

CANCER CARE IN IRELAND IN 2020

THE IMPACT OF THE COVID-19 PANDEMIC



CONJOINT BOARD
IN IRELAND OF THE
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AND ROYAL COLLEGE OF SURGEONS



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About this Report

In December 2020, the report *“Deploying Data-Driven Intelligence to measure the impact of COVID-19 on cancer care and cancer patients”* [1] was published. The report, led by the Faculty of Pathology (Royal College of Physicians of Ireland - RCPI), brought together data from the National Cancer Control Programme (NCCP) and National Specialty Quality Improvement Programmes (Histopathology and GI Endoscopy) to review and reflect on the impact of COVID-19. The work was carried out in collaboration with Queen’s University Belfast, the Northern Ireland Cancer Registry and DATA-CAN, the UK’s Health Data Research Hub for Cancer, allowing comparison between Irish and UK data and formed part of a broader engagement to learn from experiences of the impact of COVID-19 on cancer services and cancer patients in other jurisdictions. The report highlighted the dramatic reduction in activity from March to June 2020 and emphasised the need for intensive efforts to encourage early presentation when there is a suspicion of cancer and to ensure timely access to diagnostic services, enabling rapid diagnosis.

To more completely understand the impact of the COVID-19 pandemic on cancer services throughout 2020, this follow-on report presents full-year data from the same sources with additional data from the National Radiology Quality Improvement (NRQI) Programme and the National Cancer Registry Ireland (NCRI).

Acronyms

CT	Computed Tomography
FNA	Fine Needle Aspiration
GI	Gastrointestinal
GP	General Practitioner
HIPE	Hospital In-Patient Enquiry
HSE	Health Service Executive
ICGP	Irish College of General Practitioners
IHI	Individual Health Identifier
MedLIS	National Medical Laboratory Information System
MRI	Magnetic Resonance Imaging
NCCP	National Cancer Control Programme
NCRI	National Cancer Registry Ireland
NEQI	National GI Endoscopy Quality Improvement
NHQI	National Histopathology Quality Improvement
NICR	Northern Ireland Cancer Registry
NQAIS	National Quality Assurance and Improvement System
NRQI	National Radiology Quality Improvement
OoCIO	Office of the Chief Information Officer, HSE
PET	Positron Emission Tomography
QI	Quality Improvement
RAC	Rapid Access Clinics
RCPI	Royal College of Physicians of Ireland
RCSI	Royal College of Surgeons in Ireland
SACT	Systemic Anti-cancer Therapy
SBD	Symptomatic Breast Disease
US	Ultrasound

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Executive Summary

The COVID-19 pandemic has had a significant impact on cancer diagnostics and treatment in 2020. Notwithstanding the huge efforts and commitment of cancer services personnel and the National Cancer Control programme (NCCP) to the continuation of diagnosis, treatment, and support to cancer patients throughout the pandemic, the data show that cancer service activity overall for 2020 in most domains (presentation, diagnosis, and treatment) did not reach 2019 (annual) levels. The significance of the impacts detailed in this report will only be fully understood when the 2020 National Cancer Registry Ireland (NCRI) data are further refined and incorporate staging, survival, and mortality data.

Activity across different waves of the COVID-19 pandemic

The marked reduction in activity identified during the first wave of the pandemic in March to June 2020 (compared with the same months in 2019) can be attributed to implementation of comprehensive COVID-19 risk-reducing measures introduced to manage the threat associated with a novel viral respiratory pathogen. These include the pausing of many diagnostic procedures, coupled with reluctance among people with symptoms suspicious for cancer to attend for clinical evaluation, due to their concerns of contracting the virus.

There was variable recovery in presentation, diagnosis, and treatment from June 2020 onward. Reassuringly, the initial reductions in activities observed from March to June 2020 were not replicated in the Level 5 lockdown period of October 2020ⁱ, suggesting an increase in resilience within the system and behavioural changes among patients, who may have presented more readily as knowledge and information around COVID-19 accumulated and the healthcare system adapted to the challenge of the pandemic.

While incomplete, initial data for some aspects of service delivery from January to March 2021 (third waveⁱⁱ) appear to demonstrate continued resilience within the system. The reduction in activity (compared with the same months of 2019 or 2020), appears less than that experienced in the first wave of the pandemic, despite significantly higher levels of COVID-19 related hospitalisations during the third wave.

Presentation and diagnostic activity

By year end, new attendances in 2020 at the National Cancer Control Programme (NCCP) rapid access clinics (RACs) for investigation of patients with suspected cancer were at 88% of 2019 figures (98% for urgent breast clinics and 79% for non-urgent breast clinics, 91.8% for lung cancer clinics, 79.7% for prostate cancer clinics).

ⁱ Commencing 21 October 2020

ⁱⁱ First wave refers to initial restrictions in March 2020. Second wave refers to level 5 restrictions introduced in October 2020. Third wave refers to restrictions from January 2021

National Quality Improvement (QI) programme data showed a significant initial reduction in diagnostic activity between March and June 2020, with subsequent recovery in many areas (\geq 80% of 2019 levels). In 2020, diagnostic biopsies reported were 86% of 2019 levels (14,572 fewer biopsies), GI endoscopic biopsies were 80% of 2019 levels (30,350 fewer biopsies), while non-gynaecological cytology (Fine Needle Aspiration-FNA) specimens were 95% of 2019 levels (524 fewer specimens). Although it is not possible to specifically determine from the QI programme data the number of these exams that specifically represent a cancer diagnosis, it nonetheless displays a worrying trend towards reduced non-COVID-19 related diagnostic services.

Radiological investigations employed in cancer management appeared to have been less affected than biopsies or FNA cytology. Annual 2020 activity, compared to 2019 levels was 99.8% for Computed Tomography (CT) exams (916 fewer exams), 93% for Magnetic Resonance Imaging (MRI) exams (10,146 fewer exams), 90% for Ultrasound (US) exams (32,514 fewer exams) and 98% for Positron Emission Tomography (PET) exams (94 fewer exams).

Cancers diagnosed (NCRI data)

Two analyses were conducted by the NCRI in 2021. The analysis presented in this report was a direct comparison of the number of microscopically verified invasive cancers that were notified to the NCRI in 2019 and 2020. This analysis did not take into consideration the expected annual increase in cancer incidenceⁱⁱⁱ. A second related NCRI analysis has looked at all 2020 cancer registrations notified up to September 2021^{iv} and compared them to the expected number for 2020.[2]

The analyses have overlapping ranges and suggest that the 2020 overall shortfall in cancer diagnoses lies between 10% and 14%. A more complete picture of all cancers registered in 2020 will be available in late 2022.

Cancer treatment

Cancer treatments did not appear to be as adversely affected as diagnoses during this period. While overall surgical oncology activity in 2020 was 82.2% of 2019 levels (this figure relates only to patients treated within public hospitals), the volume of cancer surgery for public patients, which includes activity in private hospitals during the pandemic, is better reflected in the NHQI programme data, which demonstrated that the number of reported cancer resections in 2020 was 96% of 2019 figures. This 4% reduction in activity equates to 740 fewer cancer resections in 2020 compared to 2019.

ⁱⁱⁱ 3.1% per annum increase from 2015 - personal communication from the NCRI 2021

^{iv} There is a time lag between cancers diagnosed and those notified and registered in the NCRI system and some cancers diagnosed in 2020 may not be registered at the time of publication of this report

Day case systemic anti-cancer therapy (SACT) activity in 2020 was 90% of 2019 levels (this figure does not include offsite activity or revision of treatment protocols) and radiation oncology activity in 2020 was 92.6% of 2019 levels.

Comparison with UK data

The adverse impact of the COVID-19 pandemic on cancer services and cancer patients illustrated by the data is not unique to the Republic of Ireland. UK data (including from Northern Ireland) indicate that, at their lowest point, urgent referrals for people with suspicion of cancer dropped by 71%. In comparison, in the Republic of Ireland, e-referral to the RACs (breast, lung & prostate) fell on average by 58% at their lowest point, compared to pre-pandemic averages. [3] [4] [5] The reduction in microscopically verified invasive cancers seen in Ireland overall in 2020 (10% lower than 2019 figures) was also similar to Northern Ireland Cancer Registry (NICR) data (11% reduction in 2020). Cancer Research UK data indicate that diagnostic tests used to detect cancer in England were 22% lower in the period March 2020 – March 2021, compared to pre-pandemic figures. [6]

Impact of delays in presentation and diagnosis

This report analysed data for 2020 only and while it was encouraging to observe recovery within the system in the second half of 2020, the impact of delayed presentations and disruptions to diagnoses and treatment on patient outcomes is not yet quantifiable. Delays in diagnosis of cancer can lead to cancer being diagnosed at a later stage of the disease, when treatment options are limited, and prognosis is poor. The reduction in numbers of tumours diagnosed in 2020 may translate into reduced opportunities for early intervention in this cohort, just as fewer cancer resections may reflect reduced opportunities for surgical resection of cancer at a localised stage. For England, DATA-CAN has estimated that to address the backlog in cancer diagnoses, due to the pandemic, the system may need to be working at 130% of current capacity over a significant period. [7]

Key recommendations in our first report were to continue to encourage citizens to present with worrisome or suspicious symptoms, whilst also highlighting the importance of ensuring robust diagnostic services to enable rapid diagnosis.[1] The resilience displayed by the system has highlighted the benefits of these recommendations. However, continued efforts are required by all stakeholders to maintain and augment cancer services to improve survival and quality of life for all cancer patients. It is important that we build on the increased levels of flexibility in healthcare systems achieved during COVID-19 and accelerate inclusion of new initiatives and innovations into our cancer services going forward.[8]

Data challenges

The absence of real-time, complete, integrated datasets presented challenges to compiling this report, compromising the ability to obtain a comprehensive view of overall cancer activity in Ireland. RAC data relate only to three common cancers (breast, lung, and prostate cancer) and do not include data from the private healthcare system. Quality improvement programme data (including cancer resection data) include data from some private healthcare sites, in

Histopathology and GI Endoscopy; however, these data reflect overall diagnostic activity, without the capability to filter for cancer-specific activity. NCRI data presented in this report represent new primary tumours with a pathological sample indicating invasive cancer. They do not take into account cancers diagnosed through other sources such as clinically diagnosed (e.g., through radiology imaging) and cancer counts do not directly compare to patient counts as an individual patient may have more than one tumour (cancer). This report nonetheless demonstrates the benefits of collating such data and provides a blueprint for the development of a more real-time, comprehensive cancer data network going forward, encompassing both public and private healthcare systems.

Recommendations

1. Continue to encourage and support the public to act early on signs and symptoms of possible cancer

Based on the evidence of reduced presentations, diagnoses and treatment activity during the COVID-19 pandemic, sustained efforts are required to encourage people to seek timely medical review, diagnosis, and treatment for any signs or symptoms of possible cancer. This aligns with the European Cancer Organisation's Time to Act Campaign[9], which is being rolled out across Europe. Particular consideration must be given to cancers where early detection has most impact and to addressing barriers to presentation in marginalised groups.

In addition to encouraging early presentation, it is also essential to focus on cancer prevention, as highlighted by the National Cancer Strategy [10] and encourage attendance to screening programmes when invited to do so.

2. Ensure a resilient cancer service with sufficient capacity to address backlogs and increasing demands

Ring-fenced investment in cancer infrastructure and human resources is required to ensure continued resilience and agility within cancer services, along the entire cancer pathway, including General Practice, to effectively manage all cancer service backlogs and increasing demands, while continuing to address COVID-19 infection prevention and control requirements. A sustained focus will be necessary to address the reduction in presentation, diagnosis and treatment of cancer indicated by the data in this report and build back better.[11]

3. Improve availability and integration of data to provide more timely, comprehensive cancer specific intelligence encompassing public and private healthcare systems

To track cancer-related activity and improve cancer services, it is imperative that there is availability of high-quality data covering all cancer types, from all relevant sources including public, private, and voluntary health care systems and that these data are easily accessible in real-time (or as close to real-time as possible). While various data systems already exist, the integration of these existing systems should be improved. Integration of and investment in these systems would have a positive impact on presentation, diagnosis, and treatment of cancer.

This recommendation will be facilitated by implementation of the 'eHealth Strategy for Ireland' [12], in particular the Individual Health Identifier (IHI) and systems such as the National Medical Laboratory Information System (MedLIS).

1. Introduction

Cancer is a leading cause of death in Ireland and globally.[13] Cancer impacts the whole population, contributes to the highest number of hospital admissions every year and is the most common cause of death in Ireland, accounting for almost 31% of deaths in 2016, with an annual average of approximately 9,020 deaths from invasive cancer. [14] [15]

The vision of the National Cancer Strategy, (2017-2026) is to “*strive to prevent cancer and work to improve treatment, health and wellbeing, experiences and outcomes of living with and beyond cancer*”. [10] Ireland has made significant advances in this regard and the National Cancer Registry Ireland (NCRI) has reported significant survival improvements for most cancer types. [16] Based on the Concord Study, a global cancer analysis which includes data from Ireland, survival of Irish cancer patients now ranks in the top half of EU countries surveyed for most cancer types. [17] The COVID-19 pandemic however has the potential to adversely affect those advances and reduce predicted 5-year survivals.

In 2020, the Faculty of Pathology, Royal College of Physicians of Ireland (RCPI), commenced a collaboration with the National Cancer Control Programme (NCCP), the National Specialty Quality Improvement Programmes in Histopathology and GI Endoscopy (RCPI), Queen’s University Belfast, the Northern Ireland Cancer Registry (NICR) and DATA-CAN (the UK’s Health Data Research Hub for Cancer) to analyse the impact of the COVID-19 pandemic on cancer services and cancer patients in Ireland, with direct comparison to impacts seen in Northern Ireland and overall in the UK.

The goal of this work was to investigate the cancer-specific impact of the pandemic by analysing a variety of data sources including rapid access clinic (RAC) referral and attendance rates, the number of cancers detected at the RACs, biopsy rates and cancer-related surgical resections for the Irish population. This collaboration worked to directly benefit cancer patients by providing access to data driven insights that could help inform cancer service delivery and support recovery and maintenance of cancer services in Ireland.

An initial report, “*Deploying Data-Driven Intelligence to measure the impact of COVID-19 on cancer care and cancer patients*” was launched on 21 December 2020 and was published on RCPI’s website. [1]

In 2021, the group re-convened to complete analysis of the data intelligence available for all of 2020, with some preliminary data for 2021. Also included in the analysis are new data from the National Radiology QI Programme and the National Cancer Registry Ireland.

2. Data Sources

To illustrate the impact of the pandemic on cancer services, this report includes data intelligence and data insights from:

- National Cancer Control Programme (NCCP)
- National Histopathology Quality Improvement (NHQI) Programme
- National GI Endoscopy Quality Improvement (NEQI) Programme
- National Radiology Quality Improvement (NRQI) Programme
- DATA-CAN, the UK's Health Data Research Hub for Cancer
- Queen's University Belfast
- Northern Ireland Cancer Registry (NICR)
- National Cancer Registry Ireland (NCRI)

More information on the above data sources is included in Appendix A

3. Presentational Delay

The NCCP collates data on referrals and new attendances at rapid access clinics (RACs) for patients with suspected breast, lung, and prostate cancer. Presented here are data describing:

- E-referrals from GPs to NCCP RACs
- Attendances at NCCP RACs
- Cancer detection through the NCCP RACs

3.1. Rapid Access Clinics

The NCCP has established RACs for suspected breast, lung and prostate cancers, cancers which combined account for 42% of the almost 25,000 invasive cancers (excluding non-melanoma skin cancer) diagnosed in Ireland each year.[16] The RACs, operating from the eight designated cancer centres and one additional breast satellite centre, provide a streamlined pathway to diagnostic evaluation and specialist review for these three major cancers.

However, not all breast, lung and prostate cancers are diagnosed through the RACs. While it is estimated that almost all symptomatic patients attending public hospitals and subsequently diagnosed with breast cancer are diagnosed via the symptomatic breast disease clinics, only about half of all lung cancers and a third of prostate cancers are diagnosed via the rapid access route.

3.2. E-referrals to Rapid Access Clinics

A national electronic GP referral system (Healthlink) has been rolled out, gradually replacing manual referral by letter or fax to the hospital based RACs. The Healthlink system can provide near real-time data, reporting up to the previous day's activity. Prior to the pandemic, these data were being routinely used to monitor cumulative uptake of the Healthlink system, as increasing numbers of GP practices switched from manual to electronic RAC referral.

During the pandemic, it quickly became apparent that this automated recording of cancer e-referrals could provide valuable real-time data at national level, as opposed to the routine manual reporting of key performance data by each hospital, which was impacted by redeployment of hospital-based data managers to the COVID-19 response.

Referral data provide an insight into public behaviour throughout the pandemic. The significant decrease in RAC referrals (see below) observed during the first wave of the COVID-19 pandemic in March/April 2020 may reflect people's response to government restrictions (including a 'stay-at-home' instruction issued on 27th March 2020), fear of COVID-19 infection and a reluctance to 'burden' the healthcare system. Careful interpretation of the RAC referral data is required, given the increased uptake of e-referral systems by GPs throughout the pandemic, which impacts on the direct comparison of 2020 and 2019 data.

