The impact of COVID-19 on cancer

Update on the disruption and recovery of cancer services from COVID-19

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Introduction

This is an update to our earlier report on the impact of the pandemic on cancer services and outcomes, and possible routes to recovery (read the full report here). Now that full data on the first wave has been released, we are providing our updated analysis.

Our earlier analysis accurately projected that the first COVID-19 wave would last between three and six months, which we estimated would result in 3,600 to 7,200 excess cancer deaths. We concluded that recovering the backlog and resuming cancer services would require significant work. These estimates were based on a larger drop in urgent referrals, as was the case at the time of writing the first report. The updated estimates that we provide in the current report on the five observed months of disruption corresponding to the first COVID wave, with the updated drop in referrals, fall in line with our original predictions. The same applies to the estimates on number of excess cancer deaths, changes in survival rates and anticipated stage distribution at diagnosis.

The encouraging news is that services appear to have recovered more quickly during the second wave that the first. It is excellent news that in referrals in some tumour areas we are back to levels that would expect whilst in others we have partially recovered; yet in both situations achieving full recovery – and getting outcomes back on track – will require recovering the "lost volume" of the missing patients. And hence, robust plans and focused effort in the coming months to find these patients and speed them through the system.

We have updated our analysis of the likely impact that this will have on outcomes and have indicated it seems likely there may be 4,500 deaths that will occur due to these disruptions. This is not a given at this point but the likely impact of the delay in the pathway we have modelled. It will be critical that the government invest in the NHS in diagnostics and elective surgery as well as digital solutions to support addressing this gap in care urgently.

Beyond the first wave

The most recent data from January and February 2021 show a much more resilient picture of two week wait activity compared to the same stage of infection cycle in April 2020. The NHS learned lessons from the first wave improved its management of the consequences of the pandemic for cancer services during the second wave. This is a significant and welcome achievement under the most challenging circumstances for a health system in peacetime.

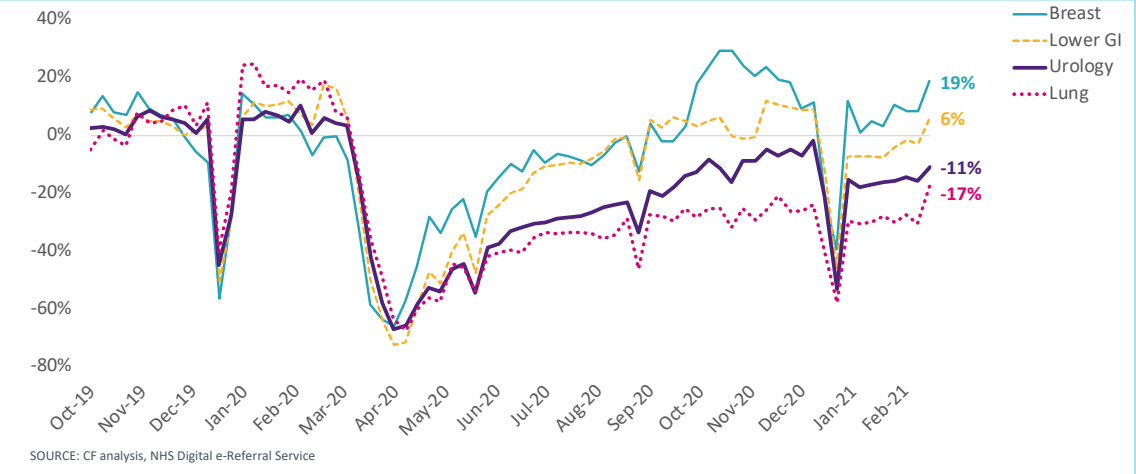
Since the start of the pandemic the availability of referral data has greatly improved. Figure 1 (below) shows the challenges faced by cancer two-week-wait referrals for the top four tumour types by volume. It clearly illustrates the initial impact of the pandemic and subsequent variation in recovery between the various tumour types.

Nonetheless, despite the return in aggregate to pre-pandemic two-week wait referral volumes by November 2020, there has yet to be a compensatory effect for the missed activity from the first wave and a number of tumour types remain well below their pre-pandemic baselines. Moreover, the top line figures obscure a more complex picture from the data: referral volumes are highly variable across both tumour types and geography.

