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Improving the effectiveness of smoking cessation in primary care: lessons learned

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Abstract

Aims The 'Smokescreen' smoking cessation programme was introduced in Christchurch in 1995, with an initial study showing six-month, self-reported quit rates of 10% and 17% (with a validated deception rate) in primary and secondary care settings. Substantial modifications were made to try to improve this rate in the primary care setting and the programme has been implemented widely. Our primary aim was to estimate programme utilisation and six-month quit rates for enrolled patients in this general primary care setting. We also aimed to use a wide range of patient, practice and environmental variables to estimate any predictive effect on outcome.

Methods Prospective longitudinal cohort study. The nicotine replacement therapy (NRT) -based programme was implemented by Pegasus Health, an independent practitioner association (IPA) situated in the Christchurch urban area, to which the majority of Christchurch-based GPs belong. A cohort of 516 patients enrolling in the programme over a two-month period were contacted six months after their nominated quit date. The main outcome measure was the six-month, self-reported quit rate.

Results Of the 516 participants, 334 (65%) were contacted by mail or telephone. The overall six-month quit rate was 36% (95% Confidence Interval (CI) 31–41). Univariate analysis initially showed duration of NRT ($p = 0.03$) and age band ($p = 0.004$) were significant predictors of quitting, while living with a smoker ($p = 0.02$), having made no previous quit attempts ($p = 0.02$) and having heart disease ($p = 0.01$) were all significant predictors of continued smoking at six months. Factors that did not predict whether respondents were smoking at six months included previous use of NRT, sex, ethnicity, who delivered the intervention, years of smoking, cigarette dose, and NZDep96 score. However, there was interaction between these factors as after multivariate analysis the only significant predictors of outcome were having others living in the house who smoked (odds ratio (OR) 0.55, 95% CI 0.33—0.93, $p = 0.03$) and having made no previous quit attempts (OR 0.29, 95% CI 0.12–0.71, $p = 0.02$). Both these factors were significantly associated with continuing to smoke.

Conclusions This programme compares favourably with six-month quit rates for NRT-based programmes reported in the international literature of 14–22%. The effectiveness of an NRT-based smoking cessation programme in a general primary care setting appears to have been significantly enhanced by local adaptation, the flexibility of a primary-care-team approach and subsidisation of NRT, together with facilitation responsive to individual practice needs. The success of this programme in helping individual patients quit, as well as its successful implementation in a wide primary care setting, suggests General Practice can play an important role in smoking

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cessation in a country with a high burden of disease from smoking-related illnesses. The programme is congruent with the current, national, smoking cessation guidelines endorsed by the RNZCGP. Widespread adoption of this kind of model in IPA/primary health organisation (PHO) settings throughout New Zealand should be encouraged and supported.

The serious health effects of smoking are indisputable. Smoking is responsible for 20% of the deaths in most Western countries, shortens the life expectancy of addicts by an average of eight years and adds a huge and preventable burden of disease to over-stretched health systems.[1] Despite this, progress both in primary prevention of addiction, using legislative and fiscal restrictions, and secondary prevention, using smoking cessation programmes and population-based interventions, has been slow.

Brief, opportunistic advice on stopping smoking and non-tailored smoking cessation letters both increase cessation rates by 2–3%.[2] There are a number of randomized controlled trials supporting the effectiveness of nicotine replacement therapy (NRT). A systematic review in 1994 found an overall, one-year quit rate of 15%.[3] A meta-analysis in the same year found an overall quit rate of 22% at six months. A recent Cochrane review of NRT efficacy included studies with endpoints six months and beyond. An overall 14% quit rate was calculated.[4]

A number of other interesting points were highlighted in this review, including the fact that a key determinant of programme success is the setting in which it is offered, with studies set in primary care showing smaller effect than those in specialised clinics or studies using volunteers. Suggested reasons for this were training differences, as well as the often-encountered problems of translating research evidence into 'real world' general practice – it was felt that differential rates reflected the selection of motivated volunteers compared with the more heterogeneous general practice population. This differential rate of success is of some concern as the general practice sector would regard smoking cessation to be one of its core functions, and delivery of smoking cessation programmes in primary care has been shown to be cost effective.[5]