In March 2020, a sharp drop in e-referrals to the RACs was observed (*Figures 1-4*) as COVID-19 cases and hospitalisations began to increase in Ireland. Schools closed on 13th March 2020 and

further government restrictions were implemented on 27th March 2020, including a “stay-at-home” instruction. The immediate impact of the first wave of COVID-19, and attendant government restrictions, was estimated by comparing the average number of weekly e-referrals to the RACs for weeks 12 to 14 of 2020 inclusive with the average number for weeks 2 to 11 inclusive (pre pandemic). At their lowest point, breast, lung, and prostate e-referrals to the RACs fell by 62%, 58% and 54% respectively (average of 58% across all three), compared to pre-pandemic averages (*Figures 1-4*).

A resurgence in referrals to the RACs was evident by May 2020. This was likely attributable to a combination of factors, including sustained messaging to the public to continue to present with symptoms suspicious for cancer, and decreasing incidence of COVID-19 cases with attendant relaxation of government restrictions, including restrictions on cancer services.

The timing of recovery varied by tumour type. Breast referrals were quickest to recover, reaching pre-pandemic levels by May 2020. Breast e-referrals approximated expected levels from June to August 2020 and then increased compared to pre-pandemic averages each month for the remainder of 2020. Lung referrals demonstrated modest month-on-month improvement from their lowest point, but failed to reach pre-pandemic levels throughout the remainder of 2020. It is assumed that some patients who ordinarily would have been referred to lung RACs will have been referred to respiratory services via COVID-19 assessment pathways implemented during the pandemic. Prostate referrals followed a similar trend to breast, but at a delayed pace, reaching pre-pandemic levels in late July 2020 before continuing to trend upwards for the remainder of 2020.

Referral rates to the RACs in Ireland were less impacted by the second wave of COVID-19 in the autumn of 2020.

By the end of 2020, the total number of e-referrals to the breast (115%), lung (91%) and prostate (98%) RACs combined exceeded 2019 levels, at 112% of the 2019 total. It is important to note that an estimated 80% of total RAC referrals were made electronically in 2019 as the roll-out of Healthlink progressed, compared with >95% of referrals made electronically since March 2020.

Figure 1: (Source - Healthlink) Number of new e-referrals to the NCCP Symptomatic Breast Disease clinics, 2020 and 2021 (Jan- Mar)

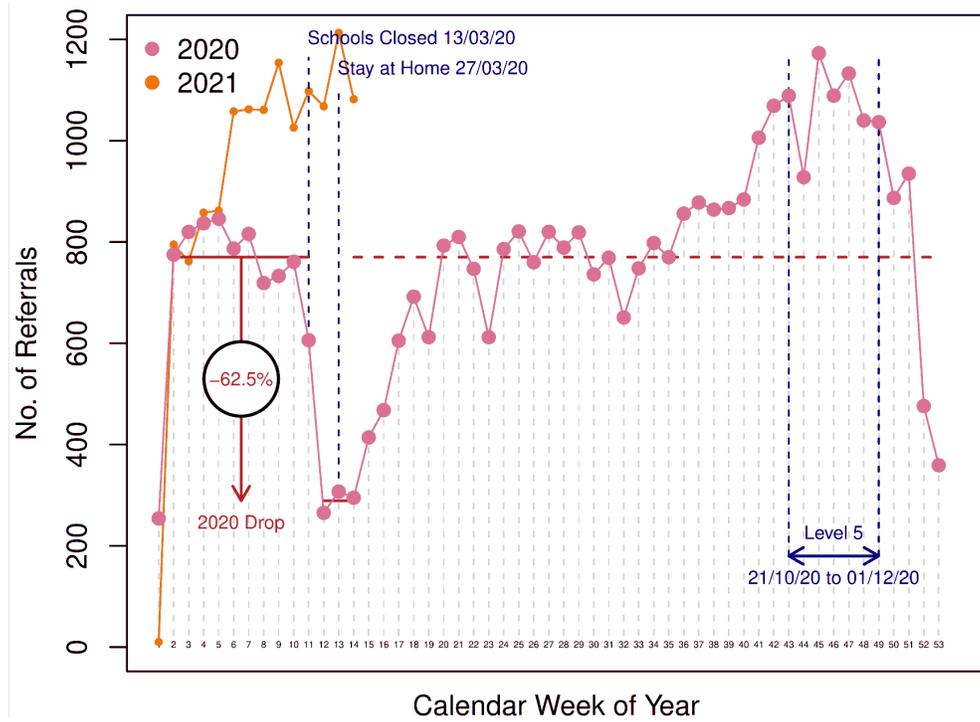


Figure 2: (Source - Healthlink) Number of new e-referrals to the NCCP lung clinics, 2020 and 2021 (Jan- Mar)

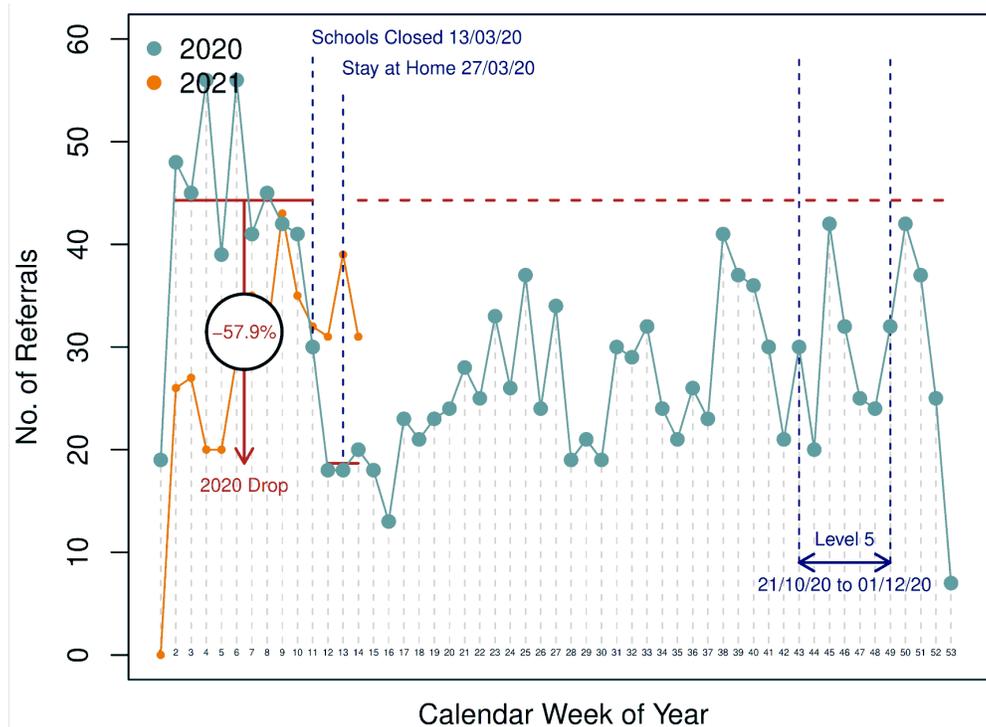


Figure 3: (Source - Healthlink) Number of new e-referrals to the NCCP prostate clinics, 2020 and 2021 (Jan- Mar)

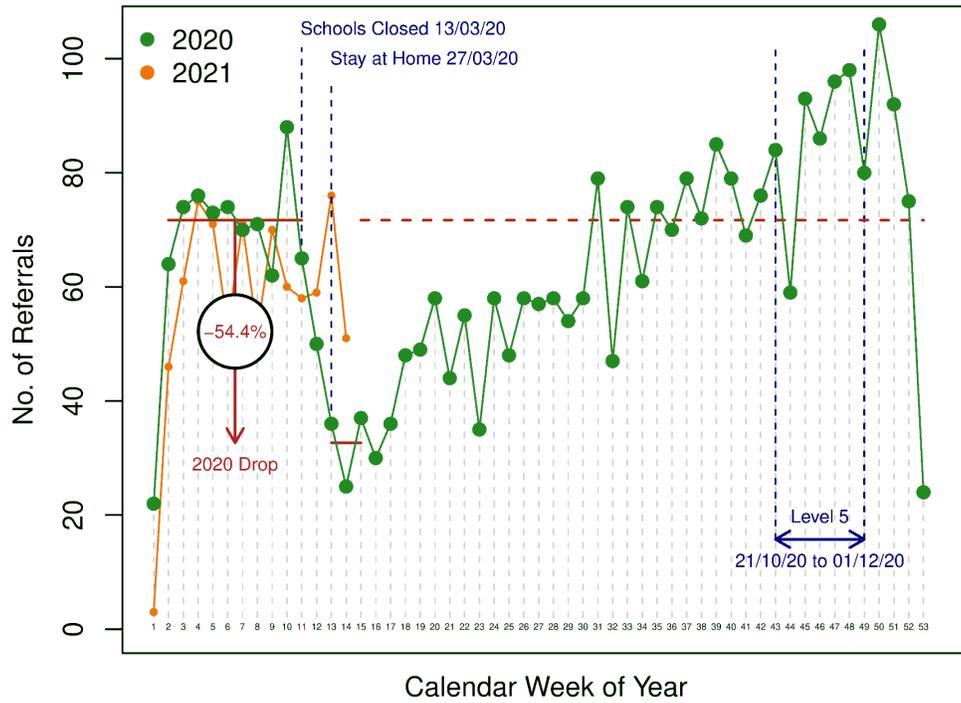
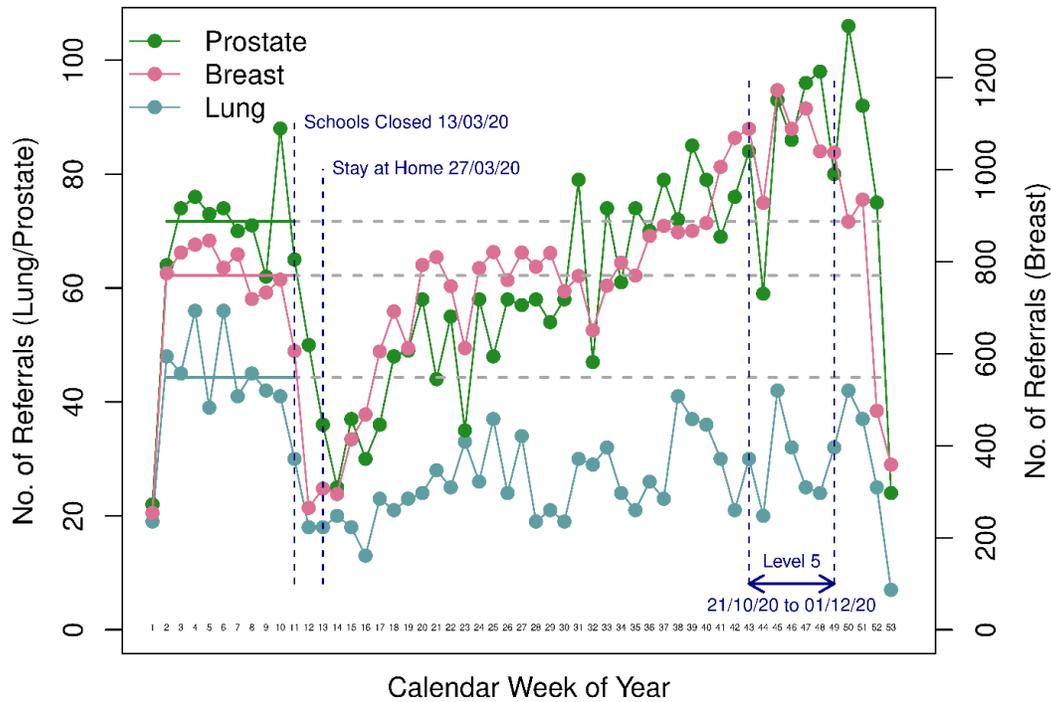


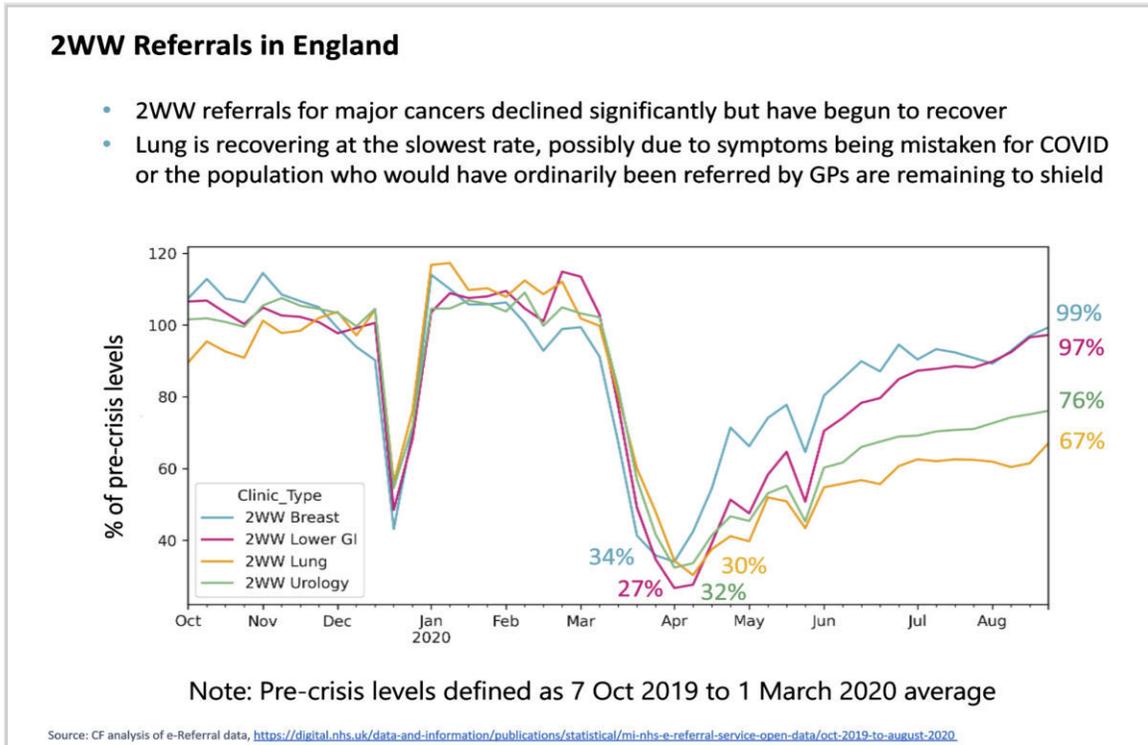
Figure 4: Healthlink – Breast/Lung/Prostate referrals – Superimposed



3.2.1. England 2 Week Wait Referrals

In England, 2 Week Wait (2WW) referrals (equivalent to rapid/urgent referrals) recovered most quickly and effectively for breast, with lung and prostate lagging behind (*Figure 5*) reflecting a similar pattern to what was observed in Irish data.

Figure 5: 2 Week Wait referrals in England



3.3. New Attendances at Rapid Access Clinics (Ireland)

Figures 6-10 indicate the pattern of new attendances by patients at the breast, lung and prostate RACs in 2020. Overall, clinic attendance activity for 2020 was 88.1% of 2019 levels (*Table 1*).

Table 1: NCCP data table (RAC data)

Year	New Attendances at SBD [†] /RAC				
	Urgent Breast	Non-Urgent Breast	Lung	Prostate	Total
2019	20,905	21,917	3,606	3,821	50,249
2020	20,523	17,364	3,311	3,047	44,245
Difference	-382	-4,553	-295	-774	-6,004
2020 as % of 2019	98.2%	79.2%	91.8%	79.7%	88.1%

Urgent breast attendances (*Figure 6*) fell by 35% in March 2020 and took a further two months to recover. Efforts to increase clinic capacity saw the number of attendances increase above 2019 numbers for the last four months of 2020. By year end, the number of attendees at urgent breast clinics was 98% of 2019 numbers; attendances at non-urgent breast clinics were 79% of 2019 numbers.

