



An audit of the accuracy and positive predictive value of red flag referrals made to the Oral Surgery and Oral Medicine Departments in the School of Dentistry over the nine-month period up to and including September 2019

PHASE ONE REPORT

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Assurance, Challenge and Improvement in Health and Social Care

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Clinical Audit Report

Executive summary

The number of red flag referrals to the School of Dentistry has increased significantly over recent years. This has been demonstrated by previous audit projects whereby the number of referrals made between January 2018 and September 2018 was 435 in comparison to 128 between September 2011 and October 2012 (3.4 fold increase). Red flag referrals to the School of Dentistry include those sent to both the Oral Surgery (a local service) and Oral Medicine departments (a regional service).

Previous audits had confirmed that many referrals contained insufficient information for adequate consultant triage and, as such, a new referral proforma was implemented in conjunction with the Belfast Health and Social Care Trust (BHSCT) and the Health and Social Care Board (HSCB) in 2013 in order to improve referral quality. Following implementation of this referral proforma, it was noted that there was an overall increase in the number of red flag referrals without a proportionate increase in the number of malignancies.

The positive predictive value for the current audit was 5.3%, which has reduced from the previous audit in 2014/15 where it was 9%. Both of these audits were carried out after implementation of the proforma. Prior to proform implementation, the PPV was 15% (2011/12) and so shows a continuing PPV reduction following proforma implementation

The National Institute for Health and Care Excellence (NICE) guidelines NG12 'Suspected cancer- recognition and referral' (https://www.nice.org.uk/guidance/ng12) have recommended that a 'risk threshold' be used as a trigger for referral and investigation of symptoms suspected to be cancer. A risk threshold of 3% has been recommended, which in turn indicates the PPV for red flag referrals should be approximately 3%.

As it has been a number of years since the accuracy of red flag referrals and positive predictive value of referrals have been investigated in the School of dentistry, we, as a clinical team, have completed an audit to determine current referral practice and outcome of red flag referrals with the intention of improving referral quality, appropriate use of the referral system, and early diagnosis of malignancy to ultimately improve patient outcomes.

Aims and Objectives

<u>Aim</u>

This project aimed to determine the accuracy and positive predictive value of red flag referrals to the School of Dentistry.

Objectives

There were several objectives to this project:

- 1. To determine current referral practice in terms of the reason for referral, patient demographic, referrer demographic and lesion characteristics.
- To determine whether red flag referrals meet the criteria set out in the 'Northern Ireland Referral Guidance for Suspected Cancer – Red Flag Criteria' document 2012 https://nican.hscni.net/info-for-professionals/primary-care-guidance/
- 3. To determine whether referrals are being seen within 2 weeks as recommended by NICE guidelines, 'Suspected cancer- recognition and referral'.

Standards/guidelines/evidence base

1. Northern Ireland Referral Guidance for Suspected Cancer – Red Flag Criteria' document 2012

2. NICE guidelines 2015 'Suspected cancer- recognition and referral' <u>https://www.nice.org.uk/guidance/ng12/resources/suspected-cancer-recognition-and-referral-pdf-1837268071621</u>

Methodology

This clinical audit relates to regional referrals made to the oral surgery and oral medicine departments at the School of Dentistry, Royal Victoria Hospital. An initial list of patients who had been placed on the red flag pathway at any point along their referral journal was acquired from the Belfast City hospital Cancer Audit Centre. This list related to patients who were referred or seen within the departments between January 2018 and September 2018. In total, 435 patients were identified to have their records reviewed.

Patient records of those identified were then requested from the dental records department to be reviewed by the data collection team (two calibrated dentists). Overall 377 records were located and reviewed with the remaining 58 records being unavailable of or unable to be located at the time.

