

Dental practice to dental hospital referrals—upgraded to urgent suspected cancer pathways: A three year service review

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Abstract

Introduction: Inappropriate General Dental Practitioner (GDP) patient referrals may delay cancer diagnoses, increasing the risk of late-stage presentation. Urgent suspected cancer (USC) referrals from GDPs are reviewed swiftly by clinicians. Non-USC referrals may wait up to a week before being reviewed by clinicians.

Aims and objectives: To investigate upgraded-to-USC GDP referrals to a University Dental Hospital (UDH) following the establishment of the pan-Wales electronic referral management system (e-RMS) in 2019. To examine reasons for their upgrade to the USC pathway, and to assess diagnostic outcomes, diagnostic delay and compliance with The National Institute for Health and Care Excellence (NICE) referral recommendations.

Methodology: Upgraded-to-USC e-Referrals were reviewed and cross-referenced against the electronic patient management system and patient files to assess waiting times from referral date to first appointment. Each e-Referral was reviewed to determine the reason for upgrade to a USC referral. Patient outcomes and diagnoses were also examined.

Results: 83 patient records were identified. Upgraded e-Referrals accounted for 18.6% of all USC e-Referrals. The majority of upgraded e-Referrals (66.3%) were upgraded because they included words describing key malignancy features. Malignant and oral potentially malignant disorders (OPMDs) accounted for 3.8% and 17.5% of diagnostic outcomes respectively. Overall, 18.8% of upgraded-to-USC e-Referrals did not meet the NICE guideline requirement of having a first appointment within 2 weeks.

Conclusion: Early diagnosis of malignancies is fundamental in improving oral cancer survival outcomes. Some GDPs' clinical judgement and referral pathway choice needs improvement. Reinforcing GDP education in regard to USC referrals will likely reduce inappropriate referrals.

KEY WORDS

diagnostic delay, Oral Cancer, referral

1 | INTRODUCTION

During the last decade, head and neck cancer incidence and mortality rates have increased by 16% and 17% respectively, ranking as the 8th most common malignancy in the UK.¹ Five year survival rates persist at 50–60% despite improvement in the understanding of risk factors, diagnostic techniques and treatment modalities.^{2,3} The Union for International Cancer Control (UICC) staging and classification system is accepted as one of the most useful malignancy prognostic markers.^{4,5}

Poor survival outcomes are associated with UICC late stage diagnosis, with 5-year survival rates of advanced stage oral cancer being <30%, compared with >80% for patients with localised disease.⁶ Diagnostic delay is a key factor associated with late stage oral cancer, with two thirds of cases diagnosed at advanced stages III or IV.⁷ Early identification, diagnosis and treatment of malignancies is vital to improve survival outcomes.⁸ Identification of likely malignant lesions predominantly occurs in primary care services, with patients presenting to their General Dental Practitioner (GDP) or General

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Medical Practitioner (GMP).⁹ Primary healthcare practitioners have a key role in early identification and appropriate referral for possible disease. Patients with malignancies and oral potentially malignant disorders (OPMDs) justify referral to more specialist services for definitive diagnosis, active behavioural modification, risk factor control and treatment if necessary.¹⁰ The National Institute for Health and Care Excellence (NICE) 'Suspected cancer: recognition and referral' guidelines specify that urgent suspected cancer referrals necessitate a cancer assessment appointment within two weeks from date of referral.⁹ This two week referral scheme is crucial, as diagnostic delay may lead to disease stage advancement and so negatively impact prognostic outcomes.¹¹

The replacement of paper-based postal referrals with the introduction of an all-Wales electronic Referral Management System (e-RMS) for GDPs in May 2019 helped to promote appropriate referrals, prioritisation of patients and reduction of waiting times.¹² Referrals are triaged by consultants to ensure that patients are seen by the most appropriate clinician and department. GDP USC e-Referrals are processed rapidly after arriving to a central email inbox which is monitored daily by hospital administration staff. However, non-USC referrals are sent to a speciality-specific electronic inbox and await consultant(s) to log in and review the referrals. This may happen just once weekly, and possibly less frequently if a consultant is absent due to leave or sickness. Therefore, an inappropriate GDP referral pathway choice may prolong patient waiting times. This may introduce delay in suspected cancer assessment and worse patient outcomes in the event of late-stage malignancy diagnosis.

