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One-hour training for general practitioners in reducing the implementation gap of smoking cessation care: A clusterrandomized controlled trial

Marjolein E.A. Verbiest¹, Mathilde R. Crone¹, Margreet Scharloo², Niels H. Chavannes¹, Victor van der Meer¹, Ad A. Kaptein² & Willem J.J. Assendelft^{3,1} (2014)

- ¹ Department Public Health and Primary Care, Leiden University Medical Centre, Leiden, the Netherlands
- ² Department Medical Psychology, Leiden University Medical Centre, Leiden, the Netherlands
- ³ Department Primary and Community Care, Radboud University Nijmegen Medical Centre, Nijmegen, the Netherlands

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ABSTRACT

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3 Introduction

4 This study examined the effectiveness of low-intensity, practice-tailored train-

- 5 ing for general practitioners (GPs) aimed at personal and organizational barriers
- 6 that arise when routinely asking patients' smoking status, advising to quit, and
- 7 arranging follow-up.
- 8

9 Methods

A cluster-randomized controlled trial with 49 GPs and 3,401 patients (677 smokers). Two patient groups participated: 2,068 patients (433 smokers) at baseline and 1,333 patients (244 smokers) post-intervention. At follow-up, 225 smokers of both groups participated. The primary outcome was GP smoking cessation counseling (asking about smoking status, advising to quit, prescribing pharmacotherapy, and referring for behavioural support). Secondary outcomes were GPs' attitudes toward smoking cessation care, patients' intention to quit, and long-term quit rates. Outcomes were measured with GP self-report and patient report.

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20 Results

Patients of trained GPs reported more often being asked about smoking behaviour
compared to patients of untrained GPs (OR = 1.94, 95% CI = 1.45–2.60). According
to GP self-report, the training increased the provision of quit-smoking advices
(difference 0.56 advice per day; 95% CI = 0.13–0.98) and the ability and intention
of providing smoking cessation care. We found no effect on GPs' arrangement of
follow-up, smokers' intention to quit, and long-term quit rates.

22 Conclusions

After 1 hour of training, we found significant differences between trained and untrained GPs on the frequency in which they asked about smoking (patient reported) and advised smokers to quit (GP self-reported). The training did not increase prescriptions of pharmacotherapy, referrals to behavioural support, or quit rates. Future training methods should focus on the GPs' ability, tools, and skills to arrange follow-up to ensure intensive smoking cessation support.

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INTRODUCTION

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General practitioners (GPs) play a key role in the delivery of smoking cessation interventions to their patients. Even a GPs' minimal intervention of advising smokers to quit has the potential to significantly benefit smokers' motivation to quit and smoking abstinence.^{1,2} Guidelines recommend that GPs put into practice a systematic approach of asking every patient about tobacco use, advising all smokers to quit, assessing smokers' willingness to make a quit attempt, assisting smokers with treatment and referrals, and arranging follow-up contacts.³⁻¹⁰ In spite of the well-documented effectiveness of these guidelines^{1;6;9}, many GPs fail to routinely implement them.¹¹⁻¹³ This results in a substantial evidence-practice gap. Several factors may affect the implementation of smoking cessation care (SCC) in general practice, related to the health professional and the organisation.¹⁴⁻¹⁶ Personal barriers of GPs that impede the implementation of tobacco support are doubts and concerns regarding their ability to deliver SCC, and the effectiveness and the appropriateness of SCC.¹⁷⁻²⁰ Also, organisational barriers may hamper guideline implementation, as GPs often report role confusion, time and financial constraints.²⁰ For this reason, interventions aimed at enhancing the implementation of SCC guidelines should be multifaceted and tailored to the needs of the health professional and organisation.^{2;18;21-25}

Training health professionals in improving SCC has been shown to benefit the implementation of counseling tasks, such as asking patients to set a quit date and providing self-help materials, as well as patient smoking abstinence.²⁶ However, these training programmes often fail to address organisational constraints that impede full implementation of smoking cessation guidelines.²⁶ Since smoking cessation counseling varies widely between general practices²⁷, strategies are needed that address the specific constraints GPs deal with in order to maximize the implementation of smoking cessation support and patients' smoking abstinence rates.

