

# Audit of referral for retinal photo screening for patients with diabetes in general practice

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## ABSTRACT

An audit of two Waikato general practices was undertaken by a final year medical student during the six week general practice attachment to quantify the number of patients with a diagnosis of diabetes who have ever been referred for retinal photo-screening and to identify factors which may impact on screening rates.

A total of 370 sets of notes were eligible for audit, and data was analysed for influence of gender, age, ethnicity, practice location, smoking status, level of diabetes control and contact for HbA1c or 'Get Checked' visit in the previous year.

Results showed that smokers were less likely to be referred, whereas patients having either a 'Get Checked' visit or an HbA1c test in the previous year were more likely to be referred. Involvement of final year students in research provides good academic experience but also methodological difficulties.

## Key words

Audit, diabetic retinopathy, retinal photo screening.

## Introduction

Diabetic retinopathy is the leading cause of avoidable loss of vision in the developed world and the risk of developing vision threatening retinopathy increases according to the duration of diabetes.<sup>1</sup> Maori and Polynesian populations have higher prevalence of diabetes and develop diabetes earlier than those of European decent.<sup>2</sup> Furthermore, they are more likely to experience vision threatening retinopathy as a result of their diabetes.<sup>3,4</sup>

Laser treatment is amongst the few successful methods of retarding disease progression.<sup>5</sup> Screening for those who would benefit from laser treatment has been found to be cost-effective.<sup>6</sup> Local initiatives tailored to community needs can assist with implementing screening programmes.<sup>7</sup> Such local solutions are particularly important when considering high overall failure-to-attend-screening rates in Maori (32.2%) compared with an overall failure-to-attend rate of 18.7%.<sup>3</sup>

The initial research question was developed by a final year medical student who wished to undertake a research project during his six week general practice attachment. This research audited diabetic patients from two general practices to examine factors that may affect referral for retinal photostrengthening.

## Method

Ethics approval was sought and gained from the Northern Y ethics committee. The audit was conducted in two general practices in the Waikato Re-

gion in late 2006; one practice from an urban area and one from a rural area (based on qualification of a Rural Bonus). Inclusion criteria were all patients enrolled in either practice, who were 18 years of age or older and had been coded for either type I or type II diabetes. Exclusion criteria were patients who were registered blind.

Data was collected manually by retrospective chart review. Ethnicity data was collected based on ethnicity provided at enrolment to the clinic, and smoking status as recorded by the practice. These were dichotomised to *Maori* or *Non-Maori*, and *Smoker* or *Ex/non-smoker* respectively. The most recent glycosylated haemoglobin (HbA1c) result was collected with 7% as a marker of good diabetic control.<sup>8</sup> The criteria for referral to photo-screening service was met if there was a documented referral letter in the chart review, or if there was a letter from the photostrengthening service documenting the outcome of an appointment. Data was analysed on STATA software (version 8, Stata Corporation, 2003) using a two-tailed chi square test and multivariate analysis.

## Results

A total of 370 patient records were coded for diabetes. Of these, 25 patient records were excluded: 22 had an unclear diagnosis, one patient had no notes available, one patient was deemed from their notes as not being appropriate for screening and one patient was registered blind. This left 345 sets of notes available for analysis. The results are summarised in Table 1.

Table 1. Distribution of referrals for photoscreening by age, gender and other exposure variables

Potential risk factor		Referred (%)	Not referred (%)	Association with referral			With co-variate adjustment**		
				Crude OR	p-value	95%CI	Adjusted OR	p-value	95%CI
Age group	18–59 yrs	88 (64.71)	48 (35.29)	1.0					
	60+ yrs	165 (78.95)	44 (21.05)	2.05	0.004*	1.25, 3.34	2.06	0.0041*	1.25, 3.44
Gender	Female	133 (76.44)	41 (23.56)	1.0					
	Male	120 (70.18)	51 (29.82)	0.72	0.19	0.45, 1.17	0.78	0.33	0.48, 1.28
Ethnicity	Maori	116 (75.32)	38 (24.68)	1.0					
	Non-Maori	137 (72.11)	53 (27.89)	0.85	0.5	0.52, 1.37	0.74	0.23	0.44, 1.22
Smoker	Ex/Non-smoker	192 (79.01)	51 (20.99)	1.0					
	Current	44 (64.71)	24 (35.29)	0.49	0.01*	0.27, 0.88	0.38	0.0062	0.19, 0.78
HbA1c	<7%	143 (80.34)	35 (19.66)	1.0					
	≥7%	104 (73.76)	37 (26.24)	1.45	0.16	0.86, 2.47	1.57	0.11	0.90, 2.76
Practice location	Urban	34 (73.91)	12 (26.71)	1.0					
	Rural	219 (73.24)	80 (26.76)	0.97	0.92	0.48, 1.96	0.83	0.63	0.39, 1.77
Type of diabetes	Type 2	236 (73.29)	86 (26.71)	1.0					
	Type 1	17 (73.91)	6 (26.09)	1.03	0.95	0.39, 6.33	1.46	0.45	0.54, 3.95
HbA1c taken in last year	No	29 (56.86)	22 (43.14)	1.0					
	Yes	218 (81.34)	50 (18.66)	3.31	0.0001*	1.73, 6.33	3.10	0.0007*	1.56, 6.17
Annual check completed in last year	No	118 (59.00)	82 (41.00)	1.0					
	Yes	135 (93.10)	10 (6.90)	9.38	0.00001*	4.39, 20.05	8.54	0.00001*	4.03, 18.11
Duration of diabetes***	<8 years	95 (87.16)	14 (12.84)	6.8		3.87, 11.89			
	>8 years	63 (98.44)	1 (1.56)	63		8.74, 454.22			
				9.28	0.01*	1.14, 75.75	41.96	0.047*	0.52, 336

\* statistically significant (p<0.05)

\*\* covariate adjustment with variables: age group, gender, ethnicity

\*\*\* test for homogeneity >0.05

A total of 253 diabetic patients (73.3%) have been referred for retinal photoscreening compared with 92 (26.7%) who have not.

