 30.

[295] Public Health Agency, *Annual Business Plan* 2016/2017 (Belfast: HSC PHA, 2016), 6-7, 26; Public Health Agency, *Public Health Agency Annual Report & Accounts For The Year Ended 31.03.2017* (Belfast: HSC PHA, 2017), 46; Public Health Agency, *Public Health Agency Annual Report & Accounts For The Year Ended 31.03.2019* (Belfast: HSC PHA, 2019), 40.

[296] Public Health Agency, *Annual Business Plan 2018/2019* (Belfast: HSC PHA, 2018), 1.

[297] Heenan, Deirdre and Appleby, John, 'Health and social care in Northern Ireland', Stewart, John, 'The Devolved Nations'.

[298] *Systems, Not Structures: Changing Health & Social Care. Expert Panel Report* (Belfast: HSC, 2016).

[299] *Health and Wellbeing 2026. Delivering Together* (Belfast: Department of Health, 2017).

[300] 'Health and Wellbeing 2026 – Delivering Together', *Department of Health* (16.05.2017), https://www.health-ni.gov.uk/publications/health-and-wellbeing-2026-delivering-together [accessed: 31.05.2023].

preventive services in consultation with local communities to improve health outcomes against measurable goals. However, enactment of most reforms stalled as a result of the renewed breakdown of power sharing in 2017.[301]

Pandemic Planning

126. Although the years between 2010 and 2019 did not see any significant pandemic outbreaks in the UK, preparedness continued to be a major focus of public health work and systems planning. This focus was heightened by UK experts' involvement in international responses to the MERS, Zika, and Ebola outbreaks and the treatment of individual patients in specialist UK centres.

127. Published one year after the 2010 election, the 2011 *UK National Influenza Preparedness Strategy* updated pandemic preparedness planning in response to experiences gathered during the recent 2009 H1N1 outbreak (see above). Although its overall approach did not differ substantially from the 2007 pandemic flu framework, the 2011 strategy stressed the need for more rapid and accurate assessment of the viral threat, more nuanced and proportionate planning rather "than just focusing on the 'worst case' planning assumptions,"[302] and taking account of factors such as age-specificity in influencing spread and severity of the disease. With up to 1.7 million UK adults relying on social care support provided by local public authorities, particular attention was paid to the need to protect the ongoing functioning of social care services.[303] Basing many of its learnings on the Hine review of the 2009 H1N1 pandemic,[304] the report also highlighted the importance of advanced purchase agreements for a pandemic specific vaccine, improved early-stage diagnostics, and using behavioural techniques to influence public behaviour. Overall, the plan acknowledged the need to allow for flexible approaches in response to the speed and differing local severity of outbreaks,

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[301] Heenan, Deirdre and Mark Dayan, *Change or collapse: Lessons from the drive to reform health and social care in Northern Ireland* (Nuffield Trust Research Report, July 2019); Anderson, Michael et al, 'United Kingdom: health system review', 31-33, 142-143.
[302] *UK Influenza Pandemic Preparedness Strategy 2011* (Department of Health, DHSSPS, Welsh Government, Scottish Government, 2011), 8.
[303] *UK Influenza Pandemic Preparedness Strategy 2011*, 50.
[304] Hine, *The 2009 Influenza Pandemic*; *UK Influenza Pandemic Preparedness Strategy 2011*, 7.

improved surge capacity for longer outbreaks, and enhanced cooperation within and between the health and other public sectors.[305]

128. Amidst the ongoing shake-up of England's health and public health systems, the 2011 UK influenza strategy did not recommend significant structural updates to preparedness systems (see above). Instead, its learnings and emphasis on individual behaviour revealed a growing influence of behavioural scientists and mathematical modelling in shaping UK pandemic planning. Interest in using non-medical interventions such as social distancing to slow the spread of a pandemic had long been a focus of research and planning with the WHO developing a Communication and Behavioural Impact (COMBI) strategy for infection control campaigns in 2000.[306] In the UK, the status of both epidemiological modelling and behavioural scientists in pandemic responses had received a significant upgrade during the mid-2000s. In 2005, it was suggested that "a behaviouralist might make a useful contribution" to the work of the newly established Scientific Advisory Group (SAG) on Pandemic Influenza and that work was already "underway on modelling crisis behaviour patterns."[307] In 2008, the Department of Health's Research Pandemic Influenza Group (PIG) also emphasized the value of incorporating "behavioural responses to pandemics into existing models."[308] In the same year, a new sub-group on behaviour and communications (SPI-B&C) was established within the Scientific Pandemic Influenza Advisory Committee (SPI – the successor of SAG).[309] SPI-B&C's first task was to advise on the phrasing of the "business as usual as far as reasonably possible message" with the government wanting "people to continue working during a

[305] *UK Influenza Pandemic Preparedness Strategy 2011*, 7-8.
[306] *WHO Strategic Action Plan For Pandemic Influenza* (Geneva: World Health Organisation, 2007), 7.
[307] *Influenza Pandemic – Scientific Advisory Group* (21.09.2005), https://webarchive.nationalarchives.gov.uk/ukgwa/20090608132128mp_/http://www.dh.gov.uk/ab/SPI/DH_095908?IdcService=GET_FILE&dID=187403&Rendition=Web [accessed:31.05.2023].
[308] Department of Health Research Pandemic Influenza Group (PIG) to Scientific Pandemic Influenza Committee, 'Research Gap Analysis' (19.08.2008) [SPI/01/09/b], 8.2, The National Archives, https://webarchive.nationalarchives.gov.uk/ukgwa/20081008133049mp_/http://www.advisorybodies.doh.gov.uk/spi/minutes/SPI0109b-ResearchGapAnalysis.pdf [accessed: 31.05.2023].
[309] Update on SPI sub-groups activity, addressed to Scientific Pandemic Influenza Advisory Committee (28.10.2008) [SPI/02/07a], https://webarchive.nationalarchives.gov.uk/ukgwa/20090608132128mp_/http://www.dh.gov.uk/ab/SPI/DH_095908?IdcService=GET_FILE&dID=187321&Rendition=Web [accessed: 31.05.2023].