Therefore, we developed and examined the effectiveness of a new low-intensity, practice-tailored training method aimed at improving smoking cessation counseling activities of GPs. This method is tailored to the personal and organisational barriers that arise during the implementation of SCC in regular daily practice. In the present study we focus on the implementation of routinely asking patients' smoking status, advising smokers to quit, and arranging follow-up. This simplified approach (also called the A-A-A approach) has recently been introduced in healthcare settings where professionals face insurmountable barriers, such as a lack of time to provide assistance to smokers who want to quit.^{28;29} Because preventive tasks, such as intensive lifestyle counseling, are more often delegated 1 to the practice nurse within Dutch general practice, this simplified approach is a

2 promising solution to reduce the implementation gap of smoking cessation care

3 in general practice.

We hypothesize that our training method will increase GPs' smoking cessation counseling activities, especially the rate at which smokers are identified, advised, and referred. Since we focus on the implementation of GPs' minimal cessation intervention, we expect a small but significant effect on smoker's intention to quit. If trained GPs succeed to increase the rate at which smokers are referred to intensive cessation support, we expect higher rates of long-term smoking abstinence reported by patients of trained GPs.

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13 METHODS

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15 Design

We performed a cluster-randomised controlled trial in general practice. In order to account for a lack of independence between the patients of the same GP, the GP was the unit of randomisation. GPs were matched according to gender, age and practice type and randomly assigned to one of two conditions using a simple randomisation procedure (coin tossing) by an independent researcher not involved in the recruitment of the GPs. Patients were unaware of the allocation during the entire study period. GPs remained unaware about the allocation until after the baseline measurements; thereafter, the GPs were informed about the allocation. GPs in both conditions were aware of the aim of the intervention during the entire study period. The study was approved by the Medical Ethical Board of the Leiden University Medical Centre (P10.125).

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28 Intervention

We earlier conducted a systematic review on the effectiveness of training healthcare professionals in SCC.²⁶ The results of this meta-analysis show that a single, short training session is likely to be just as effective as multiple longer sessions. Therefore, we developed a single, one-hour training session in order to anticipate time constraints GPs often face. The GP training was delivered by a certified trainer of the Dutch Expert Centre on Tobacco Control (STIVORO) and was based on the 5-A behaviour change model from which we derived the 6 I-Model^{4:5}; an Inventory was made of GPs' current knowledge and skills as well as organisational and personal barriers regarding SCC and the GP was Informed about the effectiveness of SCC in general practice. GPs' motivation to implement SCC was Identified and less motivated GPs were Inspired using Motivational Interviewing techniques, such as exploring and resolving ambivalence.³⁰ GPs were Instructed on knowledge and skills related to the barriers they indicated. Several themes could be addressed, such as the content of the SCC guideline, behavioural and pharmacological SCC support, skills in motivating smokers to quit, and organisational aspects of SCC, such as task allocation, referral and registration. The training concluded with concrete, individual implementation goals which were summarized into an action plan. In addition, all GPs received a toolkit, which contained a SCC flowchart, a summary of pharmacological support, and leaflets for patients. Afterwards, the GP was given the opportunity to receive additional feedback support (Intervision). GPs in the control condition continued their usual SCC. Usual care can be defined as the SCC that is usually provided by the GP when not being trained, which is likely to vary between the GPs.²⁷

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14 Participants

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6 General practitioners

We recruited GPs by letter and a follow-up telephone call. Eligibility criteria were the self-reported number of provided stop-smoking advices per week (maximum of five³¹), in order not to select 'best practice' GPs only. In addition, we selected only one GP per practice in order to prevent contamination. Among 228 GPs who returned the screening questionnaire, 64 agreed to participate. Six GPs were excluded because they provided on average more than 5 stop-smoking advices per week, and another 9 GPs already had a participating colleague in the same practice; this resulted in 49 GPs for randomisation. After randomisation, 4 GPs (3 intervention, 1 control) were partly excluded from further analyses because they did not complete their measurements, leaving 45 GPs for full analysis (22 intervention, 23 control).

