

What's next for the NHS?

Building the resilience of the health and care system

Eleonora Harwich

George Batchelor

Matthew Fetzer

Jennifer Connolly

Sebastian Rees

Maria Starovoitova

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About

This paper is a collaboration between *Reform* and Edge Health. It focuses on the NHS's response and does not cover the impact of the pandemic on the very real and pressing challenges around workforce burnout and the resilience of the social care sector. The authors felt that these topics would necessitate their own paper. The arguments and any errors that remain are the authors' and the authors' alone.

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Recommendations

Recommendation 1: NHS England and Improvement should mandate the publication of waitlist recovery plans by integrated care systems and trusts. These should clearly state how independent sector capacity will be used and usage data should be published at regular intervals.

Recommendation 2: NHS England and Improvement should devote resources to building 'community diagnostic hubs' to meet the diagnostic backlog outside of the hospital setting.

Recommendation 3: The General Medical Council should create an 'NHS reserve list' with healthcare professionals who are not currently working in the NHS but would be willing to re-join to respond to a crisis. A training programme should be developed in collaboration with Health Education England, with clear guidance on the content and frequency of training for members of the reserve list.

Recommendation 4: Health Education England should overhaul the way it provides training during a crisis. It should seek to provide training modules that present easily and quickly digestible information.

Recommendation 5: The Government should provide funding for NHS England and the social care system to increase the number of beds. This should be based on a clear independent review of bed capacity in the health and care system focused on increasing its long-term resilience. The review should focus on understanding how many extra beds the NHS needs, what type of beds and a clear plan to improve patient flow and reduce any delays to patients being transferred or discharged.

Recommendation 6: The Department of Health and Social Care, in conjunction with NHS Supply Chain, should produce end-to-end supply chain maps for critical diagnostic equipment and make them publicly available.

Recommendation 7: The Department of Health and Social Care should build and publish a register of firms capable of switching their production lines to produce diagnostic equipment and perform diagnostic analysis in the case of health emergencies.

Recommendation 8: The Department of Health and Social Care should continue to develop and maintain an up-to-date inventory of key assets, including personal protective equipment and ventilators.

Recommendation 9: NHS England and Improvement and NHSX should mandate the adoption of the Scan4Safety programme to all NHS Trusts. This will help increase the accuracy of operational data and patient safety.

Introduction

Despite early warning signs from China and Italy, it was not until Public Health England shared daily data on the number of confirmed infections in England, and stark modelling on the potential scale of the impact was published,¹ that the reality of the COVID-19 pandemic crystallised in the minds of political, public health leaders, NHS staff and the population more generally.²

To help the healthcare system cope with the expected surge in the number of COVID-19 patients, Simon Stevens, Chief Executive of NHS England, oversaw the block-purchase of capacity from hospitals in the independent sector,³ and asked hospitals in the public sector to “urgently discharge all hospital in-patients” who were medically fit to leave and “postpone all non-urgent elective operations” for at least three months.⁴ This marked the transformation of the National Health Service into the National Covid Service.

The bulk of non-COVID care provision came to a halt as non-urgent procedures were cancelled and patients stopped presenting, possibly due to a combination of fear of catching COVID-19 and not wanting to place additional burden on health services. This meant that some healthcare practitioners, as highlighted by several interviews carried out for this paper, were left “twiddling their thumbs” because there was little non-COVID work to do.

Despite the heroic efforts of the NHS workforce both at a central and local level, and the Government’s pledge to provide the NHS with “whatever resources it needs”,⁵ the system became too focussed on the short-term response to the crisis at the expense of maintaining essential non-COVID services. The result is a ballooning backlog of procedures, patients facing more serious health conditions or disabilities, and tragically an increase in non-COVID related excess deaths due to the disruptions caused by the pandemic response.⁶

The inability to simultaneously deliver both COVID and non-COVID care was in part due to the state in which the health and social care system entered the pandemic. It faced chronic issues around funding, workforce numbers, data quality and accessibility, and

¹ Sabine L. van Elsland and Ryan O'Hare, 'COVID-19: Imperial Researchers Model Likely Impact of Public Health Measures', *Imperial News*, 17 March 2020, sec. health; Sarah Knapton, 'Hospitals Could Run Short of Oxygen "within Hours" as Coronavirus Escalates, Specialists Warn', *The Telegraph*, 15 March 2020; George Batchelor, 'Hospitals Could Need 7.5 Times the Number of Critical Care Beds to Treat Virus Patients', *The Telegraph*, 15 March 2020.

² Stephen Grey et al., 'Into the Fog: How Britain Lost Track of the Coronavirus', *Reuters*, 29 June 2020; The Guardian, "'I Shook Hands with Everybody,' Says Boris Johnson Weeks before Coronavirus Diagnosis (Video)", *The Guardian*, 27 March 2020.

³ National Audit Office, *Readying the NHS and Adult Social Care in England for COVID-19*, 2020, 28.

⁴ Simon Stevens and Amanda Pritchard, *Important - for Action - Second Phase of NHS Response to COVID19: Letter from Simon Stevens and Amanda Pritchard* (NHS England, 2020).

⁵ National Audit Office, *Overview of the UK Government's Response to the COVID-19 Pandemic*, 2020, 14.

⁶ Veena S. Raleigh, 'UK's Record on Pandemic Deaths', *British Medical Journal* 370, no. m3348 (4 September 2020); BBC News, 'Covid-19: UK Sees over 80,000 Excess Deaths during Pandemic', *BBC News*, 22 December 2020; Public Health England, 'Excess Mortality in England, Week Ending 22 January 2021', Webpage, Public Health England, 1 February 2021; British Medical Association, 'Thousands of Doctors Unable to Offer Patients the Desperate Care They Need as a Result of COVID-19 Pandemic, BMA Survey Finds', Press Release, The British Medical Association is the trade union and professional body for doctors in the UK., 4 May 2020; Royal College of General Practitioners, 'Risk of "serious Consequences" If Non-COVID Conditions Unmanaged or Untreated, Warns College', Webpage, RCGP, 9 April 2020.

procurement, as well as tensions between central control and local-level decision-making, and apprehensions around the private sector involvement. All of these factors created barriers to the pandemic response.⁷

A year into this crisis and with the benefit of some hindsight, it is clear that too little consideration was given to the implications of a complete reallocation of resources away from 'business as usual'.

The healthcare system is now at a crucial point; well into the third national lockdown caused by increasing infection rates due to new virus strains⁸ – now declining – and a mass vaccination programme.⁹ A clear plan is needed to increase the Service's resilience, both by tackling the backlog and implementing changes that will mitigate against delays in routine care and procedures during future crises.

This paper seeks to address these "hard truths"¹⁰ and provide a framework for the conversation on the future of the NHS in England by highlighting some of the key questions that should be addressed by Government and policy makers.

⁷ National Audit Office, *NHS Financial Management and Sustainability*, 2020; ITV News, 'Shortage of Staff Now Greater Threat to NHS than Funding, Experts Warn', *ITV News*, 14 November 2018; James Buchan et al., *Rising Pressure: The NHS Workforce Challenge* (The Health Foundation, 2017); Tim Yates, 'Improving Clinical Data Quality: The Digital Health Challenge', *BMJ Quality Blog*, 13 December 2016; Axel Heitmueller, 'The Future NHS Is out There', *Medium*, 28 April 2020; Eleonora Harwich, Alexander Hitchcock, and Elaine Fischer, *Faulty by Design. The State of Public-Service Commissioning* (Reform, 2017).

⁸ Jacqui Wise, 'Covid-19: New Coronavirus Variant Is Identified in UK', *British Medical Journal* 371, no. m4857 (16 December 2020); BBC News, 'South Africa Variant: Urgent Covid Testing after Community Cases Found', *BBC News*, 1 February 2021.

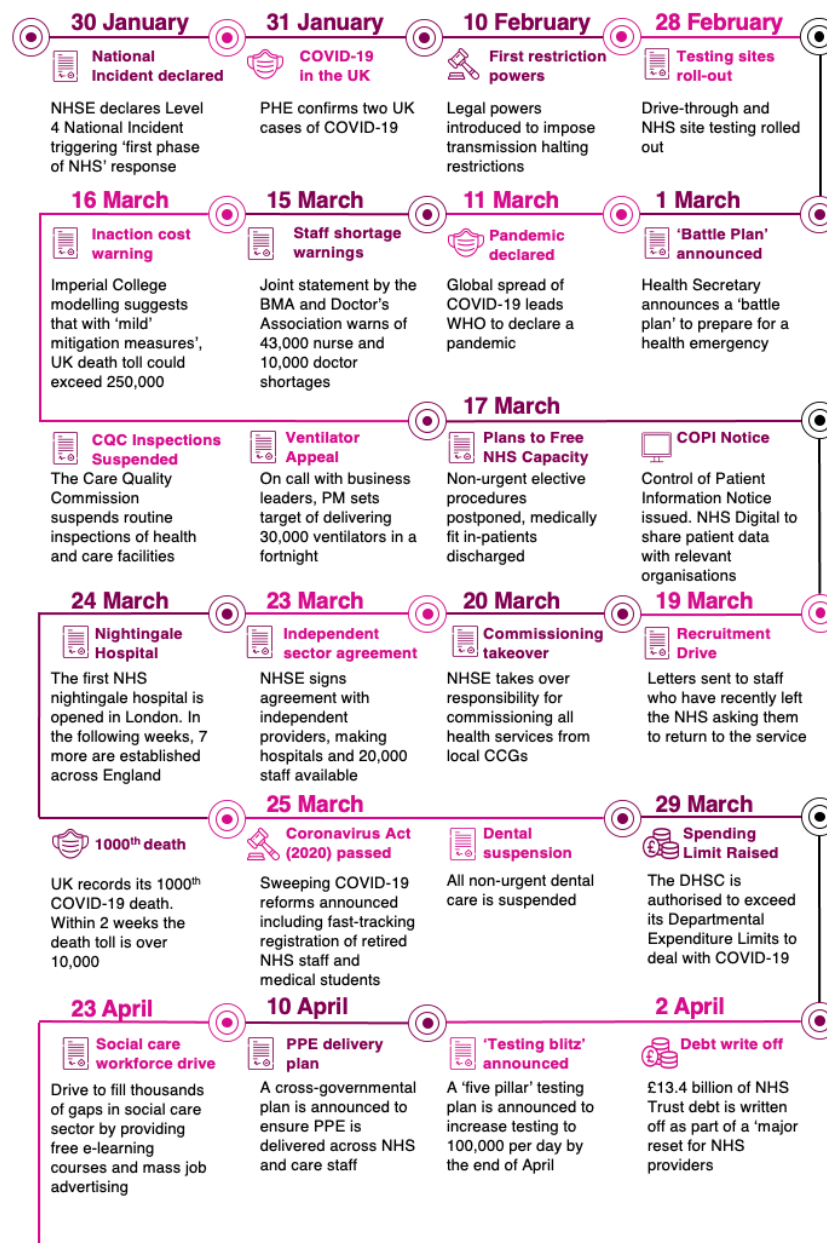
⁹ Department of Health and Social Care, 'UK COVID-19 Vaccines Delivery Plan', Webpage, GOV.UK, 13 January 2021.

¹⁰ Heitmueller, 'The Future NHS Is out There'.

1. The National COVID Service

Towards the end of March, as the Government grasped the scale of the threat posed by the novel coronavirus, the National Health Service was transformed into the National COVID Service. The health and care system had to take extraordinary steps to avoid becoming overwhelmed. It had to reorganise itself to implement infection control measures, free-up and increase capacity in the intensive care setting, and boost workforce numbers (see Figure 1).¹¹ Whilst each of these objectives were essential components of a pandemic response, there have been serious, unintended consequences for patients.

Figure 1: Timeline of Government action



¹¹ For real time updates on policy decisions the Health Foundation has created a useful COVID-19 policy tracker on their [website](#).

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The NHS's massive reprioritisation exercise had a huge impact on the system's ability to continue its 'business as usual' services. Figure 2 shows a high-level summary of the disruptive impact that COVID-19 has had on primary and secondary care.

In England, by mid-April 2020 it was estimated that about two million operations had been cancelled.¹² Compared to April 2019, GP appointments dropped 35 per cent, GP referrals for first outpatient appointments dropped by over 70 per cent, and diagnostic testing like CT scan, MRIs and ultrasounds decreased between 75 to 45 per cent in April 2020 (see Figure 2). For GP appointments the significant drop in volume continued until the summer of 2020 where an increased number of appointments started to be reported. Referrals

¹² University of Birmingham, 'COVID-19 Disruption Will Lead to 28 Million Surgeries Cancelled Worldwide', *University of Birmingham News*, 15 May 2020.