What's more, these figures must also be understood in the context of the upwards trend in referral volume over the past decade—with an annual growth rate of between 5 and 10% over the decade to 2020. This implies that the current figures are further below where we might have expected to be if the pandemic had not occurred.

Taken together, it is clear that there is much work to be done and that robust recovery plans must be developed as a matter of urgency. The NHS has shown its extraordinary capacity to adapt and respond to the pandemic; it now must mobilise to return to the improving trajectory of cancer services prior to the pandemic onset.

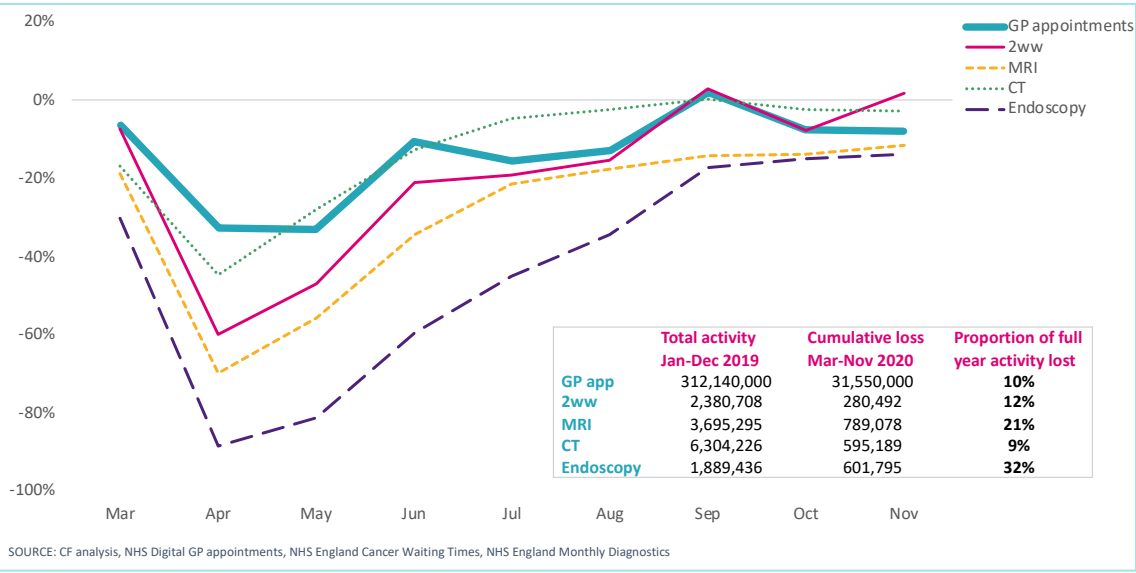
Figure 1. Changes in two-week-wait referrals by tumour type and month[1], Percentage change compared to their pre-pandemic baseline (baseline defined by NHS Digital as 7 October and 29 December 2019)



As our earlier analysis showed, activity levels varied greatly between March and November 2020 across cancer services. Figure 2 (below) shows that GP appointments, urgent referrals, and diagnostics experienced a sharp drop in April 2020 compared to 2019 levels, which started to recover slowly to reach near-normal levels in November.

The missed activity between March and November meant a cumulative loss of over 30 million GP appointments, 280,000 urgent referrals, 780,000 Magnetic Resonance Imaging (MRI) scans, 590,000 Computerised Tomography (CT) scans, and 600,000 endoscopy procedures in 2020 compared to 2019 levels. These figures represent an underlying gap in demand relative to normal and will exceed those patients who are on waitlists, but probably represent a truer picture of the demand that needs to be addressed. The NHS has a mountain to climb in the months and years ahead.

Figure 2. Changes in cancer services by month, compared to 2019 levels[2,3,4]