pandemic unless they have flu."[310] During the 2009 H1N1 pandemic, both the SPI sub-groups on Modelling (SPI-M-O, est. 2005) and Behaviour and Communication proved highly influential in structuring the advice provided to ministers by the newly activated Scientific Advisory Group for Emergencies (SAGE) – itself largely drawn from SPI.[311] While the 2010 Hine review later highlighted problems resulting from SAGE and the CCC's overreliance on academic modelling rather than operational epidemiology,[312] it emphasized the usefulness of drawing on behaviourist interventions to aid vaccine uptake.[313]

129. The concept of cost-effective behavioural nudges was also in line with the new Conservative-Liberal coalition government's political emphasis on individual choice rather than formal regulation (see above). In 2010, a Behavioural Insights Team (BIT) or 'Nudge Unit' was established within the Cabinet Office. Similar to SPI-B&C, BIT's composition and focus on individual behaviour prioritised expertise from the behavioural sciences such as psychology, behavioural economics, and marketing over the macro sociocultural expertise of other social sciences disciplines. A resulting MINDSPACE report by the Cabinet Office and Institute for Government underlined the advantages of using "low cost, low pain ways" of tackling problems such as obesity during "a period of fiscal constraint."[314] The 2011 UK influenza strategy followed this logic by emphasizing the value of tailoring messaging to specific segments of the population. Citing the MINDSPACE report and drawing heavily on the 2010 Hine Inquiry, authors of the 2011 strategy hoped that appeals to voluntary responsible behaviour would be a cost-effective measure of increasing acceptance of interventions and slowing the spread of influenza, which would

[310] Scientific Pandemic Influenza Advisory Committee (SPI). Minutes Second Meeting (11.11.2008), 2, https://webarchive.nationalarchives.gov.uk/ukgwa/20090608132128mp_/http://www.dh.gov.uk/ab/SPI/DH_095908?IdcService=GET_FILE&dID=187319&Rendition=Web [accessed: 31.05.2023].
[311] Chambers et al., 'Reflections on the UK's Approach to the 2009 Swine Flu Pandemic', 739-740; House of Commons Science and Technology Committee, *Scientific Advice and Evidence in Emergencies*. Third Report of Session 2010-2011. Volume I (London: House of Commons, 2011), para 146.
[312] Hine, Deirdre, *The 2009 Influenza Pandemic,* 69-70.
[313] Hine, Deirdre, *The 2009 Influenza Pandemic*, 124; see also: House of Commons Science and Technology Committee, *Scientific Advice and Evidence in Emergencies*, 35-37, 76.
[314] *MINDSPACE. Influencing behaviour through public policy* (London: Cabinet Office and Institute for Government, 2010), 7 and 73; see also Cabinet Office Behavioural Insights Team, *Applying Behavioural Insight to Health* (London: Cabinet Office, 2010).

reduce the need for more coercive measures such as border controls and school closures.[315]

130. The 2011 UK influenza strategy's focus on moderate adjustments of existing preparedness systems was maintained in a subsequent *PHE Pandemic Influenza Response Plan* (2014). The 2014 Plan detailed PHE's preparedness and response roles as well as the role of a New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) in providing risk assessment and mitigation advice.[316] During emergencies, PHE would have a "key supporting role to support the CMO and the SAGE process, providing expert clinical and scientific advice [to decision-makers], in partnership with other key health protection partners."[317] Similar to 2009, SAGE was supposed to "ensure a common understanding of the scientific aspects of the pandemic", provide "advice on prognosis and scientific evidence" and "highlight the nature and extent of any uncertainties or differences in expert opinion."[318] Meanwhile, CMOs from devolved administrations would work collaboratively to "ensure a comprehensive and co-ordinated UK-wide public health response."[319] Although PHE's Chief Executive could also have a direct line of communication to the Secretary of State for Health if required,[320] PHE's overall integration into the SAGE process meant that there was a risk that problems of institutional visibility and blame displacement for wider systems problems that had occurred during the 2009 pandemic would be repeated (see above).

131. With regards to testing, PHE placed a special emphasis on nucleic acid-based amplification technologies. PHE's Colindale reference laboratory would develop initial diagnostic assays for a novel pandemic virus and then undertake diagnosis and confirmation of the first UK cases. It would then roll out pandemic "specific diagnostic assay(s), to PHE (and possibly other) laboratories…"[321] PHE's Specialist Microbiology Network was tasked with leading wider testing and generating

[315] *UK Influenza Pandemic Preparedness Strategy 2011*, 46-47.
[316] *Pandemic Influenza Response Plan 2014* (London: Public Health England, 2014).
[317] *Pandemic Influenza Response Plan 2014*, 18.
[318] *Pandemic Influenza Response Plan 2014*, 18.
[319] *Pandemic Influenza Response Plan 2014*, 18.
[320] *Pandemic Influenza Response Plan 2014*, 19.
[321] *Pandemic Influenza Response Plan 2014*, 47.

information "on influenza type and subtype".[322] Testing partners beyond PHE were not specified.