This review investigated South-East Wales GDP non-USC e-Referrals to the oral medicine, oral surgery and oral & maxillofacial surgery (OMFS) departments and reasons for their upgrade to the USC pathway by vetting consultants. The review additionally assessed for any diagnostic delay and whether upgraded e-Referrals breached NICE USC referral guideline recommendations.

2 | MATERIALS AND METHODS

The service review was approved by the relevant audit and clinical governance group at the University Dental Hospital, University Hospital of Wales.

2.1 | Inclusion criteria

- GDP non-USC e-Referrals to the oral medicine, oral surgery and OMFS departments that were upgraded to the USC pathway by vetting consultants between May 2019 – June 2021.

2.2 | Exclusion criteria

- Patients who did not attend (DNA) or cancelled all arranged appointments and therefore did not have an USC

Clinical Relevance

- Scientific rationale for study: Inappropriate General Dental Practitioner (GDP) patient referrals through non-urgent suspected cancer pathways may delay cancer diagnoses. Therefore increasing the risk of late-stage malignancy diagnosis and negatively impacting patient survival outcomes.
- Principle Findings: Efficacy of urgent suspected cancer referral pathways rely on GDP discretion and clinical judgement to help safeguard early malignancy identification and rapid diagnostic intervals. Some GDPs' clinical judgement and referral pathway choice needs to be improved.
- Practical implication: Reinforced GDP training is necessary to guarantee competence in tackling the inherent challenges of early and accurate identification of suspected oral malignancy.

assessment appointment were excluded from waiting time, diagnostic outcome and diagnostic delay investigations (but included for upgrade-to-USC pathway justification analysis).

Upgraded GDP e-Referrals to the oral medicine, oral surgery and OMFS departments were individually analysed and date of receipt recorded, before patients were allocated to the USC waiting list for an initial assessment appointment (Figure 1). Retrospective electronic records of upgraded e-Referrals were accessed through the patient management system (PMS) which was used to identify and request a total of 83 patient records, comprising the entirety of upgraded referrals since the introduction of the e-Referral system. Data from patient notes and referral letters were recorded in a data collection sheet. USC assessment waiting time (waiting time for first appointment) data were cross-referenced between patient files and the PMS to ensure that the first offered assessment appointment date was taken for data collection, irrespective of whether the patient DNA or cancelled this initial assessment appointment.

3 | RESULTS

3.1 | Referral analytics

Since the establishment of the dental e-RMS, the University Dental Hospital received 447 GDP USC e-Referrals (comprising USC pathway referrals, and those upgraded to the USC pathway by the vetting consultant) to oral medicine, oral surgery and OMFS departments collectively. A total of 83 patients were upgraded to the USC pathway at the vetting stage (having been referred via the non-USC pathway), between May 2019 – June 2021, representing 18.6% (83/447) of