[†] SBD: Symptomatic Breast Disease

Figure 6: (Source: NCCP HealthAtlas Portal) New attendances at the urgent SBD clinics, 2019, 2020 and 2021 (Jan- Mar)

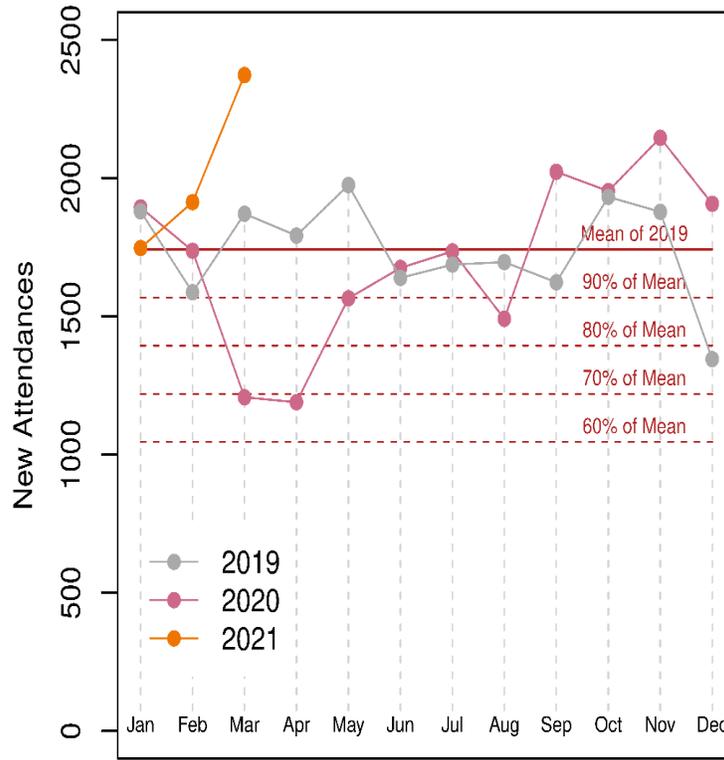
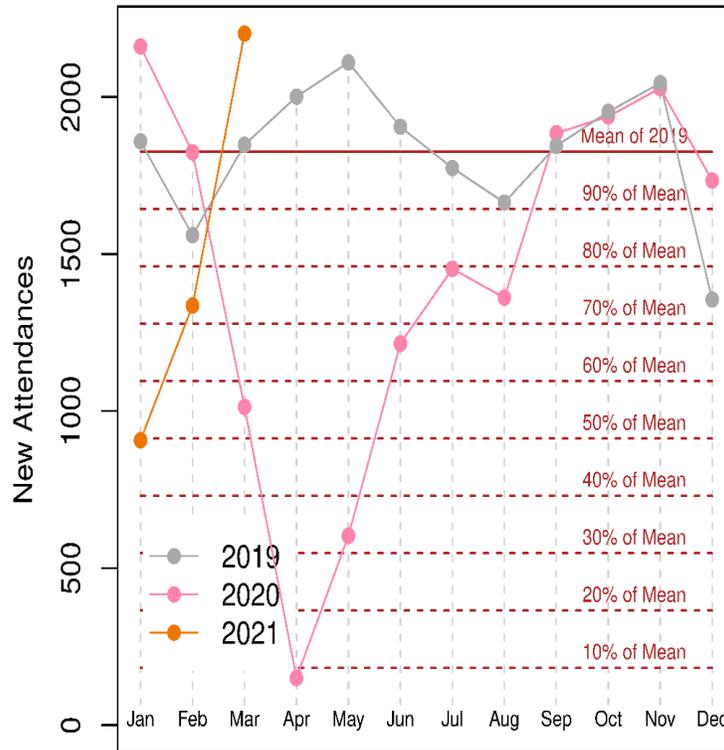


Figure 7: New attendances at the non-urgent SBD clinics, 2019, 2020 and 2021(Jan- Mar)



Similar patterns were observed in the rapid access lung and prostate clinics (*Figures 8 and 9*), though attendances reached their lowest point a month later. In April 2020, lung clinic attendances dropped by 33% and there was a 57% fall in prostate clinic attendances. Lung RAC attendances subsequently recovered and overall, in 2020 were 91.8% of 2019 attendances. Prostate RAC attendances in 2020 were 79.7% of 2019 levels.

Figure 8: (NCCP HealthAtlas Portal) New attendances at the lung rapid access clinics, 2019, 2020 and 2021(Jan- Mar)

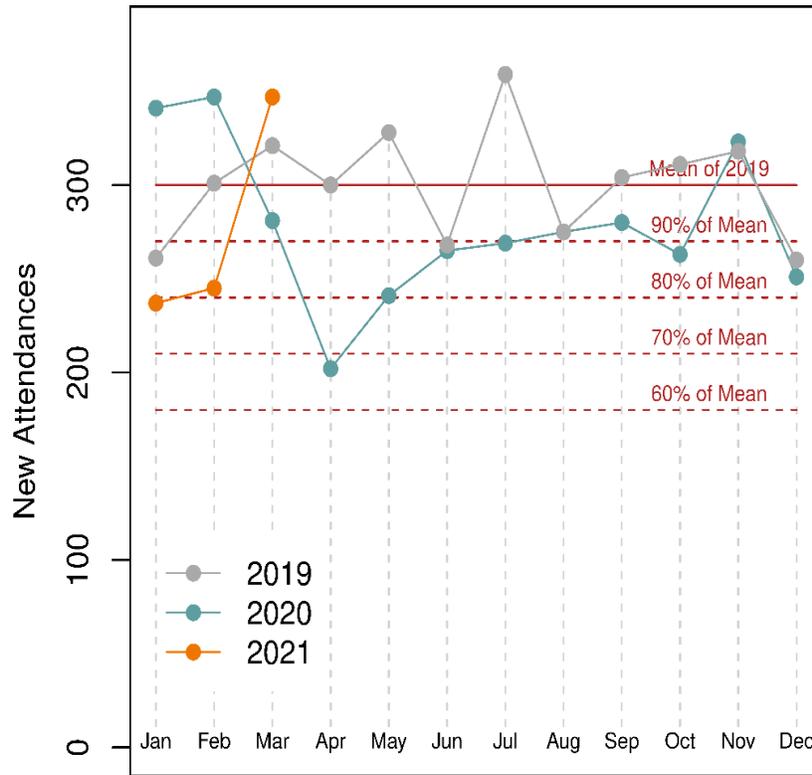


Figure 9: (NCCP HealthAtlas Portal) New attendances at prostate rapid access clinics, 2019, 2020 and 2021(Jan- Mar)

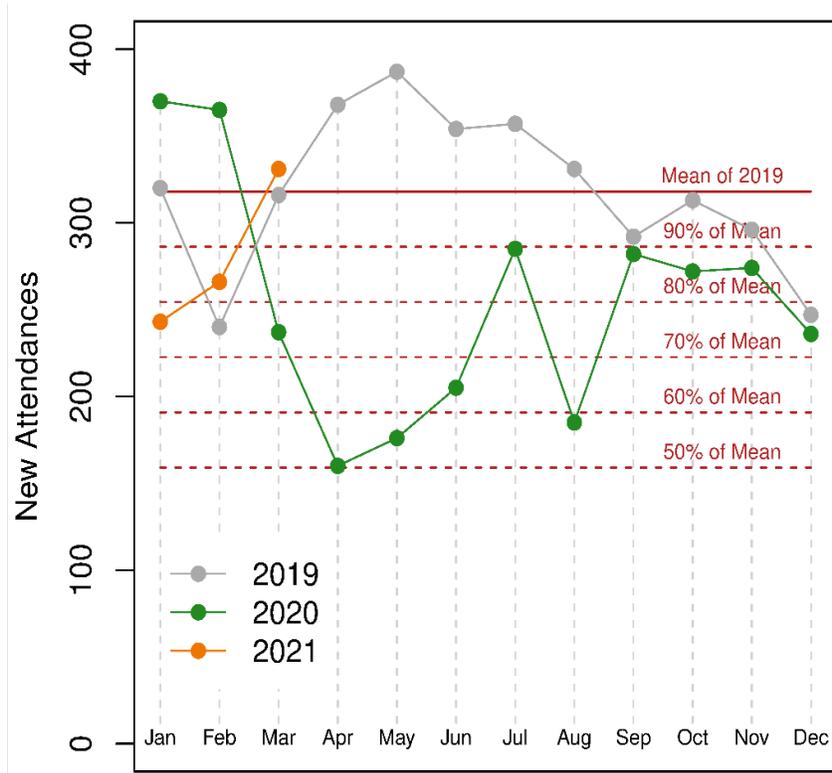
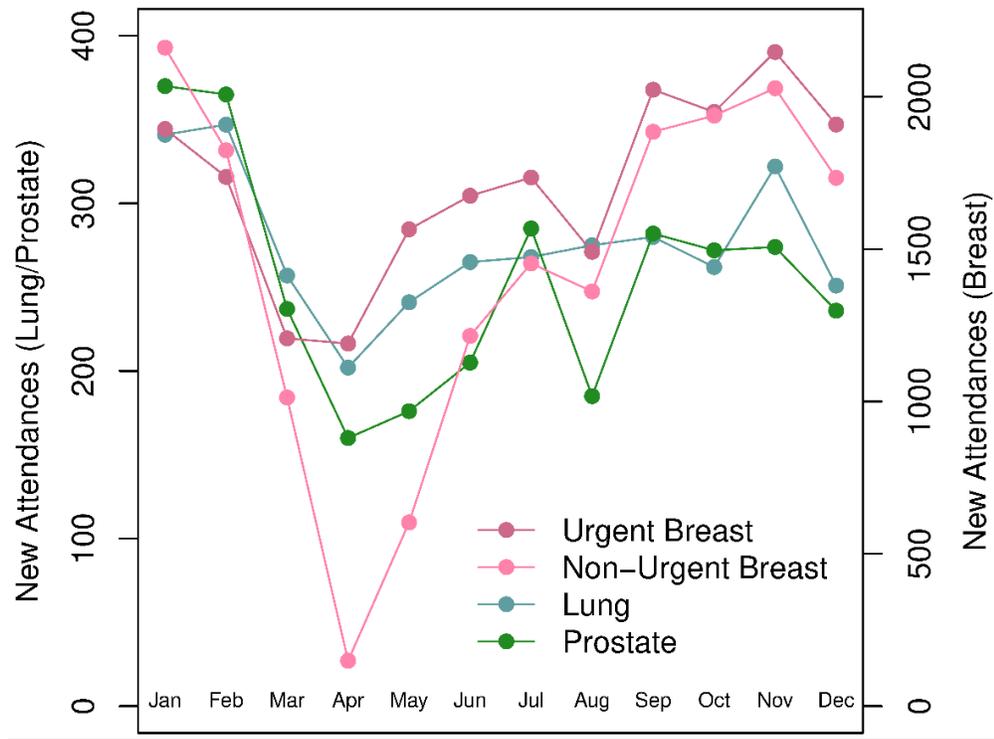


Figure 10: New attendances 2020 - breast/prostate/lung



3.4. Cancer Detection

A key outcome from the RACs is the number of patients that are subsequently diagnosed with cancer.

Commensurate with the fall in referrals and attendances, the number of cancers detected by the multidisciplinary teams in the RACs also fell to 52% of 2019 levels in April 2020, subsequently recovering as attendance rates at clinics increased.

Overall, the number of cancers detected at the RACs in 2020 was at 94.3% of 2019 figures (103.1% for breast, 96.6% for lung, 76.5% for prostate) (*Figure 11 and Table 2*). This represents a total of 301 fewer cancers detected through the RACs in 2020 compared to 2019, with the greatest impact seen in prostate cancer detection (breast cancer detection increased by 79 cases, lung cancer detection decreased by 45 cases, prostate cancer detection decreased by 335 cases).

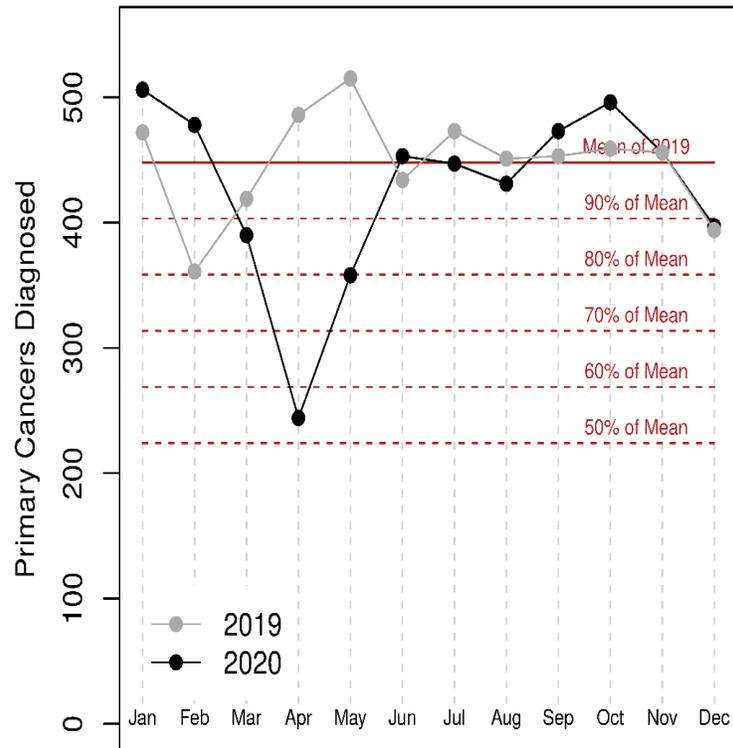
Table 2: NCCP data - Primary Cancer Diagnosed via Rapid Access Clinics

Year	Primary Cancers Diagnosed			
	Breast	Lung	Prostate	Total
2019	2,551	1,307	1,423	5,281
2020	2,630	1,262	1,088	4,980
Difference	79	-45	-335	-301
2020 as % of 2019	103.1%	96.6%	76.5%	94.3%

Absolute numbers of lung cancers detected through the RACs decreased by 45 cases in 2020 compared to 2019. However, due to the symptom overlap between COVID-19 and lung cancer, some patients who would ordinarily have been referred to the RACs will have been managed via COVID-19 assessment pathways implemented during the pandemic. Additionally, it is important to note that only approximately 50% of lung cancers are typically diagnosed via the rapid access route.

It is important to note that the NCCP RAC data relate to only three tumour types (breast, lung, and prostate cancer) and that, overall, only approximately 21% of total cancer cases in Ireland are diagnosed through the RACs.

Figure 11: Number of new patients that are subsequently diagnosed with a primary cancer, following attendance at one of the three rapid access clinics, 2019 and 2020 (Source: NCCP HealthAtlas Portal)



4. Diagnostic Delay

This section presents data on diagnostic procedures involved in cancer diagnosis, comparing data for 2020 with data collected in 2019. Aggregate monthly data and annual data are discussed.

Data in this section are from:

- The National Histopathology Quality Improvement Programme (NQAIS-Histopathology - Small Biopsy, GI Endoscopic Biopsy, Non-Gynaecological Cytology Fine Needle Aspiration), representing data from 21 public hospitals (including 8 cancer centres) and 7 private participating laboratories.
- The National GI Endoscopy Quality Improvement Programme (NQAIS-Endoscopy), representing data from 34 public hospitals and 11 private participating sites.
- National Radiology Quality Improvement Programme (NQAIS-Radiology - CT, MRI, PET, Ultrasound), representing data from 45 out of 50 public participating sites.

See Appendix A for more information on these data sources

4.1. Small Biopsy Samples

Definition: A sample of tissue taken during a diagnostic procedure from anywhere excluding the gastrointestinal tract.

Figure 12: Small Biopsy, Comparison for All Participating Sites, 2019-2020 & Q1 2021

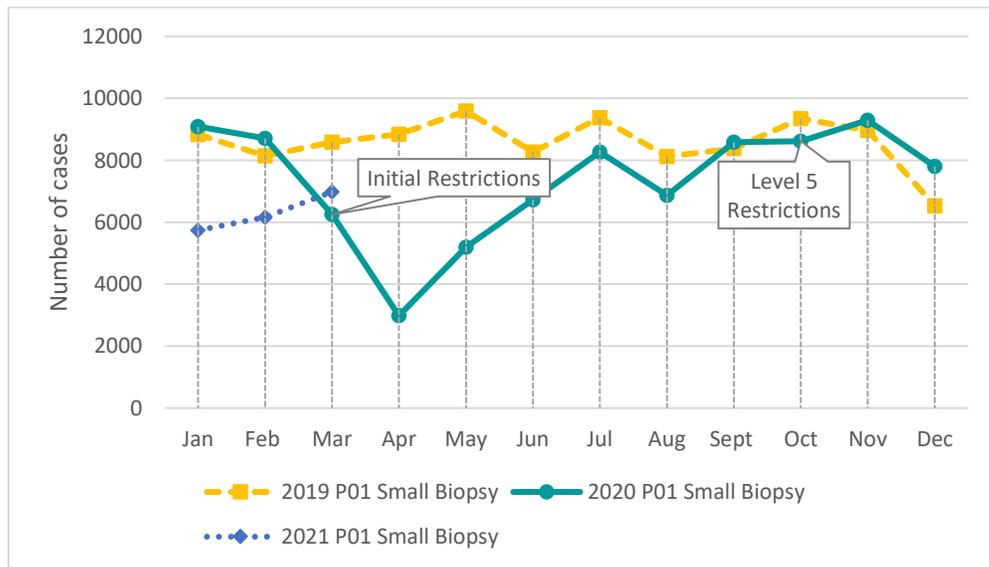


Table 3: Small Biopsy, Comparison for All Participating Sites, 2019-2020 & Q1 2021

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
2019	8831	8149	8583	8840	9592	8264	9380	8120	8376	9343	8964	6533	102975
2020	9088	8709	6251	2982	5199	6731	8266	6868	8591	8621	9295	7802	88403
2021	5736	6159	6984										18879

The above graph (*Figure 12*) illustrates the monthly workload associated with small biopsy cases from January 2019 to March 2021. Numbers of monthly cases began to decrease below expected (2019) levels from early March 2020. Monthly cases reached their lowest point in April 2020 with 2,982 cases reported (*Table 3*), representing a 66% decrease compared to 8,840 cases reported for the same month in 2019.