Tabletop Exercises

132. Although pandemic influenza continued to be the major focus of official planning, a series of PHE tabletop exercises also assessed English and UK preparedness against additional threats such as Ebola (Surge Capacity Exercise, 2015),[323] Middle Eastern Respiratory Syndrome Coronavirus (MERS-CoV; Exercise Alice 2016),[324] the temporary closure of the Royal Free Hospital's High Level Isolation Unit (Exercise Northern Light, 2016),[325] and an outbreak of viral haemorrhagic fever alongside a major chemical incident (Exercise Typhon 2017).[326] Resulting evaluations revealed significant overlaps of identified lessons. Most exercises highlighted the need to train and establish sufficient levels of skilled infectious disease control staff and isolation facilities to withstand longer surge situations and protect these capabilities during inter-pandemic phases. Significantly, exercise participants also voiced ongoing concerns about a lack of clarity regarding resources, communication pathways, and responsibilities across local authorities, PHE, and the Department of Health as well as a general lack of awareness for the *National Incident & Emergency Response Plan*.[327]

133. Many of these problems also became apparent during the UK's most important exercise for pandemic preparedness. Taking place in early 2016, Exercise Cygnus involved over 950 participants from across the UK's health services and administrations.[328] The exercise tasked officials to respond to a fictitious outbreak of

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[322] *Pandemic Influenza Response Plan 2014*, 47.
[323] *Report on the Ebola Preparedness Surge Capacity Exercise* (10.03.2015) (London: PHE, 2015).
[324] *Report: Exercise Alice Middle East Respiratory Syndrome Coronavirus* (MERS-CoV), 15 February 2016 (London: PHE, 2016).
[325] *Exercise Northern Light Final Report 24 and 25 May 2016* (London: PHE/ NHS, 2016).
[326] *Report on Exercise Typhon Public Health England Command Post Exercise 22 and 23 February 2017* (London: PHE, 2017).
[327] *Report on the Ebola Preparedness Surge Capacity Exercise* (10.03.2015) (London: PHE, 2015); *Report: Exercise Alice Middle East Respiratory Syndrome Coronavirus* (MERS-CoV), 15 February 2016 (London: PHE, 2016); *Exercise Northern Light Final Report 24 and 25 May 2016* (London: PHE/ NHS, 2016); *Report on Exercise Typhon Public Health England Command Post Exercise 22 and 23 February 2017* (London: PHE, 2017).
[328] Annex B: Exercise Cygnus Report (London: PHE, 2016), https://www.gov.uk/government/publications/uk-pandemic-preparedness/exercise-cygnus-report-accessible-report#tier-one-command-post-exercise-pandemic-influenza--18-to-20-october-2016 [accessed: 31.05.2023].

highly infectious 'swan flu', which was defined as infecting 50 percent of the UK's population and causing 200-400,000 excess deaths. Starting in week seven of the outbreak (the treatment and escalation phase), the exercise confronted responders with a situation in which a vaccine was not yet available. Participating officials were based in their usual places of work and communicated via email and telephone with mock CCC/COBR meetings set up by the central exercise team.

134. Evaluation of Exercise Cygnus revealed significant pandemic vulnerabilities. The final report warned that "there is no overview of pandemic response plans and procedures"[329] and that health systems restructuring across all devolved administrations meant that key organisations referred to in the 2011 preparedness plan no longer existed. Overall, the exercise had revealed reliance on corporate memory of the 2009 H1N1 response rather than recourse to formal preparedness plans. Additional concerns centred on lack of knowledge of how members of the public would react to the potential use of population triage, restrictions, and mass burials.

135. It also became apparent that there was a deficit of tactical planning should excess deaths and demands on health services and social care outstrip local capacity. Crucially, local exercise participants raised "concerns about the expectation that the social care system would be able to provide the level of support needed if the NHS implemented its proposed reverse triage plans, which would entail the movement of patients from hospitals into social care facilities."[330] Reflecting contemporary public health workforce shortages and the increasing concentration of infectious disease expertise within PHE (see above), there was also concern about whether sufficient subject matter experts would be available to advise local and regional responses during a real-time UK-wide outbreak. Similar concerns about secondary and community care, the need for a strategic approach to mapping social care priorities, and lack of surge and triage guidance were expressed during a smaller

[329] Annex B: Exercise Cygnus Report (London: PHE, 2016).
[330] Annex B: Exercise Cygnus Report (London: PHE, 2016).