Data collection

Data was collected by two qualified dentists who were calibrated prior to commencement of data collection. Pre-agreed data collection criteria were used. These included details relating to:

- 1. Patient demographic (age, sex, smoking and alcohol status)
- 2. Referral information (details relating to referrer, waiting time, triage and changes to triage, lesion description)
- 3. Referral outcome (diagnosis, treatment)

Findings

Referrer and referral method

Most referrals came from either General Medical Practitioners (GMPs) (55%) or General Dental Practitioners (GDPs) (43%) with the remainder coming from other medical or dental specialities or an unrecorded source.

Referral method was largely dependent on who was referring the patient. GDPs mostly preferred the paper referral proforma (97%) whereas the GMPs tended to use the electronic referral system (97%). Method of referral also impacted on the referral timeline. Referrals made via the electronic referral system took on average 0.52 days to be triaged whereas those referred as a proforma took on average 3.45 days. Referral via the electronic method led to much faster receipt and triage of referrals which in turn allowed appointments to be allocated more quickly.

Figure 1: Average time between referraland consultant triage



Referral content and triage

Upon receipt, referrals are reviewed by consultant staff and allocated a triage grade. This may involve keeping the triage grade the same, upgrading or downgrading urgency of referral. On review we found that 61% of GDP and 63% of GMP referrals remained as a red flag referral following consultant triage. A further 21% of GDP and 33% or GMP referrals were downgraded to urgent or routine. A small number of referrals, not originally sent on the red flag pathway, were upgraded to red flag on triage (18% GDP and 4% GMP).

On average it was 8.71 days from time of referral receipt until the patient was seen at a consultant clinic. They were seen in the next available appointment slot at either an oral surgery (59%) or oral medicine (41%) clinic. Only 21 referrals (5.5%) included a clinical photograph and all of these were sent by GDPs. Although there is no guideline on when a clinical photo is required, it is noted on the current proforma that a clinical photograph can be attached.

Referrals were reviewed regarding appropriate lesion description (site, size, shape, colour, consistency).



Patient demographics

The average patient age at the time of referral was 56 although this average varied significantly for males (70 years) and females (46 years). The smoking status of patients was also audited and it was found that 41% of patients were smokers at the time of referral and a further 11% had smoked previously.

Lesion characteristics and diagnosis

Lesions referred on the red flag pathway were categorised into a number of groups. The most common types of lesion referred were ulcers, white patches and lumps. Smaller numbers of speckled, red and pigmented lesions were also referred.

Table 1: Number of referrals sent to the school of dentistry divided into lesion type

Lesion Type	Number
White patch	67
Red patch	16
Speckled	13
Ulcer	133
Other	43
Pigmented	10
Lump	95

Of all lesions seen on the red flag pathway 22% underwent a biopsy. Of those lesions which were upgraded at the time of triage the most common diagnosis was a traumatic ulcer or recurrent aphthous ulceration. Of those which underwent a downgrade, the most common diagnoses were candida infection and lichen planus/reaction. Forty patients remained on the red flag pathway following the initial consultation with the remaining 293 being downgraded.

Of the 40 patients who remained on the red flag pathway following the first consultation, 20 (50%) were subsequently confirmed to be malignancies. Of these 20 lesions, 13 presented as ulcers and overall 50% of patients were smokers.

Table 2: Lesions that remained on the red flag pathway following initial consultation

Lesion Type	Number
Oral Malignancy	20
Resolved lesion	5
High grade dysplasia	3
Traumatic ulcer (biopsy)	3
Further investigation- NAD	3
Mucocele	2
Lingual tonsil (ENT biopsy)	2
FTA review	1
Papilloma	1

Referral practices

The top three referral general medical and top five general dental practices were identified for use in a future phase of our ongoing work.

Comparison with previous audits of ref flag referrals

When comparing the diagnoses of referrals which were on the red flag referral pathway between those audits after implementation of the proforma (see 2014/15 audit and current audit) and the audit carried out prior to implementation of the referral proforma (2011/12) there was an overall change in most frequent final diagnoses. Prior to the referral proforma, the most common diagnosis of red flag referrals was oral squamous cell carcinoma (OSCC) followed by traumatic ulcer. In those audits of referrals post implementation the most common diagnosis was a traumatic ulcer.