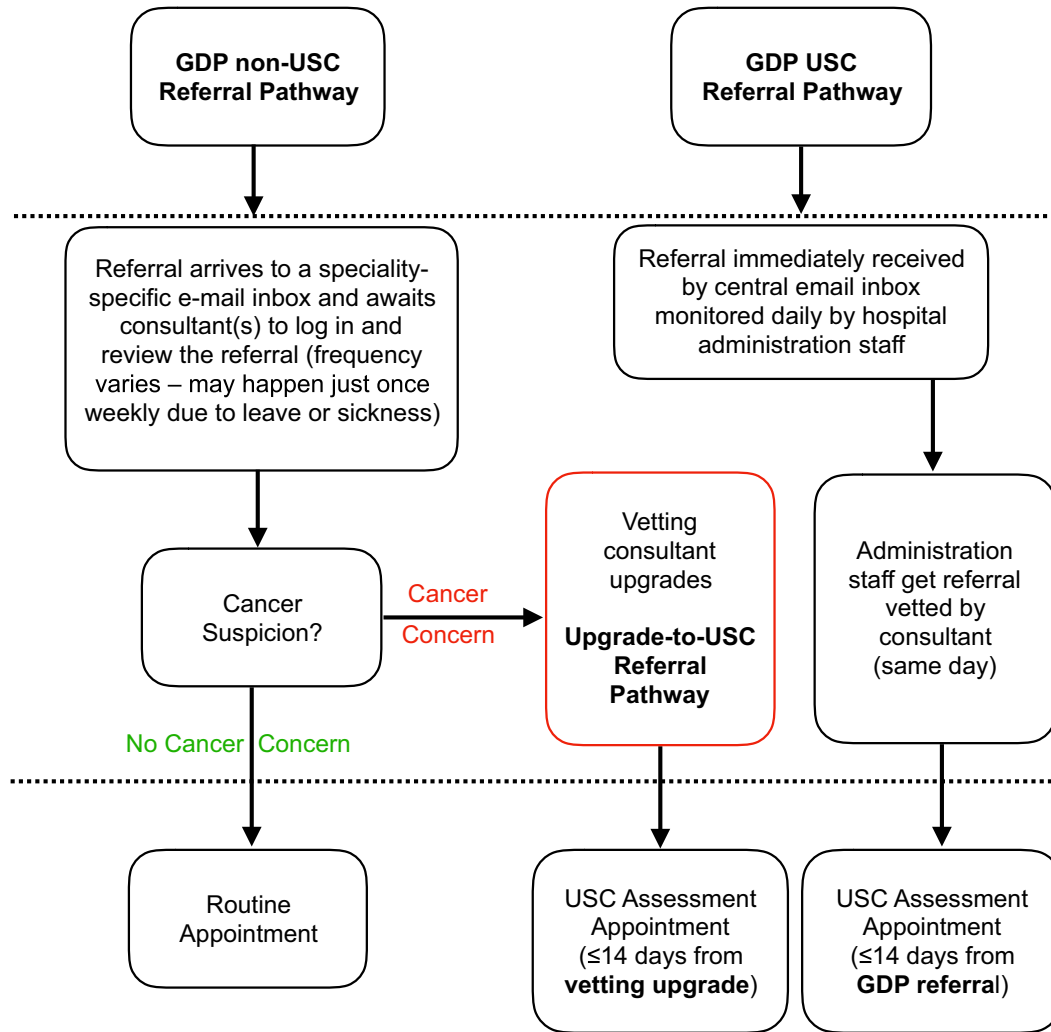


FIGURE 1 Flowchart to demonstrate GDP non-USC, GDP USC and upgraded-to-USC referral pathways. Patient cohort investigated in this Service Review outlined in the red box.

TABLE 1 Upgraded-to-USC pathway patient demographics.

Demographic variables		N= 83
Age (years)	Mean (± SD)	59.3 (15.5)
	Median	60
	Range	14–90
Gender	Male	52 (62.7%)
	Female	31 (37.3%)

the total USC referrals received in the study period. Patient demographics are portrayed in Table 1. The majority of upgraded e-Referrals were to the oral medicine department (82%), followed by oral surgery (10%) and OMFS (8%). Only 28% of referrals included a clinical photograph. The most common sites of concern mentioned in the e-Referrals were the tongue (30%) and neck (11%). Three patients did not meet the inclusion criteria as they did not present for a suspected

cancer assessment appointment (they DNA or cancelled all the appointment(s) they were offered). The final number of patients for inclusion in the study was 80.

3.2 | Reason for referral upgrade to USC pathway

In total, 66.3% (55/83) of the upgraded e-Referrals were upgraded to the USC pathway, by a vetting consultant, because the description or information provided by the referring GDP included key characteristic features associated with malignancy (Table 2). Examples of these are presented within Figure 2. A further 27.7% (23/83) of the upgraded e-Referrals were upgraded as the referring GDP explicitly stated they had a malignancy concern, but failed to use the designated USC pathway referral form. The remaining 6% (5/83) of upgraded referrals were very poor (vague) but included at least one descriptive characteristic of possible malignancy; necessitating an USC pathway upgrade to safeguard patients' health.

