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8 **Seeing new opportunities to help smokers quit: A UK national survey of optometrist**  
9 **delivered smoking cessation behavioural support interventions.**  
10

11  
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16

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26

27 **Keywords:** Smoking cessation, national survey, behavioural support, optometrist, very brief  
28 advice, training, current practice  
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1 **ABSTRACT**

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3 **Background:** Smoking is a risk factor for various eye conditions. Brief smoking cessation  
4 interventions have demonstrated effectiveness when delivered by a range of healthcare  
5 professionals. Optometrists are well-placed in the community to advise otherwise healthy  
6 smokers to quit, yet remain relatively neglected in smoking cessation research and policy. In  
7 a national survey, this study investigated self-reported practices of UK optometrists for  
8 delivering brief tobacco smoking cessation interventions to patients.

9

10 **Methods:** A randomly selected sample of 1,200 optometrists out of the 9000 optometrists  
11 registered on the UK College of Optometrists database were invited to complete a 40-item,  
12 web-based survey assessing: training related to smoking cessation; current practice [i.e. the  
13 proportion of patients to which components of very brief advice (Ask, Advise, Assist) and  
14 other evidence-based smoking cessation behaviour change techniques were delivered]; and  
15 barriers/enablers to intervention delivery.

16 **Results:** In total, 408 (34%) responses were received. Most (83%) optometrists received no  
17 training in practical skills for delivering smoking cessation support. A third (34%) routinely  
18 assessed smoking status. Fewer self-reported advising smokers to quit (22%), offering  
19 assistance (via referral to dedicated services) (3%), or advice on smoking cessation  
20 medications (2%). Perceived barriers included insufficient knowledge/training (81%) and  
21 time (65%). Optometrists were more likely to assess and advise on smoking cessation if they  
22 practised in Scotland ( $\chi^2(2)=32.95$ ,  $p<0.001$ ), an independent optometry practice  
23 ( $\chi^2(1)=4.27$ ,  $p=0.39$ ), or had received smoking cessation training ( $\chi^2(1)=13.1$ ,  $p<0.001$ ).

24

1 **Conclusions:** Substantial gaps exist in UK optometrists' current smoking cessation training  
2 and practice. Evidence-based training resources are needed to support the implementation of  
3 smoking cessation interventions into routine optometry practice.

4  
5 **IMPLICATIONS**

6  
7 Optometrists are well placed in the community to delivery brief advice interventions to a  
8 large population of smokers. This survey provides a comprehensive description of current  
9 UK optometry practice related to the provision of evidence-based brief tobacco smoking  
10 cessation interventions to patients. Although optometrists perceive advising on smoking  
11 cessation as part of their role, numerous substantial gaps in current practice and training  
12 remain which need to be addressed through targeted interventions to increase  
13 implementation.

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## 1 INTRODUCTION

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3 Behavioural support interventions for smoking cessation have been shown to be highly  
4 effective and cost-effective (1). Such interventions aim to maximize smokers' motivation to  
5 quit, promote effective use of pharmacological interventions, and facilitate relapse prevention  
6 and coping (2-4). Behavioural interventions can be delivered at different intensities- from  
7 very brief advice (VBA) (i.e. the 3A's: Ask about smoking status, Advice on smoking  
8 cessation, Assist the smoker to quit), delivered once off, over a few minutes, with the primary  
9 aim of promoting quit attempts (5); to more intensive cessation focused, multi-session  
10 support delivered by specialist advisors in dedicated stop smoking services (1).

11

12 The UK National Institute of Health and Care Excellence (NICE) Smoking Cessation Quality  
13 Standards (2013) (6) and equivalent guidelines internationally (7) recommend that all  
14 healthcare professionals routinely assess smoking status in patients. Various healthcare  
15 professionals have become involved in delivering VBA interventions, including: General  
16 Practitioners (i.e. GPs/ family physicians), cardiologists, nurses, pharmacists, psychologists,  
17 midwives, and dentists (8, 9). Smokers receiving VBA from such healthcare professionals are  
18 more likely to make a quit attempt, and succeed, compared to those offered no advice or  
19 support (5). However, to date, optometrists have remained a relatively neglected healthcare  
20 professional group in smoking cessation policy, research and service provision; representing  
21 an untapped resource with the potential to contribute to smoking cessation (10, 11).

22

23 This overlooked opportunity is surprising, given smoking is one of the leading modifiable  
24 factors associated with age-related macular degeneration- the most common cause of  
25 blindness in the UK (12), and other ocular conditions such as cataracts (13) and thyroid eye  
26 disease (14). However, public awareness in the UK of links between smoking and ocular

1 health risks is low (15). Furthermore, it has been argued that optometrists are especially well  
2 placed to deliver smoking cessation support to a wide range of smokers, who are otherwise  
3 healthy and may not come into regular contact with healthcare professionals (16). The role of  
4 optometrists in healthcare delivery has recently expanded to include broader health  
5 promotion. Optometrists often advise on dietary lifestyle changes to patients at risk of, or  
6 newly diagnosed with, age-related macular degeneration (17). It has therefore been suggested  
7 that optometrists should also advise on smoking cessation; to the extent that in the UK, the  
8 College of Optometrists has responded to the NICE Smoking Cessation Quality Standards  
9 requesting the role of optometrists in delivering smoking cessation support be recognized  
10 (18).