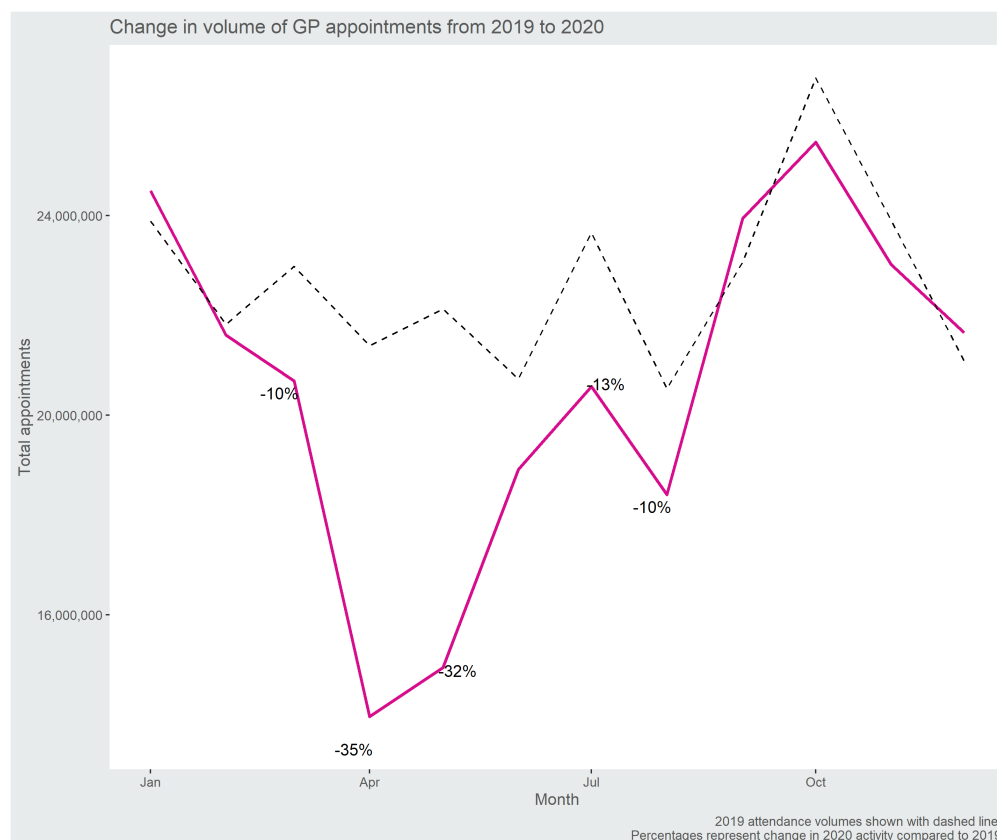
followed a similar trend as GPs started to refer more patients in the summer, but not to the same pre-pandemic levels.

A&E admissions were also greatly affected by the pandemic. There were 1.2 million fewer attendances and over a third fewer admissions in April 2020 compared to April 2019. This trend has continued over time with fewer A&E admissions in December 2020 compared to December 2019.

The Government's highly effective 'protect the NHS' mantra appears to have contributed to this, leading to a significant reduction in patients seeking, and therefore receiving, care. Research found, for example, that four in 10 people were "too worried about being a burden on the NHS to seek help from their GP."¹³ It has also been suggested that people were too afraid of contracting COVID-19 in a healthcare setting to seek help.

The Government and NHS eventually changed their communication strategy and asked patients with urgent care needs not to shy away from attending hospitals.¹⁴ At the end of April, Simon Stevens, Chief Executive Officer of NHS England, warned that "ignoring problems can have serious consequences – now or in the future."¹⁵

Figure 2: Impact of the pandemic on the provision of care



¹³ NHS England, 'Help Us Help You: NHS Urges Public to Get Care When They Need It', Webpage, NHS England, 25 April 2020.

¹⁴ Ibid.

¹⁵ Ibid.

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1.1 The impact

While it is too early to understand the full impact on the nation's health of delaying care, there are sufficient indicators to cause serious concern. Tragically, the result of the NHS reprioritisation towards COVID-19 care is that patients are waiting longer for the care they need. Some will consequently be living with a more serious health condition or develop a disability,¹⁶ or even have their lives cut short, because they were unable to access the treatment they needed.¹⁷

1.1.1 Ballooning waitlists

The pandemic and the subsequent delaying of non-urgent procedures has had a severe impact on waiting lists which are a key metric for assessing whether patients are receiving timely care.¹⁸ In addition, due to infection control measures, NHS productivity has dropped – meaning that not as many procedures can be carried out. Unsurprisingly, waitlists have been ballooning.¹⁹

During the summer 2020, the NHS confederation warned that the backlog could rise from 4.2 to 10 million by the end of the year.²⁰ Thankfully, this prediction did not materialise as the NHS started to rapidly to work through its backlog in the aftermath of the first wave, and referrals did not come back as quickly as expected. However, hospitals around the country have again been cancelling procedures due to the surge of COVID-19 patients in this third wave.²¹ In addition, current levels of staff burnout will be adding to this drop in productivity and further aggravating the issue.

Perhaps most worrying is the gradual increase in the amount of time that patients are spending on the waiting list. Whilst analysis by the NAO in 2014 showed that there is limited understanding of the impact of longer waiting times on patient harm and outcomes for elective procedures,²² the ballooning waitlist and growing number of patients waiting 52 weeks or more is cause for concern (see Figure 3). The number of people waiting for more than 52 weeks has increased by 7139 per cent from March to December 2020. Projections in Figure 3 indicate that the number of individuals waiting for 52 weeks or more will reach 375,000 by April 2021 – an increase of 12,008 per cent compared the March 2020.

Moreover, the types of diagnostic and treatment delays that are currently being witnessed are for serious health conditions such as cancer.²³ It is therefore fair to assume that for many patients the delay to care will be having significant impacts on their daily life, and as

¹⁶ Royal College of General Practitioners, 'Risk of "serious Consequences" If Non-COVID Conditions Unmanaged or Untreated, Warns College'.

¹⁷ Public Health England, 'Excess Mortality in England, Week Ending 22 January 2021'.

¹⁸ Owen Clark, 'Covid: NHS Waiting Lists Will Take "years" to Recover', *BBC News*, 19 November 2020; Mel Dyson, 'Pressure Points in the NHS', Webpage, The British Medical Association, 20 January 2021; ITV News, 'Record 4.5 Million on Hospital Waiting Lists as Impact of Covid Hits Home', *ITV News*, 14 January 2021.

¹⁹ Niall Dickson, *NHS Confederation: Letter to the Prime Minister*, 2020.

²⁰ NHS Confederation, 'Public Reassurance Needed over Slow Road to Recovery for the NHS', Press Release, 10 June 2020.

²¹ Dyson, 'Pressure Points in the NHS'; BBC News, 'Covid-19: Hospital Pressures See Cancer Operations Cancelled', *BBC News*, 28 January 2021; Paul Gallagher, 'Covid Having "calamitous Impact" on NHS Care as Waiting List in England Hits 4.5 Million', *INews*, 14 January 2021.

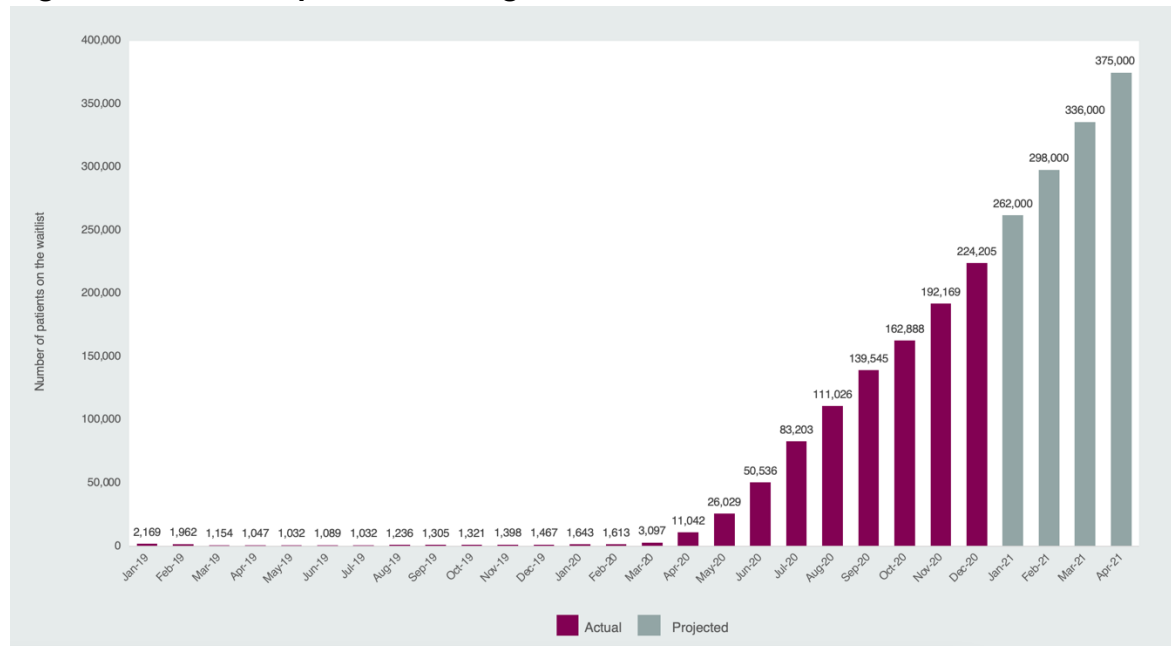
²² National Audit Office, *NHS Waiting Times for Elective Care in England*, 2014.

²³ BBC News, 'Covid-19: Hospital Pressures See Cancer Operations Cancelled'; Karol Sikora, "'60,000 Cancer Patients Could Die Because of Lack of Treatment or Diagnosis': Oncologist on Coronavirus Dilemma', *ITV News*, 22 April 2020.

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in the case of cancer or ophthalmology, may lead to permanent disability or premature death.

Figure 3: Number of patients waiting 52 weeks+



Source: NHS England, Consultant-led Referral to Treatment Waiting Times

The waiting lists also run the risk of further ballooning due to GPs potentially catching up on the number of missed referrals. As shown in Figure 4, since the start of the pandemic there have been almost 6 million less referrals than in the same period in 2019. This astronomical figure partially summarising the missed activity during the pandemic is bound to translate into an increase in the rate at which GPs refer patients to specialist further adding to the waitlist.