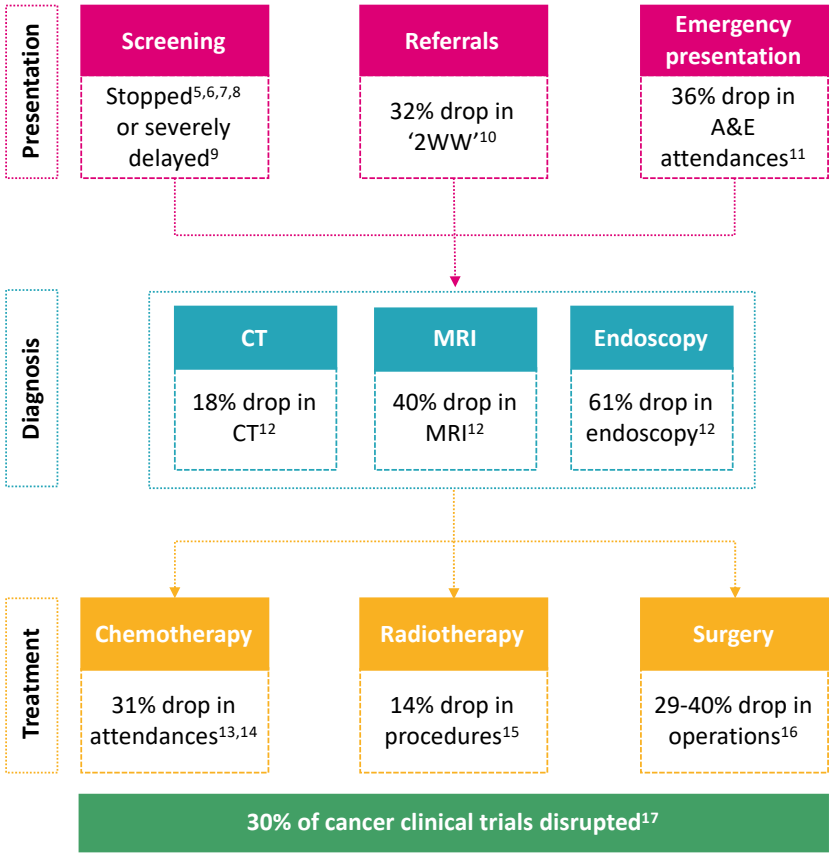


	Total activity Jan-Dec 2019	Cumulative loss Mar-Nov 2020	Proportion of full year activity lost
GP app	312,140,000	31,550,000	**10%**
2ww	2,380,708	280,492	**12%**
MRI	3,695,295	789,078	**21%**
CT	6,304,226	595,189	**9%**
Endoscopy	1,889,436	601,795	**32%**

Disruptions to the cancer pathway

We explored the changes in cancer services across the cancer pathway, and found that the period of greatest disruption was between April to August 2020, which corresponds to the first COVID-19 wave. This would suggest that the first wave lasted 5 months, which falls within the range of 3 to 6 months that we had predicted in our original report. Figure 3 shows how activities across screening, referrals, diagnosis, and treatment have been affected by the pandemic.

Figure 3. Disruptions to cancer services across the pathway due to the COVID-19 pandemic, from April to August 2020



SOURCE: CF analysis

The impact on outcomes

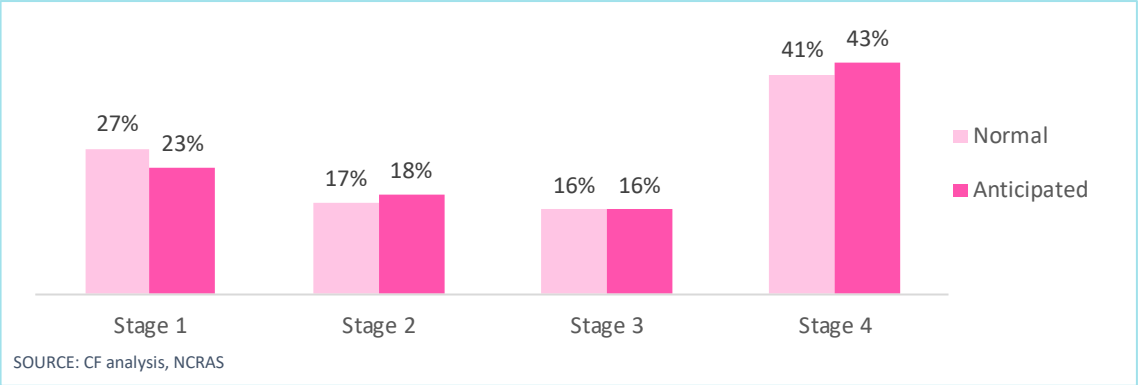
In light of these disruptions to the cancer pathway, we investigated the potential repercussions on outcomes, namely on early detection, survival, and additional deaths, due to the shift in the stage of diagnosis caused by the COVID-19 pandemic.