It is not possible to determine the number of these biopsies that represent a cancer diagnosis; however, the data signify a very worrying trend during this period, when there was reduced access to non-COVID-19 related diagnostic services.

From May 2020, small biopsy case numbers began to rise again, with cases falling slightly in August 2020 but with a recovery comparable to 2019 case numbers in the month of September 2020. The small biopsy caseload remained at a similar level to 2019 activity until November 2020, when there was an increase of 10% in the caseload, which was maintained until the end of 2020.

Overall, the number of small biopsies reported in 2020 was 86% of 2019 figures. This represents 14,572 fewer small biopsies reported in 2020 compared to 2019.

4.2. GI Endoscopic Biopsy Samples

Definition: This refers to a sample of tissue taken from the gastrointestinal tract during an endoscopic procedure for diagnosis.

Figure 13: GI Endoscopic Biopsy, Comparison for All Participating Sites, 2019-2020 & Q1 2021

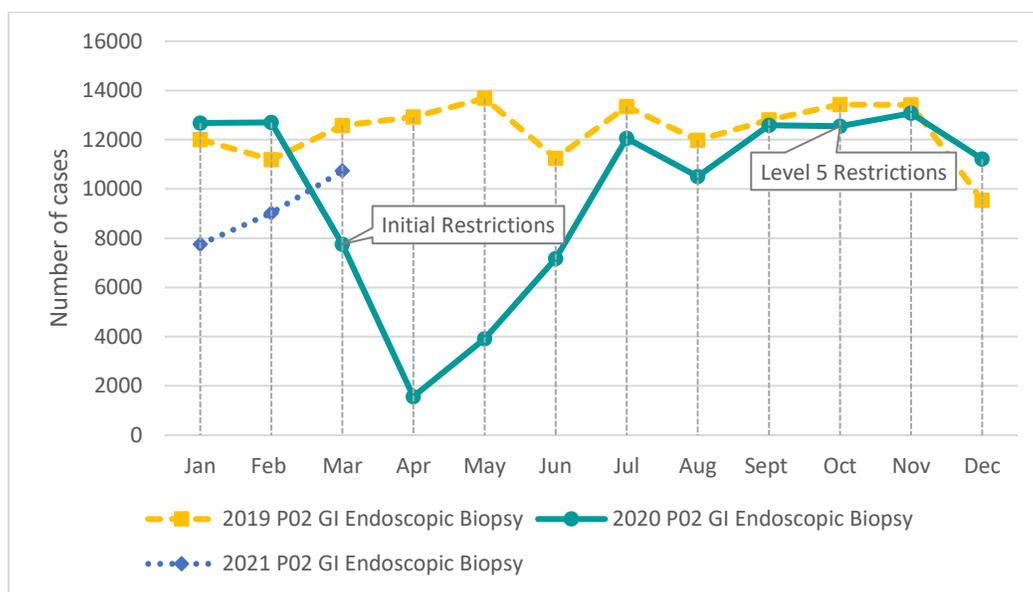


Table 4: GI Endoscopic Biopsy, Comparison for All Participating Sites, 2019-2020 & Q1 2021

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	12006	11192	12569	12916	13678	11244	13346	11983	12801	13430	13406	9537	148108
2020	12679	12702	7759	1569	3918	7167	12052	10502	12580	12542	13072	11216	117758
2021	7754	9020	10734										27508

GI endoscopic biopsy cases demonstrated a similar trend to that observed for small biopsy cases. A significant decrease was observed from early March 2020, to the lowest point recorded in April 2020 when there was a decrease of 88% in GI endoscopic biopsy cases, compared to the caseload for the same month in 2019. Between March and June 2020 inclusive, there were 60% (29,994 cases) fewer GI endoscopic biopsies undertaken compared to 2019 figures (Table 4).

The graph (Figure 13) shows a recovery to 2019 caseload numbers in September 2020, with an 18% increase in caseload recorded in December 2020 in comparison to December 2019.

Overall, the number of GI endoscopic biopsies reported on in 2020 was 80% of 2019 figures. This represents 30,350 fewer GI endoscopic biopsies reported on in 2020 compared to 2019.

4.3. Non-Gynaecological Cytology Fine Needle Aspirations

Definition: *Fine Needle Aspiration (FNA) involves using a needle attached to a syringe to collect cells from lesions or masses in various body organs, e.g., a fine needle aspiration of the thyroid gland or of a lymph node. These small samples are examined by a histopathologist/cytopathologist for evidence of disease.*

Figure 14: Non-Gynaecological Cytology FNA, Comparison for All Participating Sites, 2019-2020 & Q1 2021

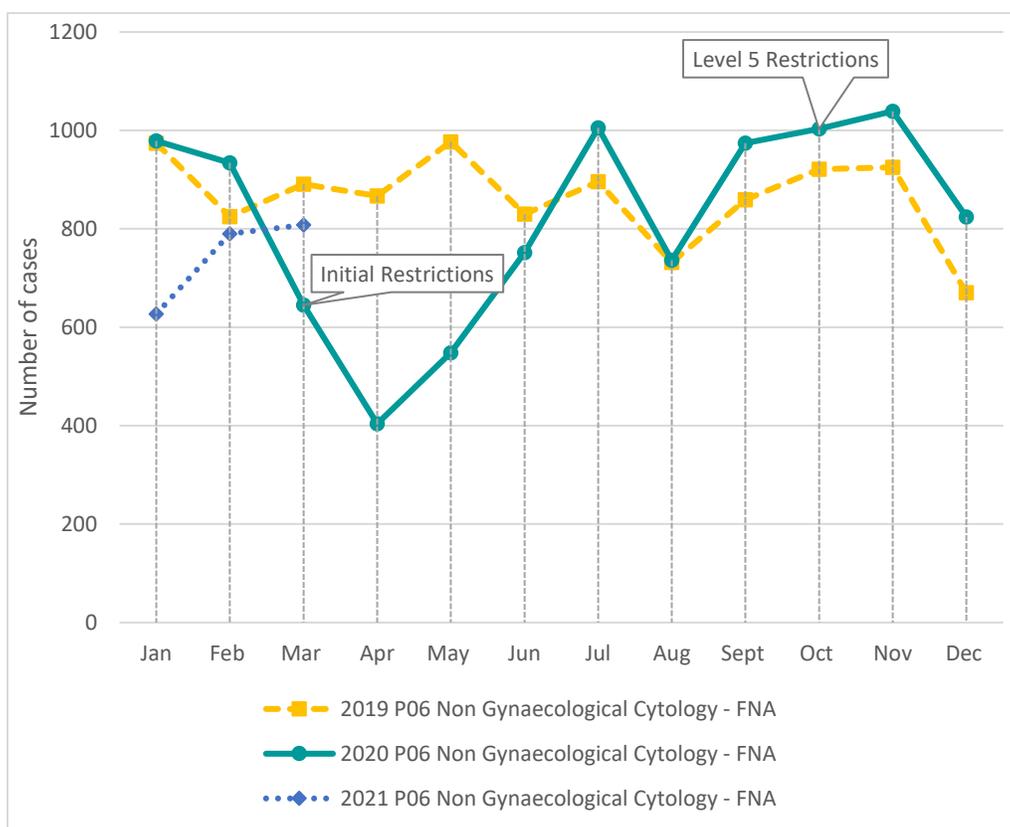


Table 5: Non-Gynaecological Cytology FNA, Comparison for All Participating Sites, 2019-2020 & Q1 2021

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	974	825	891	867	977	830	896	732	859	921	925	670	10367
2020	979	934	645	404	548	752	1005	736	974	1003	1039	824	9843
2021	627	790	808										2225

The findings for non-gynaecological cytology FNA cases also followed a similar trend to that observed for small biopsy cases, with a significant decrease from March 2020 to the lowest point recorded in April 2020. There was a decrease of 53% in non-gynaecological cytology FNA cases in April 2020, compared to the caseload for the same month in 2019 (Table 5).

Between March and June 2020 inclusive, there was a decrease of 34% in the number of non-gynaecological cytology FNA’s performed (1,216 cases), compared to 2019 figures for the same period.

FNA cytology provides an important diagnostic pathway for a number of cancers including lung cancer, informing both staging and treatment decisions. The reduction in numbers of FNA cytology specimens during this period reflects the reduction in numbers of patients being seen and assessed.

Case numbers recovered, exceeding 2019 levels in September 2020 and remained above 2019 levels for the remainder of 2020. The greatest relative monthly increase was observed in December 2020, when non-gynaecological cytology FNA cases increased by 23% compared to the same month in 2019.

Overall, non-gynaecological cytologies in 2020 were at 95% of 2019 figures. This represents 524 fewer non-gynaecological cytologies in 2020 compared to 2019.

4.4. GI Endoscopy QI Programme Data

Figure 15: National GI Endoscopy Workload, Comparison for All Participating Sites, 2019-2020 & Q1 2021

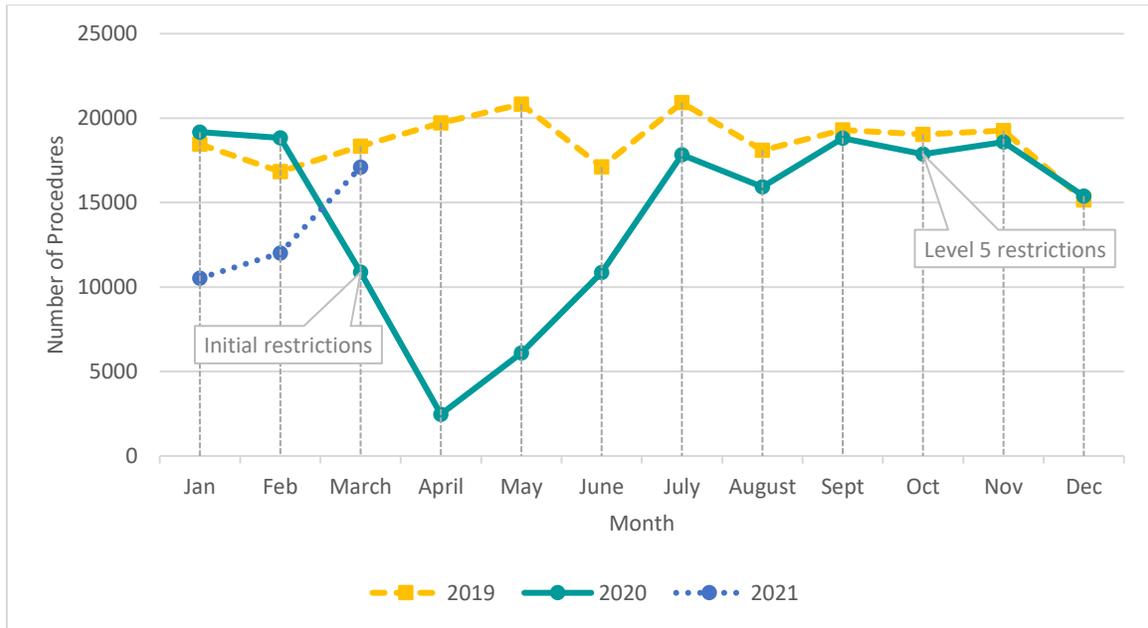


Table 6: National GI Endoscopy Workload, Comparison for All Participating Sites, 2019-2020 and Q1 2021^{vi}

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	18457	16841	18333	19708	20829	17121	20914	18103	19308	19034	19260	15156	223064
2020	19178	18829	10876	2469	6087	10861	17826	15932	18819	17863	18591	15382	172713
2021	10527	12010	17099										39636

The total workload indicated (*Figure 15*) is comprised of the total numbers of colonoscopies, oesophagogastroduodenoscopies and flexible sigmoidoscopies combined. These procedures can identify oesophageal cancer, gastric cancer (OGDs) and colorectal cancer (flexible sigmoidoscopy and colonoscopy).

At its lowest point, there was a decrease of 87.5% (17,239 procedures) in April 2020 compared with April 2019. During May and June of 2020, the number of procedures steadily increased before reaching 17,826 in July 2020. This represents a 15% (3,088) decrease compared to the number of procedures undertaken in July 2019. In September 2020, there was a 2.5% (489) decrease in procedures performed compared to September 2019.

The data indicate a large drop in the number of procedures recorded between February 2020 and April 2020. There were 16,360 fewer procedures performed in April 2020 compared to February 2020 (representing a decrease in activity of 87%). From September to December 2020, the number of procedures is comparable to numbers for the same period in 2019.

^{vi} Note: The figures presented in Table 6 and illustrated in *Figure 15* are representative of only colonoscopies, flexible sigmoidoscopies and oesophagogastroduodenoscopies captured in NQAIS-Endoscopy over the three-year period. These figures do not include Endoscopic Retrograde Cholangio-Pancreatography (ERCP) or Endoscopic Ultrasound procedures.

4.5. All Radiology Examinations

The following graph outlines the total workload of all radiology exams performed in the 45 public hospitals participating the National Radiology Quality Improvement (NRQI) Programme, out of a possible total 50 sites.

Figure 16: Radiology Workload for All Exams, Comparison for All Participating Sites, 2019-2020 & Q1 2021

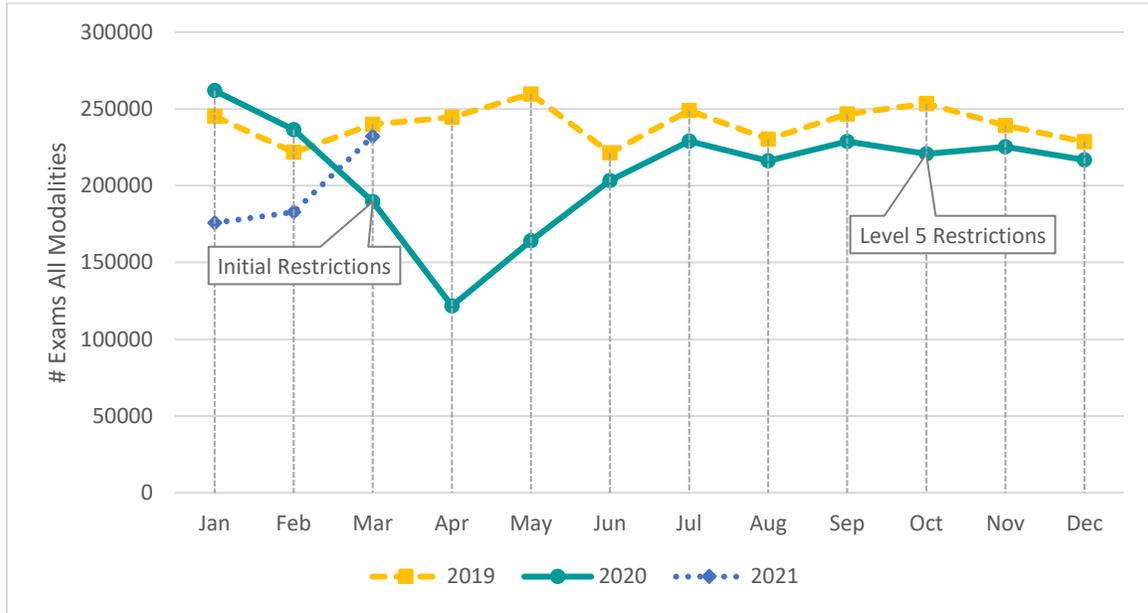


Table 7: Radiology Workload for All Exams, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	245142	221832	239982	244559	259764	221399	248848	230287	246708	253530	239211	228685	2879947
2020	261853	236499	189547	121690	164206	203370	228923	216155	228783	220658	225204	216687	2513575
2021	175768	182726	232192										683285

Data recorded in NQAIS-Radiology demonstrate an increase of 7% in January and February 2020 compared to the same period in 2019. It is expected that radiology workload will increase year on year; however, owing to the impact of the pandemic, a significant decrease of 50% (approximately 123,000 exams) in workload was noted in April 2020 compared to April 2019, the lowest point seen in 2020.

While there was a continuous increase in completed radiology exams from April to June 2020 (Figure 16), activity remained below 2019 levels for the same months.

From June to December 2020, the radiology workload remained relatively stable, however it was on average 8% below 2019 levels for the same months. Overall, radiology workload in 2020 was 87% of 2019 levels.