Figure 4: Missing referrals

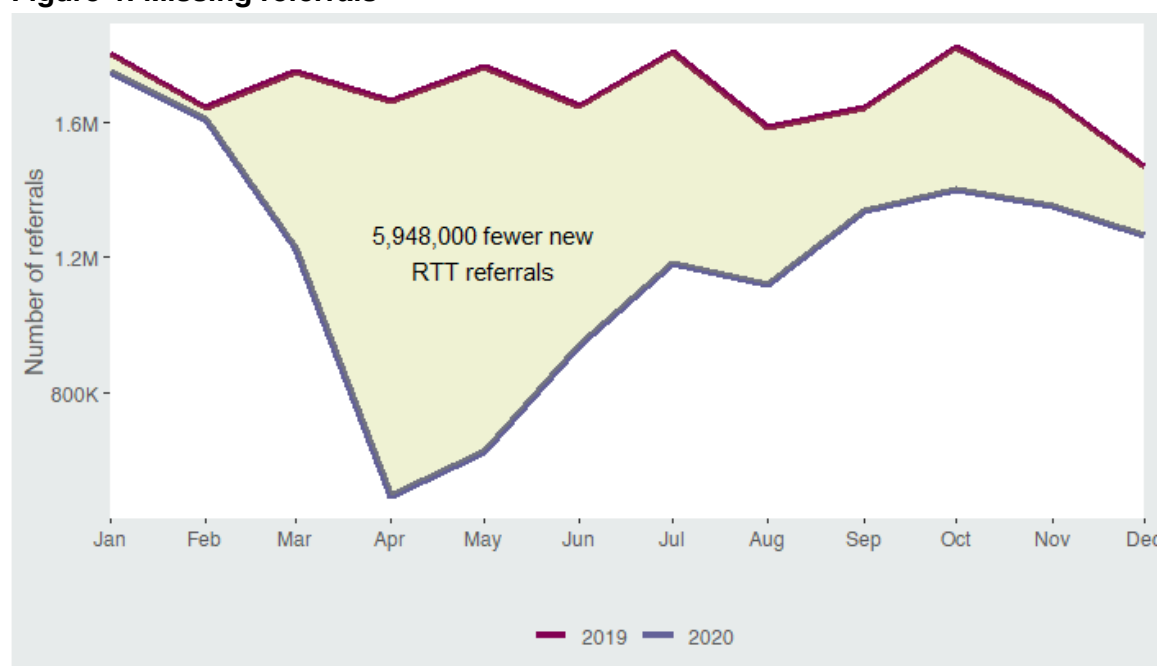
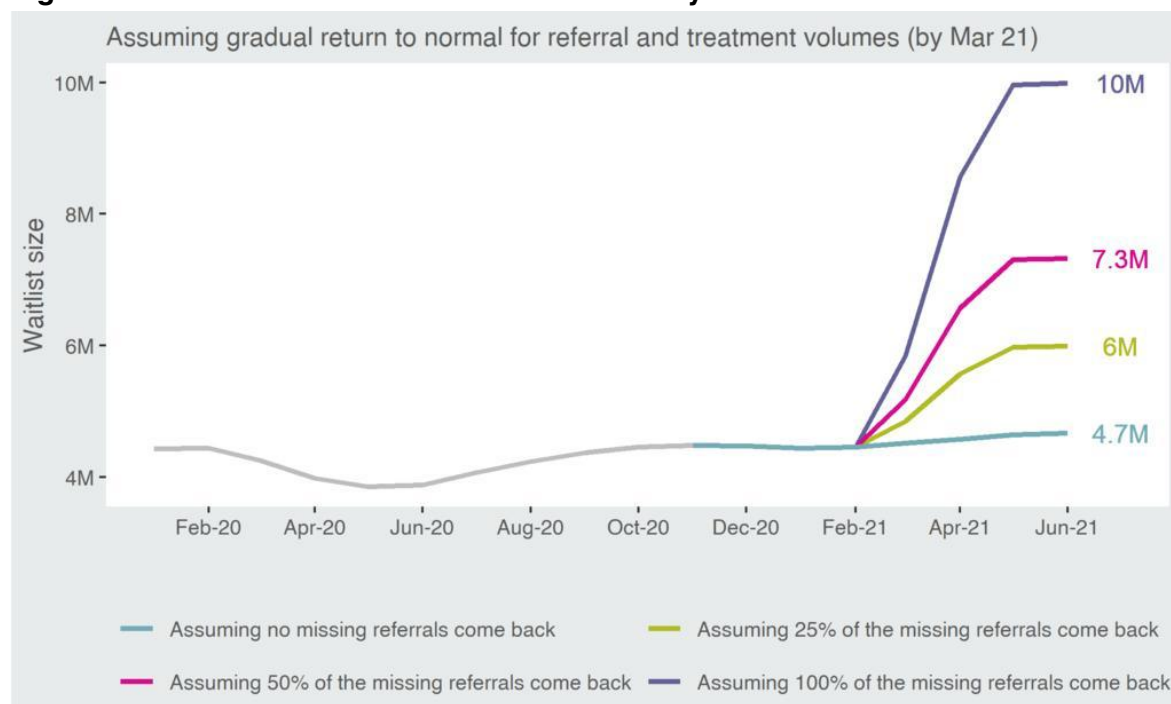


Figure 5 highlights various scenarios showing the impact of those missing referrals on the waitlist size. The projections are based on the proportion of 'missing' activity that returns over the next few months and assuming lower NHS productivity due to infection control measures.²⁴ Under the worst-case scenario, the official NHS waiting list grows to over 10 million by April 2021.

Figure 5: Waitlist size based on different recovery scenarios



1.1.2 Decrease in healthy life span

The disruption to the delivery of non-COVID-19 healthcare will have an impact on people's healthy life span – defined as the number of years people will live in good health.²⁵ The full magnitude of the impact is hard to quantify as there is no official measure of healthy life span,²⁶ and there is a natural lag in the publication of national statistics.

Nonetheless, disruptions in the management of long-term health conditions in primary care as well the drop in referrals and diagnostic tests caused by the reprioritisation of services will have had consequences for people's healthy life span.²⁷ The following two

²⁴ The chart also reflects lower productivity due to infection control requirements. This drop is based on estimates from the Royal College of Surgeons (lower than the expectations set out by NHS England/Improvement) of how much pre-Covid-19 crisis activity can be restored.

²⁵ Outcomes Based Healthcare, 'HealthSpan™', n.d.

²⁶ The Office for National Statistics's subjective measure of healthy life expectancy. It "divides life expectancy into periods of life spent in 'very good' or 'good' health; healthy life expectancy (HLE), or free from a limiting chronic illness or disability; disability-free life expectancy (DFLE)." Office for National Statistics, *Guide to: Life Expectancy in the United Kingdom*, n.d.

²⁷ Royal College of General Practitioners, 'Risk of "serious Consequences" If Non-COVID Conditions Unmanaged or Untreated, Warns College'; Louis S. Levene et al., 'Pandemic Threatens Primary Care for Long Term Conditions', *British Medical Journal* 371, no. m3793 (5 October 2020); British Medical Association, 'Thousands of Doctors Unable to Offer Patients the Desperate Care They Need as a Result of COVID-19 Pandemic, BMA Survey Finds'; The Health Foundation, "'Hidden Backlog' Looms as NHS Referrals for Routine Hospital Care Drop by a Third | The Health Foundation', Webpage, The Health Foundation, 11 November 2020; Haseeb Akram et al., 'Emergency Retinal Detachment Surgery during Covid-19 Pandemic: A National Survey and Local Review', *Eye*, 22 September 2020, 1–2; British Medical Association, *The Hidden Impact of COVID-19 on Patient Care in the NHS in England*, 2020.

case studies provide examples of how people might be living with a more serious illness, or develop a disability, due to a lack of early detection and treatment.

Ophthalmology

Ophthalmological services have been hard hit during the pandemic.²⁸ It is one speciality where delaying treatment could leave people living with a disability. It will not only cause many to live with sight issues for much longer, but issues such as a retinal detachment could cause permanent sight impairment if left untreated.²⁹

Despite requiring hospitals and eye units to prioritise patients who have sight or life-threatening conditions,³⁰ there has been a worrying drop across the country in patients presenting with issues such as retinal detachment.³¹ One eye surgeon in Manchester claimed they had seen a 49 per cent decrease in patients presenting over the course of April 2020.³² Moorfields in London stated that the figures “show a worrying trend that patients are neglecting symptoms of visual loss”.³³ This might lead to increases in the number of people with partial or total blindness.

Cataract removal is one of the procedures that has been heavily impacted by the cancellation of operations.³⁴ Guidance was issued to prioritise those with essential need as services begin to reopen towards the end of the first wave of the pandemic.³⁵ However, many people could still be waiting a long time before receiving treatment due to the backlog and the continuing impact of COVID-19 on capacity. In addition, the third national lockdown has again “severely restricted activities to re-opening services” as highlighted by the Royal College of Ophthalmologists.³⁶

One interviewee told us that scans can be done at private opticians, but that this was unavailable during lockdown as “the high street was closed.” The use of high street capacity could have mitigated against the negative impact of cancellations during the first wave. High-street opticians have not been shut during this third national lockdown and should be used to help triage patients.

Cancer

Cancer care has been severely impacted as a result of the COVID-19 outbreak, with a dangerous deceleration of referrals.³⁷ In terms of treatment, with resources heavily

²⁸ Akram et al., ‘Emergency Retinal Detachment Surgery during Covid-19 Pandemic: A National Survey and Local Review’.

²⁹ Louisa Wickham et al., ‘The Impact of COVID Policies on Acute Ophthalmology Services - Experiences from Moorfields Eye Hospital NHS Foundation Trust’, *The Royal College of Ophthalmologists*, 1 May 2020.

³⁰ Royal College of Ophthalmology, ‘RCOphth: Management of Ophthalmology Services during the COVID Pandemic’, March 2020.

³¹ Wickham et al., ‘The Impact of COVID Policies on Acute Ophthalmology Services - Experiences from Moorfields Eye Hospital NHS Foundation Trust’.

³² Selina Powell, ‘Coronavirus: The Optics Briefing’, *Optometry Today*, 2020.

³³ Wickham et al., ‘The Impact of COVID Policies on Acute Ophthalmology Services - Experiences from Moorfields Eye Hospital NHS Foundation Trust’.

³⁴ Royal College of Ophthalmologists, *Cataract Surgery during the COVID-19 Pandemic*, 2020.

³⁵ Royal College of Ophthalmologists, *Cataract Surgery Guidelines for Post COVID-19 Pandemic: Recommendations*, 2020.

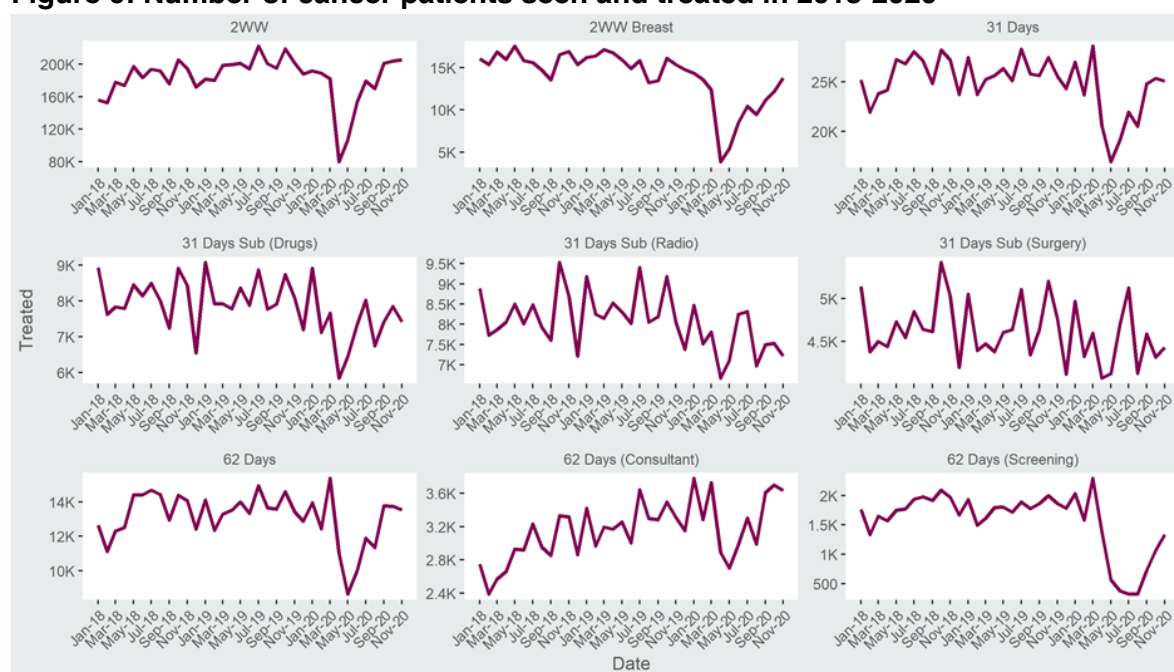
³⁶ The Royal College of Ophthalmologists, ‘RCOphth COVID-19 Guidance on Restoring Ophthalmology Services’, Webpage, The Royal College of Ophthalmologists, February 2021.

³⁷ Karol Sikora, Mike Moran, and Melanie Kay, *Re-Starting NHS Cancer Services Post Covid-19: Letter from Karol Sikora, Mike Moran, Melanie Kay* (Rutherford Health plc, 2020).

directed towards fighting coronavirus, care has been significantly delayed.³⁸ This has meant substantial drops in the number of patients being seen through different referral routes, as well as being treated (see Figure 6).

Multiple interviewees mentioned the devastating effects this will have on cancer treatment in the long term. As one interviewee commented, “cancer hasn’t gone away, there will be an upward stage migration” meaning that many will be diagnosed at a much later, and therefore more dangerous, stage of the disease.

Figure 6: Number of cancer patients seen and treated in 2018-2020



Source: NHS England, Cancer Waiting Times dataset. Note: The various diagrams correspond to the different cancer referrals pathways.

Lung cancer is a form of cancer that progresses particularly fast, meaning that delays in diagnosing can have especially severe consequences – it also shares some presentation characteristics similar to COVID-19, which may have contributed to lower detection.

Modelling for this paper – using data from the first wave of the pandemic – estimates that there will be an 11-month delay to the diagnosing and treatment of 11,300 patients of lung cancer patients compared to usual 5-6 months wait.³⁹ It is estimated that this will result in about 1,660 premature deaths from lung cancer alone in the next five years (see Appendix for further detail on the modelling). This third national lockdown is likely to have a further negative effect on the upstaging of lung cancer.

³⁸ Sikora, “60,000 Cancer Patients Could Die Because of Lack of Treatment or Diagnosis”: Oncologist on Coronavirus Dilemma’.