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29 Patients

During the study period (January-August 2011), adult patients visiting participating GPs in both conditions were asked to complete a questionnaire after consultation. The baseline group consisted of 2068 patients (1002 intervention, 1066 control) including 433 smokers (195 intervention (19.5%), 238 (22.3%) control) who completed the questionnaire during the three weeks prior to the GP training. The post-intervention group consisted of 1333 patients (630 intervention, 703 control), including 244 smokers (98 intervention (15.6%), 146 (20.8%) control) who completed the questionnaire during the three weeks after the GP training. All smoking patients of both the baseline and post-intervention group were sent a postal questionnaire 9 months after the intervention, which was completed by

- 225 smokers (112 intervention (response rate 38.2%), 113 control (response rate
 29.4%)) (Figure 1).
- 3

4 Outcomes

5 The primary outcome was GP smoking cessation counseling. Secondary out-6 comes were GPs' attitudes, self-efficacy and intentions towards implementing 7 SCC, and patients' intention to quit and long-term smoking abstinence.

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9 GPs' smoking cessation counseling

We measured GPs' smoking cessation counseling by means of GP self-report and patient report. At baseline, GPs in both conditions completed a tracking list at the end of 2 working days per week, during 3 consecutive weeks. Questions were about smoking cessation activities during that day (asking, advising, prescribing pharmacological aids, and referring for behavioural support). In the intervention group, GP training in SCC took place within 2 weeks after this first tracking period. One week after the training a second tracking period started for GPs in both conditions. On those days that GPs completed the tracking lists, all adult patients who visited the participating GPs were asked to complete a questionnaire after consultation. These questionnaires included information on socio-demographics and GP performance with regard to SCC.

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GPs' attitudes, self-efficacy and intention towards implementing SCC

Secondary endpoints were GPs' attitudes, perceived self-efficacy and intentions
 regarding routinely implementing SCC, measured with a pre- and post-question naire based on previous studies.³²⁻³⁴

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27 Patients' smoking behaviour

Patients' intention to quit smoking was dichotomised (0=no intention to quit within 6 months, and 1=intention to quit within 6 months). Smoking patients were sent a postal questionnaire 9 months after the GP training in order to assess long-term smoking abstinence rates. Because patients visit their GP on average 4 times per year, we assumed that most smokers in the baseline group revisited their GP in this 9-month period and as a consequence were exposed to a trained GP (intervention) or non-trained GP (control).³⁵ Therefore, we included smokers from both the baseline and post-intervention group in the follow-up analyses. We examined self-reported 7-day point prevalence abstinence and continuous abstinence.³⁶ In total, 225 smokers completed the 9-month follow-up questionnaire (33.7%). Of these responders, 112 smokers consulted a GP in the intervention group (70 at baseline (35.9%) and 42 post-intervention (42.9%)), and



Figure 1. Flowchart of the intervention study

113 smokers consulted a GP in the control group (72 at baseline (30.3%) and 41
post-intervention (28.1%)).

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4 Sample size

Assuming that 21% of the Dutch adult smokers currently receive a stop-smoking
advice from their GP¹², to detect a doubled proportion of smoking patients receiving a stop-smoking advice from their GP, with a power of 80% (assuming an
ICC of 0.013 and a design effect of 1.104³⁷ based on 25 clusters), 112 smoking
patients per group were required.

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11 Statistical analyses

We compared GP characteristics and practice characteristics between the intervention and control group using the χ^2 -test and independent samples t-test for dichotomous and continuous data, respectively. In addition, characteristics of patients in the intervention and control group were compared at baseline and post-intervention. The impact of the training on GP-reported outcomes was assessed using linear regression analyses, adjusting for values at baseline. Missing data were imputed according to the last-observation-carried-forward method, assuming that the outcome data did not change post-intervention.³⁸ The impact of the training on GP smoking cessation activities reported by patients was analysed using generalised estimating equations (GEE) in order to adjust for clustering. In addition, GEE was used to assess smoking abstinence rates of patients at follow-up. Smokers lost to follow-up were treated as not refraining from smoking at follow-up.³⁹

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27 RESULTS

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29 GP cessation counseling

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31 General practitioners

None of the GP and practice characteristics showed a significant difference between the intervention and control condition (Table 1). With regard to demographics, the sample was similar to the average Dutch GP population.⁴⁰ After adjustment for baseline values, we found a difference for the GP reported mean number of stop-smoking advices provided per day post-intervention (difference 0.56 advice per day; 95% CI=0.13-0.98) (Table 2). There was no significant difference in the mean number of times GPs asked smokers about smoking status, referred for behavioural support and prescribed pharmacological aids. Table 1. Background characteristics of participating GPs and practices