Setback to earlier detection

The impact of the reduction in cancer activity may be reasonably expected to result in delays in detection, diagnosis, and treatment, which lead to higher mortality. The main routes to cancer diagnosis are screening (breast, colorectal, and cervical), GP referral (urgent or not), and emergency presentation. The most common route to diagnosing cancer is through 'two-week-wait' and GP referrals which accounts for around two-thirds of cancer diagnoses.[18]

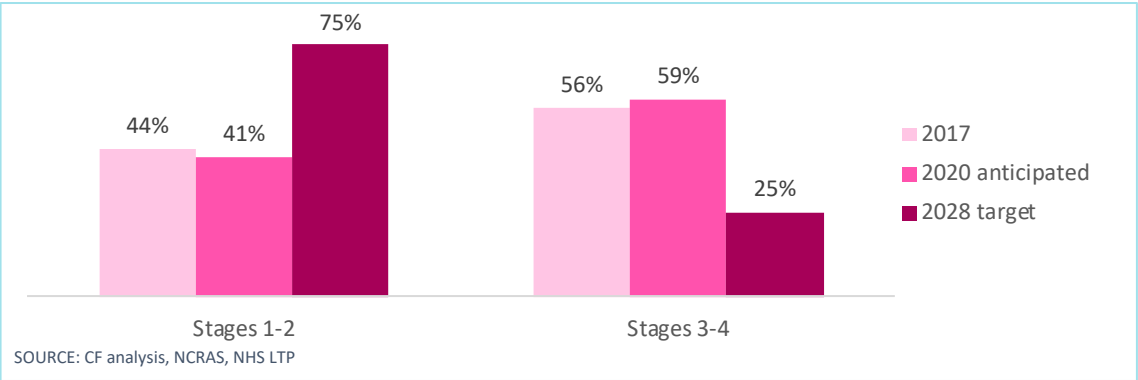
We have looked at the impact of the 32% average drop in urgent referrals observed from April to August 2020, compared to the same period last year,[10] and modelled the impact of the decrease in urgent referrals on stage of diagnosis,[19] assuming that patients who are not diagnosed on time will be detected one stage later.[20] The results are illustrated in Figure 4. This implies that many patients may have been diagnosed at a later stage than they should have been, resulting in a stage shift in diagnosis.

Figure 4. Normal stage distribution of cancer diagnosis (2017) and anticipated stage distribution for 2020 (from April to August)[21]



The last 20 years of national cancer policy have focused on earlier detection and accelerating the start of treatment, with near-continuous year-on-year improvements. Improving cancer early detection is an important part of the NHS' Long-Term Plan, with a target of having 75% of cancer diagnosis in stages 1 and 2 by 2028.[22] As figure 5 (below) shows, COVID-19 disruption has been an important set back in progress towards early diagnosis targets, with an increase in the proportion of cases diagnosed at later stages.

Figure 5. Normal stage distribution of cancer diagnosis (2017), anticipated distribution for 2020 (from April to August), and Long Term Plan target for 2028[19,22]



The impact on survival

Later detection of cancer implies greater disease progression and therefore worse survival rates. Our analysis of the stage shift in diagnosis therefore implies that overall one-year survival rates are likely to have deteriorated.

We set out to estimate the number of additional deaths that would occur by modelling the effect of the stage shift in diagnosis, and consequent drop in one-year survival, on cancer mortality. We found that, for the 5 months of disruption from April to August 2020, there could be as many as 4,502 excess deaths as a result of the reduced survival brought on by later cancer detection (**Table 1**).

Table 1. Estimated number of excess cancer deaths resulting from a stage shift in diagnosis and drop in 1-year survival[19,23]