Patients over 60 years of age, non-smokers, those who have had a HbA1c blood test in the past year, and those who have had an annual check in the past year were more likely to be referred for retinal photoscreening (p>0.05). Analysis of data according to gender, ethnicity, location of practice, HbA1c result, or type of diabetes did not demonstrate a statistically significant difference.

Multivariate analysis was used to adjust for several potential confounding variables (age, gender and ethnicity). Age group remained statistically significant after adjustment for gender and ethnicity. Patients over 60

years of age were twice as likely to be referred to retinal photoscreening as patients less than 60 years of age (*Adj* OR 2.06, p=0.0041, CI 1.25–3.44). Smokers were less likely to be referred for screening than ex or non-smokers and this result became more significant when adjusted for age, gender and ethnicity (OR 0.49, p=0.01 vs. *Adj* OR 0.38, p=0.0062). No other significant relationships were found by co-variate adjustment.

## Discussion

The results of this research must be considered in the light of both practices being part of a wider organised general practice network that actively encourages the development of practice systems and processes. Further, the 'Get Checked' programme is used

in both practices and would assist in the development of robust practice systems. The sample size was relatively small and both practices were from the central region of the North Island. The data collection was completed by the student during practice attachments. This limited the ability to re-examine specific case notes for clarification of ambiguous data.

Referral for retinal photoscreening requires prerequisites of agreement from the patient as well as appropriate practice systems. Failure to refer may be a result of either prerequisite not being met. A further issue is the possibility of the data being skewed by newly diagnosed diabetics who have not been referred for photoscreening according to standard guidelines.

The finding of similar referral rates for Maori and non-Maori is notable. Disparities in both treatment and outcome for Maori and other non-European ethnic groups with diabetes are well known and documented.<sup>4</sup> It is gratifying to find referral rates for Maori are as high as non-Maori and that controlling for ethnicity found no difference in referral rate between Maori and non-Maori for those with poorly controlled diabetes (HbA1c = 7). However, this research utilised referral to retinal photoscreening as its endpoint and did not examine other aspects of care consequent on health outcome disparities such as diagnosis rate, clinic attendance rate, offer of treatment at secondary care etc. Ethnic disparities have previously been found in secondary care management in other disease states such as ischemic heart disease.<sup>9</sup>

Previous data suggests that smoking is positively correlated with the development of diabetic retinopathy.<sup>10</sup> The lower rate of referral for smokers may be a result of a number of confounding variables; smokers may be less likely to seek or agree to proactive health measures as is evidenced by continued smoking. Conversely, practice systems may inadvertently discriminate against those who smoke; smokers may be perceived by those referring to photoscreening as being less likely to comply with a screening programme and therefore are referred less frequently. It may be of benefit to more specifically target those with diabetes who also smoke for a further intervention designed to im-

prove retinal screening rates and to highlight this issue with practitioners to be aware of possible inequities in referral of smokers.

Having either a HbA1c test or a 'Get Checked' visit in the previous year was significantly correlated with increased screening rates. Two hundred and sixty-eight patients (77.6%) had an HbA1c test in the past year while only 145 patients (42%) had a completed annual check. Conversely, tightness of glucose control did not impact on screening rates. It is known that those with worse control are more likely to develop diabetic retinopathy.<sup>11</sup> It would appear that frequency of contact between the general practice and those with diabetes may be directly related to referral rates for retinal photo screening.

Data collection over a six week general practice attachment does pose methodological problems. It may not be possible to recheck source data at the analysis stage to clarify ambiguity. Pilot studies to test the feasibility and completeness of data collection are not possible. Ethics approval must be considered as early as possible during the trainee intern year so that approval is available before the attachment commences. This requires the project to be developed in some detail well before the run starts.

## Conclusion

The results of this research must be considered in the light of the methodological difficulties inherent in this project. Referral rates for retinal photoscreening in this diabetic popu-

lation were positively influenced by having either a HbA1c test or a 'Get Checked' visit in the previous year. Smoking in the population adversely affected referral rate. No difference was found in urban versus rural practice, age of enrolled patient, level of diabetes control, gender, ethnicity (Maori or non-Maori) or type of diabetes (type 1 or type 2). Age greater than 60 years was positively correlated to screening rate. It is suggested that increased attention may be required for those with diabetes who smoke to ensure access to retinal photo screening. It is likely that programmes such as 'Get Checked' that require interface between those with diabetes and their general practice are positively influencing rates of retinal photoscreening.

The involvement of final year students in the design and data collection of research projects is feasible and provides excellent experience. However, some limitations in terms of methodology and therefore data accuracy must be accepted due to the nature of a six week attachment. Careful design of a project is required to recognise and minimise such limitations.

## Acknowledgements

We would like to thank the two participating practices and to acknowledge the Waikato Faculty Board of the RNZCGP for their support and encouragement of the undergraduate research project that facilitated the data collection.

## Competing interests

None declared.

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