11 However, there is limited knowledge regarding the extent to which optometrists currently  
12 deliver smoking cessation support to patients. The few studies conducted to date in the UK  
13 and internationally (i.e. Canada, USA, Australia) report that, although most optometrists are  
14 aware of the link between smoking and ocular conditions, and believe assessing smoking  
15 status in patients is part of their role (11, 19-21), there is wide variation in the proportion of  
16 optometrists (6% to 50%) that actually ask patients about smoking habits during a  
17 consultation (11, 17, 21, 22). An even smaller proportion of optometrists assess patients'  
18 motivation to quit (6%), or offer advice regarding possible strategies for quitting (2% to  
19 13%)(23). Reported barriers to delivering smoking cessation interventions include lack of  
20 financial incentives, training, knowledge, and time (11, 23).

21

22 However, these studies are arguably not representative of current practice in the UK. Existing  
23 UK-based surveys have primarily been conducted over 10 years ago (21, 22). More recent  
24 surveys have either been conducted in different countries and/or healthcare systems (11, 20,  
25 23), or do not comprehensively assess the delivery of all components of evidence-based

1 smoking cessation VBA (i.e. enquire about ‘Ask’ component but not ‘Advise’ or ‘Assist’)  
2 (17). There is thus a need to comprehensively assess and establish UK optometrists’ current  
3 practice.

4  
5 The aim of the current study was to conduct a national survey to determine current practice  
6 amongst UK optometrists regarding the delivery of brief evidence-based interventions (i.e.  
7 VBA) for tobacco smoking cessation. Secondary aims were to: i) investigate variation in  
8 service provision according to optometrists’ characteristics (e.g. years of experience,  
9 training), and ii) examine optometrists’ perceived barriers and enablers to delivering smoking  
10 cessation interventions to patients.

11

## 12 **METHODS**

13 This study received ethical approval from the City University London School of Health  
14 Sciences ethics committee (Ref: Opt/Proportionate Review/24).

### 15 **Design**

16 National web-based survey.

### 17 **Participants and Sampling**

18 Potentially eligible participants included currently practising optometrists registered on the  
19 membership database of the UK College of Optometrists. This database currently has 9,000  
20 registered members. A pragmatic approach to maximizing response rate was taken by  
21 recruiting a randomly selected sub-sample of all registered members. This was deemed likely  
22 to increase response rate as a smaller sample facilitates identification of bounce back emails,  
23 regional selection, and personalization of invitation emails (24). Following the methods of  
24 Dabasia et al. (2014), the required sample size was calculated using Cochran’s formula for  
25 continuous and categorical data (24, 25). Using this formula, based on a 5% error margin and

1 alpha set at 0.05, for a population of approximately 9,000 potential participants, a sample size  
2 of 370 responses was deemed necessary. Previous literature on optometrists' responses to  
3 surveys estimates a 30% response rate (24). Therefore, to account for this, 1,200 optometrists  
4 currently registered on the College of Optometrists database membership were randomly  
5 sampled and invited to participate in the survey.

6

### 7 **Materials: questionnaire**

8 A 40-item questionnaire was developed, informed by: i) the content of previous surveys of  
9 smoking cessation practice in optometrists (11, 17, 20, 22); and ii) a survey of UK specialist  
10 stop smoking practitioners' self-reported practices, attitudes and levels of training (26), which  
11 captures delivery of current, evidence-based guidelines for smoking cessation behavioural  
12 support interventions (3).

13

14 The questionnaire was structured into four sections. *Section 1:* Respondent demographics  
15 [e.g. years qualified, country, main place of work- i.e. independent practice vs multiple  
16 practice (small groups/ optometry chains), educational qualifications, and current/past  
17 smoking status]. *Section 2:* Respondent's training in smoking cessation [e.g. whether taught  
18 to assess smoking status (Yes/No/Cannot remember); extent to which respondent felt they  
19 have sufficient knowledge/training to deliver smoking cessation support (5 point Likert-scale  
20 from 1- 'Strongly Disagree' to 5- 'Strongly agree')]. *Section 3:* Current practice and service  
21 provision related to smoking cessation. Respondents were asked to estimate to what  
22 proportion of patients (1- None to 5- All) they deliver components of VBA (i.e. Ask, Advise,  
23 Assist), alongside other evidence-based smoking cessation behavior change techniques (27).  
24 *Section 4:* Listed potential barriers and enablers to delivering smoking cessation interventions  
25 (e.g. lack of knowledge/ skills, concern over intruding on patients' lifestyle choice), which

1 respondents were asked to tick all that apply. Respondents were asked to rate the extent to  
2 which they considered supporting patients to quit part of their role on a five-point Likert-  
3 scale from 1-‘Not at all’ to 5- ‘Main part of my role,’ and what level of appropriate  
4 funding/financial incentives would motivate them to offer smoking cessation services within  
5 their practice.