There is a great deal of interest in addressing cardiovascular risk factors in the primary care setting, and in the utility and funding of smoking cessation and NRT in community settings. Despite evidence that in New Zealand general practitioners (GPs) provide smoking cessation to many patients, a recent study showed that New Zealand smokers are not well informed about smoking cessation strategies and their efficacy.[6] A recent paper found differences between actual and recommended practice in primary care in New Zealand and identified a number of potential barriers to smoking cessation in primary care, including time pressure and the fee-for-service system.[7] It was suggested that increased practice nurse (PN) input could be useful.

It is important to assess the performance of a well-supported, multifaceted, NRT programme when implemented in a general primary care setting. Pegasus Health (PH) is an independent practitioner association (IPA) situated in the Christchurch urban area that services a primarily European population. It was formed in 1992, operates a collective approach to GP budget holding and currently has over 225 GP and 240 associated PN members. Pegasus Health has been running a smoking cessation programme for some years (the PEGS programme: Preparation, Education, Giving up and Staying smoke free). The programme was initially introduced as the

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'Smokescreen Programme' in both primary and secondary care. This was devised for use in primary care in Australia[8] and is based on the 'readiness to change' model[9] (precontemplative/contemplative/ready), incorporating a nominated quit date and NRT, and accompanied by supportive counselling and literature. An initial study was performed after its introduction in 1995 using self-reported, six-month quit rates and once again showed differential quit rates in primary and secondary care, with rates of 17% in secondary care and 10% in primary care,[10] and a biochemically validated deception rate using exhaled carbon monoxide of 14.4%. The primary care programme has been substantially modified to make the programme more locally relevant and to try to improve quit rates (the programme has been renamed the PEGS programme).

The primary aim of this study was to estimate programme uptake and six-month quit rates for patients enrolled in a New Zealand, general-practice-based, smoking cessation programme. The programme combines NRT with supportive counselling and has been implemented broadly in a primary care setting in Christchurch, New Zealand.

The secondary aim was to use a wide range of patient, practice and environmental variables to estimate any predictive effect on outcome.

Methods

Current intervention A half-time programme coordinator provided training, materials and a readily accessible support service. Training and resources were provided by the coordinator to practices on an individual basis that allowed the programme to be tailored to each practice's working style and patient population. The training incorporated aspects of the model of behavioural change, motivational interviewing, quitting strategies, NRT use, and relapse prevention. The coordinator also provided ongoing updates, support and advice. The IPA encouraged frequent (weekly to two-weekly) practice contact and PN involvement was encouraged after the first consultation. One of the key philosophies underpinning the implementation was to allow flexibility in delivery between practices. Practices used the programme in a variety of ways, from nurse-run clinics/groups to a GP/PN team approach. Each practice chose how they wished to run the programme, usually based on the skill mix and interests of GPs and PNs within the team.

While the criteria for patient enrolment remained the same as the original model,[9] material for GPs and patients was rewritten and draws on the US Preventive Services Task Force's *Guide to clinical preventive services*.[11] Booklets were made shorter with less text, simple language, a 'positive benefits of quitting' perspective, and less emphasis on the health risks of smoking. There is less emphasis on the smoking cessation 'battle' and more on encouragement and support using a matter-of-fact tone. NRT is emphasised as central to the programme rather than just one option, with subsidisation of the NRT by Pegasus Health underpinning this. The 'Quitters' booklet is very patient interactive and used as a brief 'workbook' with emphasis on individualising the book to each smoker (eg, supports, reasons for and benefits from quitting, identification of likely relapse moods and events, nomination of rewards for quitting).

Consultations covered, in no particular order, assessment of motivation to quit, nominated quit date, discussion of usage of NRT, use of motivational techniques, and discussion of behaviour changes. Patients contributed NZ$15 a week towards the cost of NRT as well as the initial consultation cost. Pegasus Health met the remaining costs of NRT supply. PN involvement was encouraged with flexible roles – either the GP or the PN may implement the programme depending on the availability and skill mix of the individual practice team. This is consistent with effective teamwork principles and was thought to offer added benefits for patient access by reducing costs, as the majority of practices in which PNs implement the programme can reduce or waive charges to the patient for follow-up visits.