English exercise (Exercise Cygnet) focusing on the earlier phases of an influenza pandemic.[331]

136. In response to the highlighted deficits, additional PHE exercises took place in 2018 to assess proposals for reformed response capabilities during public health emergencies (Exercise Cerberus, 2018),[332] NHS primary care pandemic influenza preparedness (Exercise Pica, 2018),[333] and end-to-end patient pathways for known and unknown high consequence infectious diseases (Exercise Broad Street, 2018).[334]

137. Suggestions for improved response capabilities made by participants during Exercise Pica included the creation of a self-diagnosis app and remote working protocols for primary care. However, the exercise also highlighted the ongoing need to join up local response plans and NHS IT systems as well as concerns about supply chain resilience and ongoing confusion about which role local authority DPHs would play during a pandemic emergency.[335]

138. Meanwhile, Exercise Broad Street warned that notification practices between PHE and local and regional partners following a positive test remained "based on a mixture of formal and informal notification."[336] The exercise also expressed concern about differing escalation algorithms across NHS Trusts and likely logistics challenges posed by transporting samples from patients and clinics to distant testing hubs. There was a clear preference for 'near patient sample testing' and a view that a concentration of testing resources was less preferable than developing multiple hubs. Reflecting the increasing administrative fragmentation of UK health systems, the report ended by highlighting the need to write instructions according to organisation roles and not specific names.[337] Additional table-top exercises were

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[331] *Report on Decisions and Actions – Exercise Cygnet 02 August 2016* (INQ000090433).
[332] *Exercise Cerberus. PHE National Exercise 08.02.2018* (London: PHE, 2018).
[333] *Report on Exercise Pica NHS primary Care preparedness and response to pandemic influenza 05.09.2018* (London: PHE, 2018).
[334] *Report: Exercise Broad Street High Consequence Infectious Disease (HCID) Exercise 29.01.2018* (London: PHE, 2018).
[335] *Report on Exercise Pica NHS primary Care preparedness and response to pandemic influenza 05.09.2018* (London: PHE, 2018).
[336] *Report: Exercise Broad Street High Consequence Infectious Disease (HCID) Exercise 29.01.2018* (London: PHE, 2018), 12.
[337] *Report: Exercise Broad Street High Consequence Infectious Disease (HCID) Exercise 29.01.2018* (London: PHE, 2018), 12, 14-18.

conducted in devolved administrations. However, only very few exercises seem to have been UK-wide in their scope.

139. The described exercises foreshadowed many of the key challenges that would emerge during COVID-19. Recurrent warnings about the same vulnerabilities also underlined the difficulties UK planners faced in moving from tabletop exercises and influenza plans to creating and sustaining the real physical infrastructures, staffing levels, and regulatory alignment necessary for an effective pandemic response. Although pandemic preparedness remained a frequently voiced concern, actual UK infection control capacity building between 2010 and 2019 was undermined by budget cuts, regulatory heterogeneity, repeated health services shake-ups, workforce shortages, and rapidly expanding public health remits. Following the 2016 Brexit referendum, there was also concern about reduced European coordination and a loss of British influence on European public health bodies.[338]

Stockpiles

140. The significant decline of UK preparedness stockpiles was another indication of the relatively low political priority of contingency planning within the Department of Health as well as PHE's constrained ability to defend core preparedness capabilities. Department of Health pandemic consumables planning documents reveal that initial decisions to reduce the overall stockpile were taken from 2012 onwards. During the 2009 H1N1 pandemic, the UK had invested in a significant expansion of its pandemic stockpile. By 2012, purchased items such as surgical masks and FFP3 respirators were nearing the end of their shelf-life and would have to be replaced with particularly large replacements due in 2014/15 and 2016/17.[339] In addition to attempts to prolong product shelf life via supplier certification,[340] the Pandemic Influenza Preparedness Programme (PIPP) also examined ways of reducing the overall physical stockpile.

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[338] *Report: Exercise Broad Street,* 12-13; Participants of the 2023 witness seminar highlighted a relative loss of UK influence due to its new observer status after 2020; *Witness Seminar on the reform of communicable disease control systems 1980s to 2019* (18.05.2023).
[339] PIPP Programme Board 2.11.2012. Facemasks and FFPT3 respirators – shelf life extension proposal (INQ 000101111), 3.
[340] PIPP Programme Board 2.11.2012. Facemasks and FFPT3 respirators – shelf life extension proposal (INQ 000101111).

140.1. One way of reducing costs was to complement the Just In Case (JIC) stockpile model of physically stored emergency supplies with Just In Time (JIT) contract frameworks, which were designed to procure items within 12 weeks of a pandemic being declared.[341] Relying on JIT provision of critical PPE would result in substantial savings since PPE stock would not actually be purchased or stored outside of pandemics.

140.2. However, the approach also created great vulnerabilities should supply chains be disrupted. In the case of valved and unvalved FFP3 respirators, which would play a key role in protecting medical personnel during the 2020 pandemic, an initial 2014 procurement analysis confirmed that 80 percent of the projected PPE demand for a reasonable worst case scenario should be physically held on a Just In Case (JIC) basis with 20 percent unvalved respirators procured on a Just In Time (JIT) basis.[342] Market intelligence suggested that "any attempt to increase the volume to be procured on a JIT basis would be high risk and could result in an inability to meet the total volume obligation."[343] However, just one year later, a new analysis claimed that "the supplier base"[344] was now in a position to also supply 20 percent of valved respirators on a JIT basis– although likelihood of failure of timely delivery within 11 weeks was still judged as medium.[345]

140.3. Submitted in October 2015, PIPP's Outlined Business Case claimed that JIT "will ensure that while we maintain a reduced stockpile on a JIC basis over the period of a 15-week -pandemic, we should still be able to meet demand."[346] An additional JIT procurement contract for 6.8 million unvalved respirators, which would protect patients from pathogens exhaled by medical personnel, was supposed to act as a failsafe should favoured JIT procurement