6

7 Two optometrists with expertise in smoking cessation reviewed an initial draft of the  
8 questionnaire for content validity. The final questionnaire is available as Supplementary File  
9 1.

10

## 11 **Procedure**

12 The survey was conducted in June 2015. The questionnaire was uploaded and hosted online  
13 using the tool ‘SurveyMonkey’ (a provider of web-based surveys; [www.surveymonkey.com](http://www.surveymonkey.com)).

14 A personalized, explanatory letter of invitation to take part in the survey was sent via email  
15 from the College of Optometrists to the sub-sample of randomly selected 1,200 optometrists.

16 Weekly reminders were sent to non-responders up to four weeks following the initial  
17 invitation email. Consent to take part in the survey was implied by completion of the  
18 questionnaire.

## 19 **Analysis**

20 After closure of the survey, all data were imported into SPSS 21.0, anonymised and cleaned  
21 to remove any duplicate responses. Data were summarized using descriptive statistics [i.e.  
22 percentages (*n*), or mean/ standard deviation] as appropriate.

23

24 In post-hoc analyses, the association between the delivery of VBA intervention components-  
25 Ask, Advise, Assist, and key optometrists’ demographic characteristics (i.e. years qualified,

1 training, country, place of work, and smoking status) was examined using Chi-squared  
2 analyses. Some response options were collapsed to avoid small group sizes. Items in Section  
3 3 of the survey regarding the proportion of patients to which optometrists report delivering  
4 evidence-based components of VBA interventions to were collapsed into two categories for  
5 analysis: 'infrequent delivery' (i.e. 'None of them,' 'Few of them,' and 'Some of them'  
6 responses) and 'frequent delivery' (i.e. 'Most of them' and 'All of them' responses).  
7 Similarly, 'years qualified' was collapsed into three categories: 'Less than 5 years,' '6 to 25  
8 years,' and '25 years plus.' Optometrists were categorized as either 'having received formal  
9 training' or 'not having received formal training' in smoking cessation. Location of current  
10 practice was collapsed according to country (i.e. England, Scotland, Wales, Northern  
11 Ireland).

12

## 13 **RESULTS**

### 14 **Response rate**

15 In total, 408 responses were received (34% response rate). To maximize available data for  
16 each survey item, we included all available responses to each item, including from  
17 incomplete surveys. Rate of missing data varied between 0.4% and 30.4% for each  
18 questionnaire item (mean 7.1%). No attempt was made to impute missing values. The  
19 number of responses per item included in the analysis is presented in Tables 1-3.

20

### 21 **Section 1: Respondent demographic characteristics**

22 Respondent demographic characteristics are presented in Table 1. The greatest proportion of  
23 respondents were female (61.2%, n=249), qualified for five to 15 years (26.3%, n=107), held  
24 a highest educational qualification of a BSc or equivalent (46.4%, n=187), were currently  
25 working full-time (60.9%, n=248), in England (47%, n= 191), as a multiple practice

1 employee (28.5%, n=115). Very few respondents reported being current smokers (2.4%,  
2 n=10).

3

4

[TABLE 1 HERE]

5

## 6 **Section 2: Training related to smoking cessation**

7 Only one quarter of optometrists reported having been taught how to assess smoking status  
8 during a routine eye examination (25.3%, n=98). Even fewer reported having received formal  
9 training in how to support smokers to quit in practice (16.7%, n=56) (Table 2). Only a small  
10 proportion of respondents had been formally assessed in their smoking cessation knowledge  
11 and/or practical skills (4.2%, n=16).

12

13 The majority of respondents reported having sufficient knowledge on the relationship  
14 between smoking and eye disease (73.8%, n=307) (Table 2), which is reflected in the fact  
15 that ‘the relationship between smoking and eye disease’ was selected as the most frequently  
16 covered topic in the curricula of smoking cessation training respondents reported receiving  
17 (Supplementary File 2). In contrast, the least frequently covered topics in the curricula of  
18 smoking cessation training included: ‘practical delivery of smoking cessation interventions in  
19 clinical settings (e.g. observations in practice)’ (2.1%, n=5), and ‘smoking cessation  
20 medications’ (3.2%, n=9) (Supplementary File 2). In turn, most (48.9%, n=190) respondents  
21 felt inadequately trained to advise patients of smoking cessation in practice (Table 2).