	Intervention	Control	
GP characteristics	(n=25)	(n=24)	
Gender, male	16 (64%)	12 (50%)	
Cultural background, Dutch	24 (96%)	22 (92%)	
Years of employment, > 10 years	19 (76%)	19 (79.2%)	
Smoking status			
Smoker	0 (0%)	2 (8.3%)	
Ex-smoker	8 (32%)	7 (29.2%)	
Previous training in SCC	11 (44%)	8 (33.3%)	
Age in years (M, SD)	49.9 (8.1)	51.3 (8)	
Patients seen per week (M, SD)	115.8 (39.8)	109.5 (46.7)	
Hours of work per week (M, SD)	38.3 (9.0)	38.1 (10.4)	
Practice characteristics			
Type of practice			
Single-handed	12 (48%)	10 (41.7%)	
Duo	6 (24%)	9 (37.5%)	
Group	5 (20%)	2 (8.3%)	
Health care centre	2 (8%)	3 (12.5%)	
Number of practice nurses			
None	1 (4%)	3 (12.5%)	
1 practice nurse	17 (68%)	16 (66.7%)	
2 or more practice nurses	7 (28%)	5 (20.8%)	
Previous training in SCC practice nurse	19 (76%)	14 (58 3%)	

GP=general practitioner, SCC=smoking cessation care, M=mean, SD=standard deviation. Differences were examined using χ^2 -tests for dichotomous variables and independent samples t-tests for continuous variables

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28 Patients

Table 3 reports the characteristics of patients at baseline, post-intervention and at follow-up. At baseline, more patients in the control group reported a chronic airway disease compared to the intervention group (15.4% vs. 12.4%; p=0.03). Post-intervention, patients in the control group were younger, more often reported a non-Dutch cultural background and being a smoker (Table 3). After adjustment for clustering effects and patient background characteristics, a time-by-condition interaction was found for patients' report of being asked about smoking status (OR=1.94, 95% CI=1.43-2.60) (Table 2); patients in the intervention group who visited their GP post-intervention reported being asked about their smoking status more often than patients who visited their GP prior to the training. We found no effect on patient's report of being advised to quit