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[341] Pandemic Consumables – Replenishment for the Pandemic Influenza Preparedness Programme – PIPP. Phase 4B PPE FFP3 valved Respirators Element 1 Just in Case with Element 3 Just in Time option. Outline Business Case v. 1.0 (London: Department of Health, 2015), INQ000101067, 7.
[342] *Pandemic Consumables – Replenishment for the Pandemic Influenza Preparedness Programme*, 5.
[343] *Pandemic Consumables – Replenishment for the Pandemic Influenza Preparedness Programme*, 5.
[344] *Pandemic Consumables – Replenishment for the Pandemic Influenza Preparedness Programme*, 5.
[345] *Pandemic Consumables – Replenishment for the Pandemic Influenza Preparedness Programme*, 47.
[346] *Pandemic Consumables – Replenishment for the Pandemic Influenza Preparedness Programme*, 8.

of valved masks fall short.[347] In effect, the switch to JIT purchasing meant that up to 20 percent of the 34 million FFP3 respirators (6.8 million items) that were deemed necessary under a reasonable worst case scenario would not actually exist before a pandemic occurred.[348] Meanwhile, defects in official quality assurance processes for emergency PPE procurement that had already surfaced in 2009 remained unaddressed.[349]

140.4. While a detailed assessment of provision decisions for other PPE components is beyond the scope of this report, it is clear that cost-cutting considerations also dominated other restocking decisions. In 2020, a *Guardian* investigation reported that the overall value of UK pandemic stockpiles had fallen from £831 million in 2013 to £506 million in March 2019.[350] A subsequent National Audit Office investigation highlighted the Department of Health and Social Care's 2018 decision to prioritise financial savings and not include targets for resilient supplies when redeveloping the NHS Supply Chain. According to the National Audit Office, the combined UK Pandemic Influenza Preparedness Programme (PIPP) and EU Exit stockpiles had only provided an estimated two weeks' worth, or less, of most types of PPE needed by the NHS and social care during a pandemic in early 2020.[351] This was far less than the 2011 preparedness strategy's "reasonable worst case scenario" of "one or more pandemic waves lasting 15-weeks"[352] and planning assumptions for a "sustained response"[353] in the 2014 *PHE Pandemic Influenza Response Plan*.

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[347] *Replenishment for the Pandemic Influenza Preparedness Programme – PIPP. Phase 4B PPE FFP3 Respirators (unvalved) – Element 3 Just In Time. Full Business Case Final* (London: Department of Health, 2016), INQ000101185, 36.

[348] *Pandemic Consumables – Replenishment for the Pandemic Influenza Preparedness Programme*, 6, 18-19; The OBC was forwarded for approval on 29.10.2015, INQ000101073.

[349] Government Internal Audit Agency, Department for Health and Social Care. Analysis of PPE issue. Advisory Review. Consulting Engagement Report – Final (21.09.2020) [20/21-DHSC-01], INQ000057530, 3-6.

[350] Davies, Harry, Pegg David and Lawrence, Felicity, 'Revealed: value of UK pandemic stockpile fell by 40% in six years', *Guardian* (12.04.2020), https://www.theguardian.com/world/2020/apr/12/revealed-value-of-uk-pandemic-stockpile-fell-by-40-in-six-years [accessed: 30.05.2023].

[351] Comptroller and Auditor General, *The supply of personal protective equipment (PPE) during the COVID-19 pandemic. Report by the Comptroller and Auditor General. Department of Health & Social Care* (London: National Audit Office, 2020), 6-7.

[352] *UK Influenza Pandemic Preparedness Strategy 2011*, paragraph 2.19.

[353] *Pandemic Influenza Response Plan 2014* (PHE, 2014), Appendix 1.

141. The outlined decline of stockpiles and other core public health capabilities did not mean that there were no improvements in health protection capabilities. As described in this report, the period between 2000 and 2019 saw significant advances in UK molecular diagnostic capacity across a variety of platforms, the integration of electronic surveillance systems, improved analytic and modelling capabilities, and the development and trials of adaptable vaccine platforms for priority pathogens of epidemic potential.[354] Following the erosion of domestic manufacturing capabilities between the 1980s and 1990s, investment in a new Vaccine Manufacturing and Innovation Centre (VMIC, launched 2018) and NIHR clinical trial networks also promised to overcome long-standing bottlenecks in safety and efficacy studies, which had been highlighted since 2003.[355] Contemporary UK leadership in global efforts against antimicrobial resistance (AMR) also resulted in significant investment and improvements of infection prevention and control practices in clinical settings.[356]

142. However, by themselves, new technological and vaccine rollout capabilities would not be enough to prevent major vulnerabilities during the initial stages of a pandemic emergency. As predicted by both the UK pandemic preparedness strategy and PHE exercises, the first stages of a major communicable disease outbreak would see health protection officials primarily rely on slowing the spread of a pathogen via track and trace responses while maintaining essential services. In this situation, success required clear command and control pathways, close coordination between adequately resourced local and national public health and

[354] Horby, Peter, 'Improving preparedness for the next flu pandemic', *Nature microbiology* 3/8 (2018), 848-850; Noad, Rob J., Karl Simpson, Anthony R. Fooks, Roger Hewson, Sarah C. Gilbert, Mark P. Stevens, Margaret J. Hosie et al., 'UK vaccines network: Mapping priority pathogens of epidemic potential and vaccine pipeline developments', *Vaccine* 37/43 (2019), 6241-6247.