TABLE 2 Reasons for GDP non-USC e-Referral to be upgraded to the USC pathway.

Reason for upgrade:	Total upgraded GDP Non-USC e-Referrals (%)
e-Referral described characteristic malignancy features (red flag descriptors)	66.3
Using non-USC form despite explicitly stating a concern of malignancy	27.7
Very poor e-Referral requiring upgrade to safeguard patients' health	6.0

3.3 | USC assessment waiting time

A steep reduction in referrals between April 2020 – June 2020 was reflective of the postponement of GDP non-urgent dental care due to the COVID-19 Red Dental Alert Level, declared by the Chief Dental Officer for Wales, on 23rd March 2020. The median time from receipt of the e-Referral to consultant vetting was 3 days, with a range of 0–28 days. The median time from e-Referral to first appointment was 10 days with a range of 5–39 days. In total 18.8% (15/80) of the patients whose e-Referrals were upgraded to the USC pathway, presented for their cancer assessment appointments more than 14 days from the date of GDP referral and so, did not meet the NICE guideline two-week recommendation. All patients were offered an initial assessment appointment within 14 days from date of referral upgrade. Assessment appointments more than 14 days from date of GDP e-Referral resulted from patient DNA, cancellation, or prolonged vetting due to consultant absence. Consultant absence poses an enhanced risk for prolonged vetting and USC upgrade periods – we found one patient had a referral to vetting interval of 28 days, and therefore a referral to cancer assessment appointment time of 39 days.

3.4 | Diagnostic outcome and diagnostic delay

The most common diagnosis of patients whose referrals were upgraded to the USC pathway was normal anatomy (12.5%), followed by traumatic ulceration (7.5%) and oral lichen planus (5%) (Table 3). A diagnosis of malignancy accounted for 3.8% (3/80) of all diagnoses, comprising an adenocarcinoma, a basal cell carcinoma and a squamous cell carcinoma. Potentially malignant diagnoses including pleomorphic adenomas and OPMDs (as defined by Warnakulasuriya¹³) made up 17.5% (14/80) of diagnostic outcomes. All upgraded e-Referrals resulting in a positive malignancy diagnosis (3.8%) had a rapid referral to vetting time (2-day median), subsequently all having assessments within 7 days from referral date (range 5–7 days), therefore meeting the NICE standards (Figure 3). The median assessment waiting time for OPMDs was 10 days, with a range of 7–16 days. In total 21.4% of patients with upgraded e-Referrals who received a potentially malignant diagnosis (pleomorphic adenoma or OPMD), had an assessment appointment more than 14 days from the date of GDP e-Referral and so did not meet the NICE two-week standard (Figure 3).

4 | DISCUSSION

4.1 | Referral upgrade to USC pathway

The General Dental Council's (GDC) 'Preparing for Practice' undergraduate curriculum guidance stipulates that all registered dental professionals, including new graduates, should be able to identify the stages of malignancy and appreciate the significance of rapid referral for investigation and biopsy.¹⁴ According to our findings this requirement is not being met as 66.3% of upgraded GDP non-USC e-Referrals described key malignancy features but the GDP failed to recognise this or to mention a malignancy suspicion, meaning they did not refer their patient via the appropriate USC pathway. Referral triage by vetting consultants was therefore crucial in these cases to mitigate the risk of patient harm due to diagnostic and treatment delay, through the longer non-USC pathway.¹⁵ The three patients excluded from the Service Review could have affected the results significantly if malignancy was diagnosed. All upgraded-to-USC e-Referrals resulting in a positive malignancy diagnosis (3.8%) had assessment appointments that met the NICE 14-day standard.