		Basel	ine			Post-inte	rvention			
GP self-report, SCC ^a	Intervention (n=22)	Control (n=23)	B (95% CI)	പ	Intervention (n=22)	Control (n=23)	B (95% CI)	പ		
Asked about smoking status	2.94 (1.80)	4.09 (5.19)	-1.15 (-3.51 - 1.21) (0.33	4.98 (0.62)	3.27 (0.60)	1.71 (-0.04 – 3.46)	0.06		
Advised to quit	1.09 (0.75)	1.43 (2.11)	-0.33 (-1.29 – 0.63) (0.50	1.61 (0.15)	1.05 (0.15)	0.56 (0.13 – 0.98)	0.01		
Provided pharmacotherapy	0.10 (0.12)	0.10 (0.18)	-0.002 (-0.09 - 0.09)	0.96	0.10 (0.03)	0.09 (0.03)	0.01 (-0.08 – 0.10)	0.87		
Arranged follow-up or referred	0.49 (1.04)	0.29 (0.38)	0.20 (-0.26 – 0.67) (0.38	0.56 (0.16)	0.26 (0.15)	0.30 (-0.14 – 0.74)	0.18		
									Time X Gro Interactio	dn
Patient report, SCC ^b	Intervention (n=1002)	Control (n=1066)	OR (95% CI)	പ	Intervention (n=630)	Control (n=703)	OR (95% CI)	പ	OR (95% CI)	д
Asked about smoking status $^{\circ}$	32.7%	40.8%	0.79 (0.47-1.33) (0.37	41.5%	37.1%	1.60 (0.83-3.08)	0.16	1.94 (1.45-2.60)	<0.00
Smoker report, SCC	Intervention (n=195)	Control (n=238)	OR (95% CI)	р.,	Intervention (n=98)	Control (n=146)	OR (95% CI)	<u>с</u> ,	OR (95% CI)	P.
Asked about smoking status ^c	45.2%	56.0%	0.74 (0.37-1.51) (0.41	53.1%	54.5%	1.27 (0.48-3.19)	0.68	1.79 (0.96-3.32)	0.07
Advised to $quit^{c}$	40.2%	43.8%	0.79 (0.43-1.43) (0.43	43.3%	44.1%	1.37 (0.49-3.84)	0.56	1.70 (0.71-4.06)	0.24
Provided with pharmacotherapy $^{\circ}$	17.4%	16.4%	1.38 (0.71-2.69) (0.34	13.3%	19.9%	0.76 (0.29-1.96)	0.57	0.54 (0.22-1.36)	0.54
Arranged for follow-up or referred $^{\rm c}$	12.3%	8.8%	1.43 (0.75-2.74) (0.28	16.0%	9.8%	2.38 (0.97-5.86)	0.06	1.40 (0.49-4.14)	0.52
Intention to quit smoking ^d	33.1%	33.3%	1.10 (0.70-1.70) (0.70	34.4%	37.7%	0.98 (0.55-1.73)	0.93	0.95 (0.46-1.98)	06.0
GP self-report, attitudes	Intervention (n=25)	Control (n=24)	B (95% CI)	പ	Intervention (n=22)	Control (n=23)	B (95% CI)	Д.		
Attitude ^e	2.86 (0.39)	2.72 (0.54)	0.14 (-0.13 – 0.41) (0.30	2.84 (0.08)	2.65 (0.08)	0.19 (-0.05 – 0.43)	0.11		
Perceived self-efficacy ^e	2.56 (0.44)	2.39 (0.45)	0.18 (-0.08 – 0.43) (0.18	2.69 (0.07)	2.43 (0.07)	0.26 (0.05 – 0.46)	0.02		
Intention ^f	1.88 (1.09)	1.46 (0.78)	0.42 (-0.13 – 0.97) (0.13	2.32 (0.22)	1.00 (0.23)	1.32 (0.67 – 1.97)	0.00		
GP=general practitioner, SCC=smoki ^a Average number of smoking cessat ^b Consection Institution	ng cessation ca ion activities pe	re, B=unstan er day measu	dardised regression cc red on a continuous s	befficie scale	ent indicating	difference, C)R=odds ratio, CI=co	onfider	nce interval	

^c Control group = reference category ^d No intention to quit within 6 months = reference category ^e 5-point scale: 0=very negative attitude/low perceived self-efficacy; 4=very positive attitude/high perceived self-efficacy ^f 4-point scale: 0=no intention within 6 months; 1=intention within 6 months; 2=intention within one month; 3=already full implementation

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	B	aseline		Post-i	ntervention		9 mont	h follow-up	
	I	n=2068		и	i=1333		u	=225ª	
	Intervention n=1002 (48.5%)	Control n=1066 (51.5%)	Ч	Intervention n=630 (47.3%)	Control n=703 (52.7%)	Ч	Intervention n=112 (49.8%)	Control n=113 (50.2%)	Ч
Age in years, M (SD)	52.9 (16.7)	52.2 (17.4)	su	54.0 (16.2)	52.3 (17.3)	0.01	51.7 (14.9)	48.9 (14.3)	ns
Gender, Men	374 (37.3%)	425 (39.9%)	ns	282 (44.8%)	278 (39.5%)	ns	62 (55.9%)	45 (40.2%)	0.02
Cultural background, Dutch	918 (91.6%)	933 (87.5%)	su	586 (93.0%)	626 (89.0%)	0.01	111 (99.1%)	106 (94.6%)	ns
Education level									
High	375 (37.4%)	401 (37.6%)	su	250 (39.7%)	294 (41.8%)	su	41 (36.6%)	34 (30.4%)	su
Medium	356 (35.5%)	349 (32.7%)	su	203 (32.2%)	215 (30.6%)	ns	37 (33.0%)	41 (36.6%)	su
Low	224 (22.4%)	242 (22.7%)	ns	145 (23.0%)	162 (23.1%)	ns	33 (29.5%)	35 (31.2)	ns
Physical condition									
Chronic airways disease	124 (12.4%)	164 (15.4%)	0.03	73 (11.6%)	78 (11.1%)	su	20 (17.9%)	22 (19.5%)	ns
Diabetes	73 (7.3%)	90 (8.4%)	ns	42 (6.7%)	60 (8.2%)	ns	11 (9.8%)	8 (7.1%)	ns
Cardiovascular disease	125 (12.5%)	108 (10.1%)	ns	78 (12.4%)	84 (12.0%)	ns	17 (15.2%)	8 (7.1%)	ns
Pregnant	5 (0.5%)	7 (0.7%)	ns	3 (0.5%)	6 (0.9%)	ns	1 (0.9%)	0 (0.0%)	ns
Smoker	195 (19.5%)	238 (22.3%)	ns	98 (15.6%)	146 (20.8%)	0.01			

