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# The effect of the SARS-CoV-2 pandemic on suspected cancer referrals at a regional head and neck unit

Andrew Hannah<sup>\*</sup>, Terry Lowe

Department of Oral and Maxillofacial Surgery, Aberdeen Royal Infirmary, Scotland, UK

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## ABSTRACT

The novel coronavirus SARS-CoV-2, initially identified in late 2019 as a small case cluster, has rapidly become a global pandemic. Government restrictions, closure of primary care services, interruption of cancer screening programmes, and fear of contracting the virus have demonstrably led to a reduction in referrals for suspected cancer and delays to treatment across the United Kingdom. A retrospective analysis was carried out on suspected cancer referrals to the maxillofacial service at Aberdeen Royal Infirmary during the 12 months from March 2020, and compared with the 12 months prior. Suspected cancer referrals reduced by 38.6% ( $p < 0.001$ ) during this period, with a reduction in the percentage referred by General Dental Practitioners. Further analysis shows a proportionate reduction in squamous cell carcinoma diagnoses, with other diagnoses remaining stable. Time from referral to first appointment, biopsy, and treatment showed no change. Stage at diagnosis and treatment modality was also unaffected. Assuming no change to the incidence of head and neck malignancies, over a third of new malignancies may have been undiagnosed during the 12 months from March 2020. Evidence for the impact of the pandemic is likely to become apparent as services return to pre-pandemic levels and these patients begin to present.

## 1. Introduction

The novel virus SARS-CoV-2 was first identified among a small case cluster in Wuhan city, China, geographically associated with a local wet market [1,2]. Initially reported in December 2019 as cases of pneumonia of unidentified origin [3], the small cluster grew rapidly into a local epidemic, and by March 2020 the World Health Organisation declared it a global pandemic [4]. A wide range of symptoms are associated with the disease caused by SARS-CoV-2 infection, commonly known as COVID-19. Respiratory symptoms such as cough and shortness of breath are frequently reported, as are fever, myalgia, headache, and loss of sense of smell or taste [5]. A number of affected patients will develop Acute Respiratory Distress Syndrome (ARDS), with potentially fatal consequences [5].

The first confirmed case in the UK was reported at the end of January 2020 [6], and the first confirmed case in Scotland at the beginning of March [7]. By the end of March 2020 the UK was in its first lockdown, with a public health order to stay at home for all but essential travel [8, 9]. Around the same time General Dental practices stopped all routine treatment [10], and General Medical practices were encouraged to

engage with patients remotely where possible [11]. Two further national lockdowns would occur during the following 12 months, with varying levels of restriction on daily activity in-between. At the time of writing the pandemic is ongoing.

The impact on patient care and access to services was immediate. Routine cancer screening programmes were effectively paused from March 2020 across the UK [12], and the number of urgent suspected cancer (USC) referrals dropped, with reports that urgent referrals in England fell by 60% in April 2020 compared with the same month a year prior [13]. Diagnostic investigations were also affected, with a reduction in the number of investigations carried out along with an increase in waiting times. It is difficult to accurately estimate the impact of these on cancer deaths. A study published in The Lancet Oncology looking at breast, colorectal, oesophageal, and lung cancers estimated approximately 3500 additional deaths within 5 years across these groups as a direct result of the pandemic [14].

Head and neck cancer has not escaped the impact of COVID-19, with reductions in referrals, delays in diagnoses, and alterations to treatment all reported in the literature [15–19]. In this paper we analyse the impact of the pandemic on head and neck cancer at a regional

<sup>\*</sup> Corresponding author.

E-mail address: [andrew.hannah3@nhs.scot](mailto:andrew.hannah3@nhs.scot) (A. Hannah).

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maxillofacial unit in Scotland.

## 2. Method

We analysed data on head and neck cancer referrals to the Maxillofacial service at Aberdeen Royal Infirmary (ARI) during the 12 months from March 2020 until February 2021 and compared this to data from the 12 months prior to March 2020. Information on the number of monthly referrals was obtained from the NHS Grampian Health Intelligence department and checked against clinic details obtained from the TrakCare patient management system. Anonymised data extracts were used to determine the source and vetting outcome of these referrals.

Information on patients discussed at our head and neck multi-disciplinary team (MDT) meeting during the same period was obtained from our MDT co-ordinator. Patients with a confirmed diagnosis of malignancy or high-grade dysplastic changes who were under the care of the maxillofacial team were included for further analysis. Patient records were accessed using TrakCare and the Scottish Care Information (SCI) store. Data collection included referral date, first appointment, biopsy date, diagnosis, TNM stage where available, treatment modality, first treatment date where available, and any delay reason if this was recorded.

Patients with delays unrelated to the pandemic were excluded, as were those for whom the above information was not available in their electronic record.