4.2 | GDP targeted education

GDP training through case-based calibration with the oral medicine South-East Wales Managed Clinical Network Referral Guide, might increase the accuracy in identification of signs/symptoms of malignancy and appropriateness of referrals to secondary care, safeguarding patient welfare, and reducing the demand on vetting consultants.^{16,17} The Referral Guide integrates clinical descriptions and photographs of presenting malignancy into the NICE 2015 guidance, to provide an invaluable resource for GDPs. Whilst it also incorporates a Decision Process Tool, in the form of a flowchart, to aid with correct GDP referral pathway choice. Identification of repeated inappropriate referrals from specific GDPs and/or practices could facilitate an enhanced, targeted educational approach to maintain compliance more effectively with standards and improve patient care.¹⁸

Since the introduction of the e-RMS, limited guidance or training has been provided to GDPs regarding appropriate referral pathway choice. More comprehensive GDP training regarding the correct use of the USC referral form is clearly required, as evidenced by our findings that 27.7% of upgraded e-Referrals explicitly mentioned a suspicion of malignancy, as per the College of General Dentistry (CGDent

"I saw this patient this morning who has noticed a swelling under his tongue in FOM a week ago and had numbness and impaired movement of his tongue. The lesion is 2cm diameter, indurated, and tender to palpation, it has sinister features. (Photo of lesion attached). Please can you see this patient for diagnosis and management as soon as possible"

"The patient came in today with history of pain and swelling in the area of his right parotid gland. The swelling started on the 24th March. She said that she has the same problem before in the submandibular gland. She has been treated with tablets before but she can't remember the name of the medication. Now she is experiencing problems with her fascial muscles. During this episode of swelling in the right parotid she said that she felt problem with blinking her eye and her right corner of mouth is deviated. We did an examination to her teeth, no swelling, no TTP no caries"

FIGURE 2 Examples of GDP non-USC e-Referrals with characteristic descriptions of malignancy.

TABLE 3 Diagnostic outcomes of upgraded GDP non-USC e-Referrals categorised by negative malignancy diagnosis (black), oral potentially malignant disorders (amber) and positive malignancy diagnosis (red).

Diagnostic outcome	Total	Diagnostic outcome	Total (N= 80)
Actinic Keratosis	1	Lipoma	2
Acute Pseudomembranous Candidiasis	1	Neuropathic pain	1
Adenocarcinoma	1	Major Aphthous Ulcer	1
Basal Cell Carcinoma	1	Median Rhomboid Glossitis	1
Chronic Erythematous Candidiasis	1	Mucocele	2
Chronic Hyperplastic Candidiasis	4	Mucous Extravasation Cyst	1
Denture-induced Hyperplasia	1	Non-specific inflammation	4
Dysgeusia	1	Normal Anatomy	10
Epidermoid Cysts	1	Odontogenic Pain	4
Fibroepithelial Polyp	3	Parotid Sialadenosis	1
Fibrosis	1	Pleomorphic Adenoma	2
Frictional Keratosis	4	Sialolithiasis	2
Geographic Tongue	2	Solar Elastosis	1
Haemangioma	2	Squamous Cell Carcinoma	1
Herpes Simplex Virus Reactivation	1	Squamous Papilloma	2
Leukoplakia	4	TMJ Dysfunction	2
Lichenoid Reaction	2	Trichilemmoma	1
Oral Lichen Planus	5	Traumatic Ulcer	6

- previously Faculty of General Dental Practice) referral recommendations.¹⁰ However, the referring GDP still failed to utilise the appropriate USC pathway referral form (despite the form clearly stating 'please note that this form should not be used for suspected cancer referrals').

Training could be facilitated via distributing a pre-recorded USC referral form guide to GDPs. A supplementary virtual Q&A session would then consolidate knowledge gained. Refinement of the non-USC referral forms may be

necessary to prompt referring GDPs to ensure they are using the correct form and to promote compliance with the NICE guideline two-week standard. Furthermore, case-based calibration with NICE guidance and a targeted education approach could be applied to GMPs in improving identification of malignancy presenting in sites outside the head and neck region. Training would help meet the demand for increased compliance with guideline recommendations, improving the diagnostic process for malignancy and ensure a greater