[355] 'Memorandum submitted by Professor S.P. Borriello (January 2003)', House of Lords Select Committee on Science and Technology – Minutes of Evidence (04.03.2003); Simpson, Colin R., Dan Beever, Kirsty Challen et al., 'The UK's pandemic influenza research portfolio: a model for future research on emerging infections', *The Lancet Infectious Diseases* 19/8 (2019), e295-e300; Glover, Rebecca E., Andrew C. Singer, Adam P. Roberts, and Claas Kirchhelle, 'NIMble innovation—a networked model for public antibiotic trials', *The Lancet Microbe* 2/11 (2021), e639; the VMIC was surprisingly sold-off in 2022, Glover, Rebecca E., Adam P. Roberts, Andrew C. Singer, and Claas Kirchhelle, 'Sale of UK's Vaccine Manufacturing and Innovation Centre', *BMJ* 376 (2022), 1-2.

[356] Hopkins, Susan, 'UK initiatives to reduce antimicrobial resistant infections, 2013-2018', *International Journal of Health Governance* 21/3 (2016), 131-138.

health services, and sufficient levels of well-trained and protected personnel. In December 2019, many of these capabilities were severely constrained.

Summary

143. The years between 2010 and 2019 saw a renewed round of organisational restructuring and financial pressures cause difficulties across UK public health systems. Public health planners responded to new concepts of integrated governance, early-stage disease prevention, and localism by broadening the remit of existing health protection organisations to encompass health promotion and instituting new audit mechanisms. While Welsh and Scottish authorities attempted to strengthen coordination of local services within existing structures, the 2012 Health and Social Care Act saw English authorities hand over significant powers for the provision of public health services from now defunct PCTs to local councils. Meanwhile, attempts to coordinate and improve the accountability of health services in Northern Ireland stalled both as a result of fiscal pressures and the breakdown of power-sharing. Despite the increasingly similar remits and designations of national public health bodies across England, Wales, Scotland, and Northern Ireland, devolution still led to differences in their ability to perform services. England's PHE was an executive body within the Department of Health. Northern Ireland's PHA was a statutory body subject to directions from DHSSPS. Meanwhile, the Welsh PHW and Scottish PHS – and their predecessors – were part of the NHS. The different legal position of public health services impacted on their funding and ability to act as effective public health advocates. The relative protection of NHS budgets in comparison to sharp local authority cuts reduced austerity's impact on Scottish and – to a more limited extent – Welsh public health systems. By contrast, Northern Irish systems experienced stress both as a result of budget pressures and political uncertainty. Meanwhile, English public health systems had to cope with simultaneous cuts to national PHE and local authority budgets. The resulting weakening of important UK public health workforces was compounded by ongoing organisational confusion about local, regional, and national public health responsibilities resulting from the major contemporary political reforms. English surveys highlighted that reintegrating key public health

staff into local authorities raised both the local profile of public health and support for relevant interventions. However, in the case of infectious disease control, public health's broadened remit and the accelerating replacement of specialist with managerial posts also weakened local-level capabilities. At the English and UK level, PHE's ability to act as an independent advocate for public health and long-term preparedness was hampered both by budget cuts and its new position as an executive agency within the Department of Health (from 2018 Department of Health and Social Care). Gaps in UK pandemic preparedness arrangements such as confusion over responsibilities, lacking specialist infection control resources, and the need to integrate social care into planning were highlighted by multiple tabletop exercises but not sufficiently addressed. Although major technological advances in vaccine design, molecular diagnostics, and IT infrastructures enable unprecedented surge testing, real-time surveillance, and record vaccine rollouts, these capabilities were not enough to compensate for increasingly fragile baseline infection control infrastructures.

Conclusion

144. The past offers no simple lessons for the future of UK public health. There is no timeless solution and public health infrastructures evolve to match shifting health challenges and societal values. Looking back, it is, for example, impossible to say whether now defunct parts of the UK's public health system such as the office of the MoH, the PHLS, HPA, or corresponding institutions in Scotland, Wales, and Northern Ireland would have been more successful in responding to COVID-19 or the myriad of other 21st century health challenges. Rather than setting out a reform checklist, the advantage of an historical survey instead lies in its ability to reveal the longer-term path dependencies shaping public health as well as recurring problems. In the case of the UK, analysing eight decades of evolving infection control reveals four central challenges for decision-makers: declining attention, administrative misalignment, emergency priorities, and selective memory.

Attention

145. Throughout the analysed time period, maintaining or improving relevant control capabilities has proven challenging due to declining visibility, infrastructural investment, and advocacy for infectious disease control:

145.1. ***Visibility:*** since the early 20th century, significant technological advances in treatment and prevention as well as rising levels of wealth and access to health services and water and sanitation mean that most UK citizens no longer perceive infectious disease as a significant threat to lives and livelihoods. This is despite current generations' lived experience of multiple major pandemic outbreaks ranging from the 1957, 1968, and 2009 influenza waves to the ongoing HIV/AIDS pandemic, and SARS-CoV and SARS-CoV-2. This punctuated complacency about infectious disease threats rests on the smooth functioning of substantial public health, health, and other technological infrastructures put in place to control them. However, the last 50 years have seen the very success of these infrastructures lead to increasingly precarious maintenance.