ns=not significant, M=mean, SD=standard deviation Differences were examined using χ 2-tests for dichotomous variables and independent samples t-tests for continuous variables ^a Smokers at baseline and post-intervention were included into the follow-up measurement

GP training in smoking cessation care

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- 1 smoking, being prescribed pharmacotherapy, or being referred for behavioural
- 2 support (Table 2).
- 3

4 GPs' attitudes, self-efficacy and intention

5 We found an effect of the training on GPs' perceived self-efficacy and intention 6 towards implementing SCC (Table 2).

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8 Patient's intention to quit and smoking abstinence

After adjustment for clustering effects and patient background characteristics. we found no effects of the GP training on smokers' intention to guit (Table 2). Nine months after the GP training, more patients in the intervention group (baseline and post-intervention) completed the follow-up questionnaire compared to patients in the control group (38.2% vs. 29.4%; p=0.02). We compared patients who completed the follow-up questionnaire with patients who did not complete 14 the questionnaire. The patients did not differ on the background characteristics they filled out in the first questionnaire (age, gender, cultural background, and educational level). Also, responders and non-responders did not differ on the number of times they reported being asked about their smoking behaviour, were advised to quit, were prescribed pharmacotherapy or were referred for behavioural counseling during the GP visit, as indicated in the first questionnaire. After controlling for clustering effects and patient background characteristics, 26.8% of patients in the intervention group reported not having smoked during the past 7 days and 10.8% refrained from smoking since they completed the 24 first questionnaire (Table 4). In the control group 25.0% and 7.1% of the patients reported 7-day point prevalence abstinence and continuous abstinence, respec-

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Table 4. Effect of GP training in smoking cessation care on patient smoking behaviour at 9 month
 follow-up with different assumptions about smoking behaviour of non-responders

% non-smokers, not including non-responders	Intervention (n=112)	Control (n=113)	OR (95% CI) ^a	Р
Point prevalence abstinence	26.8%	25.0%	1.07 (0.57-2.00)	0.89
Continuous abstinence	10.8%	7.1%	1.62 (0.60-4.34)	0.34
% non-smokers, assuming that all non-responders smoke	Intervention (n=293)	Control (n=384)	OR (95% CI) ^a	Р
Point prevalence abstinence	10.2%	7.3%	1.33 (0.77-2.31)	0.30
Continuous abstinence	4.1%	2.1%	1.93 (0.77-4.89)	0.16

GP=general practitioner, OR=odds ratio, CI=confidence interval

³⁸ Generalised Estimating Equations adjusted for clustering effects and patient characteristics

39 ^a Control group = reference category

tively. We did not find an effect on long-term patient smoking behaviour (Table
4). Also, when analysing responders of the baseline and post-intervention group
separately, no effect of the GP training on long-term smoking abstinence was
found (data not shown). We performed a sensitivity analysis using the conservative assumption that non-responders did not change their behaviour and still
smoked at follow-up.³⁹ This analysis did not change the findings on long-term
patients smoking abstinence rates (Table 4).

0

0 DISCUSSION

11

12 Major findings

This study evaluated the effectiveness of a low-intensity, practice-tailored training in smoking cessation care (SCC) for GPs, addressing both personal and organisational barriers that arise during the implementation of these counseling activities. After the training we found significant differences between trained and untrained GPs on the frequency they asked about smoking (according to the patients) and gave advice to quit (according to the GPs themselves).
However, we did not find an effect on the arrangement of follow-up support,

neither on provision of pharmacological therapy, nor on referrals for behavioural
support. In addition, we found no effects on patients' intention to stop smoking
after GP consultation and long-term cessation rates.