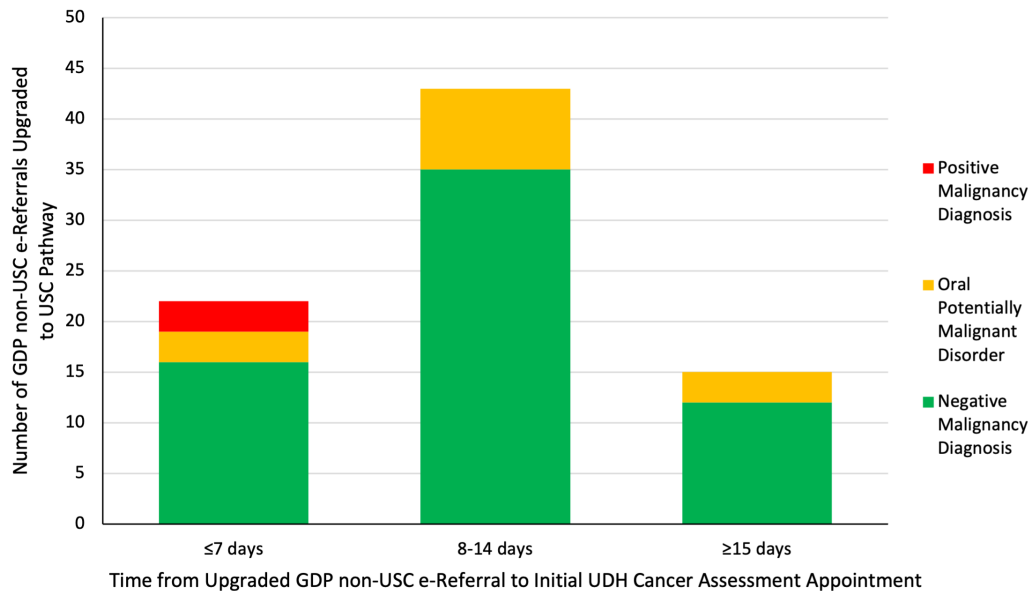


FIGURE 3 Cancer assessment waiting times for GDP non-USC e-Referrals upgraded to the USC pathway by vetting consultant between May 2019 – June 2021 categorised by diagnostic outcome.

proportion of patients presenting with red-flag symptoms receive a timely urgent referral.¹⁹

4.3 | Consultant vetting

None of the very poor-quality upgraded referrals (6%) resulted in a malignancy or OPMD diagnosis. These referrals necessitated an USC pathway upgrade to safeguard patients' health because they contained insufficient information to be able to clearly triage the clinical urgency, but did raise a concern of a possible malignancy. However, if an adequate clinical description had been provided by the referring dentist, these patients likely could have been signposted through the non-USC pathway, resulting in less pressure on administrative teams and clinicians to accommodate patients in clinics within a 2-week period. Aligning GDP training with the CGDent guidance for systematic lesion description may limit the need for unnecessary USC referral upgrades during vetting, reducing service demand and maximising resource and appointment availability to improve efficiency in reducing cancer assessment waiting times.¹⁰ In patients' best interests, vetting consultants were more likely to simply upgrade poor quality (vague) non-USC referrals as opposed to rejecting them and informing the referring GDP to re-refer using the USC pathway, as this would result in a further delay for the patient. Although this is to the benefit of the patient, it ultimately means some GDPs are not educated regarding their poor referrals, and further instances of inappropriate referrals may not be prevented. An integrated communication feature within the referral system, would provide constructive, case-based education regarding the consultant's justification for referral upgrade directly to GDPs, with the aim of preventing such issues from re-occurring. Consultant vetting was vital to identify

and upgrade the 18.6% of total UDH USC referrals that would have otherwise been filtered through the non-USC pathway. Once-weekly vetting of non-USC referrals may contribute to delay in the upgrade-to-USC pathway, prolonging patient waiting times and introducing delay in suspected cancer assessment and diagnosis. Implementation of a daily departmental vetting rota would be necessary to systematically reduce these risks and provide continuous, quantitative service improvement that can be measured by future Service Reviews or Quality Improvement Projects to confirm Quality Assurance. Although daily vetting (usually a vetting rota agreed amongst department clinicians) is carried out in many hospitals and departments, it is not always feasible (e.g. if there is only one consultant in a department). One could argue this should not be necessary to overcome the use of incorrect forms by GDPs who are referring a suspected cancer, nor for those who need education to recognise the red-flag nature of the symptoms they describe, because the dedicated USC referral pathway involves daily vetting for the very reason of avoiding any delay in patient care.