Table 3: Comparison of the top 5 diagnoses made for referrals in the 2011/12, 2014/15 and 2018 year

Lesion Type 20111/12	Lesion Type 2014/15	Lesion Type 2018 (current)
 Oral Squamous Cell Carcinoma Traumatic Fibrous epulides Hyperplasia Nicorandil ulcer 	 Resolved Traumatic ulcer Candidosis Hyper/frictional keratosis OSCC 	 Traumatic ulcer Nil to see Failed to attend OSCC Candidosis

The positive predictive value for the current audit was 5.3%, which has reduced from the previous audit in 2014/15 where it was 9%. Both of these audits were carried out after implementation of the proforma. Prior to proform implementation, the PPV was 15% and so shows an overall reduction following proform implementation.

NICE clinical guideline (NG12) "Suspected cancer: recognition and referral (2015)" suggest a positive predictive value of 3% or less should be aimed for, which takes into account financial and clinical costs.

Table 4: Proportion of red flag referrals which were diagnosed as Head and Neck cancer (HNC) in three consecutive audits

	Sep 11-Aug 12	Jun14-Jun15	Jan-Sept18 (current)
Study Size	128	298	377
Study Period (months)	12	12	9
Number of OSCC diagnoses	19	26	20
HNC (%)	15	9	5.3

Malignancies

Of the 20 diagnosed malignancies, 13 were male and seven female with an average age of 62 and 71 respectively.

Table 5: Types of lesions later diagnosed as malignancy with persistent ulceration being the most common

LESIONS REFERRED	NUMBER
Ulcer	13
White Patch	1
Swelling	2
Hypoglossal Palsy	1
Painful Swallow	1
Numbness/Swelling	1
Necrotic Mass	1

Discussion

At the outset there were three main aims to our project. The first of these was to determine current referral procedures as well as patient and referrer characteristics. This project has highlighted that our referrals come from two main sources, General Dental Practitioners (GDP's 43%) and General Medical Practitioners (GMP's 55%) although a small number come from other sources.

The source of referrals has therefore changed significantly since 2011 where 90% of referrals came from GMP's in comparison to the current 55%. This may be due to implementation of the proforma in 2013 and ease of referral by GDP's as a written letter is no longer required.

The reduction in PPV in this audit is noted. the use of the proforma approach is a contributor here but the explanation may be more nuanced. The time-limited response afforded to the referring practitioner by this pathway, the ease of adopting it (particularly for GMPs and for GDPs when electronic referrals come online for them) and education sessions for practitioners has increased the referral base well beyond historic levels increasing from 70 in 2012 audit through to 377(n=435) in current audit.

There are two main routes of referral used and those are either electronic referrals which are used by the significant majority of GMPs (97%) and proforma referrals used by almost all GDP's (97%). The method of referral impacted on how quickly the referrals were triaged by a consultant (electronic- average 0.52 days, proforma-average 3.45 days) and demonstrated that the electronic referral method would appear to be more efficient than proforma referrals and patients can therefore receive an appointment sooner. This highlights an area of potential improvement in the referral structure for GDPs may be made.

In terms of patient demographics, the overall mean age of patients was 56 years although when broken down into sex, the average age of females was 46 and that of males was 70 demonstrating a much younger age of referral for females. There may be many factors contributing to this including increased likelihood of females to present regarding medical issues. We also found that 53% of those referred were current or ex-smokers.

Our second aim was to determine whether referrals met the NI referral guidelines for red flag referrals. Of those referrals initially on the red flag pathway, 69% were deemed appropriate and remained on the red flag pathway (75% of GDP and 66% of GMP referrals). This is an area which could potentially be improved upon and will be looked into further by both departments.