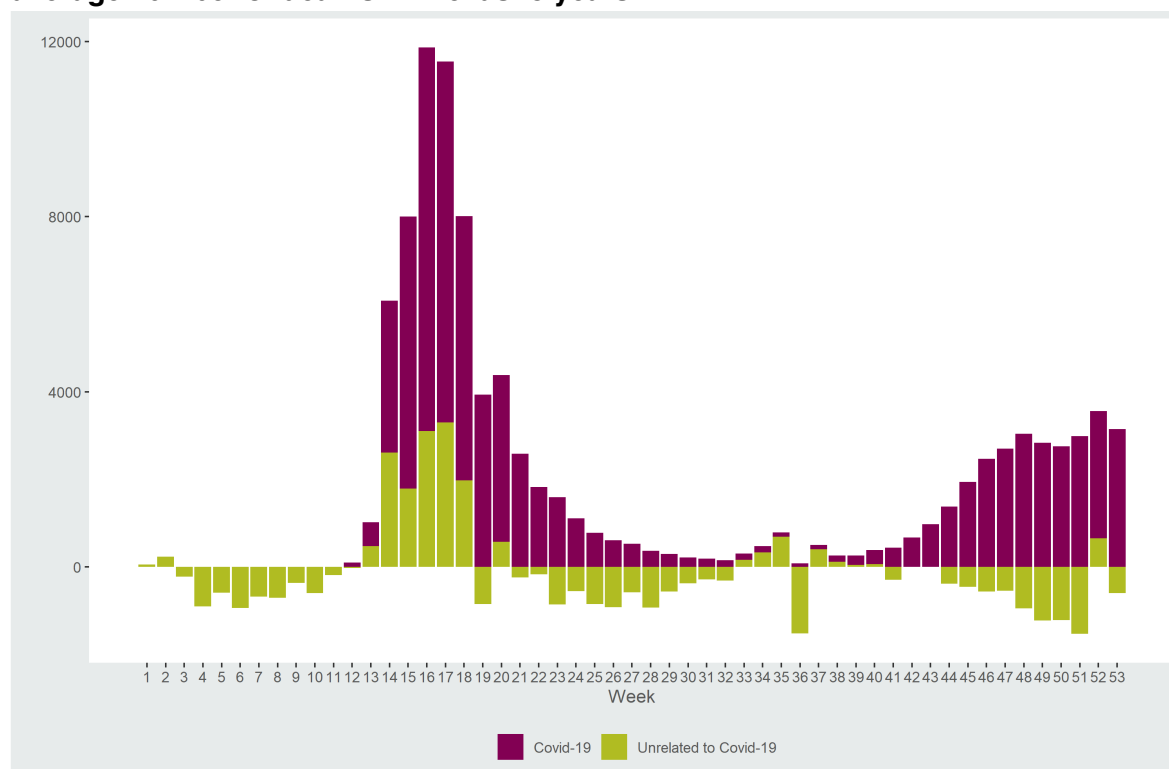
³⁹ Using 5-year data on survival by cancer stage from Public Health England, Edge Health take the difference in mortality between the “normal” distribution of cancer stages and the distribution including an 11-month delay.

1.1.3 Increase in excess deaths

The COVID-19 death toll in the UK has been high – surpassing 100,000 deaths⁴⁰ – but that does not tell the full story. There has also been an increase in the number of non-COVID related deaths compared to the same period last year – known as excess deaths. These are likely the result of drops in A&E admissions and attendance and cancelled or delayed diagnostics and treatments – like in the case of lung cancer highlighted in the previous section.

Figure 7 shows this spike in excess deaths. While it is worth noting that there will be some 'noise' in the data due to how COVID-19 deaths are counted,⁴¹ the revised numbers will still be in the same order of magnitude.⁴²

Figure 7: Difference between the number of registered deaths in 2020 and the average number of deaths in the last 5 years



Excess deaths have also affected the social care sector, with the Care Quality Commission reporting a 134 per cent increase in deaths of adults with learning disabilities compared to this time last year, with 46 per cent of these deaths being unrelated to COVID-19.⁴³

⁴⁰ European Centre for Disease Prevention and Control, 'COVID-19 Situation Update Worldwide', Webpage, European Centre for Disease Prevention and Control, 28 January 2021.

⁴¹ John Appleby, 'What Is Happening to Non-Covid Deaths?', *British Medical Journal* 369, no. m1607 (24 April 2020), <https://www.bmj.com/content/369/bmj.m1607>; BBC News, 'Hancock Calls for Urgent Review on Covid Death Data', *BBC News*, 17 July 2020, sec. Health.

⁴² Pippa Allen-Kinross, 'Changes to Government Covid-19 Death Data Won't Make a Big Difference to the Overall Death Count', *Full Fact*, 27 July 2020, <https://fullfact.org/health/coronavirus-death-count-data/>.

⁴³ Care Quality Commission, 'CQC Publishes Data on Deaths of People with a Learning Disability', Press Release, 2 June 2020.

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Further research is needed to understand the cost of this displacement in mortality. In other words, has COVID-19 and related disruptions brought forward the deaths of individuals who were likely to die within the next year or has it had an even more worrying impact of bringing forwards the deaths of people who would have lived another five or ten years. A greater understanding of this will only be possible in time but will be crucial in understanding the true impact of the service disruption caused by COVID-19.

2. Dealing with the backlog

As highlighted in the previous chapter, the NHS faces a huge and growing backlog of treatment.⁴⁴ The system began to address some of this backlog between the first two waves of the pandemic under a 'new normal' of infection control, including social distancing measures and constant decontamination of equipment.⁴⁵

Restoring capacity in routine diagnostics and treatment must be a priority as the health system builds back after the pandemic. To do so will require significant investment to fill staffing and estate deficits⁴⁶ – even before the pandemic, “diagnostic services in the NHS were reaching a tipping point”.⁴⁷ However, these are longer term measures and will not deliver urgent care for patients currently facing incredibly long waitlists.

The NHS needs to focus on a plan for dealing with the backlog as soon as possible to ensure that patients do not face further potentially serious decreases in healthy life span. It will need to focus on risk stratifying patients to make sure those in most urgent need of care are seen first. The NHS will also need to make the most of the existing resources by maximising the use of diagnostic equipment and operating theatre schedules and making best use of private sector capacity.

2.1 Risk stratification

It is crucial that the Trusts who plan and purchase services in local areas are able to appropriately risk-stratify patients on the waitlists.⁴⁸ In the aftermath of the first wave, NHS England set out operational guidance for how to restart procedures covering how and when to test patients, and highlighted areas, such as cancer treatment, that should be prioritised.⁴⁹ The guidance also specified that patients who have had their care plan disrupted should receive clear communication and updates about when they should be expecting treatment to resume.

By September 2020, NHS England and Improvement supplemented this high-level guidance by commissioning a “digital solution” – known as the NHS e-Review – for “Trusts and Primary Care to clinically prioritise patients on waiting lists”.⁵⁰ Once rolled out the NHS e-Review system would help “Trusts in managing the most clinically urgent patients first, in addition to enabling waiting lists to be managed at a system level.”⁵¹

⁴⁴ University of Birmingham, 'COVID-19 Disruption Will Lead to 28 Million Surgeries Cancelled Worldwide'.

⁴⁵ Nick Woznitza, Samanjit S Hare, and Arjun Nair, 'COVID-19 Pandemic: Summary of Current and Emerging Issues for Radiographers', *The Society of Radiologists*, 3 April 2020; NHS Confederation, *Getting the NHS Back on Track: Planning for the next Phase of COVID-19*, 2020.

⁴⁶ NHS England, *Diagnostics: Recovery and Renewal*, 2020.

⁴⁷ Ibid.

⁴⁸ Nigel Edwards, 'Here to Stay? How the NHS Will Have to Learn to Live with Coronavirus', *Nuffield Trust*, May 2020.

⁴⁹ NHS England, *Operating Framework for Urgent and Planned Services in Hospital Settings during COVID-19*, 2020; Stevens and Pritchard, *Important - for Action - Second Phase of NHS Response to COVID19: Letter from Simon Stevens and Amanda Pritchard*.

⁵⁰ NHS England and Improvement, 'Third Phase of NHS Response to COVID-19 - Clinical Prioritisation & Validation of Elective Waiting Lists', 18 September 2020.

⁵¹ Ibid.

However, no assessment has been made of the rollout completion, or if all trusts had clinically reviewed and started going through their inpatient waiting lists using the e-Review system by 23rd October 2020, as stipulated in the guidance.

2.2 Maximising use of all available resources

The NHS will have to make best use of available resources in order to deal with the pressing backlog. This will mean finding ways of maximising the use of existing capacity, for example through optimising the scheduling of operating theatres or the use of diagnostic equipment.⁵² Patient pathways will also need to be optimised to improve the patient experience and to reduce length of stay and associated costs. It is important to recognise, however, the worrying levels of staff burnout which might put breaks on maximising use of resources. Staff will need to be appropriately supported.

Finding innovative solutions to deliver services will also be important. Pockets of innovation have emerged around the country with, for example, the roll out of 'chemo buses' to treat patients in a safe environment, and mobile imaging where possible.⁵³

The Department of Health and Social Care (DHSC) will also need to consider its standing agreement with the independent sector which was meant to boost capacity within the system. In late March 2020, NHS England and NHS Improvement reached an agreement with the Independent Healthcare Providers Network to secure all inpatient capacity by bulk buying it.⁵⁴ This enabled the creation of cancer pathways,⁵⁵ but was mainly meant to be used in case NHS Trusts could not cope with the surge of COVID-19 patients.

However, due to the cancellation of procedures outlined in the previous chapter, the NHS did manage to cope. This meant that private providers had unused spare capacity.⁵⁶ Subsequently, HM Treasury rightfully expressed doubts about the value for money of this first contract⁵⁷ – capacity went unused, despite having been bulk bought.

In the operating guidance letter issued by NHS England and Improvement in April 2020, it clearly states that Trusts should make "full use of the NHS capacity currently available, as well as re-contracted independent hospitals"⁵⁸ to work through the backlog. Yet there has been a clear gap between the guidance and actual usage of independent sector capacity.

The guidance note also highlights the importance of using the independent sector for increasing diagnostic capacity.⁵⁹ The independent sector possesses significant capacity in

⁵² AHSN Network, 'Space Finder: An Intelligent Scheduling Software Solution for Maximising Use of Theatre Capacity', Webpage, 9 April 2020.

⁵³ Jack Hardy, "'Chemo Buses' Rolled out by NHS to Ease Cancer Treatment Backlog', *The Telegraph*, 11 June 2020; Woznitza, Hare, and Nair, 'COVID-19 Pandemic: Summary of Current and Emerging Issues for Radiographers'.

⁵⁴ Neil Permain, *COVID-19: Partnership Working with the Independent Sector Providers and the Independent Healthcare Providers Network (IHPN)* (NHS England and NHS Improvement, 2020).

⁵⁵ NHS Confederation, *Getting the NHS Back on Track: Planning for the next Phase of COVID-19*.

⁵⁶ The Private Healthcare Information Network, 'Covid-19 and Private Healthcare: The Data', Webpage, Media PHIN, 18 June 2020.

⁵⁷ Denis Campbell, 'Treasury Blocks Plan for Private Hospitals to Tackle NHS Backlog', *The Guardian*, 18 June 2020.

⁵⁸ NHS England, *Operating Framework for Urgent and Planned Services in Hospital Settings during COVID-19*; Stevens and Pritchard, *Important - for Action - Second Phase of NHS Response to COVID19: Letter from Simon Stevens and Amanda Pritchard*.

⁵⁹ NHS England, *Operating Framework for Urgent and Planned Services in Hospital Settings during COVID-19*; Stevens and Pritchard, *Important - for Action - Second Phase of NHS Response to COVID19: Letter from Simon Stevens and Amanda Pritchard*.

core diagnostic services such as PET-CT and MRI scanning which will be vital for meeting the substantial increase in demand for routine screening and testing built up during the pandemic.

The contract with independent providers was revised in summer 2020, in order to deliver increased value for money for the taxpayer,⁶⁰ and allow for a national framework to be set for local areas to commission services from the independent sector based on need. A further modification was made in October 2020, where private providers were asked to apply to a new procurement framework worth up to £10 billion,⁶¹ allowing NHS organisations to purchase additional capacity until November 2024. This is to support the NHS in dealing with its backlog and in case of a surge of COVID-19 patients.

Yet despite this provision, there has been “a knee-jerk tendency to cancel all outpatient activity by NHS trusts”,⁶² without much thought being given to how those patients could have still received care via the independent sector. It is key that the central guidance is followed locally, and that independent sector capacity is used in the short to medium term in order to alleviate the waitlists. In addition, making maximum use of the capacity within the independent sector will help relieve workload on NHS staff who are suffering from high levels of burnout.