Data collection All patients enrolling in the programme provide information, which is recorded on an enrolment form, about their smoking history, previous quit attempts, and smoking-related diseases. A cohort of 516 patients enrolling in the programme over a two-month period (March and April 2000) were selected for study. The cohort were contacted by mail six months after their nominated quit date

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and asked to fill in a simple questionnaire. To maximise the response rate, those who did not respond were sent repeat questionnaires at least twice and then telephoned at least three times before being classified as non-contactable. Attempts were made to determine the new addresses of those who had moved since participating in the programme. The questionnaire gathered information about age, sex and ethnicity (using the New Zealand Census format). Address at enrolment was geo-coded and a New Zealand Index of Deprivation (NZDep96) score assigned as an indicator of socioeconomic status.[12] At six months, patients were asked about their motivation for enrolling in the programme, where they had heard about the programme, whether they were currently smoking and, if they were, why they felt they had continued to smoke. Patients were also asked how long they had used NRT, whether they lived with other smokers, and who they had seen at the practice (primarily PN, GP or a combination). Responses to the questions about demographics, smoking and disease history were all categorical and pre-coded prior to study commencement. Responses to the questions about motivation for quitting, reasons for restarting, and suggestions for improvements were also categorical, with the categories developed from free-text answers during the first interviews, which were conducted by telephone to allow this. A free-text 'other' category allowed extra categories to be built in if necessary.

Analysis Simple descriptive statistics were calculated in Excel. SAS (Version 8.02) and Confidence Interval Analysis (CIA)[13] were used for the more detailed statistical analyses.

Results

A total of 3670 patients enrolled in the programme in 2000 in 94 member practices (227 GPs). Of the 516 participants enrolled in a consecutive two-month period, 334 (65%) were contacted by mail or telephone. Over one third of participants had changed address in the six months since participating in the programme so, as previously discussed, considerable effort was required to achieve this response rate. The majority of non-contactable participants had moved and no forwarding addresses were available.

Table 1. Demographic characteristics of participants (age, sex, ethnicity, NZDep96 score)

	Enrolled patients	Respondents
Age band (years)*		
15–25	50	26
26–35	130	68
36–45	130	77
46–55	104	74
56–65	56	51
66–75	26	26
>75	13	12
Sex (F:M)	294:222 (57:43%)	211:123 (63:37%)
Ethnicity		
NZ European	Not available	88% (86%)†
NZ Maori		4 % (7%)†
Other European		4%
Other		2%
No response		1%
NZDep96 mean score	5.8	5.6
Years of smoking		
>5	92%	92%
≥15	65%	71%
Smoking-related disease	24%	29%
Previous quit attempts (mean)	2.07	2.07
Previous use of NRT	23%	23%

*there was a statistically significant difference in response rates across different age bands: 51.89 degrees of freedom 6, $p < 0.00001$; †equivalent percentage of Christchurch population

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The majority of enrolled patients (57%) and respondents (63%) were female. Almost all (92%) enrolled and respondent patients had smoked for greater than five years and around two thirds had smoked for 15 years or more. One quarter had a documented, smoking-related disease, and enrolled patients and respondents had made on average two previous quit attempts. Eighty eight per cent of respondents were European, 4% Maori, 4% other European, and 4% 'other'. These small numbers did not allow any sub-analysis within specific ethnic groups. (Demographic and socioeconomic data are shown in Tables 1 and 2).