Thirty-five referrals were upgraded to a red flag referral at the time of triage and would have met the NI guidelines initially for a red flag referral to be made. It may be that further education on the appropriate use of the red flag referral system is required in some cases. The positive predictive value is a means of quantifying the percentage of referrals made on the red flag pathway that translate to a cancer diagnosis. It is recognised that in order to ensure that cancers are not missed, this value will remain low (3% as per NICE guidelines). In the current audit the PPV is 5.3% which is a significant reduction since the 2011/12 audit at which time it was 15%. We did not specifically look at the reasons for this shift in the audit although

ease of referral on the red flag pathway since proforma implementation may be a contributing factor as well as increased awareness of oral cancer presentation.

Our final aim was to determine whether referrals on the red flag pathway were being seen within two weeks as outlined in the NICE guidelines. We found that overall, 91% of patients were being seen within the recommended two weeks from time of referral. The time taken to being seen ranged from the same day of referral to a maximum of 45 days (median 20 days). Although a large proportion of patients are being seen within the recommended time frame our aim is to achieve 100% compliance, therefore measures should be implemented in order to achieve this.

Evidence of sharing learning

This audit will be presented at the School Wide audit in the School of Dentistry which is attended by Consultants, Trainees and Nurses of all dental specialties as well as community dental teams from BHSCT. The aim will be to highlight our results to those involved in the red flag referral system as well as the wider school and start conversations regarding how improvement can be made.

For future work, we also intend to involve the most frequently referring GMP practices by organising study sessions to highlight appropriate use of the red flag referral systems in terms of which lesions should be referred and which should not. This has unfortunately been delayed due to current COVID-19 restrictions.

- KEY (Change status) as per HSC Trust1 Recommendation agreed but not yet actioned

- Action in progress
 Recommendation fully implemented
 Recommendation never actioned (please state reasons)
 Other (please provide supporting information)

Project title	A clinical audit of red flag referrals to the Oral Surgery and Oral Medicine Departments at the School of
Project title	Dentistry

Action plan leadName: John MarleyLitle: Consultant Oral SurgeonContact: 02890633472	02890633472
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Recommendation	Actions Required (specify	Action	Person	Comments/Action Status	Change
	"None", if none required)	by Date	Responsible	(Provide examples of action in	Stage
			(Name and	progress, changes in practices,	(see Key)
			grade)	problems encountered in	
				facilitating change, reasons why	
				recommendation has not been	
				actioned etc)	
To look into implementing an electronic referral system that can be used by GDPs in order to speed up the referral process to the same extent as for GMPs	Continue to discuss methods of implementing this at a local management level as well as at HSCB level.		John Marley	Discussions have previously taken place at HSCB level regarding this although due to current COVID pandemic these discussions have not been delayed.	
To review the red flag referral pathway to ensure that there are enough slots available for RF	 To determine reasons contributing to outlier delays in appointments for red flag patients. 		John Marley	At present we are awaiting COVID restrictions to reduce before implementing this plan.	

Clinical Audit Action Plan

referrals to be seen within the allocated 2 weeks.	2. To undertake consultation between senior consultant staff in oral surgery and oral medicine as to how red flag referrals are allocated an appointment slot within the 2-week timeframe.			
To educate GMP's on which lesions/conditions require referral on the red flag pathway and which do not.	To provide education sessions to the top GMP referral practices on what constitutes an appropriate red flag referral.	John Marley	At present we are awaiting COVID restrictions to reduce before implementing this plan.	
Re-Audit	To determine if action has been taken allowing for an improvement.	John Marley	As above	

Project Team

Name	Job Title/Specialty	Trust	Role within Project (data collection, Supervisor etc)	
Project lead				
John Marley	Consultant Oral Surgeon	BHSCT	Consultation and steering group, action planning	
Deputy Project Le	ad	•		
Christine Causey	Specialty trainee in Oral Surgery	BHSCT	Planning and audit, proforma development, data collector recruitment and training, data collection, analysis, report writing, action planning, dissemination	
Project Team				
Padraig Kerlin	Dental core trainee	BHSCT	Data collection	
Amanda Willis	Consultant Oral Medicine	BHSCT	Consultation and steering group, dissemination	





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 Image: Compare the system of the system

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