22

23

[TABLE 2 HERE]

24

25

## 26 **Section 3: Current practice and service provision related to smoking cessation**

1 Most optometrists reported their practice did not have any patient educational materials,  
2 leaflets or flyers related to smoking cessation (66.8%, n=249). Similarly, most optometrists  
3 (83.3%, n=309) reported their practice did not have any guidance documents outlining  
4 recommendations for delivering stop smoking support to patients (e.g. manuals/protocols).  
5 The proportion of patients with whom optometrists reported delivering each evidence-based  
6 component of very brief advice (3 A's) interventions is presented in Table 3 and summarized  
7 below.

8  
9 Ask about smoking status: Approximately one third of optometrists reported asking about  
10 tobacco use/smoking status in 'most/all' new patients (35.2%, n=132). However, fewer  
11 reported doing so for 'most/all' return or follow-up patients (28.3%, n=106). For patients  
12 who smoke, just 10.4% (n=39) reported assessing patients' motivation to quit tobacco use.

13  
14 Advice about smoking cessation: Although only 14.6% (n=56) of optometrists reported  
15 advising 'most/all' patients who smoke about the general harmful effects of tobacco use, 45%  
16 (n=167) reported providing optometry specific advice to 'most/all' smoking patients about  
17 links between smoking and age-related macular degeneration. Most optometrists reported  
18 advising 'none/very few' patients who smoke to quit completely (54%, n=202), and/or to cut  
19 down or gradually reduce tobacco use (52%, n=194). A minority reported providing advice to  
20 'most/all' patients who smoke on stop smoking medications (2.4%, n=9), typically: 'general  
21 advice not specific to a particular medication' and/or 'recommending patients discuss  
22 medication options with another healthcare professional' (i.e. GP) (52.4%, n=22). Advice on  
23 specific medications was most often for single or combined nicotine replacement therapy  
24 products (38%, n=16).

25 [TABLE 3 HERE]

1 Assist smoker to quit: Only 3.2% (n=12) of optometrists reported providing in house  
2 assistance to ‘most/all’ patients who smoke to quit. Even fewer (0.8%, n=3) reported  
3 following up on whether or not the patient successfully quit. If a patient expressed an  
4 interest in quitting, most optometrists reported that they would respond by advising  
5 the patient to see another healthcare professional (e.g. GP/ pharmacist) (65.1%,  
6 n=245) (Supplementary Figure 1). Although 12.3% (n=48) of respondents reported  
7 that they would refer a patient to a stop smoking service, a comparable proportion  
8 (13.6%, n=51) reported being unaware of smoking cessation services locally and thus  
9 were unsure how to refer patients (Supplementary Figure 1).

10

#### 11 *Differences in current practice according to optometrist demographic characteristics*

12 No significant differences were observed in current practice according to the number  
13 of years optometrists had been qualified, or their current/past smoking behaviour  
14 (Table 4). However, optometrists were significantly more likely to assess smoking  
15 status in new patients if they were currently practising in Scotland ( $\chi^2(2)=32.95$ ,  $p <$   
16  $0.001$ ) compared to England or Wales. A significantly higher proportion of  
17 optometrists who worked in an independent practice reported advising patients who  
18 smoke to quit completely than those based in a multiple site practice ( $\chi^2(1)=4.27$ ,  $p=$   
19  $0.39$ ). Optometrists who had received formal training in smoking cessation were also  
20 significantly more likely to advise patients who smoke on the harms of smoking  
21 ( $\chi^2(1)=9.45$ ,  $p= 0.002$ ), to quit completely ( $\chi^2(1)=13.1$ ,  $p < 0.001$ ), and/or cut down  
22 ( $\chi^2(1)=4.27$ ,  $p= 0.39$ ), than those who had not received formal training (Table 4).

23

24

[TABLE 4 HERE]

#### 1 **Section 4: Barriers and enablers to delivering smoking cessation interventions**

2 Although many respondents considered advising on smoking cessation to be a 'very  
3 small part of their role' (47.1%, n=173), most believed optometrists are ideally placed  
4 to discuss smoking cessation with patients within their practice (51.8%, n=188). The  
5 most frequently reported barriers were concerns over 'intruding on patient lifestyle  
6 choice' (71.4%, n=260), followed by 'lack of time' (64.6%, n=235), and 'lack of  
7 knowledge on the subject' (n=53%, n=194) (Supplementary Figure 2). The most  
8 frequently endorsed enablers were: 'Further knowledge' (74.2%, n=213) and  
9 'practical skills training' (46.9%, n=134), as well as 'establishing a professional norm  
10 that optometrists are expected to provide smoking cessation advice' (48.1%, n=138),  
11 (Supplementary Figure 3). Although a third of respondents felt no financial incentives  
12 were required to encourage assessment and recording of smoking status (34.1%,  
13 n=104), approximately 20% (n=58) felt that £20 would be an appropriate financial  
14 incentive for provision of advice on smoking cessation and also for referring patients  
15 to local smoking cessation service (19.3%, n=60). However, a higher financial  
16 incentive of £50 was deemed appropriate by the majority of respondents (17.6%,  
17 n=51) for supporting patients to quit within their optometry practice.