Despite this contract extension with the private sector, NHS England and Improvement have had to remind local health leaders to use private sector capacity,⁶³ and it remains unclear, nine months on, how much of the independent sector capacity is actually being used. It is crucial that health and care organisations use all the capacity at their disposal. Not doing so is negligent and will have a negative impact on the lives of many people.

Recommendation 1: NHS England and Improvement should mandate the publication of waitlist recovery plans by integrated care systems and trusts. These should clearly state how independent sector capacity will be used and usage data should be published at regular intervals.

In addition, given that the diagnostic backlog is partially the result of restricted access to hospital facilities, programmes for community diagnostics that avoid using hospital sites, established during the pandemic, should be expanded on. Remote testing sites can allow diagnostic services to continue even where hospitals find themselves overwhelmed by COVID-19 care, or where ongoing social distancing requirements reduce capacity. Suggestions made elsewhere to establish ‘community diagnostic centres’ for cancer, cardiac, respiratory and other conditions should be acted upon to help clear the diagnostic backlog.⁶⁴

⁶⁰ NHS England and Improvement, ‘COVID-19: Update on Partnership Working with the Independent Sector Providers and the Independent Healthcare Providers Network (IHPN)’, Webpage, 14 August 2020.

⁶¹ NHS England, ‘NHS Increasing Capacity Framework’, Webpage, Contracts Finder, 14 October 2020.

⁶² Martin J. Connor, Mathias Winkler, and Saiful Miah, ‘COVID-19 Pandemic – Is Virtual Urology Clinic the Answer to Keeping the Cancer Pathway Moving?’, *BJU International* 125, no. 6 (1 June 2020): E3–4.

⁶³ Rebecca Thomas, ‘NHS England Pushes for More Private Capacity and Cancels Planning Round’, *Health Service Journal*, 14 January 2021.

⁶⁴ NHS England, *Diagnostics: Recovery and Renewal*.

What's next for the NHS?

Recommendation 2: NHS England and Improvement should devote resources to building 'community diagnostic hubs' to meet the diagnostic backlog outside of the hospital setting.

3. Building resilience

It is essential that the Government and the NHS take stock and understand how making such stark trade-offs can be avoided in the future. Policy makers must place a premium on building a resilient healthcare system which effectively responds to crises whilst minimising disruption to routine services. This must be treated as a holistic agenda covering the workforce, bed and diagnostic capacity, supply chain resilience and data and technology. A long-term funding settlement which allows the system to invest in building its resilience will be key to delivering this agenda.

3.1 Creating an NHS reserve list

COVID-19 has placed huge challenges on workforce numbers at a time when the NHS was already facing staffing shortages prior to the pandemic – particularly in nursing.⁶⁵ The NHS needs to focus on delivering the workforce goals enshrined in its Long-Term Plan and Interim People Plan in order to tackle staff shortages and burnout or risk of high levels of early retirement, but it also needs to improve on how it can make best use of its highly flexible and extremely committed workforce in a crucial time of need.

In the early days of the pandemic, the Government was faced with having to find ways to rapidly increase staff numbers; and reallocate and retrain current staff. The NHS sent a call to 65,000 nurses and doctors who had recently left the NHS to come back and “help the health service to tackle the ‘greatest global threat’ in a century”.⁶⁶ Final year medical students and student nurses were also offered the “chance to take temporary, fully-paid roles to boost the NHS frontline even further”.⁶⁷ More than 15,000 former staff returned to the front line,⁶⁸ representing a 1.6 per cent increase in workforce levels.⁶⁹

The majority of interviews carried out for this paper highlighted several issues with the workforce recall process. Firstly, healthcare practitioners who had relevant experience and knowledge, but had left the workforce years ago struggled to lend their services. This was mainly due to the fact that the application process was rigid and confusing. Secondly, the lack of coordination between the General Medical Council and Health Education England (HEE) meant that individuals who had been accepted back into the workforce but had not yet received their assignment did not systematically receive training materials – to brush-up on their skills for working within intensive care units or other assigned areas of care – from HEE.

⁶⁵ NHS Digital, ‘NHS Vacancy Statistics England February 2015 - March 2020, Experimental Statistics’, Webpage, NHS Digital, 27 May 2020; Anita Charlesworth, ‘Staff Shortages Left the NHS Vulnerable to the COVID-19 Storm’, *Prospect Magazine*, 8 January 2021.

⁶⁶ NHS England, ‘Former Docs and Nurses Told “Your NHS Needs You” to Tackle Greatest Global Health Threat in History’, Webpage, NHS England, 19 March 2020.

⁶⁷ Ibid.

⁶⁸ NHS England, ‘Thousands of Former NHS Staff Are Back on the Front Line in the NHS Fight against Coronavirus’, Webpage, NHS England, 12 April 2020.

⁶⁹ This calculation is an estimate based on the proportion that these 15,100 members of staff who came back make-up of the full time equivalent staff members in February (excluding NHS infrastructure support staff from the calculation). NHS Digital, ‘NHS Workforce Statistics - February 2020’, Webpage, NHS Digital, 21 May 2020.

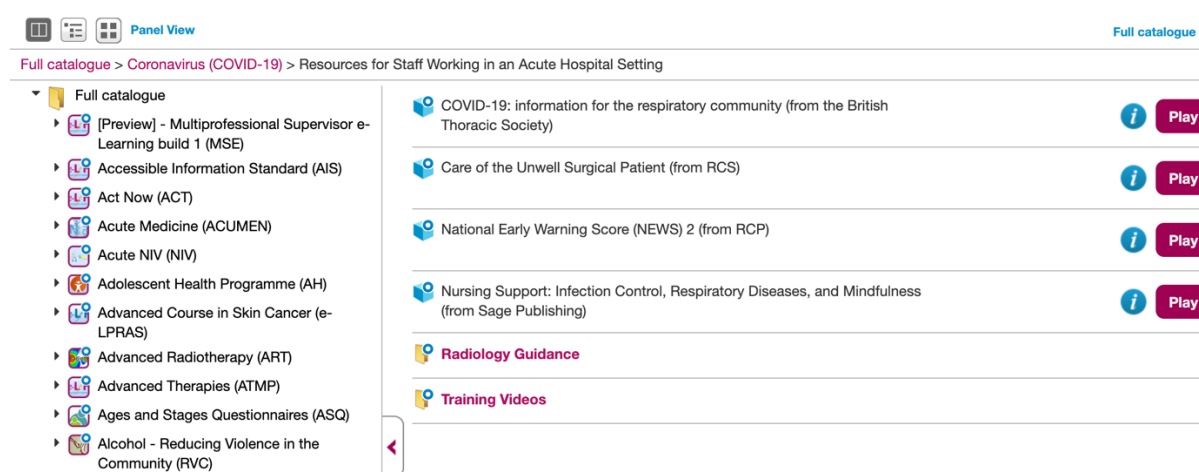
Creating a reserve list of health and care practitioners who would be willing and ready to return to the NHS workforce in a time of crisis would alleviate some of the issues experienced during the pandemic. The GMC should maintain a consolidated reserve list of health and care practitioners spanning various specialities and professions and should facilitate the recall process. The GMC should also work with HEE to develop an annual training programme for individuals on this reserve list to ensure that their skills are kept up to date, thereby minimising delays during a recall.

Recommendation 3: The General Medical Council should create an 'NHS reserve list' with healthcare professionals who are not currently working in the NHS but would be willing to re-join to respond to a crisis. A training programme should be developed in collaboration with Health Education England, with clear guidance on the content and frequency of training for members of the reserve list.

3.1.1 Timely and accessible training tools

HEE developed a programme of e-learning resources for the NHS specifically in response to the pandemic, a simulation centre and guidance on how to use PPE.⁷⁰ It also created resources to "ensure staff temporarily switching roles during the COVID-19 crisis have access to the required additional training".⁷¹ While these were regularly updated,⁷² closer scrutiny of the e-learning resource centre reveals a significant gap between the promise and what has actually been provided (see Figure 8).

Figure 8: e-Learning for Healthcare portal for COVID-19



⁷⁰ Health Education England, 'HEE Supporting Returners to Work in the Fight against the COVID-19 Pandemic', Webpage, Health Education England, 19 March 2020.

⁷¹ Health Education England, 'HEE Rolls out Urgent Countrywide Training Programme to Equip Staff for COVID-19 Challenge', Health Education England, 15 April 2020.

⁷² Health Education England, 'HEE Launches Package of Online COVID-19 Resources for Free Worldwide Use', Webpage, Health Education England, 1 April 2020.

The play button displayed next to the various training resources for staff working in the acute care setting are not in fact short educational videos, but links to other websites where people can search for further information.⁷³

Despite the clear need for health practitioners to upskill fast during a pandemic caused by an unfamiliar virus, no easily digestible educational resources appear to have been created by the NHS. Unsurprisingly, in a survey conducted by the Royal College of Nursing Research Society in April, 62 per cent of nursing and midwifery respondents who were being redeployed said they found their training “non-existent, or inadequate”.⁷⁴ By contrast companies specialised in digital medical training had started releasing easily digestible COVID-19 related training modules within a couple of weeks after lockdown.⁷⁵

Recommendation 4: Health Education England should overhaul the way it provides training during a crisis. It should seek to provide training modules that present easily and quickly digestible information.

3.2 Reviewing the NHS's bed capacity

The UK entered this crisis with a lower bed capacity than its European counterparts.⁷⁶ In addition, many parts of the NHS are “working with an outdated estate and will be challenged to scale activity while maintaining infection control measures”.⁷⁷

The health and care system faced a huge capacity challenge leading to the cancellation of procedures and the discharging of patients in order to free up capacity. The Government also sought to increase bed capacity by buying an additional 8,000 beds from independent hospitals⁷⁸ and by building field hospitals, with seven Nightingale hospitals set up in England over the course of the outbreak.⁷⁹

Increasing the long-term resilience of the healthcare system in the aftermath of the pandemic does not necessarily imply increasing the number of acute care beds in the NHS. COVID-19 has clearly demonstrated that the NHS can and should use independent sector capacity when faced with an exceptional surge in demand. The NHS needs to draw the lessons from this pandemic and understand how to better flex additional capacity when needed.

Despite initial fears of not having enough capacity to cope with COVID patients, just 29 per cent of NHS general and acute beds were occupied by COVID-19 patients, and 50 per

⁷³ Health Education England, 'E-LfH Hub', Webpage, Health Education England, n.d.

⁷⁴ 'Survey of UK Nurses and Midwives' Highlights Their Concerns about Health, Training and Workload during COVID-19', Press Release, Kings College London, 21 April 2020.

⁷⁵ Touch Surgery, 'Basic Skills: Thoracocentesis', n.d.; Touch Surgery, 'Basic Skills: Catheterization', Webpage, Touch Surgery, 11 August 2015, <https://www.touchsurgery.com/simulations/catheterization>; Touch Surgery, 'Basic Skills: Cricothyroidotomy', Webpage, Touch Surgery, 22 September 2015; Touch Surgery, 'Basic Skills: Chest Tube Insertion -', Webpage, Touch Surgery, 14 April 2015.

⁷⁶ Sarah Reed, 'Resuming Health Services during the Covid-19 Pandemic', *Nuffield Trust*, July 2020, 4.

⁷⁷ *Ibid.*, 24.

⁷⁸ National Audit Office, *Readying the NHS and Adult Social Care in England for COVID-19*, 28.