4.6. Computed Tomography (CT)

Definition: *Computed Tomography (CT) utilises x-ray photons and digital image reconstruction to create a two- or three-dimensional image. CT scans can show a tumour’s shape, size, and location and therefore they can be used for diagnosing and staging cancer as well as monitoring treatment effectiveness.*

Figure 17: Computed Tomography, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

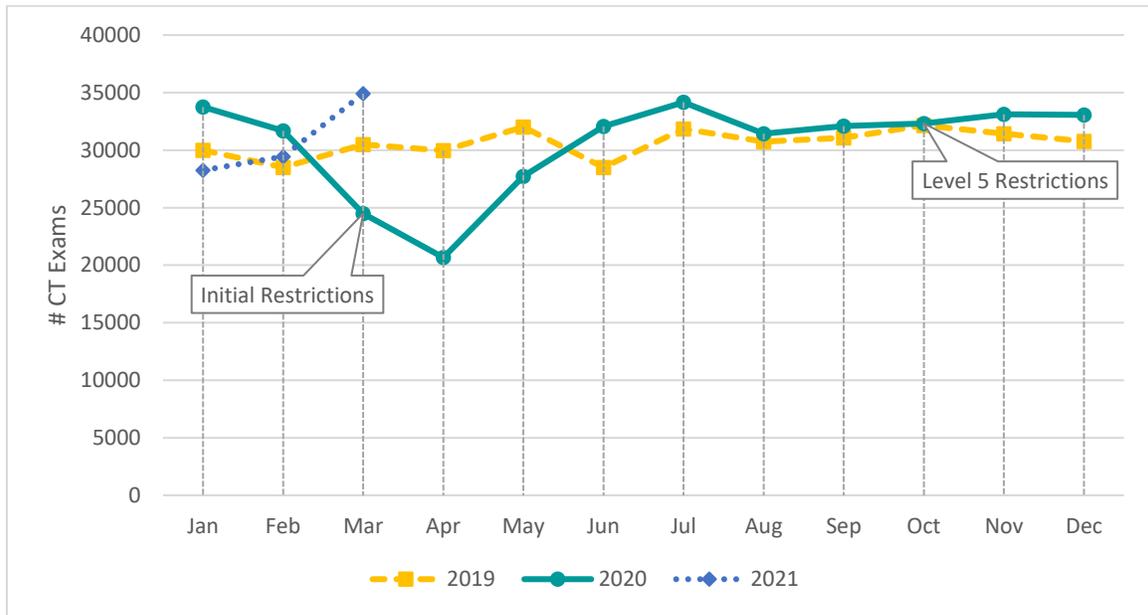


Table 8: Computed Tomography, All Participating Sites, 2019 – 2020 & Q1 2021

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	30004	28497	30487	29957	32023	28496	31852	30745	31083	32151	31425	30774	367494
2020	33746	31691	24501	20663	27730	32055	34157	31441	32087	32324	33128	33055	366578
2021	28258	29434	34907										92599

The first two months of 2020 revealed an increase in CT exams of up to 12% compared to the same period in 2019. A decrease of 20% in CT exams was seen in March 2020 and in April 2020 at 31%, representing the lowest point that year compared to data recorded in the same two months of 2019. This equates to 15,280 fewer CT exams completed between March and April 2020 inclusive, compared to the same period in 2019.

From June 2020, numbers exceeded 2019 activity, with an increase of 12% in completed cases recorded in June 2020, compared with June 2019.

The number of CT exams remained steady and above 2019 levels for the remainder of 2020. Overall, the total number of CT exams completed in 2020 was 99.8% of 2019 figures (916 fewer exams).

4.7. Magnetic Resonance Imaging (MRI)

Definition: *Magnetic Resonance Imaging (MRI) involves the use of magnetic fields and radio waves to visualise detailed internal structures, providing real time, three-dimensional images of body organs with good soft tissue contrast. MRI is helpful in diagnosing cancerous changes, size and location of tumours. It is also used in cancer treatment planning and its evaluation.*

Figure 18: Magnetic Resonance Imaging, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

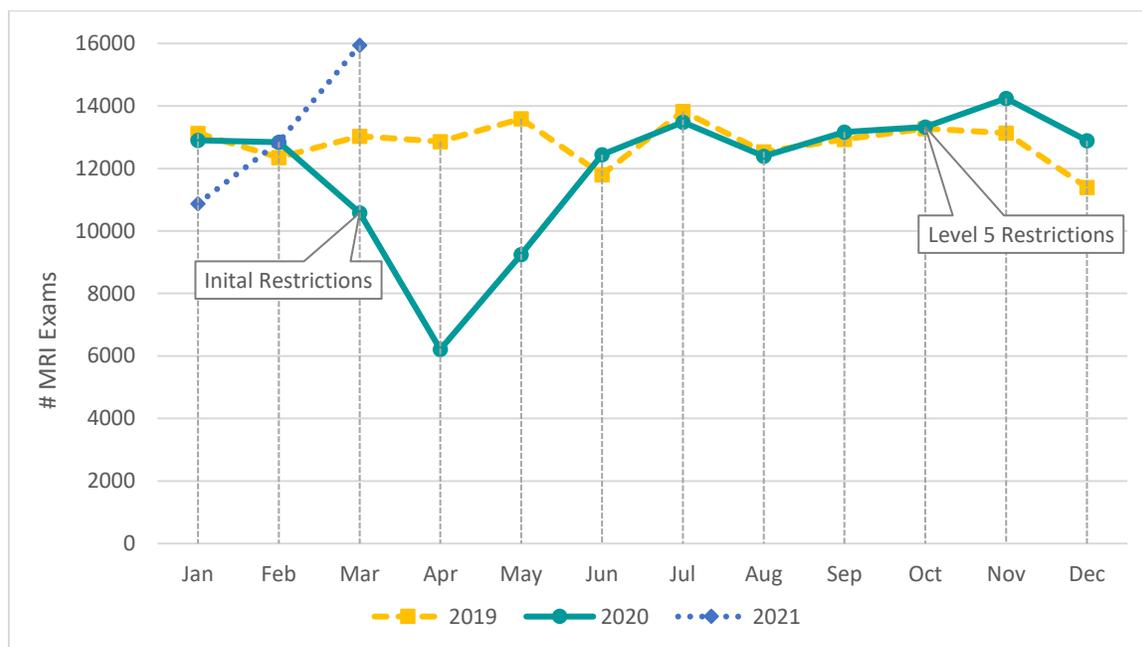


Table 9: Magnetic Resonance Imaging, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	13122	12354	13031	12857	13597	11799	13827	12532	12932	13277	13140	11394	153862
2020	12903	12840	10577	6211	9245	12439	13477	12396	13163	13334	14243	12888	143716
2021	10872	12850	15942										40790

As illustrated in Figure 18 and in Table 9, the lowest number of MRI exams was recorded in April 2020, where data reveal a decrease of 52% (6,646 exams), in comparison to April 2019.

In June 2020, the number of completed MRI exams recovered to close to 2019 levels and this trend continued throughout the year, with an increase of 13% in cases recorded in December 2020 in comparison to December 2019.

The overall number of MRI exams recorded in 2020 was 93% of 2019 levels (10,146 fewer MRI exams).

4.8. Positron Emission Tomography (PET)

Definition: Positron Emission Tomography (PET) uses small amounts of radioactive materials called radiotracers or radiopharmaceuticals to evaluate organ and tissue functions. By identifying changes at the cellular level, this imaging method may help the early detection of a disease. PET exam is an effective tool in detecting cancer, assessing its stage, and precise location. It is considered a highly specialised exam ordered by very few consultants and used almost exclusively in cancer diagnosis.

Figure 19: Positron Emission Tomography, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

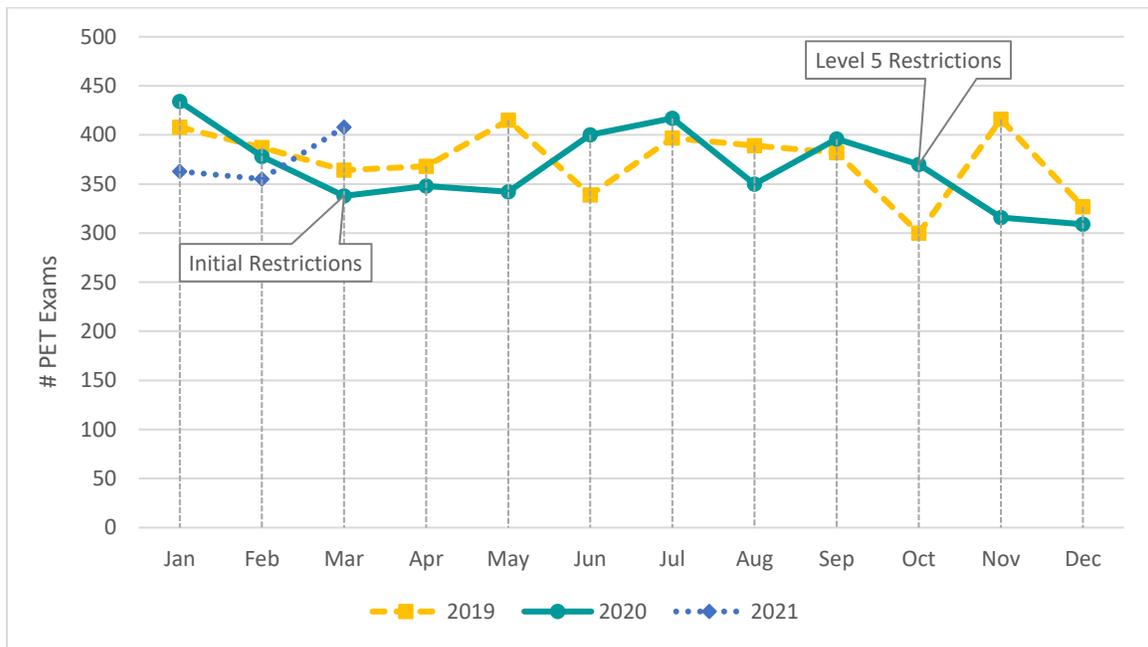


Table 10: Positron Emission Tomography, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	408	387	364	368	415	339	397	389	382	300	416	327	4492
2020	434	378	338	348	342	400	417	350	396	370	316	309	4398
2021	363	355	408										1126

Data recorded in NQAIS-Radiology show no significant change in overall numbers of PET exams in 2020 compared with 2019 records. The extreme drop in caseload observed in other modalities in April 2020 was not observed for PET. In total, the number of exams in 2020 was 98% of 2019 levels, corresponding to 94 fewer exams in 2020 than in 2019.

PET-CT is a highly specialised exam ordered by very few consultants and used almost exclusively in cancer diagnosis. Treatment decisions are dependent on these scans, which may explain why no significant decrease was observed.

4.9. Ultrasound (US)

Definition: *Ultrasound (US) utilises high-frequency sound waves to provide cross-sectional images of the body. US can be helpful for diagnosing tumours in soft tissues. It may be used as one of the first steps in the cancer diagnosis process. It can be performed relatively quickly and without exposure to radiation.*

Figure 20: Ultrasound, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

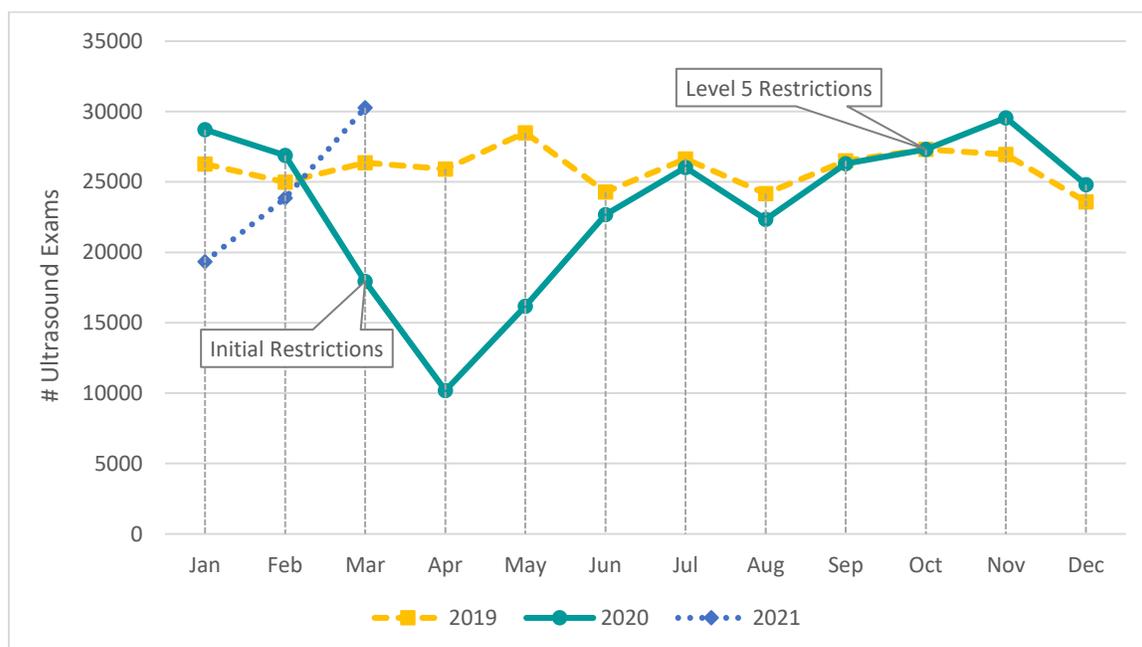


Table 11: Ultrasound, Comparison for All Participating Sites, 2019 – 2020 & Q1 2021

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	26268	24983	26357	25913	28499	24290	26632	24181	26495	27307	26954	23589	311468
2020	28722	26895	17945	10185	16165	22688	26036	22347	26288	27313	29561	24809	278954
2021	19337	23849	30269										73455

The biggest decrease in numbers of completed radiology exams in 2020 in comparison to 2019 was recorded for ultrasound (US) imaging. In April 2020, there was a decrease of 61% in cases completed, in comparison to the same month of 2019. Taking into consideration that January and February of 2020 saw an increase of 9% and 8% respectively compared to the same months in 2019, the decrease in April 2020 was the lowest point seen and equated to 15,728 fewer exams than were recorded in April 2019.

Similarly to CT and MRI, the number of completed ultrasound exams recovered in June 2020 and remained close to 2019 figures for the remainder of 2020. The overall number of ultrasound exams recorded in 2020 was 90% of 2019 levels (32,514 fewer exams). However, records show an increase of 10% (2,600) in cases completed in November 2020 compared to November 2019.

5. Treatment Delays

This section presents data on cancer treatment, comparing data from 2020 with data from 2019. Both monthly and cumulative data are discussed. Included are data on:

- Surgery
 - Cancer Resection data from the National Histopathology Quality Improvement Programme (NQAIS-Histopathology), representing data from 21 public hospitals (including the 8 cancer centres) and 7 private participating laboratories.
 - Surgical oncology data (Hospital/HIPE data) provided by the NCCP (Note: data from private hospitals are not included in HIPE data).
- Systemic therapy (Hospital/HIPE data) provided by the NCCP.
- Radiation oncology (Hospital/HIPE data) provided by the NCCP.

5.1. Surgery Data

5.1.1. Cancer Resection

Definition: The partial or total resections of organs involved by cancer. Examples include mastectomy for the treatment of breast cancer, and colectomy for the treatment of colon cancer.

Figure 21: Non-Biopsy Cancer Resection, Comparison for All Participating Sites, 2019-2020 & Q1 2021

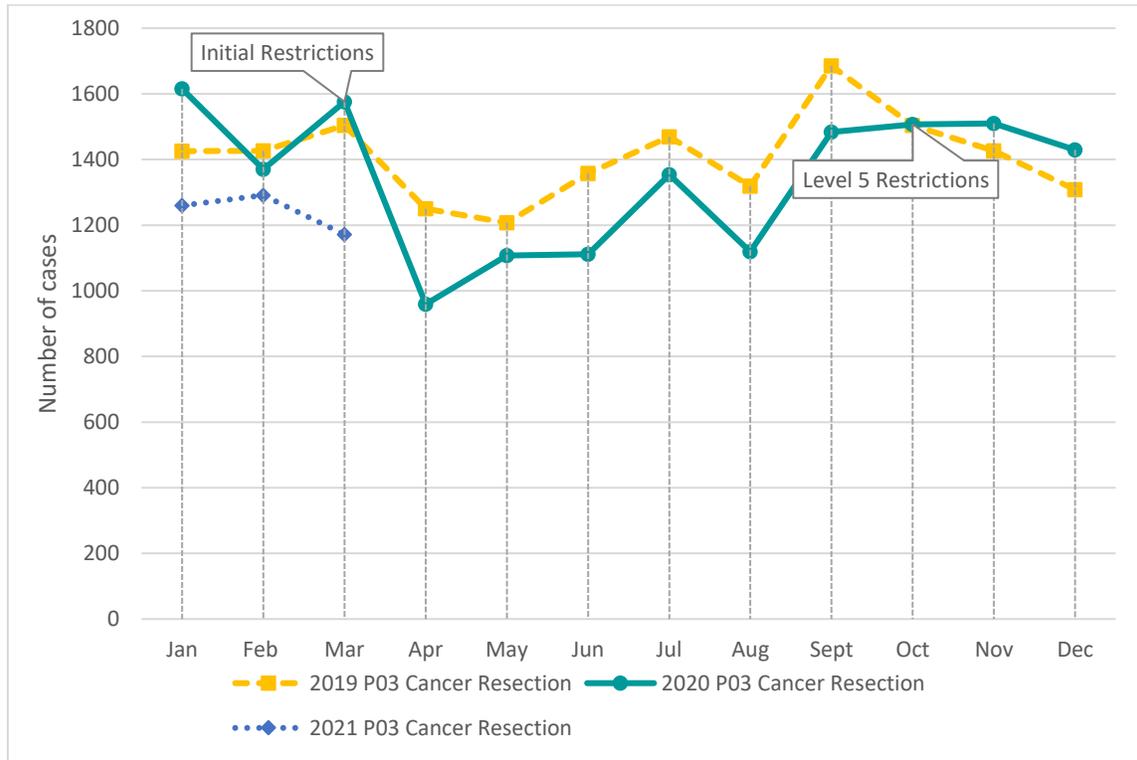


Table 12: Non-Biopsy Cancer Resection, Comparison for All Participating Sites, 2019-2020 & Q1 2021

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
2019	1425	1426	1504	1250	1207	1358	1469	1319	1685	1504	1426	1308	16881
2020	1615	1370	1576	959	1107	1111	1354	1119	1484	1507	1510	1429	16141
2021	1260	1291	1171										3722

Cancer resection cases began to significantly decrease in April 2020. The lowest percentage of non-biopsy cancer resection cases was seen in April 2020 at 24% (959 cases) in comparison to April 2019 (Figure 21). From April to June 2020 inclusive, there was a decrease of 17% in cancer resections recorded.