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## DISCUSSION

This survey investigated the self-reported practices of UK optometrists related to smoking cessation. The findings provide an up-to-date, nationwide description of the extent to which UK optometrists currently deliver evidence-based smoking cessation interventions to patients who smoke. Approximately a third of optometrists reported currently assessing patients' tobacco use. However, assessing and recording smoking status alone is insufficient. There is evidence that it is specifically advice to quit, and offering assistance to do so, that leads to more quit attempts (5). It is thus particularly concerning that the present survey identified that few UK optometrists go on to advise patients who smoke on the benefits of quitting and available options for support to do so, and that even fewer subsequently offer to assist the smoker to quit, either in house or via a referral to dedicated services.

The present findings are to an extent unsurprising. Although smoking cessation intervention options, service provision and policy in the UK have evolved significantly over the last decade (e.g. establishment/promotion of NHS Stop Smoking Services, indoor smoking ban, licensing of new pharmacological interventions, electronic cigarettes), the proportion of optometrists offering advice and support to quit has remained unchanged relative to findings from UK surveys conducted in 2006 (23) (i.e. 23% vs 22.7% , respectively advising patients who smoke to stop; 2% vs 3% offering assistance to quit via a referral to a local stop smoking service). Furthermore, the present findings are consistent with those of studies conducted more recently in other countries, such as Canada (11, 23, 28) and Australia (20); indicating that the gap in optometrists' current practice related to smoking cessation is a global and enduring issue.

1 The present survey also identified barriers and enablers to optometrists delivering  
2 smoking cessation support in practice. The most frequently endorsed barriers were  
3 lack of time and fear of intruding on a patient's lifestyle choice. These barriers have  
4 previously been reported by optometrists internationally (11, 20), and by other  
5 healthcare professional groups (e.g. GPs) (5, 29, 30). However, there is no evidence  
6 to support the notion that asking about smoking or uninvited advice on cessation are  
7 detrimental to provider-patient relationships (3, 31), including in the context of  
8 optometry and smoking cessation (32).

9

10 Limited time is an enduring issue in healthcare service provision. VBA interventions  
11 are not designed to be time consuming, and are deliverable over a few short minutes  
12 (3). These are arguably minutes well spent, given the vast potential public health and  
13 socio-economic benefits of generating more quit attempts. It has been suggested that  
14 development of clinical tools to support optometrists to capture relevant information  
15 related to smoking status may help address time constraints and embed smoking  
16 cessation support within routine clinical practice (20). Yet, the present findings  
17 demonstrate most optometry practices do not have any procedural guidance resources,  
18 such as treatment manuals, to inform smoking cessation service provision. There is  
19 evidence that stop smoking practitioners working for services that have treatment  
20 manuals, who perceive manuals to be useful, and utilize manuals routinely in practice  
21 have higher successful quit rates than those that do not (33).

22

23 Furthermore, adequate training in how to optimally deliver smoking cessation  
24 interventions more efficiently in clinical practice could in part help optometrists  
25 overcome time constraints and to deliver advice in a sensitive manner. Training could

1 also help raise awareness amongst optometrists of potential issues and challenges  
2 related to advising on cessation and how to overcome these. For instance, although  
3 asking about tobacco use is a vital first step, optometrists should be aware of potential  
4 issues around smoking deception (i.e. under-reporting or failing to report tobacco  
5 use); which has been identified as a more prevalent issue in smokers with age-related  
6 macular degeneration than in the general population (34). However, the majority of  
7 respondents in the present survey have not received any such smoking cessation  
8 related training. Respondents endorsed further knowledge and skills training as a key  
9 enabler to increasing provision of smoking cessation support. Optometrists' desire for  
10 further training related to smoking cessation has been echoed in other studies  
11 internationally (11), and was also identified in the 2006 UK survey (22). Yet a decade  
12 later, this training gap remains. A recent national survey of the curricula of all  
13 optometry undergraduate and pre-registration training programmes in the UK  
14 identified that optometry schools typically dedicate limited time (i.e. < 1 hour) to  
15 teaching on smoking cessation (35). This time is spent primarily teaching the negative  
16 health consequences of smoking, rather than practical skills for delivering smoking  
17 cessation interventions in practice (35). Similar gaps have been identified in surveys  
18 of optometry training curricula in other countries (e.g. Canada) (36).