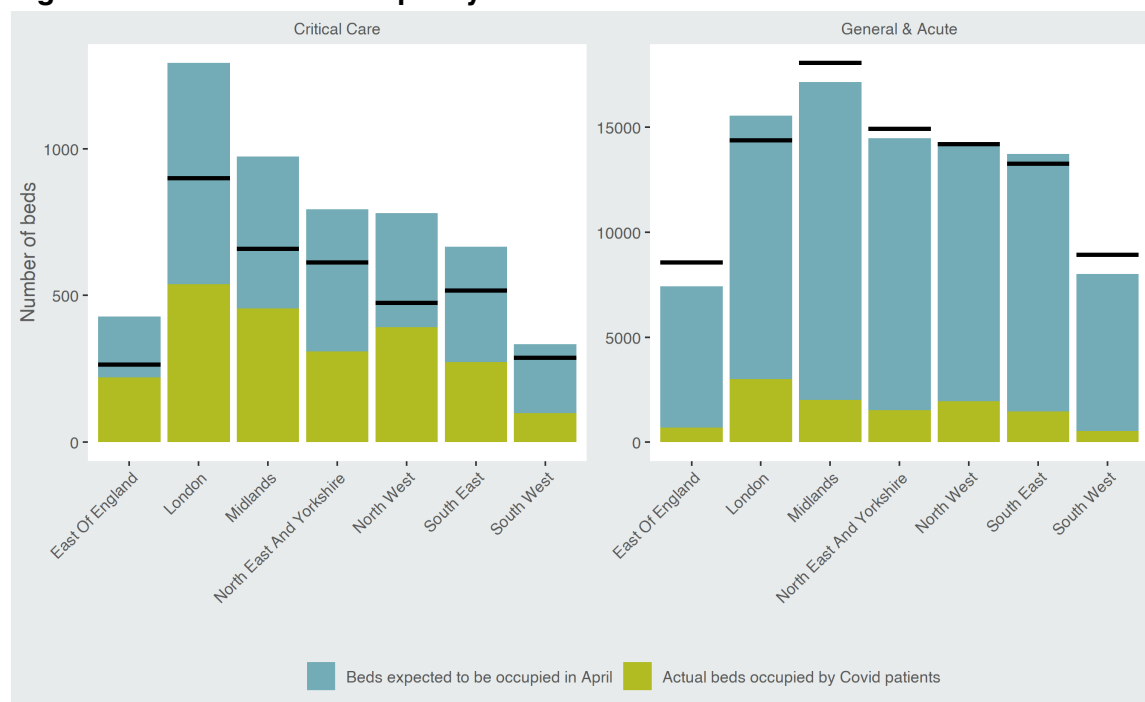
⁷⁹ Edna Astbury-Ward, 'NHS Nightingale Hospitals: Agile Response to COVID-19 or a White Elephant?', *Medscape*, 1 May 2020.

cent of critical care beds, during the first wave.⁸⁰ At the moment, these figures are at 26 per cent and 71 per cent for general and acute and critical care beds, respectively.⁸¹

The additional Nightingale capacity went largely untouched now⁸² and during the first wave.⁸³ In addition, little of the independent sector capacity was actually utilised.⁸⁴ This highlights the importance of being able to rapidly adapt to new information and plan at a system level. When it became clear during the first wave that the NHS was going to be able to absorb the surge in demand due to COVID-19, independent sector capacity could have been repurposed to continue non-COVID care – leading to a less appointment cancellations and a reduced waitlist. This should be the approach moving forward.

Figure 9 shows the average number of beds occupied by COVID-19 patients in April 2020 and the 'expected' number of occupied beds normally in April (using data from April 2019). The black line shows the bed capacity. It is assumed that the service will not be able to go back to 100 per cent capacity due to COVID-19 safety measures. This shows that there is a clear shortfall of both critical care and general and acute beds when trying to cope with both COVID-19 and normal demand. Meaning that the NHS alone could not have coped with the provision of COVID and non-COVID care.

Figure 9: Shortfall in bed capacity



The NHS should also assess how it can improve its use of existing bed capacity, as well as assessing any additional non-acute bed capacity – such as intermediate care beds

⁸⁰ National Audit Office, *Readying the NHS and Adult Social Care in England for COVID-19*, 30.

⁸¹ NHS England, 'Statistics: COVID-19 Hospital Activity', Webpage, NHS England, February 2021.

⁸² Ben Quinn, 'What Has Happened to England's Seven Nightingale Hospitals?', *The Guardian*, 8 October 2020.

⁸³ Bethan Staton et al., 'Nightingale Hospitals Largely Empty as NHS Weathers the Storm', *Financial Times*, 24 April 2020; Sophie Grubb, 'Nightingale Hospital Remains Empty a Week after Opening', *Bristol Post*, 1 May 2020; Lawrence Dunhill, Dave West, and Annabelle Collins, 'Nightingale Hospitals Largely Empty as ICUs Handle Surge', *Health Service Journal*, 14 April 2020.

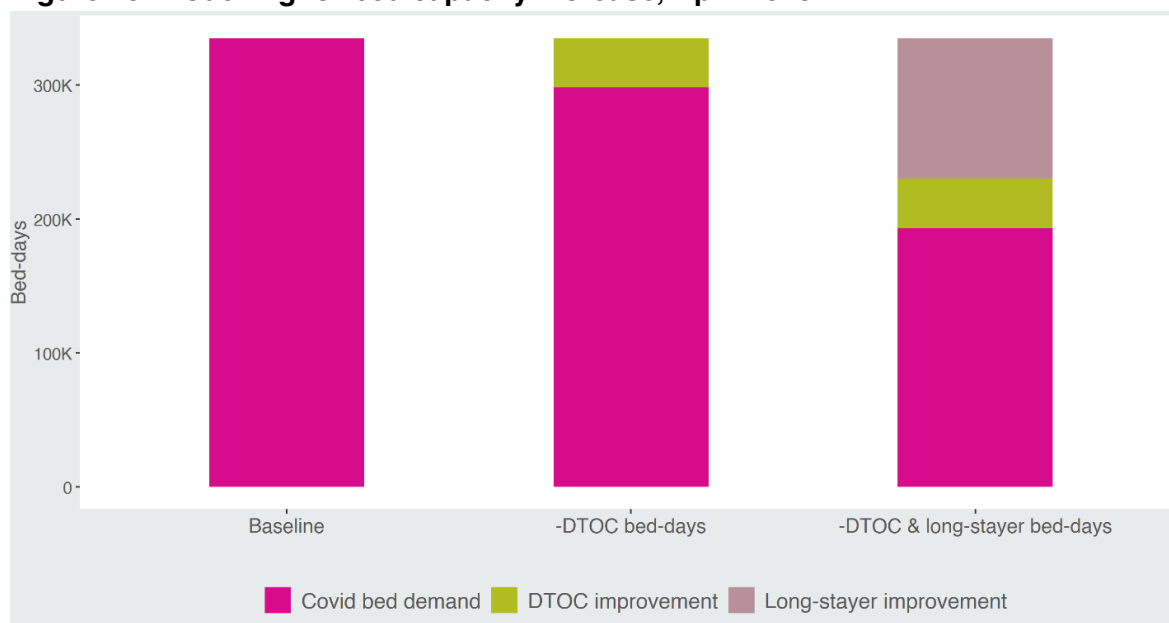
⁸⁴ National Audit Office, *Readying the NHS and Adult Social Care in England for COVID-19*, 30.

which can bridge the gap between primary and secondary care – it might need outside of a pandemic. This would enable more efficient discharge of patients who no longer need acute care but cannot yet return home, and, in the context of COVID-19, can provide care for patients suffering long-term consequences of the virus.⁸⁵

Outside of this pandemic period, the NHS has a well-documented history of delays to discharging patients which impedes the optimal use of resources. NHS England reported that 4,478 beds in March 2019 were being used by patients who should have been discharged into the community.⁸⁶ Research by the Nuffield trust in 2017 estimated that by freeing up the 4,500 acute care beds and 2,200 non-acute beds occupied by patients who could have been transferred to a non-acute care setting or discharged is the equivalent of “more than ten 650-bed hospitals”.⁸⁷ There is thus clearly scope to improve the patient flow.

Analysis was undertaken for this paper to identify whether general and acute bed capacity could be increased by reducing the number of people waiting to be transferred to other forms of care (known as delayed transfer of care or DTOC) and reducing the number of long stayers (defined as people staying more than 21 days in hospital). The modelling – which uses data from the first wave – shows that not enough capacity would have been able to be freed up to deal with the COVID-19 response while also continuing to deliver the NHS's business as usual care (see Figure 10).

Figure 10: Modelling for bed capacity increase, April 2020



The NHS would have had a substantial bed deficit if normal activity had continued alongside COVID-19 – even if capacity had been created by freeing up beds from DTOC and long stay patients, amounting to a demand for roughly 190,000 bed-days for COVID-19 patients. Although, the consequences of this surge in demand could have been dealt

⁸⁵ Rita Rubin, 'As Their Numbers Grow, COVID-19 "Long Haulers" Stump Experts', *JAMA* 324, no. 14 (13 October 2020): 1381, <https://doi.org/10.1001/jama.2020.17709>.

⁸⁶ NHS England, *Delayed Transfers of Care Statistics for England 2018/19* (NHS England, 2019), 19.

⁸⁷ Nigel Edwards, 'What's behind Delayed Transfers of Care?', *The Nuffield Trust*, 8 February 2017.

with in the independent sector, the NHS is prone to yearly seasonal surges, otherwise known as the NHS winter crisis, and it is key for the healthcare system to be appropriately equipped to deal with those.

The NHS needs to invest in increasing its long-term bed capacity, however, it should properly evaluate which type of bed it needs (including social care beds) rather than simply increasing the number of acute care beds as a knee-jerk reaction to this pandemic. The current healthcare system is already too focused on acute care provision, at the expense of community-based care.

Recommendation 5: The Government should provide funding for NHS England and the social care system to increase the number of beds. This should be based on a clear independent review of bed capacity in the health and care system focused on increasing its long-term resilience. The review should focus on understanding how many extra beds the NHS needs, what type of beds and a clear plan to improve patient flow and reduce any delays to patients being transferred or discharged.

3.3 Increasing infectious disease diagnostic capacity

The pandemic has brought into sharp focus the challenges the NHS faces in delivering timely diagnostic services to those who need them.⁸⁸ The commitment of substantial resources to Test and Trace, saw improvements in diagnostic capacity after the first wave of the pandemic, and the latest available statistics reveal that, per million population, the UK has performed the second highest number of COVID-19 tests out the 30 states with the highest number of recorded cases.⁸⁹ Yet early in the pandemic, it was clear that Britain was in a sub-optimal position to build mass testing capacity. Tests had to be shipped abroad, delaying turnaround times, and eligibility for testing had to be limited to those who presented with clear COVID-19 symptoms, despite clear evidence of asymptomatic transmission.⁹⁰

These issues stemmed, in part, from the fact that Britain entered the pandemic lacking firms capable of producing and analysing tests on mass.⁹¹ Diagnostic laboratories relied on a handful of non-domestic suppliers and were particularly dependent on a single Swiss firm, Roche, for testing kits and reagents. When this manufacturer switched warehouses in September, logistical difficulties delayed the supply of critical test kits to health and social care providers.⁹²

This example attests to the importance of thorough supply chain mapping before crises hit. Better end-to-end supply chain mapping in diagnostics can be used to identify critical

⁸⁸ NHS England, *Diagnostics: Recovery and Renewal*.

⁸⁹ Statista, 'Rate of Coronavirus (COVID-19) Tests Performed in the Most Impacted Countries Worldwide as of February 12, 2021 (per Million Population)', Webpage, February 2021, 19.

⁹⁰ National Audit Office, *The Government's Approach to Test and Trace in England*, 2020.

⁹¹ Matthew Hancock, 'Health and Social Care Secretary's Statement on Coronavirus (COVID-19)', Webpage, Department of Health and Social Care, 2 April 2020.

⁹² Carlos López-Gomez, 'UK Supply Chains: Learning the Right Lessons from COVID-19', *UK in a Changing Europe*, 22 May 2020.

vulnerabilities that may complicate carrying out mass testing, such as over-reliance on particular firms or markets, and foreseeable complications in procurement in the event of a health emergency. Making supply chain maps for crucial equipment available for public scrutiny can help ensure a necessary level of accountability over the security of critical resources in times of crisis.

Recommendation 6: The Department of Health and Social Care, in conjunction with NHS Supply Chain, should produce end-to-end supply chain maps for critical diagnostic equipment and make them publicly available.

The Government should be commended for moving quickly to rectify its diagnostic deficit during the pandemic. Programs such as the “Lighthouse Labs Project” built mega testing labs across the country which were “staffed by teams of highly skilled volunteers drawn from industry and academia”.⁹³ Contracts secured with pharmaceutical companies allowed “access to data and resources to further increase their capacity as they scale[d] up at record pace”.⁹⁴ The expansion of Britain’s diagnostics sector, which resulted from the COVID-19 pandemic, puts Britain in a better position to face future infectious illness threats.⁹⁵

As outlined above, the pandemic has raised important questions about building spare capacity into a stretched healthcare system. Yet building systemic resilience, and specifically resilient diagnostic capacity, need not rely on extensive stockpiling or maintaining expensive crisis-specific infrastructure.

Considered planning can allow government to identify and leverage existing capacity in both the public and private sectors to meet the challenges of healthcare emergencies when this is required. Surveying the UK’s diagnostic landscape and identifying firms capable of switching production to meet demand for diagnostic equipment in health emergencies will prevent unnecessary delays in scaling up capacity.