The reduction in cancer resection specimens is much less marked than that observed in small biopsies and FNA cytologies presented in sections 4.1 and 4.3. This may reflect patients who had diagnostic biopsies and cytologies earlier in the year and were awaiting surgery when

the pandemic began in March 2020. It may also highlight the arrangement between public and private hospitals, whereby some public patients had their care delivered in private hospitals over this period.

There was a recovery to 2019 levels in October 2020 with a 6% and 9% increase in caseload in November and December 2020 respectively, in comparison to the same months in 2019.

Overall, the number of cancer resections in 2020 was 96% of 2019 figures. This represents 740 fewer cancer resections undertaken in 2020 compared to 2019.

5.1.2. Cancer Surgery – Hospital Activity

Data for surgical cancer procedures within public hospitals shows a marked fall in activity in April 2020 (to 38% of April 2019 activity), increasing again in May 2020, but remaining below 2019 levels for the remainder of the year (*Figure 22*). Overall, surgical oncology activity in 2020 was 82.2% of 2019 levels (*Table 13*).

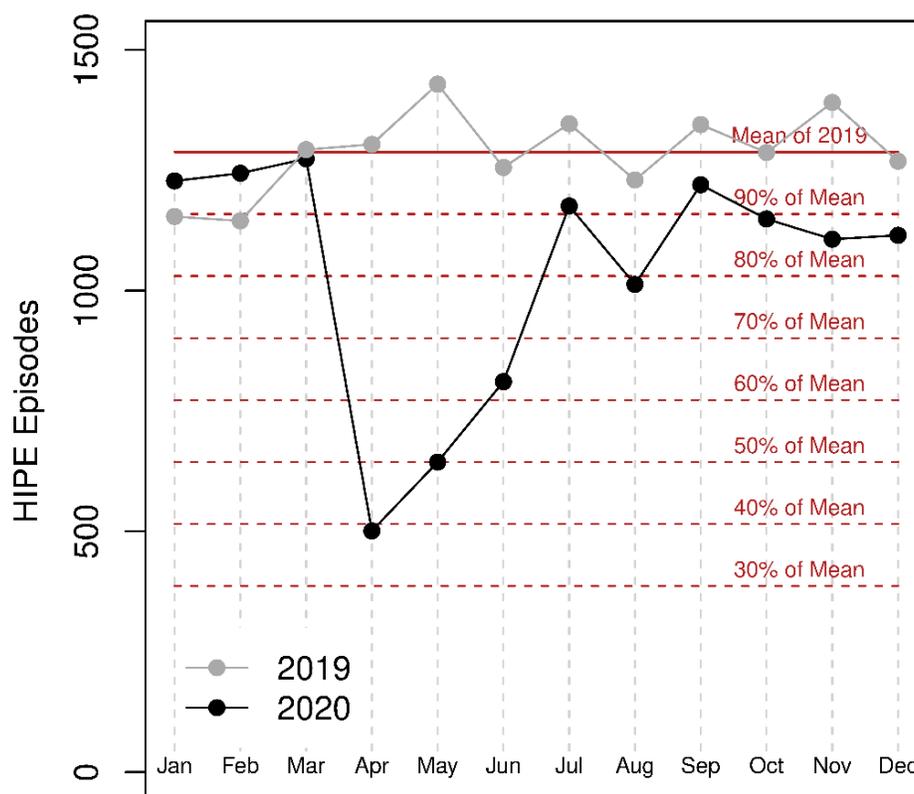
Table 13: HIPE data for cancer surgeries, systemic anti-cancer treatment and radiation oncology episodes of care, 2019 and 2020

Year	HIPE ^{vii} Episodes excluding outsourced activity		
	Surgery	SACT	Radiation Oncology
2019	15,450	117,328	106,900
2020	12,706	105,541	98,997
Difference	-2,744	-11,787	-7,903
2020 as % of 2019	82.2%	90.0%	92.6%

Of note, these data (HIPE) relate only to patients treated within public hospitals. The volume of cancer surgery for public patients, which includes public activity delivered in private hospitals during the pandemic, is better reflected in the pathology data above, (*section 5.1.1*) which includes both sectors. HIPE data is useful for analysing trends in activity as opposed to absolute numbers of patients accessing services.

^{vii} Hospital In-Patient Enquiry (HIPE) Scheme is a health information system designed to collect demographic, clinical and administrative information on discharges and deaths from acute hospitals nationally.

Figure 22: Number of patients who attended for surgical oncology, 2019 and 2020 (source: HIPE)



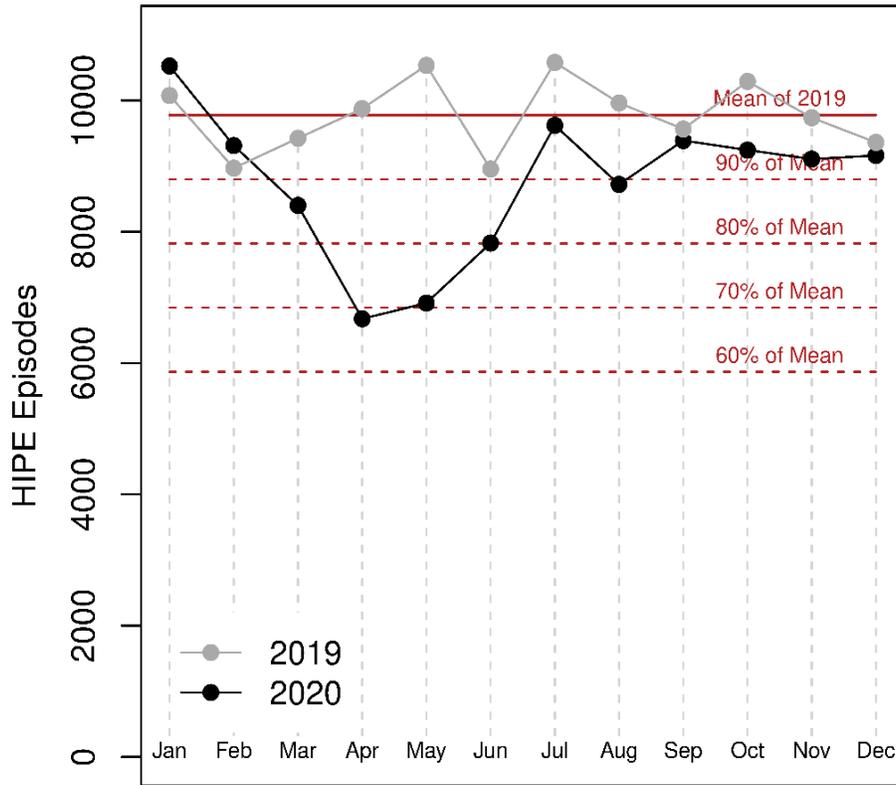
5.2. Systemic Anti-Cancer Therapy Hospital Activity

Definition: Systemic anti-cancer therapy (SACT) is a broad term used to describe medicines administered for the treatment of a cancer diagnosis, typically at recurring intervals over a period of time. SACT includes, but is not limited to, chemotherapy, targeted therapies and immunotherapies. SACT can be used on its own or in combination with other cancer treatment modalities such as surgery and radiotherapy.

Some hospitals (8 out of 26) moved their systemic therapy services (such as chemotherapy) offsite when the number of COVID-19 cases began to increase in Ireland. Most have returned to their original hospital, but offsite activity is not reflected in the data presented below (Figure 23), which therefore overestimates the fall in activity during the pandemic. In addition, in some cases medical oncologists revised the protocols of their patients, taking into account the risk of COVID-19 infection, and thus reduced the number of patients on active treatment that required day case attendances.

In April 2020, patient attendance as a day case for systemic anti-cancer therapy in Irish public hospitals reached its lowest point (a reduction of 32% from mean monthly activity in 2019) (Figure 23). Recovery began in May 2020 and by June 2020 onsite activity in public hospitals was back to 2019 levels. Overall, day case SACT activity in 2020 was 90% of 2019 levels.

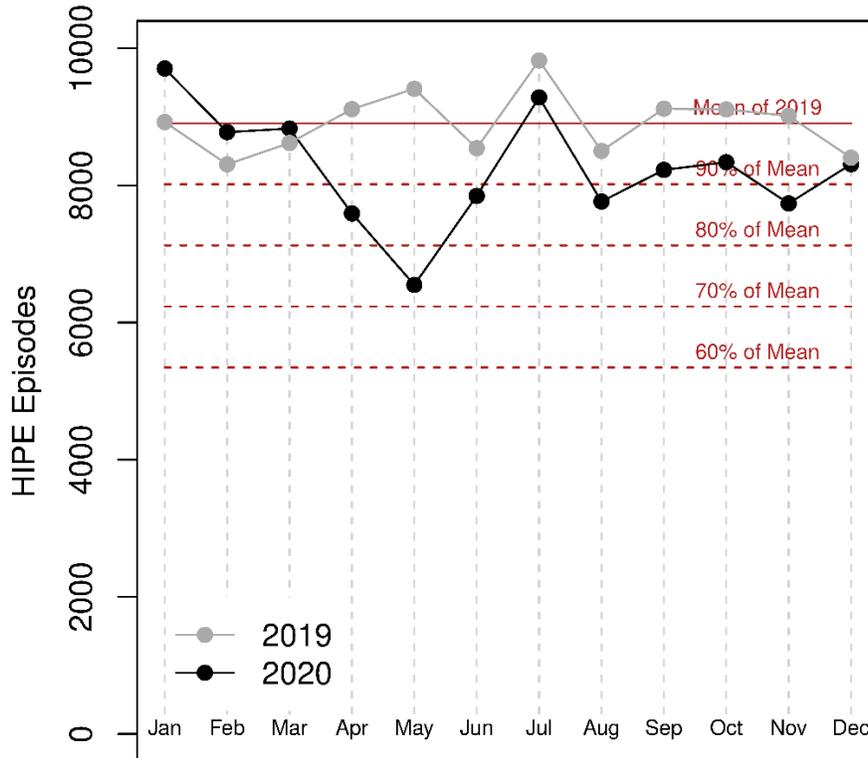
Figure 23: Number of patients who attended as a day case for systemic anti-cancer therapy (SACT), 2019 and 2020 (source: HIPE)



5.3. Radiation Oncology Hospital Activity

Definition: Radiation oncology is the use of ionising radiation to treat cancer. Radiotherapy (Radiation Therapy) uses high-energy radiation to kill cancer cells in the affected area by damaging their DNA.

Figure 24: Number of patients who attended as a day case for radiotherapy, 2019 and 2020



Radiation oncology activity fell by 20% in April 2020, recovering in June 2020 and by the end of July 2020 it was 10% below 2019 levels (Figure 24), remaining below 2019 levels for the rest of the year. Overall, radiation oncology episodes of care in 2020 were 92.6% of 2019 levels (Table 13).

6. Data from the National Cancer Registry Ireland (NCRI)

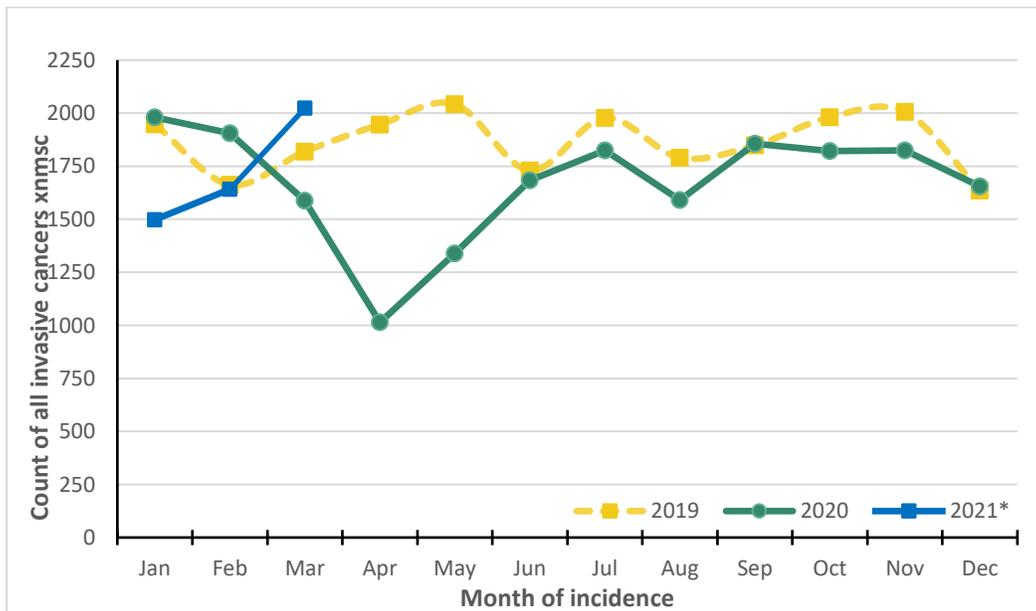
The NCRI reviewed the number of microscopically verified invasive cancers (excluding non-melanoma skin cancers) in the years of incidence (YOI) 2019, 2020 and quarter 1 of 2021. It must be emphasised that these numbers are preliminary and are subject to verification. Account is not taken of cancers diagnosed through other sources (e.g. clinically diagnosed or through flow cytometry etc.). Cancer counts do not equate to patient counts as some patients may have more than one tumour (cancer). The data refer only to new primary invasive cancers in 2019 and 2020. Histopathology reports are the source of notification for 90% of all cancers registered.

Comparison was made over the years of incidence 2019 and 2020. The total number of microscopically verified invasive cancers in 2020 was lower by 10.3% when directly compared to 2019 figures. Allowing for typical year-on-year increases in cancer incidence^{viii}, this equates to a circa 13% reduction compared to 2019.

The decrease in the number of microscopically verified invasive cancers, compared with 2019, reflects a decline in March 2020, reaching the lowest point in April 2020 (52%), before rising to expected levels by year end.

Cancer numbers were lower in January 2021 compared to January 2020, which coincided with tighter COVID-19 restrictions at that time. By February/March 2021, cancer numbers had recovered to expected levels.

Figure 25: Invasive cancers (excluding non-melanoma skins cancers), 2019-2020 & Q1 2021 - source NCRI



^{viii} 3.1% per annum increase from 2015 - personal communication from the NCRI 2021

Table 14: Invasive cancers (excluding non-melanoma skins cancers) - source NCRI

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
2019	1948	1663	1819	1946	2042	1730	1978	1790	1848	1981	2006	1636	22,387
2020	1980	1906	1588	1014	1339	1684	1824	1590	1856	1821	1825	1655	20,082
2021*	1498	1641	2023										5,162

A related analysis undertaken by the NCRI, looking at all 2020 cancer registrations notified up to September 2021, estimates the shortfall to be between 12% and 14% of cases.[2] This estimate could, at least in part, be accounted for by cases already diagnosed not yet being registered on the NCRI database.

The analyses have overlapping ranges and suggest that the 2020 overall shortfall in cancer diagnoses lies between 10% and 14%. A more complete picture of all cancers registered in 2020 will be available in late 2022.

7. Data from the N. Ireland Cancer Registry (NICR)

In order to provide an indication of the potential impact of the COVID-19 restrictions on diagnostic cancer services in Northern Ireland (NI), the NI Cancer Registry (NICR) produces a monthly overview of recent trends in the number of patients with pathology samples indicating cancer, with these trends contrasted to similar data from previous years.