19

20 Thus, if optometrists are to deliver evidence-based smoking cessation interventions,  
21 they must first be knowledgeable and adequately trained to do so. Indeed, the present  
22 survey identified that optometrists who received formal training in smoking cessation  
23 were significantly more likely to advise patients who smoke on cessation. A number  
24 of smoking cessation training resources have been developed (37-40), which could be  
25 used to address existing training gaps for optometrists. For instance, in the UK, a

1 national knowledge and skills accreditation programme has been developed to  
2 provide training in the delivery of evidence-based, specialist smoking cessation  
3 behavioural support interventions [National Centre for Smoking Cessation and  
4 Training, [www.ncsct.co.uk](http://www.ncsct.co.uk)]. This training programme has been shown to significantly  
5 increase knowledge and skills of specialist stop smoking advisors (26). The NCSCT  
6 has also developed a VBA training module, which takes no longer than 30 minutes to  
7 complete. It aims to equip trainees with the necessary skills to deliver evidence-based  
8 brief advice over a few minutes. Internationally, countries such as New Zealand have  
9 plans to implement national training to educate optometrists on advising patients  
10 about nicotine replacement therapy (10).

11

12 Findings from the present survey also highlight as an enabler ‘establishing a  
13 professional norm and expectation that optometrists should provide smoking cessation  
14 advice.’ Whilst most optometrists in the present survey, and other surveys  
15 internationally (23), acknowledge smoking cessation is part of their role, this notion  
16 should be reinforced through relevant professional bodies and policy initiatives. For  
17 example, optometrists in the present study were more likely to report assessing  
18 smoking status in new patients if they were currently practising in Scotland, where it  
19 is a healthcare service provision contractual requirement that optometrists record  
20 smoking status. In the UK, the College of Optometrists Scheme for Registration  
21 Trainee Handbook specifies the core competences that trainee optometrists are  
22 expected to acquire and demonstrate as part of their pre-registration training and  
23 assessment. However, a content analysis of the most recent edition of the competence  
24 framework identified no competence indicators related to smoking cessation service  
25 provision (35). There is scope to incorporate smoking cessation under existing

1 competence indicators in the framework, such as ‘assessing patient history related to  
2 general health and lifestyle,’ and ‘making appropriate referrals’ (35). Doing so would  
3 help reinforce smoking cessation as part of the optometrist role.

4  
5 A limitation of the present study is the relatively low response rate (34%). However,  
6 this is comparable with other survey studies in this professional group (17), and is  
7 higher than other national surveys conducted of optometrists’ smoking cessation  
8 practice (i.e. Australia: 6% response rate) (20). Furthermore, the responses are prone  
9 to a number of biases. First, self-selection bias, whereby the optometrists with a  
10 specialist interest in smoking cessation are those more likely to have completed the  
11 survey. Second, self-report and social desirability biases, whereby optometrists are  
12 likely to have overestimated and reported the extent to which they deliver smoking  
13 cessation advice in clinical practice (41). However, this indicates that the present  
14 findings represent a ‘best case scenario’ of the extent to which optometrists currently  
15 deliver smoking cessation support to patients who smoke. The actual gap in current  
16 practice is thus likely to be even greater, as is in turn the consequent need for further  
17 training and initiatives to bridge this gap.

18 It is important to also acknowledge the limitations in the scope of the present survey.  
19 Smoking cessation is a complex issue, and in supporting smokers to quit it is  
20 important to consider the different types of tobacco consumption (i.e. chewed, water  
21 pipe), specific population groups that might face unique barriers to cessation (e.g.  
22 adolescence (42), pregnancy, mental health), and the importance of highlighting the  
23 broader consequences of smoking (e.g. of second hand smoke). However, in order to  
24 keep the survey succinct, minimize respondent burden, and potential drop out, we did  
25 not ask about smoking cessation advice at the more granular level, and instead limited

1 the scope of the survey items to enquiring about VBA more broadly (e.g. ‘assessing  
2 smoking status,’ ‘providing advice on health consequences,’ ‘providing advice on  
3 cessation,’ ‘assisting to quit).

#### 4 **Conclusions**

5  
6 Substantial gaps exist in UK optometrists’ current smoking cessation training and  
7 practice. Smoking remains a significant public health priority. Optometrists have  
8 potentially high public health reach in the community. If this potential is to be  
9 realised, evidence-based training and guidance resources are needed to support the  
10 introduction of smoking cessation interventions into routine optometry practice.