145.2. ***Investment:*** reduced societal visibility of infectious disease threats has correlated with reduced investment in control capabilities. If we exclude individual bumper years following pandemics or bioterrorism fears, funding for major infection control infrastructures such as the PHLS entered a prolonged period of gradual decline from the 1980s to the mid-2000s before experiencing a more pronounced fall between 2010 and 2019. Although impacts varied between UK nations, this multi-decade process of declining or stagnating core funding persisted across governments from different political parties. Funding reductions between 2000 and 2019 may have been less pronounced than some contemporary accounts suggest. However, even stagnation and moderate declines will have compromised routine infection control and surge capacities during a time when the UK population was growing larger (13.9 percent increase between 2000 and 2020), older (median age increase from 37.4 years to 39.5 years), and exposed to a growing number of (re)emerging infections amidst the climate emergency.[357]

145.3. ***Advocacy:*** funding reductions coincided not only with a wider decline of infectious disease visibility, but also with organisational changes that made it harder for specialists to advocate for infection control capabilities within policy circles. In England, reduced advocacy capabilities resulted from merging the once highly visible PHLS into the HPA in 2003, the increasingly frequent rearrangement and blurring of public health responsibilities at the local level, and reduced independence resulting from PHE's creation as a non-statutory executive agency of the Department of Health in 2013. By contrast, health and public health emerged as major areas in which devolved administrations could create signature policies – small nations' governments have also proven more responsive to societal demands for collaborative 'flat' health systems structures.[358] Scotland and Wales, in particular, have upgraded the status of public health on domestic policy agendas while ambitious Northern Irish initiatives suffered from repeated periods of political stagnation. A lack of comparative studies makes it difficult to judge the

[357] Data from *Our World in Data*.
[358] Stewart, John, 'The Devolved Nations'.

efficacy of diverging administrative and infrastructural arrangements on infectious disease control. However, the political emphasis on long-term public health capabilities and the decision to maintain relatively independent public health institutions have undoubtedly minimised disruption.

Alignment

146. The last three decades have seen a fragmentation of administrative responsibilities, centralisation of capabilities, and devolution lead to increased misalignment of UK public health services.

146.1. ***Fragmentation:*** Public health and infection control are collaborative enterprises that require close alignment between different specialities and public bodies to achieve successful outcomes. Defining where exactly public health services should be positioned within complex national and local bureaucracies is notoriously difficult. Over the last 84 years, UK decision-makers have experimented with numerous administrative models. However, despite administrative variations across the UK, there has been a general trend to broaden the remit of public health to first encompass environmental health and non-communicable diseases, then integrate protection services for chemical and radioactive threats, and finally to focus on health promotion and prevention. Public health's rapidly broadening remit means that responsibilities have either been spread ever more widely – and thinly – across multiple administrative levels or incorporated into mammoth agencies, which often selectively prioritise certain aspects of public health over others. In the case of infectious disease control, the result has been a de-emphasis on routine services outside of crisis situations and confusion about where responsibilities in increasingly complex public health and health bureaucracies lie.

146.2. ***Centralisation:*** the increasing concentration of infection control resources in centralised hubs has exacerbated confusion and fragmentation at the local level and led to a misalignment of national and local capabilities. The last two decades in particular have seen a significant concentration of the

technological means and skills to produce, analyse, and act on microbiological and epidemiological data at the national level. Although there are notable administrative variations across the UK, local public health workers in most parts of the country no longer have the ability to generate and act on their own data and instead rely on epidemic intelligence from the centre. This division of labour carries significant risks and is exacerbated by administrative fragmentation of local infection control capabilities: at the national level, over relying on centralised data processing without contextual local inputs can compromise epidemic intelligence and result in flawed decision-making. Meanwhile, even the best epidemic intelligence will prove useless if local officials lack access to underlying data, relevant expertise, and operative capabilities.

146.3. ***Devolution:*** although variations of public health systems predate 1997, the last two decades have seen a significant acceleration of administrative divergence: Wales and Scotland opted to use the NHS as the location for public health services; Northern Ireland first relied on a mix of commissioning from HSSBs and service provision from PHLS/HPA before integrating health and social services with the HSCB and creating a new body corporate in the form of PHA; England first decided to rely on a new non-departmental agency (HPA) and then an executive departmental agency (PHE) alongside the NHS and local authorities. A similar divergence has emerged over whether to maintain or end the 1990 provider-purchaser split with Scotland (2004) and Wales (2009) abolishing the internal market in the name of service collaboration, Northern Ireland creating a distinct model of integrated commissioning, and England deciding to maintain the internal market and introduce additional market-like competition and private sector elements.[359] Administrative divergence has been exacerbated by infrastructural divergence. Although all nations have adopted the model of centralised

[359] McGregor, Pat, and Ciaran O'Neill, 'Resource allocation in the Northern Ireland health service: consensus or challenge?', *Public Money & Management* 34/6 (2014), 409-416; Atkins, Graham, Grant Dalton, Andrew Philips, Alex Stojanovic, *Devolved public services. The NHS, schools and social care in the four nations* (Institute for Government, April 2021), 5-7.

epidemic intelligence with specialist hubs in Belfast, Cardiff, Glasgow, and London, Wales decided to integrate the entire regional PHLS network into NPHS (and subsequently PHW). Meanwhile, England experienced the most radical slimming of local public health laboratories. The described differences between devolved public health systems can lead to significant misalignment when it comes to structuring UK-wide public health interventions but do not have to. Comparison with European neighbour states shows that federal public health services can perform just as well as centralised public health systems. However, the UK neither has a federal public health system nor a centralised one. Amidst the increasing divergence between devolved public health systems and the absence of a truly federal public health agency, key powers still rest within the London-based Department of Health and Social Care and an essentially still English UKHSA. This concentration of power may also explain why major reforms of English/UK public health institutions such as the creation of HPA, PHE, and most recently UKHSA have taken place without substantial consultation with Belfast, Cardiff, and Edinburgh. Tellingly, a 2017 review of PHE found that devolved administrations "sometimes felt excluded from appropriate levels of consultation, or even communication, over changes" with PHE "staff forgetting, or not knowing, when to include the Devolved Administrations, or their organisations"[360] in planning. Moving forward, a more sustainable alignment of UK-wide and national public health systems will require greater input from public health workers at all administrative levels and communication between devolved administrations and Westminster.