The total number of patients with a pathological sample indicating cancer from January 2020 to the end of December 2020 was 962 fewer than the number in 2019. This represents a 11% decrease, although many of these patients may have been diagnosed clinically (e.g., via X-rays or CT scans).

The decrease in patient numbers, compared with the average for 2017-2019, was most marked in April (56% reduction) and May of 2020, with patient numbers steadily improving up to November 2020, when patient volumes recovered to usual levels.

The 11% decrease, when comparing full year data from 2020 to 2019, is similar to the 10% drop in microscopically verified invasive cancers observed in provisional data from the NCRI.

A further decrease was observed in January 2021 as a result of tighter COVID-19 restrictions, however, by March 2021 patient numbers had increased to slightly above the levels recorded in 2019.^{ix}

^{ix} Note: Part of the decrease observed in 2021 (maximum of 90 patients per month) may be due to under recording of pathology data in one of the NI pathology labs as a result of a change in the IT system used to record data.

Figure 26: Number of patients with a pathological sample indicating cancer (excluding non-melanoma skin cancer): N. Ireland, 2019-2020 & Q1 2021

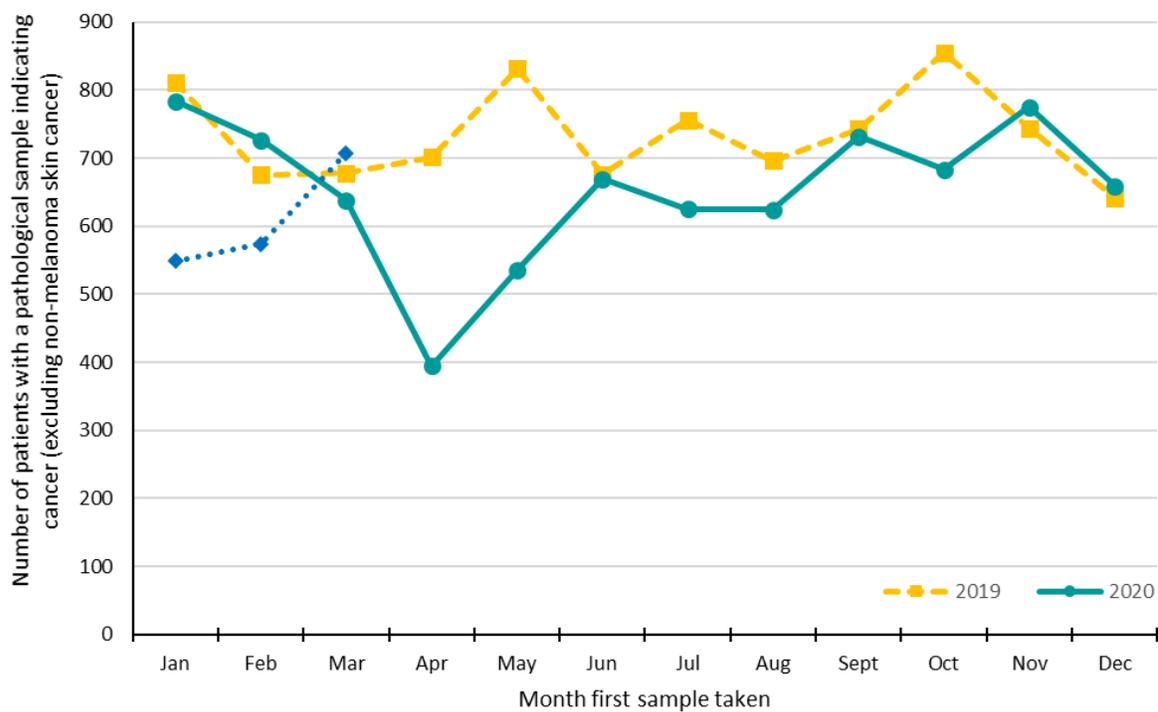


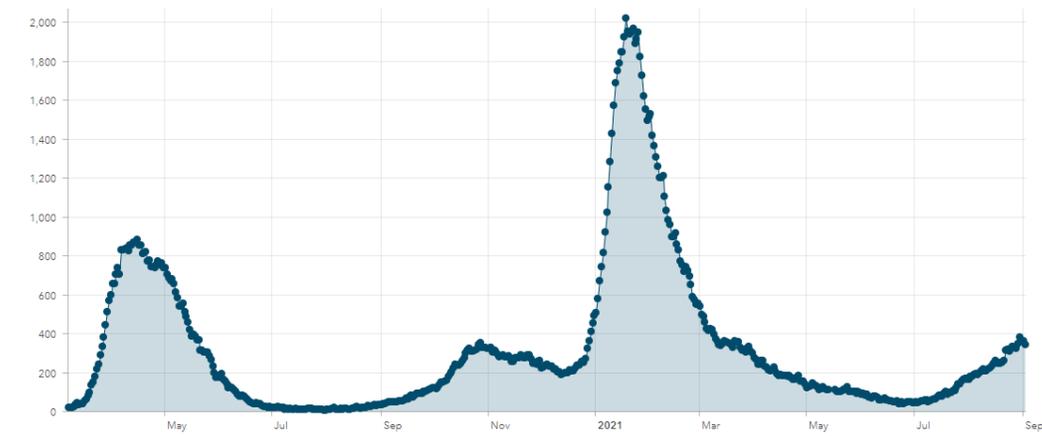
Table 15: Number of patients with a pathological sample indicating cancer (excluding non-melanoma skin cancer): Northern Ireland

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
2019	811	675	678	701	831	676	756	696	743	855	744	641	8,807
2020	784	726	638	394	536	669	625	624	732	683	775	659	7,845
2021*	549	574	707										

8. Data From 2021

Although incomplete, the available data for January to March 2021 again appear to demonstrate an overall trend in reduction in activity during the third wave, when compared with the same months in 2019 or 2020 (see Sections 3, 4 and 5). The overall trend in rate of reduction however appears to be less severe than that observed in the first wave of the pandemic, despite clear demonstration of a more severe impact of COVID-19 on acute hospitals during this third wave (Figure 27). Reassuringly, this underlines the continued resilience of the cancer services into 2021 in the face of increased challenges within the acute hospital network related to COVID-19. It nonetheless further highlights the need to enhance cancer services to manage increasing cancer case backlogs and service demands.

Figure 27: COVID-19 confirmed cases in Acute Hospitals, March 2020 to September 2021 (Source - Ireland's COVID-19 Data Hub covid19ireland-geohive.hub.arcgis.com)



9. Discussion

Provision of optimal cancer care, while balancing the need to protect citizens, patients and healthcare staff from the direct effects of COVID-19, is crucial to ensuring improved outcomes for cancer patients during and beyond the pandemic.[18] Securing a timely cancer diagnosis and receiving optimal treatment as early as possible in the disease course is essential to reducing morbidity and mortality. Prevention of upward stage migration, where the patient presents at a later more aggressive stage, is critical.

In this study, comparative analysis of 2019 and 2020 data demonstrates significant reductions in referrals and attendances at rapid access clinics (presentational delay), an overall reduction in diagnostic activity (diagnostic delay) and, to a lesser extent, reduced cancer treatment activity (treatment delay) in 2020 compared to 2019. This reduction was most marked in the initial wave of COVID-19 (between March and June 2020) and mirrors the peak of COVID-19 hospitalisations during this same period (*Figure 27*).

Increased resilience within the system was evident throughout 2020, with many services recovering well and a reduced negative impact apparent during the second wave in October 2020. Overall, however, activity for 2020 in most domains (presentation, diagnosis, and treatment) did not reach 2019 annual levels. Although the 2021 data included in this report are incomplete, the degree of reduction in activity in the third wave appears to be less than that experienced in the first wave of the pandemic, despite the significantly increased hospitalisations that have occurred during the third wave (*Figure 27*). Although it is clear that our learning during the pandemic has enabled increased resilience within the health system, it is imperative that this resilience is augmented to enable the services to manage any accumulated backlogs, annual expected cases, as well as the on-going year-on-year increasing demand. Indeed, many of these adverse impacts have been compounded by the as yet unquantifiable effects of the subsequent ransomware cyber-attack on the HSE in May 2021 that affected all healthcare services including cancer services.[19] It is noteworthy that some areas less impacted by the COVID-19 pandemic, such as radiation oncology services, were severely impacted by the cyber-attack.

The adverse impact illustrated by the data is not unique to the Republic of Ireland. Data intelligence from the Northern Ireland Cancer Registry (*see Section 7*) and from DATA-CAN, the UK's Health Data Research Hub for Cancer, show a similar impact at NI/UK trusts. DATA-CAN rapidly collected and analysed near real-time weekly data from hospital trusts across the UK (including all five hospital trusts in Northern Ireland) and deployed this cancer intelligence to estimate the impact of the pandemic on cancer systems and cancer patients.[3] At their lowest point, urgent referrals for people with a suspicion of cancer dropped by 71%, while the number of diagnostic tests performed for cancer in England from March 2020 – March 2021 was 22% lower when compared to pre-pandemic levels.[3-6] Attendances at chemotherapy clinics, a relevant proxy measure of the impact of the pandemic on the cancer treatment pathway, dropped by 41% at their nadir. Modelling predictions suggested that between 7,000 and 18,000 people with cancer may die in the UK due

to the impact of the pandemic.[7] There are also published data from the Netherlands, Croatia, Spain and Italy which show reductions in cancer diagnoses during the COVID-19 pandemic.[20-23] A recently published article highlights the impact of COVID-19 on cancer care in eight different countries, including Ireland. [24] At European level the figures are worrying. A study by the European Cancer Organisation (which included data from Ireland, Northern Ireland and the UK), indicated that many as one million Europeans may be living with an undiagnosed cancer. [7, 9]

Key recommendations in the first report were to continue encouraging patient presentation with worrisome or suspicious symptoms, while highlighting the importance of ensuring the availability of robust diagnostic services to enable rapid diagnosis.[1]

It is reassuring from the data presented here that the initial dramatic reduction in presentational, diagnostic and treatment activities in the March to June 2020 period was not replicated in October 2020. Engagement across acute services, primary care, the voluntary sector and cancer support services assisted in the overall delivery of services for patients with cancer.[8] The NCCP undertook initiatives to assuage citizen and patient fears and encouraged citizens to continue to present to their GP's if they had concerning symptoms. They developed a number of guidance documents, in consultation with clinicians to bring a clear, practical, and national approach to various issues pertaining to cancer diagnosis and treatment during the pandemic, that facilitated access and throughput to the benefit of patients. The HSE Winter Plan provided resources to support the implementation of infection prevention and control measures to minimise the risk of COVID-19, such as capacity improvement initiatives to help manage clinic and treatment processes such as social distancing, as well as resourcing additional pathways for non-COVID-19 care, including improved GP access to community-based diagnostics.[25] Resilience within primary care, to ensure early recognition and investigation of concerning symptoms, remains key to the earlier diagnosis of cancer.

A continued focus has remained throughout the year on ensuring access to non-COVID-19 related diagnostic services. Despite the significant initial reduction in diagnostic activity between March and June 2020, there was impressive recovery in many areas; however it did not reach 2019 levels of activity in all areas. The NCRI data (*Section 6*) presented in this report demonstrates a 10% decrease in microscopically verified invasive cancers that were notified to the NCRI compared to 2019. While this figure represents tumours (cancers), rather than patients, it nonetheless reflects a potential missed opportunity for early intervention for a significant number of patients. This analysis did not take into consideration the expected annual increase in cancer incidence. A second NCRI related analysis has looked at all cancer registrations (microscopically verified cancers and cancers diagnosed by other means such as clinically diagnosed (e.g. through radiology imaging) notified up to September 2021 and compared them to the expected number for 2020.[2] The analyses have overlapping ranges and suggest that the 2020 overall shortfall in cancer diagnoses lies between 10% and 14%. A more complete picture of all cancers registered in 2020 will be available in late 2022. Other cancer registries have already reported that fewer cancer diagnoses were made during the first wave in 2020 (Northern Ireland [26], Belgium [27] and Netherlands [28]).

Treatment did not appear to be as adversely affected as diagnosis during the pandemic, and this is also reflected in the comparative UK data (DATA-CAN's cancer intelligence indicates >70% reduction for 2WW/urgent red flag referrals at its nadir, whereas chemotherapy attendances only dropped by ~40% at their lowest point).[3] Resilience of the system in Ireland, with the added benefits of enhancement of public/private partnership for delivery of healthcare during this 2020 period is acknowledged. The ability to continue cancer resections during this period was aided by the partnership between public and private healthcare facilities, which certainly contributed to the mitigation of adverse effects, with an overall reduction of 4% (740 cases) in cancer resections reported in 2020 compared to 2019. However, the absolute decrease is concerning. Surgical cancer resections usually represent a potentially curative therapeutic intervention, so with each case reduction there is a concern for potential upward stage migration at subsequent presentation with less treatment options. Unfortunately, delineation of cancer subtype(s) affected is not possible within this dataset.

The drop of 32% in April 2020 compared to April 2019 in day case treatment episodes for systemic therapy was comparable to the 41% drop seen for chemotherapy attendances in the UK. Overall data illustrate a reasonable level of recovery (activity at end of 2020 was 89% of 2019 levels); these data are also likely to overestimate the fall in treatment episodes, as treatment regimens were revised and some hospitals moved their systemic therapy services offsite when the number of COVID-19 cases began to rise in Ireland. Most have returned to their original locations, but offsite activity delivered during the pandemic is not reflected in these data, further implying an overestimate in the reduction in activity attributable to the pandemic.

The benefits of standalone units/sites structurally separated from COVID-19 care in acute hospitals is highlighted by the fact that radiation oncology activity was less impacted than other treatment activities during this period (radiation oncology day case activity in 2020 was 92.6% of 2019 levels). Radiation oncology centres are standalone units which meant they were already structurally separated from COVID-19 care in acute hospitals, minimising both risk to patients and disruption to radiation oncology services. However, the effects on the radiation oncology services have been compounded by the as yet unquantifiable impact of the subsequent ransomware cyber-attack in May 2021.

A key concern raised by the data presented here is the overall impact of the delay in patient presentation and constraints in delivering clinical care in the context of COVID-19, that resulted in fewer patients undergoing cancer diagnostics and treatment in 2020 compared to 2019. Although encouraging to see recovery within the system as a whole, the impact of missed opportunities in presentation, diagnosis and treatment on patient outcomes is not yet quantifiable. Indeed, the number of cancers detected has not kept pace with the predicted annual increase in cancer cases that would ordinarily be expected.[8] DATA-CAN has estimated that returning to pre-pandemic levels would simply not be enough of itself. To reduce the backlog in cancer diagnoses in England, the system there may need to be working at 130% of capacity over a significant period of time.[7] Indeed, to further mitigate the negative impact, it is also important that here in Ireland, we build on the increased levels of flexibility in healthcare systems achieved during COVID-19 and accelerate

inclusion of new initiatives and innovations into our cancer services going forward.[8] Examples of success to date include the adoption of virtual assessment where appropriate, e.g. for triage, follow-up care or psychological support, and the introduction of stereotactic ablative radiotherapy (SABR) to reduce required attendance for treatment.

Delays in diagnosis of cancer can lead to cancer being diagnosed at a later stage of the disease, when treatment options are limited, and prognosis is poor. Less cancers detected through the RAC reflect potential missed opportunities for early intervention in this undiagnosed cohort, while less cancer resections reflect missed opportunities to surgically remove cancer at a localised stage.

Using the UK data as a guide, there may be very significant impacts of the COVID-19 pandemic on cancer outcomes in Ireland. A recent modelling study across four major tumour types (breast, colorectal, lung and oesophageal) has estimated that delays in cancer diagnosis and treatment will increase cancer deaths from 5-17% (depending on cancer type) within five years of diagnosis. [29] Other studies have come to similar conclusions.[4]

Treatment delay can have a significant impact on patient morbidity and mortality. A systematic review of seven major cancer types including breast, colon, rectum, and lung and three treatment modalities (surgery, systemic treatment, and radiotherapy), consistently observed an association between treatment delay and increased mortality. A treatment delay of four weeks was associated with a 6-13% increase in the risk of death, depending on the type of cancer. For surgery alone, every four-week delay was associated with a 6-8% increase in the risk of death.[30]

The data from this report will again help to inform continued optimal cancer service delivery, while ensuring effective COVID-19 risk reduction. Although the strengths of this report include the voluntary contribution of collaborators, along with the diversity of specialities represented, the variety of challenges in collating and analysing these data, including the limitations of the data sources themselves, must be addressed. Ireland does not currently have a connected health data intelligence system capable of delivering the required (near) real-time data to optimally monitor and lead recovery of our cancer services going forward.

A number of factors, including the manual nature of certain patient records, the relatively siloed approach to health data across the services, and the absence of cancer flags in the datasets, present considerable challenges to obtaining a real-time, holistic view of cancer activity across the country. This, in turn, impedes efficient service planning and timely response to challenges to the health care system, such as those presented by the COVID-19 pandemic. Significant delays with the national medical laboratory information system (MedLIS) for pathology have negatively impacted the ability to gather more detailed information on cancer specimens and cancer histopathological subtypes, which would have significantly contributed to a more complete data record for this pandemic period. This report clearly demonstrates the importance of comprehensive, integrated, effective, and efficient data systems. Development of a more real-time cancer data network for Ireland, encompassing public, private, and voluntary healthcare systems, must remain a key priority.