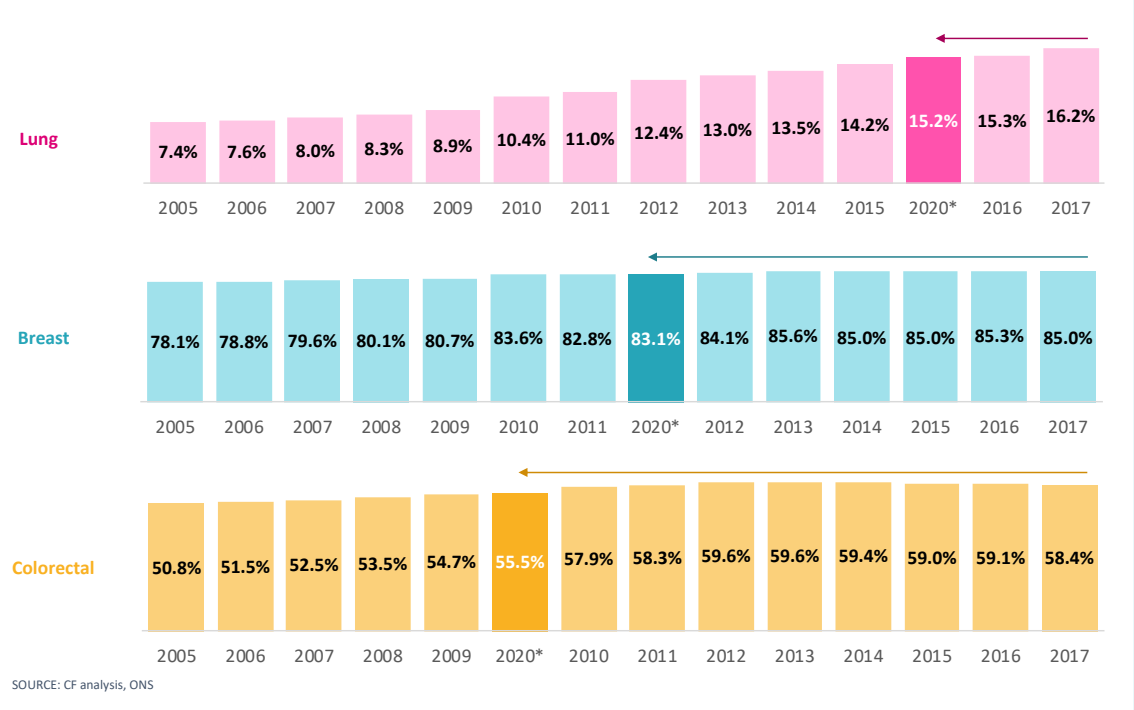
	Disruption from April to August 2020
Normal 1-yr survival	65.3%
Anticipated 1-yr survival	63.8%
Normal # of people dead	106,003
Anticipated # of people dead	110,506
Additional people dead	**4,502**

Setting the UK back in time

We then evaluated how this stage shift in detection could affect five-year survival rates for lung, breast, and colorectal cancers, to find an estimate of the anticipated survival rates for 2020 for patients with these disease indications brought on by the disruptions to the cancer pathway. Based on the same assumptions, we found that, for 5 months of disruption, five-year survival could drop from 16.2% to 15.2% for lung cancer, while for breast cancer it stands to decrease from 85.0% to 83.1%, and for colorectal cancer from 58.4% to 55.5%.[23] While we have focused our analysis here on these three cancer types, similar trends are expected to be seen in other cancer types.

To better illustrate what these decreases in survival mean, we have looked at how these anticipated rates compare to five-year survival rates across time in England. We found that, while England had been experiencing a near-steady improvement in five-year survival across these three cancers for the past decade, the disruptions to cancer activities due to the pandemic could have the impact of setting back cancer outcomes by several years (**Figure 6**). More specifically, our estimates show that five-year survival is likely to be set back by two years for lung cancer, by six years for breast cancer, and by eight years for colorectal cancer.

Figure 6. Five-year survival over time and anticipated for 2020, by cancer type, in England[23]



The international perspective

To further understand the impact of the drop in survival, we looked at how COVID-19 influenced UK survival rates compare to those of other countries as they were prior to the pandemic. Our modelling shows that, for 5 months of disruption, the anticipated reduction in five-year survival is likely to make the UK lag further behind other OECD countries.[24]

Implications

There can be no greater shock to a health system than a global pandemic. Our findings are not a criticism of the response to COVID-19 but a rallying call for action to return to the improvements in cancer services in recent decades. The NHS has shown it has remarkable capacity to adapt and respond to the challenges of the past year, and precisely those skills will be needed to recover from the wider impacts of the pandemic on the nation's health. We will not know the full impact of the winter 2020/21 wave until more data is released later in the year.

What is clear is that Cancer must remain a top national priority in the years ahead. Providers and integrated care systems will need robust plans for recovery that will take sustained focus and attention from the frontline to the boardroom.

About the authors

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