Throughout the pandemic, UK firms have successfully adapted existing production lines to supplying COVID-19 tests. For instance, Diagnostics for the Real World, a University of Cambridge spinout company, converted SAMBA II machines, designed to detect HIV, into rapid COVID-19 testing equipment.⁹⁶ Compiling an up-to-date register of firms capable of similar adaptations will help ensure a more rapid response can be mobilised for future emergencies.

Pre-planning and identifying firms able to switch their production lines will also play an important role in allaying concerns about ad hoc contracts secured with the private sector during times of crisis.⁹⁷ Giving adequate consideration to potential contract partners

⁹³ Department of Health and Social Care, ‘Health Secretary Launches Biggest Diagnostic Lab Network in British History to Test for Coronavirus.’, Press Release, 9 April 2020.

⁹⁴ Ibid.

⁹⁵ National Audit Office, *The Government’s Approach to Test and Trace in England*.

⁹⁶ University of Cambridge, ‘Rapid COVID-19 Diagnostic Test Developed by Cambridge Team to Be Deployed in Hospitals’, *University of Cambridge Research News*, 2 April 2020, <https://www.cam.ac.uk/research/news/rapid-covid-19-diagnostic-test-developed-by-cambridge-team-to-be-deployed-in-hospitals>.

⁹⁷ National Audit Office, *The Government’s Approach to Test and Trace in England*.

before health emergencies, and, in some instances, pre-drafting partnership agreements would help allay some of these legitimate concerns.

Recommendation 7: The Department of Health and Social Care should build and publish a register of firms capable of switching their production lines to produce diagnostic equipment and perform diagnostic analysis in the case of health emergencies.

3.4 Improving supply chain resilience

Difficulties in the diagnostic setting are a telling example of a wider challenge in the health and social care system: securing access to large supplies of high-quality medical equipment. Medical functions cannot be carried out effectively, efficiently or safely when supplies required for care cannot be acquired or are not of an adequate standard. Shortages of PPE and ventilators during COVID-19 have brought long-standing vulnerabilities in the medical product supply chain into sharp focus and triggered discussions about spare capacity and resource procurement.⁹⁸

The recommendations outlined above to increase diagnostic capacity can be applied to equipment and supply chains more broadly. Firstly, building more resilient supply chains will require better processes for mapping them end-to-end, identifying key vulnerabilities and taking mitigating action. Secondly, an awareness of existing domestic manufacturing capacity would have allowed a timelier response to major supply challenges. The Cabinet Office 'Ventilator Challenge' revealed the speed with which firms in adjacent industries could turn over production lines to manufacture essential medical supplies.⁹⁹ After the DHSC set out an ambitious 'PPE strategy' in September 2020, domestic manufacturers moved swiftly to repurpose production lines.

Though a lack of reliable data makes it difficult to ascertain whether the target of manufacturing 70 per cent of forecasted demand for all types of PPE (excluding gloves) domestically has been met, Britain's medical equipment supply chain is certainly less reliant on international partners than it was at the start of the pandemic.¹⁰⁰ Advanced planning and identification of firms capable of producing equipment required to meet the demands of a healthcare crisis would have allowed the UK to respond more swiftly and helped avoid the supply challenges that characterised the early months of the pandemic.

However, before seeking to expand capacity and secure additional supplies of vital equipment, it is essential that government departments and health and care providers have a clear understanding of existing stock. During the pandemic, providers revealed that they lacked up-to-date information on the resources available to them.¹⁰¹ In February,

⁹⁸ Fiona Miller et al., 'Vulnerability of the Medical Product Supply Chain: The Wake-up Call of COVID-19', *British Medical Journal Quality and Safety*, October 2020.

⁹⁹ House of Commons Public Accounts Committee, *COVID-19: Supply of Ventilators: Twenty-Seventh Report of Session 2019-2020*, HC685 (London: The Stationery Office, 2020).

¹⁰⁰ Knapton, 'Hospitals Could Run Short of Oxygen "within Hours" as Coronavirus Escalates, Specialists Warn'.

¹⁰¹ National Audit Office, *The Supply of Personal Protective Equipment (PPE) during the COVID-19 Pandemic*, 2020.

for instance, NHSE/I revealed that it did not possess accurate information on the size of PPE stockpiles or the number of mechanical ventilators in the health system.¹⁰² NHSE/I was forced to put out a call for this information as the pandemic began to unfold and found that the NHS only had 7,400 mechanical ventilators, far fewer than the 59,000 deemed necessary.¹⁰³ Action to supplement this stock may have been quicker had that information been available immediately.

It is crucial that the NHS maintains an adequate asset register of critical equipment and considers methods to quickly gather up-to-date data on key supplies.¹⁰⁴ Knowing both the quantity and location of key medical supplies can help effectively allocate resources to meet the challenges of health emergencies".¹⁰⁵ Building resilience will require ensuring that resources do not sit idle in one part of the system when they are desperately needed in another.

In December 2020, the NHS agreed a contract with Palantir to improve supply chain mapping and management for key resources including PPE, ventilation and oxygen equipment and intensive care consumables.¹⁰⁶ This is a welcome first step, yet attention must continue to be paid to keeping inventories up-to-date and accessible to those who rely on them.

Recommendation 8: The Department of Health and Social Care should continue to develop and maintain an up-to-date inventory of key assets, including personal protective equipment and ventilators.

3.5 The role of data and tech

Before COVID-19 hit the health and care system in early 2020, it had a relatively poor track record of adopting technology at scale.¹⁰⁷ While there were many pockets of innovation in the systems, overall, there was varying degrees of digital maturity.

At a central level, NHS England was not equipped with the right technology to have a singular view of key operational data such as bed occupancy or the number of ventilators, or even infection rates.¹⁰⁸ It was handling "information in spreadsheets held by disparate organisations", which, as senior NHS leaders candidly wrote in a blog in late March, hugely increased the risk of having inaccurate data as it "will be duplicated and rapidly

¹⁰² Ibid.

¹⁰³ House of Commons Public Accounts Committee, *COVID-19: Supply of Ventilators: Twenty-Seventh Report of Session 2019-2020*.

¹⁰⁴ Ibid.

¹⁰⁵ House of Commons Public Accounts Committee, *Whole of Government Response to COVID-19: Thirteenth Report of Session 2019 - 21*, HC 404 (London: The Stationery Office, 2020).

¹⁰⁶ Crown Commercial Service, 'National Health Service Commissioning Board and National Health Service Trust Development Authority: Provision of Data Management Platform Services', Webpage, Contracts Finder, 18 December 2020.

¹⁰⁷ Pritesh Mistry, 'The Digital Revolution: Eight Technologies That Will Change Health and Care', *The King's Fund*, 13 November 2020.

¹⁰⁸ Matthew Gould, Indra Joshi, and Ming Tang, 'The Power of Data in a Pandemic - Technology in the NHS', *Technology in the NHS Blog*, 28 March 2020.

become outdated, leading to inaccurate or incomplete understanding of the situation”.¹⁰⁹ This could cost lives in a crisis response.¹¹⁰

The lack of a pre-existing infrastructure meant that the NHS was slower than it could have otherwise been. In an effort to recognise the importance of good quality data and the need “for accurate real-time information”,¹¹¹ the Government commissioned NHS England, Improvement and NHSX “to develop a data platform that will provide those national organisations responsible for coordinating the response with secure, reliable and timely data”¹¹² in a privacy preserving way. This dashboard was developed in partnership with five private sector organisations including Palantir, Amazon Web Services and UK-based start-up Faculty. It linked key datasets together and allowed decision-makers to have access to essential real-time and up-to-date information such as ICU capacity and infection rates.

The contract with Palantir, one of the private sector partners to develop the COVID-19 datastore, was extended and more capabilities were developed such as a supply chain and workforce management.¹¹³ However, the stock counts rely on healthcare staff manually filling forms. There are huge opportunities to automate or simplify the collection of operational data through the use of barcodes for example.¹¹⁴ The DHSC transferred the responsibility of the Scan4Safety programme to NHSX in July 2019.¹¹⁵ This programme allows for data to be collected from barcodes that are scanned in order “to inform the whereabouts and utilisation of NHS trust resources”. Scan4Safety alleviates the burden of data collection and also minimises errors. The programme has demonstrated that it can increase patient safety¹¹⁶ and operational efficiency in several pilot sites. It is crucial that this programme is expanded to all NHS trusts.

Recommendation 9: NHS England and Improvement and NHSX should mandate the adoption of the Scan4Safety programme to all NHS Trusts. This will help increase the accuracy of operational data and patient safety.

The pandemic has had a particularly transformational impact on the adoption of technology in primary care – which was already more digitally advanced than other areas of care.¹¹⁷ The NHS Long-term plan sets out that everyone should have access to a virtual GP by 2024¹¹⁸ – as several interviewees for this paper pointed out, that goal has almost

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

¹¹¹ Ibid.

¹¹² Ibid.

¹¹³ Crown Commercial Service, ‘National Health Service Commissioning Board and National Health Service Trust Development Authority: Provision of Data Management Platform Services’.

¹¹⁴ Scan4Safety, ‘For NHS Trusts’, Webpage, Scan4Safety, n.d.

¹¹⁵ Scan4Safety and Department of Health and Social Care, ‘Responsibility for Scan4Safety to Transition over to NHSX’, Webpage, Scan4Safety, 2 May 2019.

¹¹⁶ Matt Discombe, ‘Prior: Use of Barcodes Should Be “Commonplace in the NHS”’, *Health Service Journal*, 14 July 2020.

¹¹⁷ Jacqui Thornton, ‘Covid-19: How Coronavirus Will Change the Face of General Practice Forever’, *British Medical Journal* 368, no. m1279 (30 March 2020).

¹¹⁸ NHS England, *The NHS Long Term Plan*, 2019.

been achieved overnight. In primary care, “digital triaging” became the norm “in just three weeks”.¹¹⁹

The adoption of telehealth was also accelerated in secondary care.¹²⁰ One interviewee commented how previous resistance to virtual clinics¹²¹ has now been largely overcome, the “door is ajar” after COVID-19 to digitally transform delivery of care. They stated that, if maintained, it would lead to “less outpatient appointments” and reduce the burden on clinicians.

Technology has a fundamental role to play in the NHS’s recovery and future resilience. Digital health applications can be used for whole swathes of care, from optimising the use of diagnostic equipment to helping patients manage their conditions at home. For example, thousands of patients with “cystic fibrosis and dozens recovering from coronavirus are being given devices and apps so that medics can monitor their condition remotely.”¹²²

NHS England is also running trials that will see “some patients with COVID-19 given devices which can help spot any dip in their blood oxygen-levels while they recover at home”.¹²³ This trial should help establish if the technology can detect when a “patient might need to be re-admitted into hospital.”¹²⁴

However, truly harnessing the power of technology is dependent on good quality data. The NHS is notorious for having poor-quality data, particularly when used for purposes other than direct patient care.¹²⁵ This pandemic has placed the issue centre stage as recently highlighted by Matt Hancock, Secretary of State for Health and Social Care, who said “the pandemic has demonstrated just how important health data is”.¹²⁶

The healthcare system is “data rich”, it is also “information poor”.¹²⁷ It struggles with having access to and analysing the right data at the right time in order to make informed and evidence-driven decisions. As highlighted by interviews for this paper, issues around data quality in the NHS range from not knowing the exact number of beds in a local area – because the count at a central level does not match the local level data – to more complex issues concerning clinical coding (see Figure 11).

¹¹⁹ Clare Gerada, ‘Primary Care Has Transformed into a “dial-in” or “Click First” Service’, *Health Service Journal*, 27 March 2020.

¹²⁰ NHS England, *Clinical Guide for the Management of Remote Consultations and Remote Working in Secondary Care during the Coronavirus Pandemic*, 2020.

¹²¹ It is a “form of telemedicine between healthcare professionals and patients that crucially occurs without the need for a traditional face-to-face consultation and thus avoids in-person attendance at hospital”. Connor, Winkler, and Miah, ‘COVID-19 Pandemic – Is Virtual Urology Clinic the Answer to Keeping the Cancer Pathway Moving?’

¹²² NHS England, ‘Thousands of Patients to Benefit from NHS At Home Roll-Out’, Webpage, NHS England, 5 June.

¹²³ Ibid.

¹²⁴ Ibid.

¹²⁵ Owen Hughes, ‘UK Can Be “world Leader in AI” If NHS Data Can Be Tapped’, *Digital Health*, 3 April 2018; Eleonora Harwich and Kate Laycock, *Thinking on Its Own: AI in the NHS* (Reform, 2018); Simon de Lusignan et al., ‘Call for Consistent Coding in Diabetes Mellitus Using the Royal College of General Practitioners and NHS Pragmatic Classification of Diabetes’, *Informatics in Primary Care* 20, no. 2 (2012): 103–13.