Data analysis was performed in Microsoft Excel and IBM SPSS Statistics (version 27) using an independent-samples *t*-test to determine if the differences were statistically significant.

## 3. Results

### 3.1. Overall referrals

A total of 2989 referrals were made to the maxillofacial service during the 12 months from March 2020, of which 31.9% (n = 953) were marked Urgent, representing a mean of 79 per month. During the 12 months prior a total of 7709 referrals were made, of which 20.6% (n = 1588) were marked Urgent, representing a mean of 132 per month. This data represents a statistically significant reduction in both total number of referrals (-61.2%,  $p < 0.001$ ) and number of Urgent referrals (-40.0%,

$p < 0.001$ ) (Fig. 1).

### 3.2. Suspected malignancy referrals

Referrals assigned to the Urgent pathway which, following consultant vetting, meet the criteria for Urgent – Suspected Cancer (USC) are allocated to the Head and Neck waiting list to be appointed. During the 12 months from March 2020 443 patients were allocated to this pathway representing a statistically significant reduction of 38.6% when compared with the 721 during the 12 months prior ( $p < 0.001$ ) (Fig. 2).

### 3.3. Referrer data

During the 12 months from March 2020 referrals from General Dental practitioners accounted for 29.1% (n = 129), with 67.9% (n = 301) from General Medical practitioners. The figures during the 12 months prior were 38.4% (n = 277) and 56.9% (n = 410) respectively. The remainder came from secondary care.

### 3.4. Further analysis

A total of 100 new patients were discussed at our head and neck multi-disciplinary team (MDT) meeting in the 12 months from March 2020, of which 37 met the inclusion criteria outlined above. 132 new patients were discussed during the year prior, with 61 meeting the criteria for further analysis. Mean age at referral was similar across the two groups, at 69 (median 68, range 28–94) and 67 (median 68, range 19–96) respectively.

The average time from referral to first appointment was similar during both periods, at 18 days (median = 16, range 0–45) from 2020–21, and 20 days (median 18, range 5–75) from 2019–20. Average time from referral to biopsy was 22 days (median 21, range 1–57) and 27 days (median 20, range 7–82) respectively. For those undergoing surgery, the average time from referral to treatment dropped from 57 days (median 49, range 25–104) during 2019–20 to 47 days (median 47, range 28–85) during 2020–21.

Diagnoses during both periods showed an apparent reduction in the proportion of patients diagnosed with squamous cell carcinoma (Table 1). TNM stage at diagnosis or following surgical treatment was equal in proportion for both years, with no evidence of upstaging during the pandemic. Choice of treatment modalities were similar with no

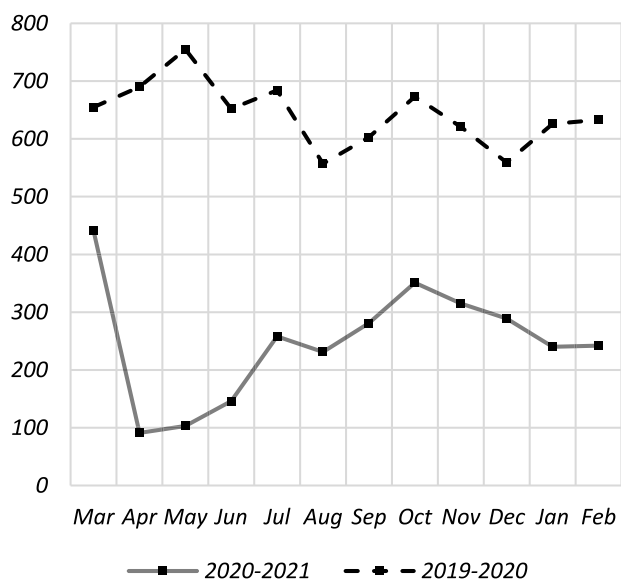


Fig. 1. Total referrals by month.

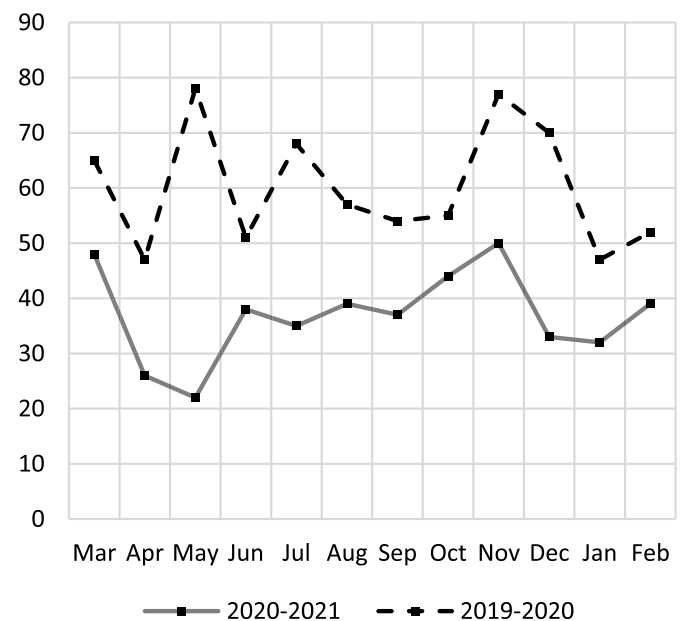


Fig. 2. Suspected malignancy referrals by month.