Delays in GDP and GMP suspected oral cancer referrals have been demonstrated to be similar to one another in timeframe.^{6,20} It has been proposed that increased dental referral delays may be attributed to GDPs more frequently undertaking a 'treatment trial' (such as denture easing) before referral submission.^{6,20} If a 'treatment trial' is unsuccessful in resolving the problem, and a referral is still required, this could further introduce delay in the diagnostic process.

4.4 | Adjunctive clinical imaging

The introduction of e-RMS provided standardised referral templates to guarantee provision of consistent information.¹⁶

It also permitted the attachment of clinical photographs or radiographs, eliminating the need for repeat exposure. Such data forms an important element of clinical record keeping and medico-legal protection, but was only incorporated into 28% of upgraded referrals.²¹ Greater use of adjunctive clinical imaging may better illustrate the lesions of concern and therefore reduce the impact of inaccurate written descriptions upon patient prioritisation and diagnostic delay.²² Imaging inclusion may also reduce the necessity to upgrade poor quality referrals with limited clinical descriptions.

4.5 | Strengths and limitations

This review provides a comprehensive assessment of the entirety of upgrade-to-USC pathway e-Referrals in South-East Wales since the introduction of the e-RMS. Whilst we recognise the relatively small sample size impacts the reliability and generalisability of the results, this study does provide an insight into referral pathway choices and shortcomings, and hypotheses how the current situation might be improved to the overall benefit and safety of patients.

Despite the issues, the current vetting process was effective at catching inappropriate referrals in a timely manner, with the majority of upgraded patients having an appointment within the NICE suggested timeframe. Furthermore, all patients who did receive a diagnosis of a malignancy had an appointment for an assessment within 2 weeks of their referral.

To better understand the efficacy of the vetting process, further work is needed. This would involve examining the diagnostic outcomes of *routine* (non-USC) referrals, to assess if the diagnoses given to these group of patients did indeed only warrant a routine referral, or whether any of these patients would have benefitted from a USC referral by their GDP, or upgrade of their routine referral by the vetting consultant.

5 | CONCLUSION

Early identification, diagnosis and treatment of malignancies is fundamental in improving oral cancer survival outcomes. Challenges in oral malignancy identification relate to the asymptomatic nature of early cancer and its varying clinical presentations.²³ Evidence for population-wide cancer screening is limited and is presently not recommended as it is impossible to predict which 5% of abnormalities develop to malignancy.²⁴ Efficacy of USC referral pathways rely on GDP discretion and clinical judgement to help safeguard early malignancy identification and rapid diagnostic intervals. Some GDPs' clinical judgement and referral pathway choice needs to be improved. This is founded upon reinforced GDP training to guarantee competence in tackling the inherent challenges of early and accurate identification of suspected oral malignancy and combined with referral form refinement, to provide greater clarity between referral pathways.

5.1 | Recommendations

- GDP case-based calibration with the Oral Medicine South-East Wales Managed Clinical Network Referral Guide, to increase accuracy of malignancy identification, systematic lesion description and referral pathway choice
- Establishment of a targeted education approach through identification of specific GDPs and/or practices repeatedly referring inappropriately
- Refinement of non-USC referral forms to provide greater clarity between referral pathways, including mandatory GDP justification for referral pathway choice
- Implementation of an integrated communication feature within the referral system to allow consultants to provide case-based justification for referral upgrade directly to GDPs, thus indirectly educating them
- Introduction of a daily departmental vetting rota, where possible, to prevent delay in upgrade of inappropriate non-USC referrals, mitigating risk of delayed suspected cancer assessment and diagnosis
- Promotion of clinical image inclusion to better demonstrate the lesion, reducing the impact of inaccurate written descriptions
- Repeat Service Reviews or Quality Improvement Projects after implementation of recommendations to confirm Quality Assurance

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CONFLICT OF INTEREST STATEMENT

None.

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