Emergency Priorities

147. Although planning for health emergencies is an important part of infection control work, an overemphasis on intelligence-led command and control responses to single events has diverted resources from baseline services. Over the past century, two major emergency scenarios have shaped public health planning in the UK. The first was the Second World War and the second was the heightened fear of

[360] Department of Health, *Tailored Review of Public Health England,* 29.

pandemic threats from around 1990 onwards. These two highly distinct emergency scenarios required different forms of response infrastructure. Ahead of the Second World War, planners devised a networked emergency public health system that would be capable of withstanding major blows to central command and control centres and urban laboratories and react flexibly to local emergencies amidst predicted aerial warfare, mass civilian displacements, and bacteriological sabotage. Significant agency and resources were vested in local and regional public health workforces while a networked approach to intelligence gathering generated sufficient information for national authorities to keep abreast of challenges exceeding local capacities. In contrast to this decentralised networked approach, the emergency scenarios and contingency planning that have dominated public health from the 1990s onwards have tended to favour 'lean' centralised intelligence-led command and control systems that rapidly identify, respond to, and quell outbreaks. By invoking future emergencies, the preparedness paradigm has justified a steady increase in the allocation of resources, powers, and duties away from local-level services towards powerful regional and national hubs of epidemic intelligence. National coordination of emergency responses is important and the concentration of specialist infection control and surveillance in the centre is undoubtedly more cost-effective than spreading them locally. However, in the long-term, this top-heavy mode of emergency planning inadvertently also increases the likelihood of a systems-wide public health emergency should centralised capabilities experience severe bottlenecks or collapse during prolonged disease surges. A relative de-emphasis of planning for single emergencies and a re-emphasis on the importance of evenly distributed and networked infection control capabilities may be a more sustainable way of building resilient surge capabilities for the next pandemic.

Selective Memories

148. The historical evidence base on which pandemic and public health planning relies needs to be improved by systematising institutional memory retention, diversifying the sources memory capture draws on, and ensuring that sufficient attention is paid to critical voices and recurrent warnings.

148.1. ***Institutionalising and diversifying memory capture:*** the importance of analysing past public health responses and capturing contemporary insights has long been emphasized by public health planners and was integrated into preparedness planning from the 1990s onwards. Despite this emphasis on memory, it is surprising to see how unsystematic, unrepresentative, and uncritical official UK memory capture has been. In contrast to major US public health agencies such as the Food and Drug Administration or CDC,[361] there is no specialist public health archive or historical service to retain institutional memory. Existing witness seminars and research on UK pandemic responses have either resulted from ad hoc agency initiatives or independent academic research. Official accounts have also been remarkably selective when it comes to capturing critical voices. The need for more independent forms of memory capture beyond direct institutional control is indicated by the stark contrast of historical narratives that emerge from official witness seminars and inquiries as opposed to the far more critical memories voiced by public health workers during academic oral history projects, ethnographic fieldwork, or sociological surveys. To avoid replicating institutional biases and ensure a robust dataset for future learning, institutionalised memory capture must also preserve a sufficiently representative and diverse set of memories. This includes paying attention to representativeness in terms of ethnicity, gender, and class as well as respondents' professional status and geographic position within the UK's devolved public health services. While researching this report, it has, for example, been far easier to find historical information on the routine and emergency performance of English as opposed to Scottish, Welsh, and Northern Irish public health systems. The startling gap of official public health data and histories that are comparable across the UK has long been highlighted by social scientists and significantly complicates meaningful systems comparisons.[362] It also makes it more likely that future UK-wide reforms will be primarily based on data and experiences from England as the

[361] 'The Origins of the FDA History Office', *US Food and Drug Administration* (01.02.2018), https://www.fda.gov/about-fda/fda-history-office-old/origins-fda-history-office [accessed: 05.06.2023]; US CDC records are held in a dedicated National Archives and Records Administration facility in Atlanta.
[362] Greer, 'Devolution and health in the UK', 22.

UK's largest nation. Moving forward, institutionalising memory capture, creating comparable forms of data collection, and integrating independent and transparent academic research to ensure the creation of a robust and diverse historical dataset is extremely desirable.

148.2. ***Paying attention to critical memory:*** turning resulting data into meaningful action poses the perhaps most significant identified challenge. One of the most worrying insights emerging from research on this report is how well-known structural weaknesses of UK pandemic response capabilities were by the time of the COVID-19 pandemic. Challenges resulting from confused responsibilities, parallel hierarchies, lack of data access, and insufficient surge capacity were voiced after SARS-CoV (2003) and H1N1 (2009) as well as after numerous preparedness exercises such as Exercise Cygnus (2016). However, warnings were not acted on as a result of selective official memory capture, the frequent restructuring of public health institutions, and political pressure for 'business as usual'. Institutionalising critical memory capture and conducting regular independent UK-wide comparative reviews of how health protection systems are addressing identified weaknesses can play a critical role in improving official accountability, maintaining visibility for infectious disease control, and preparing for the next pandemic.

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