**Table 1**  
Diagnoses following biopsy.

	Mar 2020–Feb 2021	Mar 2019–Feb 2020
Squamous cell carcinoma	18 (48.6%)	43 (70.5%)
Lymphoma	9 (24.3%)	7 (11.5%)
Metastatic tumour deposit	4 (10.8%)	6 (9.8%)
Other	6 (16.2%)	5 (8.2%)

apparent shift towards or away from a particular treatment due to the pandemic.

#### 4. Discussion

The data shows a reduction in both overall referrals and those of suspected malignancies. This is in line with reports from other referral centres in the UK and worldwide. Our centre saw a reduction of 38.6% in referrals for suspected malignancy, which coincides with the reduction in the number of patients with confirmed malignancy included in our analysis. Assuming no change to the incidence of head and neck cancers since the previous year, this could indicate over a third of new head and neck malignancies have gone undiagnosed in the 12 months following March 2020.

The greatest decrease in referral numbers was evident in April and May 2020. This aligns with the introduction of mandatory public health orders and emphasis by the government to ‘stay at home’. Evidence suggests patients have been reluctant to seek advice, even for symptoms of malignancy [20]. Those that sought help may have found it difficult as primary care services were attempting to establish effective means of remote triaging and consultation.

Reduced access to primary care, especially primary dental services, is likely to have impacted referrals, and this is reflected in our findings. Dental practitioners are in a prime position to detect head and neck cancers before patients are aware of them, with routine screening at regular check-up intervals. Limited access to dental services is likely to have resulted in delayed referrals, and evidence for this may emerge as these services return to normal. Data from NHS Digital shows a reduction in patients seeking primary care advice from their GP [21], which will further reduce the number of referrals. Head and neck cancers often remain asymptomatic until late stage, meaning patients may not be aware of them until significantly advanced. Overall survival rates decline rapidly with increased stage at diagnosis, so any delay in referral negatively impacts patient outcomes.

Of the patients included in our analysis, the main diagnoses were squamous cell carcinoma (SCC) and lymphoma. The proportion of SCC diagnoses dropped during the 12 months following March 2020 from 70.5% to 48.6%, while the absolute number reduced by over half. The proportion of lymphoma diagnoses increased, while the absolute number remained stable. The absolute numbers of other diagnoses also remained stable, suggesting that the overall reduction consisted mainly of SCC diagnoses. It is difficult to hypothesise why this may be, but one possibility is that this reduction includes asymptomatic patients who would have otherwise been identified by routine screening. Further, symptoms of lymphoma are difficult to ignore, and a new neck lump or B symptoms may be more likely to prompt engagement with primary care than an asymptomatic oral lesion.

Our data shows that, once referred, patient management was similar compared to the year prior to the pandemic. For the patients included in our analysis the referral to first appointment, referral to biopsy, and referral to treatment times were similar, or in some cases better. At first glance this is reassuring, and likely reflects prioritisation of the cancer service during this difficult period. We expect increased demand going forward as services return to pre-pandemic levels and begin to identify patients who have not accessed care during this period. Our data on TNM staging and treatment modality is also unchanged, likely due to a lack of increase in referral to appointment time and prioritisation of the

cancer service.

#### 5. Conclusion

The SARS-CoV-2 pandemic has presented unique challenges to both patients, clinicians, and the health service as a whole. Head and neck cancer care has not been exempted, and this paper adds to the body of evidence showing how it has affected regional services in the UK. Overall referrals have decreased dramatically, including referrals for suspected malignancy, and this is likely to have a measurable impact on patient outcomes moving forward. Prospective data collection would be beneficial to determine the extent of any impact, and it would be interesting to see this data on a national level. Effective service planning and appropriate funding is essential to ensure provision of specialist services is maintained as we begin to normalise following this profoundly challenging period.

#### Conflict of interest

We have no conflicts of interest.

#### Ethics statement/confirmation of patient permission

This project does not require ethics approval. It has been registered with the NHS Grampian Quality Improvement and Assurance Team. Patient permission not required.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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