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4 Study findings compared to previous research

Our training managed to increase the frequency at which patients reported being asked about smoking, and at which GPs reported the provision of stop-smoking advices. Compared to several other training programmes that did not find an increase in these counseling activities, this is a hopeful outcome.⁴¹⁻⁴³ However, we found relatively small rates of smokers for whom GPs had arranged referral and follow-up; other studies found rates of behavioural follow-up ranging from 25-59% and pharmacological prescriptions from 14-37%.⁴¹⁻⁴⁵

With regard to the long-term effect of the GP training on patients' smoking behaviour, a recent meta-analysis of 14 studies found comparable long-term quit rates as a result of training health professionals in smoking cessation care.²⁶ However, the majority of the individual studies within this meta-analysis did not confirm statistical significance between quit rates in the intervention and control group, which is in line with our finding. Although our data suggest that trained GPs more often advised smokers to quit, they failed to increase referral rates and the intention to quit of smokers. This might explain the lack of long-term 1 results. A study of McRobbie et al. has shown the effectiveness of a brief training

2 session addressing skills for referral of smokers on the number of GP referrals

3 to evidence-based cessation support.⁴⁶ In addition, more and more studies show

4 the increasing role and effectiveness of in-practice cessation support delivered

- 5 by practice nurses.⁴⁷⁻⁵¹ Moreover, referring and connecting smokers to evidence-
- 6 based quit lines is likely to increase smoking cessation.^{29;52}
- 7

8 Strengths and limitations

9 Some limitations with regard to the study design should be considered when
10 interpreting the results of our study. First, the exact response rate of patients
11 who completed the questionnaire at baseline and post-intervention is unknown.
12 Reasons for non-response might be attributed to GPs who did not hand over the
13 patient questionnaires, or to patients who forgot or were unwilling to complete
14 the questionnaire.

Second, participating GPs relatively often advised their patients to quit at baseline (40.2% and 43.8%, respectively, compared to only 21% found in another Dutch study.¹² An explorative analysis showed that the GPs' awareness of the aim of the intervention and completing tracking lists regarding smoking cessation counseling might make them more prone to ask about smoking, compared to GPs that did not complete tracking lists and were unaware of the study topic (data not shown). Despite this possible priming effect, we found an additional significant effect of the training on the number of times patients who were asked about their smoking status (patient-reported) and advised to quit (GP-reported). A third limitation is the fact that smoking abstinence at follow-up was selfreported and lacked biochemical verification due to financial constraints. In

addition, a large number of patients were lost to follow-up (66.4%), especially
in the control group (69.9%). Attrition is common in lifestyle intervention trials,
which may affect the study power, cause bias and threaten generalisability.⁵³

Fourth, the different sources were slightly inconsistent. On the one hand, GPs reported an increase in the number of stop-smoking advices. On the other hand, patients only reported a significant increase in the number of times they were asked about their smoking status. This discrepancy is in line with other studies, reporting a lack of agreement between patient and provider surveys when measuring tobacco counseling actions.⁵⁴⁻⁵⁷ This might be explained by patients' perception of a stop-smoking advice as being embedded in a general discussion about smoking behaviour and therefore have escaped their attention. This could have led to recall bias and may have contributed to the lack of effect on patients' motivation to quit and long-term smoking cessation. Finally, a minority of the participating GPs did not have direct access to smoking cessation programmes of 1 a (trained) practice nurses during the study period, which may have contributed

2 to the lack of effect on GPs' referrals for behavioural cessation support.

3 Nevertheless, the major strengths are the pragmatic nature of this study (a

4 low-intensity and pragmatic training method) in a specific setting (GP practice),

5 tested in a cluster-randomised controlled trial preventing contamination be-

- 6 $\,$ tween GPs, with outcome measures being assessed on both short-term GP and $\,$
- 7 long-term patient level.
- 8

9 Conclusions

Our low-intensity, practice-tailored training for GPs in the implementation of asking patients' smoking status, advising smokers to quit, and arranging referral and follow-up does not lead to an increased patient access to more intensive smoking cessation support. Future training methods should also include practice nurses and focus on the GPs' role as gatekeeper for referring or connecting smokers to cessation support, such as quit lines and practice nurses. This approach is likely to ensure pharmacological and behavioural cessation support and increase patient abstinence rates.

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