The following section outlines the recommendations arising from this report.

10. Recommendations

1. Continue to encourage and support the public to act early on signs and symptoms of possible cancer

Based on the evidence of reduced presentations, diagnoses and treatment activity during the COVID-19 pandemic, sustained efforts are required to encourage people to seek timely medical review, diagnosis, and treatment for any signs or symptoms of possible cancer. This aligns with the European Cancer Organisation’s Time to Act Campaign[9], which is being rolled out across Europe. Particular consideration must be given to cancers where early detection has most impact and to addressing barriers to presentation in marginalised groups.

In addition to encouraging early presentation, it is also essential to focus on cancer prevention, as highlighted by the National Cancer Strategy [10] and encourage attendance to screening programmes when invited to do so.

2. Ensure a resilient cancer service with sufficient capacity to address backlogs and increasing demands

Ring-fenced investment in cancer infrastructure and human resources is required to ensure continued resilience and agility within cancer services, along the entire cancer pathway, including General Practice, to effectively manage all cancer service backlogs and increasing demands, while continuing to address COVID-19 infection prevention and control requirements. A sustained focus will be necessary to address the reduction in presentation, diagnosis and treatment of cancer indicated by the data in this report and build back better.[11]

3. Improve availability and integration of data to provide more timely, comprehensive cancer specific intelligence encompassing public and private healthcare systems

To track cancer-related activity and improve cancer services, it is imperative that there is availability of high-quality data covering all cancer types, from all relevant sources including public, private, and voluntary health care systems and that these data are easily accessible in real-time (or as close to real-time as possible). While various data systems already exist, the integration of these existing systems should be improved. Integration of and investment in these systems would have a positive impact on presentation, diagnosis, and treatment of cancer.

This recommendation will be facilitated by implementation of the ‘eHealth Strategy for Ireland’ [12], in particular the Individual Health Identifier (IHI) and systems such as the National Medical Laboratory Information System (MedLIS).

Appendix A: Data Sources

Data was analysed from the following sources:

1. National Cancer Control Programme (NCCP)

The NCCP was established in 2007 to ensure that a programmatic approach was applied to cancer care in Ireland. This enables a whole population, broad approach that deals with all aspects of cancer in a planned way, emphasises equity of care and ultimately seeks to deliver improved outcomes for patients. For any cancer, high-quality clinical care consists of early detection, accurate diagnosis and staging, prompt access to the right combination of surgery, radiotherapy, chemotherapy or supportive care, and appropriate specialist follow-up. Preventive strategies and palliative care are also crucially important phases of care. Across the cancer care pathway, a holistic approach, including psychosocial support and effective communication between clinical teams, patients and carers is critical. The NCCP aims to continuously monitor and improve the quality of cancer care delivered to all patients. Research is also an important component of the NCCP's vision.

Looking at improving the quality of care, the NCCP has focussed on a number of key processes that are correlated with improved outcomes for patients – access to treatment, application of key diagnostics along the pathway, multidisciplinary discussion, the quality of pathology reporting and the location, timeliness, and quality of surgical treatment. High quality data needs to be as complete, timely and representative as possible to enable the provision of information for action.

The NCCP collect a suite of Key Performance Indicators (KPI) for each cancer centre and by six tumour sites that are designed to monitor in near real-time that the delivery and organisation of national cancer services is in accordance with international best practice and that evidence is continuously available that each cancer centre is operating within their mandated service level agreements. Each tumour site is reported as separate datasets as a suite of numbered KPIs that are specific to activity in each month, quarter, bi-annual or annual recording period. Data are collected by each hospital in a standardised manner and are returned to the NCCP. Only summarised data on counts of patient workload and cancer centre activity are collected. Data at the individual patient-level is strictly not part of the KPI suite and as such no patient-identifiable data are requested or kept by the NCCP.

The NCCP Cancer Intelligence team compiles a monthly performance report that monitors certain KPIs for each Cancer Centre by tumour type to maintain operational oversight of timeliness of referral to rapid access clinics, reasons for delay, patient workload volumes, cancer detection rates and commencement of treatment for medical and radiation oncology.

Each tumour group also hold annual or biennial AQR (Audit Quality Review) meetings at which the NCCP Cancer Intelligence team present detailed findings and commentary from the full KPI dataset.

NCCP Data Sources:

E Referrals

The number of e-referrals sent by general practitioners to each of the rapid access lung, prostate, and symptomatic breast disease clinics via Healthlink. Only summary counts are reported by Healthlink to the NCCP, and no patient-level data are shared between Healthlink and NCCP.

Attendances and Cancer Detection Data are collected on a monthly basis from the eight cancer centres and Letterkenny on the key elements of the three rapid access clinics – breast, lung, and prostate disease. Data are aggregate in nature and uploaded through the NCCP HealthAtlas portal, a web-based application that enables centres to see their own data and compare with the national picture in real time.

Hospital Inpatient Enquiry (HIPE) System

All admissions and discharges in the Irish public hospital system are coded onto one national database (HIPE). Monthly uploads of anonymised data from each hospital are sent to the HealthCare Pricing Office (HPO) who are responsible for quality assuring the data. The NCCP source HIPE data via the HPO portal. Activity in private hospitals is not covered by HIPE.

Individual hospitals are not identified in this report and as such the data presented are the sum total across the eight cancer centres and Letterkenny.

Data Collection Period

1st January to 31st December 2019 - All

1st January to 31st Dec 2020 / Mar 2021– e referrals

1st January to 31st Dec 2020/ Mar 2021 Clinic activity

1st January to 31st Dec 2020 HIPE data

2. National Histopathology Quality Improvement Programme

About the National Histopathology Quality Improvement Programme

The National Histopathology Quality Improvement (NHQI) Programme was launched by the Faculty of Pathology in January 2009 in collaboration with the National Cancer Control Programme (NCCP) and Directorate of Quality and Clinical Care in the Royal College of Physicians of Ireland (RCPI), in response to high profile cancer misdiagnoses. Funding was initially provided by the NCCP and was taken over by the HSE National Quality Improvement Team in 2014. RCPI continues to provide the management of the programme.

The central goal of the NHQI Programme is to give the public greater confidence in histopathology services in Ireland, to enhance patient safety and improve patient centred care with timely, accurate and complete pathology diagnoses and reports. This is achieved in a manner that is both supportive and encouraging to the participating histopathology laboratories.

The programme aims to:

- improve patient care by minimising diagnostic errors in histopathology
- increase public confidence in diagnostic reporting by providing evidence-based assurance on the quality of this diagnostic service
- continue to develop a standardised national quality improvement system for histopathology
- enable individual laboratories to review their performance against national targets
- identify and share good practice between participating laboratories
- recognise and encourage opportunities for quality improvement locally
- improve communication between participating institutions
- actively promote a culture of quality improvement by engaging key hospital stakeholders

The National Quality Assurance and Improvement System (NQAIS)

NQAIS-Histopathology functions as a central repository for quality improvement data from participating hospital's Laboratory Information Systems (LIS). It allows the programme to generate national reports on the accuracy and timeliness of diagnostic reporting in laboratories across Ireland. The data relating to Key Quality Indicators (KQIs), extracted from NQAIS are used to produce an annual report on these national metrics in histopathology. Ireland is the first country in the world to generate this lab-based report. Laboratories can use the report to identify best practice and any variations, to review, improve and sustain the quality of their work in the context of national norms and targets set by the Faculty of Pathology.

Data Collection

The data contained in this report were collected from NQAIS-Histopathology between the following dates:

2019: 1st January to 31st December

2020: 1st January to 31st December

2021: 1 January to 31st March

Data Analysis

The national dataset in this report was analysed by the NHQI Programme Manager. No patient or hospital staff identifiable information is collected within NQAIS-Histopathology. Data provided in this report are aggregate, anonymised and reported at national level.

In 2020, 21 public and 7 private laboratories contributed their data to the NHQI programmes dataset.

3. National GI Endoscopy Quality Improvement Programme

About the National GI Endoscopy Quality Improvement Programme

The Conjoint Board of the Royal College of Physicians of Ireland (RCPI) and the Royal College of Surgeons in Ireland (RCSI) launched the National GI Endoscopy Quality Improvement (NEQI) Programme in October 2011 in collaboration with the NCCP. As of 2014, this programme has been funded by the HSE National Quality Improvement Team and is managed by the Specialty Quality Improvement Team, RCPI.

The National Quality Assurance and Improvement System (NQAIS)

Endoscopy units participating in the NEQI Programme agreed to implement continuous quality improvement measures, as outlined in the Guidelines for the National GI Endoscopy Quality Improvement Programme. Endoscopy units upload their hospital's data to NQAIS-Endoscopy via a data extract obtained from the local Endoscopy Reporting System (ERS)

Data Collection

The data contained in this report were collected between the following dates:

2019: 1st January to 31st December

2020: 1st January to 31st December

2021: 1 January to 31st March

Data Analysis

The national dataset in this report was analysed by the NEQI Programme Manager. No patient identifiable information is collected within NQAIS-Endoscopy. All data used in the analysis for this report were anonymised aggregate national level data.

Please Note: Roll out of the NEQI Programme in hospitals was ongoing during the years that comprise the data in this report. As such, the dataset will have grown a small amount each year as more hospitals began contributing data to NQAIS-Endoscopy. The number of hospitals grew from 44 at the beginning of 2019 to 45 in 2020. This represents 34 public hospitals and 11 private sites (as of 2020).

The figures included in this report were extracted from NQAIS-Endoscopy on 25/05/2021. Figures included in previous reports covering 2020 have been updated, due to the uploading of data extracts from participating hospitals in the interim period.

4. National Radiology Quality Improvement Programme

About the National Radiology Quality Improvement Programme

The National Radiology Quality Improvement (NRQI) Programme was initiated by the Faculty of Radiologists, Royal College of Surgeons in Ireland (RCSI), in collaboration with the NCCP in 2009 in response to earlier findings of reports into cancer misdiagnoses. The programme continues to be led by the Faculty of Radiologists, RCSI. The NRQI Programme is funded by HSE National Quality Improvement Team and is managed by Specialty Quality Improvement (SQI) Team, RCPI.

The Programme provides a national framework to standardise the service provided by radiology departments across the country. The main goal of this programme is to ensure a high-quality service nationally, which translates into improved patient care through timely and accurate diagnoses. The key to achieving this is creating a safe and collaborative learning environment, where best practice is shared and followed and learning from experience can take place.

The NRQI Programme aims to:

- Ensure a high quality, consistent and accurate service nationally which translates into an improved patient experience with consistently high standards of quality care.

- Improve patient safety and enhance patient care through timely, accurate and complete radiology diagnoses and reports.
- Provide a safe space for learning and continuous improvement where QI activities are performed routinely by all.

The National Quality Assurance and Improvement System (NQAIS)

Fundamental to the programme is the extraction of encrypted QI data from the local information systems which is then uploaded to the National Quality Assurance & Improvement System (NQAIS) for Radiology. This online platform is an essential component of the NRQI Programme. NQAIS-Radiology is a central repository for quality improvement data, allowing for generation of national reports on the data related to Key Quality Indicators (KQIs). Radiology departments can use the report to identify best practice and any variations on this, to review, improve and sustain the quality of their work in the context of national recommendations and targets.

Data Collection

The data contained in this report were collected in NQAIS-Radiology between the following dates:

2019: 1st January to 31st December

2020: 1st January to 31st December

2021: 1 January to 31st March

Data Analysis

The national dataset in this report was analysed by the NRQI Programme Manager. The data collected and analysed in radiology departments contain no patient-identifiable information. They also do not include information which could identify Radiologists or other members of the radiology department. Data reported on in this report are aggregate, anonymised and reported at national level.

The NRQI programme does not currently collect any data on diagnoses and patients' clinical outcomes. Therefore, radiology data presented in this report relate to all radiology exams and not only those connected with cancer diagnosis.

5. National Cancer Registry Ireland (NCRI)

The NCRI is a publicly appointed body, established in 1991, to collect and classify information on all cancer cases which occur in Ireland. It operates under Statutory Instrument 19/1991, the National Cancer Registry Board (Establishment) Order, 1991 as amended by Statutory Instrument 293/1996, National Cancer Registry Board (Establishment) Order, 1991 (Amendment) Order, 1996.

Latterly, legislation relating to NCRI is under the Data Protection Act, 2018.

NCRI functions are as follows <https://www.ncri.ie/about/history>

- To identify, collect, classify, record, store and analyse information relating to the incidence and prevalence of cancer and related tumours in Ireland.
- To collect, classify, record and store information in relation to each newly diagnosed individual cancer patient and in relation to each tumour which occurs.
- To promote and facilitate the use of the data thus collected in approved research and in the planning and management of services.
- To publish an annual report based on the activities of the Registry.
- To furnish advice, information, and assistance in relation to any aspect of such service to the Minister.

The NCRI has produced national figures on cancer incidence since 1994. Tumours are notified to the NCRI from various sources. A total of 85% of tumours are notified through histopathology. NCRI receives regular scheduled histopathology extracts from the various national hospital laboratories. These data are uploaded onto the Cancer Registration System (CRS), where each tumour is followed up and validated by Cancer Data Registrars. Data on the primary course of the patient's cancer pathway are collected.

6. DATA-CAN (HDRUK) / NI Cancer Registry

DATA-CAN is the UK's national Health Data Research Hub for Cancer^x. It is a programme of Health Data Research UK (HDRUK), the national health data science institute for the digital world. For the analysis presented here, DATA-CAN collected weekly data from hospital trusts across the UK, specifically targeting data that would highlight the adverse impact of the COVID-19 pandemic on the cancer diagnostic and treatment pathways. Data were collected on 2 Week Wait (also known as red flag referrals (equivalent to urgent referrals here in Ireland) which allowed evaluation of the impact of COVID-19 on the diagnostic pathway, while collection of weekly data on chemotherapy attendances at clinic allowed the impact on the cancer treatment pathway to be evaluated.

The Northern Ireland Cancer Registry (NICR) receive data on a monthly basis from all pathology labs serving Northern Ireland. These were compared with data combined for the years 2017-2019 and were published on the NICR website each month. The pathological diagnosis of cancer occurs for over 80% of cancers, varies by cancer site (e.g., is lower for brain cancers and higher for breast cancers). It should be noted that patients may also be diagnosed clinically instead of pathologically (e.g., as a result of an emergency admission to hospital).

^x <https://www.data-can.org.uk/>

Appendix B: List of Contributors/Group Members

Role and Organisation	Name	Member / Contributor
Dean of the Faculty of Pathology, RCPI	Prof Louise Burke	Chair and Lead Contributor
National Director of the National Cancer Control Programme	Prof Risteárd Ó Laoide	Lead Contributor and Member
Associate Pro-Vice-Chancellor and Professor of Digital Health, Queen's University Belfast; Scientific Director, DATA-CAN, the UK's Health Data Research Hub for Cancer	Prof Mark Lawler	Lead Contributor and Member
Director, National Cancer Registry Ireland	Prof Deirdre Murray	Co-Lead Contributor and Member
Director of the Northern Ireland Cancer Registry	Prof Anna Galvin	Co-Lead Contributor and Member
Assistant National Director of the National Cancer Control Programme	Dr Triona McCarthy	Co-Lead Contributor and Member
Manager, Specialty QI Programmes, RCPI	Caitriona McGrath	Co-Lead Contributor and Member
CEO, RCPI	Dr Terry McWade	Member and Contributor
Chair of the National Histopathology QI Programme Working Group	Dr Ann Treacy	Member and Contributor
National Histopathology QI Working Group Member	Dr Niall Swan	Member and Contributor
Chair of the National Radiology QI Programme Working Group	Dr Rachel Ennis Dr Catherine Glynn	Member and Contributor
Chair of the National GI Endoscopy QI Programme Working Group	Dr Jan Leyden	Member and Contributor
Northern Ireland Cancer Registry	Dr David Donnelly	Member and Contributor
Programme Manager, National GI Endoscopy QI Programme	Conor Canavan	Member and Contributor
Programme Manager, National Histopathology QI Programme	Áine Mitchell	Member and Contributor
Programme Manager, National Radiology QI Programme	Joanna Swierczynska	Member and Contributor
Strategy and Policy Specialist, RCPI	Mairead Heffron	Member and Contributor

Coordinator of the Faculty of Pathology and Institute of Obstetricians & Gynaecologists	Darragh Whelan	Member
Specialist in Public Health Medicine, NCCP	Heather Burns	Member and Contributor
Data Analyst, NCCP	Ian Dawkins	Member and Contributor
Data Integration Manager, National Cancer Registry Ireland	Fiona Dwane	Member and Contributor
Cancer Registration Manager, National Cancer Registry Ireland	Grace Gregan	Member and Contributor

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