¹²⁶ Department of Health and Social Care, ‘New Review into Use of Health Data for Research and Analysis’, Webpage, GOV.UK, 9 February 2021.

¹²⁷ Heitmueller, ‘The Future NHS Is out There’.

Figure 11: Case study – The shielded patient list and neurological data

Part of the Government's infection control strategy was to create a 'shielded' list of vulnerable patients at high-risk of COVID-19 complications (about 2 million people).¹²⁸ People who were on the shielded list were advised not to leave their homes other than for essential healthcare needs and were to receive support from local authorities.¹²⁹ Several interviews for this paper highlighted the limitations of NHS Digital's approach to the shielded patient list.

One of the major issues faced by NHS Digital was the fact that "existing data sets did not hold data in the required form" to identify the vulnerable people as "data held in clinical codes did not directly map to the requirements" for the shielded patient list. To help address the issue, clinical experts, including experts in neurology, were asked to help with mapping existing clinical codes onto the list requirements.

The Association of British Neurologists produced guidance for organisations that were "coordinating the identification of these patients". In neurology, however, "clinical coding for outpatient episodes is not mandatory". This meant that a huge amount of manual work had to be completed by teams of clinicians to identify who would be deemed extremely vulnerable based on that guidance.

The multitude of information systems, lack of consistency in names and formats, etc., further hampered efforts at local level to automate any aspect of the process. Issues with clinical coding in neurology have been known for some time, but "COVID-19 has exposed just how urgent this issue has become" because patients can be missed.

Source: Kemp M (1), Biggin F (2), Dayanandan R (1), Knight J (2), Emsley HCA (1,2), "COVID-19 exposes the urgent need for coding of outpatient neurology episodes", Department of Neurology, Royal Preston Hospital, Preston, UK (1) and the Lancaster Medical School, Lancaster University, Lancaster, UK (2)

In addition to data quality issues, data in healthcare can often be trapped in clunky and old proprietary systems¹³⁰ – meaning it cannot be extracted from these systems or appropriately shared. This goes against much of the government's current guidance on good tech practices in the public sector.¹³¹

There are several upcoming reviews and strategies in the healthcare data landscape, with the DHSC recently announcing a review into use of health data for research and analysis.¹³² There is also going to be a Data Strategy for Health and Social Care which will set the direction for the use of data in a post-pandemic healthcare system.¹³³ These are all crucial steps in the right direction.

¹²⁸ Outcomes Based Healthcare, 'COVID-19 Vulnerable Population Analysis', Webpage, OBH, July 2020.

¹²⁹ NHS Digital, 'Coronavirus Shielded Patient List Open Data Set, England', Webpage, n.d.

¹³⁰ Jamie Clifton, 'The Prevalence of Obsolete Legacy Applications in the NHS', *Building Better Healthcare*, 12 January 2017; Matt Baker, 'Legacy Applications Pose Serious Cybersecurity Risks to Hospitals - UK Tech News', *UK Tech News* (blog), 19 February 2019; Sarah Timmis, Luke Heselwood, and Eleonora Harwich, *Sharing the Benefits: How to Use Data Effectively in the Public Sector* (Reform, 2018).

¹³¹ Department of Health and Social Care, *Initial Code of Conduct for Data-Driven Health and Care Technology*, 2018; Government Digital Service, 'Technology Code of Practice', Webpage, GOV.UK, 27 March 2019.

¹³² Department of Health and Social Care, 'New Review into Use of Health Data for Research and Analysis'.

¹³³ Ibid.

What's next for the NHS?

It is essential that the Data Strategy for Health and Social Care focuses on developing a plan to deal with legacy IT in the NHS as well as finding ways to incentivise the improvement of data quality in the NHS. Previous *Reform* research made several recommendations to increase data quality such as “including the user-friendliness of IT systems in the procurement process of data collection systems” and “favouring intelligent systems that flag-up errors in real-time”,¹³⁴ or making submissions to NHS Digital’s Data Quality Maturity Index compulsory (this index measures improvements in data quality across NHS organisations).¹³⁵

¹³⁴ Harwich and Laycock, *Thinking on Its Own: AI in the NHS*, 7.

¹³⁵ Ibid.

Conclusion

The Government and healthcare system have had to face a crisis of an unprecedented nature – leading to three national lockdowns, the suspension of many areas of the economy, and a staggering 120,000 deaths related to COVID-19 plus an increase in the excess deaths caused by the disruption to the normal provision of care.¹³⁶ Government has had to navigate incredibly difficult trade-offs between health and economic imperatives, which will also have a long-term impact on people's health.

The way these decisions were operationalised led to the transformation of the NHS into a National COVID Service. While temporary reprioritisation was understandable, it is crucial that the health and care system recognises that it can no longer afford to make the trade-off between COVID and non-COVID care.

The Service must use all the resources at its disposal to work through its ballooning wait list as quickly as possible. This will mean making use of capacity in the independent sector. NHS England and Improvement has extended the contract until 2024, not using this extra capacity to diagnose and treat patients would be negligent.

The ballooning backlog of procedures will have an impact on the nation's overall health. Patients will be facing more serious health conditions or disabilities. As highlighted by the Royal College of GPs, patients are "living with the long-term health conditions and becoming sick from non-COVID-related illnesses, which if left unmanaged or untreated could have serious consequences."¹³⁷ The country will also, tragically, witnessed an increase in the number of excess deaths from diseases such as cancer due to delays in diagnosing and treatment.

The current mass vaccination programme offers hope that the pressures on the NHS will slowly but surely start to ease.¹³⁸ Ministers and elected politicians will have to make many "societal choices" as highlighted by Professor Chris Whitty about the post-pandemic period.¹³⁹ Part of this must be a focus on the increasing the long-term resilience of the NHS.

¹³⁶ Public Health England, 'Official UK Coronavirus Dashboard', Webpage, GOV.UK, 9 February 2021; BBC News, 'Covid-19'.

¹³⁷ Royal College of General Practitioners, 'Risk of "serious Consequences" If Non-COVID Conditions Unmanaged or Untreated, Warns College'.

¹³⁸ Department of Health and Social Care, 'UK COVID-19 Vaccines Delivery Plan'.

¹³⁹ Science and Technology Committee and Health and Social Care Committee, 'Oral Evidence: Coronavirus: Lessons Learnt', *House of Commons HC 877* (9 December 2020): Q798.

Appendix

Case study on the upstaging of lung cancer

Using early data on the impact of lockdown on lung cancer diagnosis and treatments, as well as historical data on cancer treatments, we have modelled the potential impact of the first lockdown on lung cancer patients.

Eighty-five per cent of lung cancers were treated within the 31-day to treatment pathway in 2018, which corresponds to about 46,000 people.¹⁴⁰ Mortality rates from lung cancer are quite high as many are diagnosed at a later stage with 50 per cent of cases diagnosed at stage 4 and 22 per cent at stage 3.¹⁴¹ Survival rates between the different stages of lung cancer vary dramatically, reinforcing the importance of early diagnosis. The survival rates after the first year of being diagnosed with lung cancer are 87.7 per cent for stage 1, 73 per cent for stage 2, 48.7 per cent for stage 3 and 19.3 per cent for stage 4.¹⁴² Survival rates drop five years after diagnosis, but the difference between stages remains similar with 51.1 per cent of patients surviving stage 1, 32.1 per cent stage 2, 11.6 per cent stage 3 and 2.3 per cent stage 4.

Cases can be referred through different routes, including:

- 2-week wait referral (2WW), corresponding to outpatient appointments done within 2 weeks, and accounting for 34 per cent of all lung cancer diagnoses;¹⁴³
- GP appointments, which represent 21 per cent of all lung cancer referrals;
- Emergency presentation, accounting for 31 per cent of lung cancer cases; or
- Other routes which make up 14 per cent of all cancer referrals.¹⁴⁴

Pre-COVID-19, 3,800 lung cancer cases were diagnosed and treated per month via the 31-day pathway.¹⁴⁵ Typically, 18 per cent of referrals via 2WW diagnose lung cancer.¹⁴⁶

Based on data from April and May 2020, 2WW referrals for lung cancer were down by 60 per cent in April 2020 and 57 per cent in May 2020 compared to an average of monthly

¹⁴⁰ NHS England, 'Cancer Waiting Times', Webpage, NHS England, 11 June 2020. Using data from 2018 data as a sense-check, Edge Health found that 85 per cent of lung-cancer diagnoses are treated through the 31-day referral pathway. The other 15 per cent might potentially choose not to pursue treatment or get treatment through another route. Conservatively, Edge Health assumed that these patients do not pursue treatment, which means that they are not added to the delayed treatment group.

¹⁴¹ Public Health England, 'Staging Data in England', Webpage, Cancer Data, March 2020.

¹⁴² Office for National Statistics, 'Cancer Survival in England - Adults Diagnosed', Webpage, ONS, 12 August 2019.

¹⁴³ Average of patients treated via 2WW referral pathway divided by total treated via 31-day pathway in Mar 2019-Feb 2020.

¹⁴⁴ The percentages were calculated by weighting stage by route to diagnosis data from 2012-2016 (Public Health England and National Cancer Registration and Analysis Service) with 2018 data on stage at diagnosis, and then re-apportioning results based on most recent data (Mar 2019- Feb 2020) on the proportion of 31-day treatments coming from 2WW referrals.

¹⁴⁵ Edge Health use routine data on the percentage of lung cancers treated via the 31-day pathway versus those treated via the 2WW referral pathway.

¹⁴⁶ Conversion rate for 2WW referrals for suspected lung cancer to actual lung cancer has been calculated using the average monthly 2WW referral appointments compared to the average monthly count of patients treated on the 62-day pathway – 2WW referrals lead patients along the 62-day pathway. Conversion rate for lung cancer is higher compared to other cancers.

2WW referrals over the past year.¹⁴⁷ The recovery in April and May for lung cancer referrals was much lower than for other cancers.

Assumptions for modelling the upstaging of lung cancer

- The upward staging of lung cancer takes about 4-months.¹⁴⁸
- 2WW referrals increase by 8 per cent in future months, which would be twice the national average recovery rate between April and May 2020.
- Physicians triaging referrals are aware of the drop in diagnosing for cancer and may be more likely to refer people thus increasing the detection rate. It is plausible that the detection rate increases by about 25 per cent (increasing from 18 per cent to 23 per cent).
- Missed diagnoses will start to be seen after the NHS gets back to pre-COVID-19 levels of cancers diagnosed per month.
- Due to a lack of information on the drops in referrals and diagnoses routes other than 2WW – it is assumed that the same numbers of cases are delayed from other routes as well.

Under those assumptions, it is estimated that it will take ten months (i.e. January 2021) to return to past levels of lung cancer diagnosing.¹⁴⁹ The 'missing' 2WW referrals will lead to 3,980 missed cancer diagnoses. The number of missed diagnoses is then divided by the percentage of lung cancers referred through 2WW (i.e. 34 per cent).

Results

Including a one-month delay to treatment because of slowed treatment capacity (due to COVID-19 work safety guidelines),¹⁵⁰ it is estimated that there will be an 11-months delay to the diagnosing and treatment of 11,300 patients of lung cancer patients.¹⁵¹

Given that it takes about four months to progress between one stage of lung cancer to the next, all delayed and missed cases were upstaged assuming that patients are uniformly distributed by month within each stage. That would mean that everyone in the delayed cohort would be diagnosed at stage 3 and 4, rather than earlier. Due to the higher mortality rates when caught at late stages it is estimated that there will be 1,660 premature deaths from lung cancer alone in the next five years.

As more data on cancer diagnosis, staging, and mortality is released over the coming years, we will be able to compare the actual impact of COVID-19 – related delays in cancer treatments with the modelled impact.

¹⁴⁷ There are no seasonal patterns in referrals (like for A&E attendances, for example), so Edge Health used yearly averages. Edge Health calculated the yearly average for March 2019-February 2020, and excluded March 2020 so as to ensure that no residual COVID-19 impact would affect the average.

¹⁴⁸ Estimate based on expert opinions from oncologists obtained for this paper.

¹⁴⁹ Edge Health use 2018 data on stage at diagnosis which they aggregated across each route to diagnosis to obtain the distribution of how these cases would normally be diagnosed (pre-covid-19).

¹⁵⁰ The 1-month delay to treatment is basic assumption made by Edge Health to do the final modelling. Reality might be a bit more complex as some people might get referred earlier, as physicians will triage most urgent cases, and there will be some attrition.

¹⁵¹ Using 5-year data on survival by cancer stage from Public Health England, Edge Health take the difference in mortality between the "normal" distribution of cancer stages and the distribution including an 11-month delay.

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