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1 **Table 1. Section 1: Participant demographic characteristics**  
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	Percentage (n)
<b>Years qualified</b>	
• < 5 years	16.9% (n=69)
• 5-15 years	26.3% (n= 107)
• 16-25 years	23.3% (n=95)
• 26-35 years	23.3% (n=95)
• 36-45 years	8.3%(n=34)
• 45 + years	1.7% (n=7)
<b>Country</b>	
• England	47.0% (n=191)
• Wales	19.4% (n= 79)
• Scotland	33.6% (n=137)
• Northern Ireland	0% (n=0)
<b>Female</b>	61.2% (n=249)
<b>Optometry practice characteristics</b>	
• Full-time	60.9% (n=248)
• Part-time	39.1% (n=159)
• Independent practice sole practitioner	15.1% (n=61)
• Independent practice partner	11.2% (n=45)
• Independent practice employee	14.9% (n=60)
• Independent practice locum	13.9% (n=56)
• Multiple practice director	4.9% (n=20)
• Multiple practice employee	28.5% (n=115)
• Multiple practice locum	3.2% (n=13)
• Other	8.2% (n=33)
<b>Highest Educational Qualifications</b>	
• BSc (or equivalent)	46.4% (n=187)
• MOptom	38.9% (n=157)
• MSc	2.5% (n=10)
• PhD	5.5% (n=22)
• Other	6.7% (n=27)
<b>Smoking status and history</b>	
• Current smoker	2.4% (n=10)
• Ever smoker	33.3% (n=135)
• Regular ex-smoker (i.e. 1+ daily cigarettes, 1+ cigar per week, or 30g + chewing tobacco per month, for longer than 1 year	14.5% (n=58)

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1 **Table 2. Section 2: Extent of respondents' training related to smoking cessation**  
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	Percentage (n)
<b>Received formal training in supporting smoking cessation in practice</b> ( <i>e.g. undergraduate/ post-graduate/ LOC/ College of Optometrists/ CET events, lectures, and/or seminars</i> )	16.7% (n=56)
<b>Taught to assess smoking status during routine examination</b>	25.3% (n=98)
<b>Knowledge and/or practical skills for delivering smoking cessation support has been formally assessed</b> ( <i>e.g. written exams, OSCE, role play, observations in practice</i> )	4.2% (n=16)
<b>'I feel adequately trained to advise patients on smoking cessation'</b>	
• Strongly disagree	16% (n=62)
• Disagree	32.9% (n=128)
• Neither agree or disagree	27.8% (n=108)
• Agree	20.1% (n=78)
• Strongly agree	3.1% (n=12)
<b>'I have sufficient knowledge about the relationship between smoking and eye disease'</b>	
• Strongly disagree	3.9% (n=15)
• Disagree	6.5% (n=25)
• Neither agree or disagree	17.9% (n=69)
• Agree	58.3% (n=255)
• Strongly agree	13.5% (n=52)
<b>Useful sources of clinical knowledge regarding smoking cessation</b>	
• Undergraduate education	41.3% (n=159)
• Post-graduate scheme for registration	18.2% (n=70)
• Workplace training/ experience	37.9% (n=146)
• CET/CPO lectures	89.4% (n=344)
• Professional newsletters/briefings	52.7% (n=203)
• Published research	48.8% (n=188)

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1 **Table 3.** *Section 3:* Delivery of evidence-based smoking cessation interventions to service users  
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<b>With what proportion of service users do you routinely perform the following activities?</b>	<b>‘None of them’ (Percentage/ N)</b>	<b>‘Very few of them’ (Percentage/ N)</b>	<b>‘Some of them’ (Percentage/ N)</b>	<b>‘Most of them’ (Percentage/ N)</b>	<b>‘All of them’ (Percentage/ N)</b>
Asked about tobacco use for new patients	10.3% (n=41)	28.5% (n=107)	25.3% (n=95)	16.8% (n=63)	18.4% (n=69)
Asked about tobacco use for follow-up or return patients	14.2% (n=53)	32.1% (n=120)	25.4% (n=95)	13.6% (n=51)	14.7% (n=55)
Assessed the patient’s motivation to quit tobacco use	42.1% (n=157)	28.4% (n=106)	19.0% (n=71)	7.5% (n=28)	2.9% (n=11)
Advised smokers about the harmful of effects of tobacco use generally (e.g. lung cancer)	39.4% (n=147)	22.3% (n=83)	23.3% (n=97)	9.6% (n=37)	5% (n=19)
Advised smokers about the link between smoking and age-related macular degeneration specifically	3.5% (n=13)	11.6% (n=43)	39.9% (n=148)	24.5% (n=91)	20.5% (n=76)
Advised patients who smoke to quit tobacco use completely	28.1% (n=105)	25.9% (n=97)	23.3% (n=87)	13.9% (n=52)	8.8% (n=33)
Advised patients who smoke to cut down or gradually reduce their tobacco use	28.1% (n=105)	23.9% (n=89)	26.0% (n=97)	13.9% (n=52)	8.1% (n=30)
Advise the patient on stop smoking medications	82.4% (n=308)	9.9% (n=37)	5.4% (n=20)	1.3% (n=5)	1.1% (n=4)
Advised patients about the use of e-cigarettes	88.7% (n=330)	5.4% (n=20)	5.1% (n=19)	0.3% (n=1)	0.5% (n=2)
Assisted the smoker to quit (i.e. either within the optometry practice or via referral to additional services)	75.7% (n=283)	11.5% (n=43)	9.6% (n=36)	1.9% (n=7)	1.3% (n=5)
Followed up or assessed whether patient successfully quit	90.1% (n=337)	5.4% (n=20)	3.7% (n=14)	0.5% (n=2)	0.3% (n=1)

1 **Table 4.** Comparison of optometrists' reported delivery of Very Brief Advise intervention components according to demographic characteristics  
2

Demographic Variable	% of optometrists reporting ASKING most/all new patients about smoking status	% of optometrists reporting ASKING most/all return/follow-up patients about smoking status*	% of optometrists reporting ADVISING most/ all patients who smoke on harms of smoking	% of optometrists reporting ADVISING most/all patients who smoke to quit completely	% of optometrists reporting ADVISING most/all patients who smoke to cut down	% of optometrists reporting ADVISING most/all patients who smoke on stop smoking medications	% of optometrists reporting ASSISTING most/all patients who smoke to quit (i.e. in house/ via referrals to other services*
<b>Years Qualified</b>							
• Less than 5 years	27.8% (17)	0% (0)	12.3% (7)	21% (12)	19.2% (11)	1.8% (1)	0% (0)
• 6-25 years	39.0% (73)	0% (0)	14.6% (26)	25.5% (46)	23% (41)	3.9% (7)	0% (0)
• 25+ years	32.8% (41)	0% (0)	16.7% (18)	19.6% (21)	21.2% (23)	0% (0)	0% (0)
• Comparison	$\chi^2(2)=2.962,$ $p = .23$	-	$\chi^2(2)=.587,$ $p = .75$	$\chi^2(2)=1.475,$ $p = .48$	$\chi^2(2)=.383,$ $p = .82$	$\chi^2(2)=4.603,$ $p = .10$	-
<b>Country</b>							
• England	26.3% (46)	0% (0)	13.6% (24)	22.2% (39)	19.5% (34)	1.7% (3)	0% (0)
• Wales	21.9% (16)	0% (0)	21.2% (15)	22.3% (16)	18.1% (13)	4.2% (3)	0% (0)
• Scotland	54.8% (69)	0% (0)	13.6% (17)	23.8% (30)	27.8% (35)	2.4% (3)	0% (0)
• Comparison	$\chi^2(2)=32.95,$ $p < 0.001$	-	$\chi^2(2)=2.531,$ $p = .28$	$\chi^2(2)=.113,$ $p = .94$	$\chi^2(2)=3.71,$ $p = .16$	$\chi^2(2)=1.32,$ $p = .52$	-
<b>Type of practice</b>							
• Independent	38.9% (72)	0% (0)	15.4% (32)	25% (52)	20.7% (43)	2.7% (5)	0% (0)
• Multiple	29.9% (38)	0% (0)	12.3% (17)	15.8% (22)	19.7% (27)	1.4% (2)	0% (0)
• Comparison	$\chi^2(1)=2.67$ $p = .10$	-	$\chi^2(1)=.67,$ $p = .41$	$\chi^2(1)=4.27,$ $p = .039$	$\chi^2(1)=.48,$ $p = .83$	$\chi^2(1)=.40,$ $p = .53$	-
<b>Formal training in smoking cessation</b>							
• Received	45% (28)	0% (0)	27.9% (17)	40.3% (25)	32.3% (20)	6.5% (4)	0% (0)

• Not received	33% (104)	0% (0)	12.5% (39)	19.2% (60)	19.9% (62)	1.6% (5)	0% (0)
• Comparison	$\chi^2(1)=3.23,$ $p = .072$	-	<b><math>\chi^2(1)=9.45,</math></b> <b><math>p = .002</math></b>	<b><math>\chi^2(1)=13.1,</math></b> <b><math>p &lt; 0.001</math></b>	<b><math>\chi^2(1)=4.27,</math></b> <b><math>p = .039</math></b>	n/a**	-
<b>Smoking status</b>							
• Ever smoker	30.9% (39)	0% (0)	14.3% (18)	20.5% (26)	20% (25)	2.3% (3)	0% (0)
• Never smoker	37.1% (92)	0% (0)	15.4% (38)	23.9% (59)	23.1% (57)	2.4% (6)	0% (0)
• Comparison	$\chi^2(1)=1.39,$ $p = .24$	-	$\chi^2(1)=587,$ $p = .77$	$\chi^2(1)=587,$ $p = .44$	$\chi^2(1)=467,$ $p = .50$	$\chi^2(1)=.001,$ $p = .98$	-

\*Not possible to analyse variation in delivery of these VBA intervention components as frequency of optometrists reporting delivering this component to most/all patients was zero.

\*\*n/a= Expected minimum frequencies are not all greater than 5- chi-square analyses assumptions therefore not met.

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