Table 2. Socioeconomic distribution of programme participants

NZDep96 Category*	Proportion of respondents (%)	Proportion of enrolled patient group (%)
1	9	9
2	9	7
3	9	10
4	9	5
5	5	12
6	12	10
7	9	12
8	10	13
9	13	7
10	7	7

*1 = least deprived, 10 = most deprived

Primary delivery role was split between PN (54%), GP (25%), and combined delivery (16%). Patients heard about the programme mostly from their GP (49%) or by word of mouth (34%). One fifth of respondents had used NRT in previous quit attempts. Reasons for wishing to quit were varied – 38% said they just did not want to be smokers any more, 19% said they enrolled in the programme because of recent health deterioration, and 10% enrolled under pressure from family and friends.

The overall six-month quit rate was 36% (95% CI 31–41). Assuming all non-contactable respondents are still smoking, a 'worst-case-scenario', six-month quit rate was calculated at 23% (95% CI 20–27). This is likely to underestimate the true quit rate, as most missing data were from untraceable patients who had moved rather than non-responders. Using the deception rate of 14% established in the initial study using exhaled carbon monoxide measurement[10] this figure remains above 20%.

Univariate analysis initially showed duration of NRT ($p = 0.03$) and duration of NRT therapy ($p = 0.03$) were significant predictors of quitting. Five to six weeks of NRT therapy was significantly better than one to two weeks (OR 0.38, 95% CI 0.19–0.95), three to four weeks (OR 0.25, 95% CI 0.06–0.98) or 11 to 12 weeks (OR 0.35, 95% CI 0.16–0.78). Age group 45–55 years had a significantly better quit rate (50%) than 26–35 years, 36–45 years and 66–75 years. Conversely, living with a smoker ($p = 0.02$), having made no previous quit attempts ($p = 0.02$) and having heart disease ($p = 0.01$) were all significant predictors of continued smoking at six months (Table 3). Factors that did not significantly predict whether respondents were smoking at six months included: previous use of NRT ($p = 0.77$); sex ($p = 0.08$, male:female, OR

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1.49, 95% CI 0.92–2.42); ethnicity (p = 0.12); who delivered the intervention (p = 0.51); years of smoking (p = 0.50); cigarette dose (p = 0.49); NZDep96 score (p = 0.08); reason for quitting (range of p values 0.21–0.98); history of asthma or chronic obstructive pulmonary disorder (p = 0.46); vascular disease (p = 0.31); and other smoking-related disease (p = 0.46). The NZDep96 scores were collapsed into three categories to test for any evidence of a trend: 'low' (NZDep96 score 1–3), 'medium' (NZDep96 score 4–7) and 'high' (NZDep96 score 8–10). There was no significant linear trend (OR: low 1.00 (reference), medium 0.69, high 1.38; $?^2 = 1.14$; p = 0.29).

Table 3. Univariate analysis

	Odds ratios (95% CIs)	p value
Predictors of quitting		
Duration of NRT 5–6 weeks: odds ratio vs 1–2 weeks odds ratio vs 3–4 weeks odds ratio vs 11–12 weeks	 2.63 (5.26, 1.05) 4.00 (16.67, 1.02) 2.86 (6.25,1.28)	 0.03
Age band (46–55 significantly better than 26–35, 36–45 and 66–75: odds ratios compared to 46–55 age band between 0.33 and 0.48)	Chi-square 17.10 5 DoF	0.004
Barriers to quitting		
Pre-existing heart disease	0.23 (0.04, 0.81)	0.01
Living with a smoker	0.55 (0.32, 0.93)	0.02
No previous quit attempts (no linear trend with number of quit attempts)	0.28 (0.11, 0.71)	0.02

As seen in Table 4, subsequent multivariate analysis using a logistic regression model showed there was interaction between variables that seemed to predict outcome using univariate analysis. When applying the multivariate model, the only independently significant predictors of smoking status at six months were two with a negative influence on outcome. Having others living in the house who smoked (OR 0.55, 95% CI 0.33–0.93, p = 0.03) and having made no previous quit attempts (OR 0.29, 95% CI 0.12–0.71, p = 0.02) were factors significantly associated with continuing to smoke. Where respondents had made previous quit attempts, outcomes did not significantly differ between different numbers of quit attempts.

Table 4. Multivariate analysis

Barriers to quitting	Odds ratios (95% CIs)	p value
Living with a smoker: Others in the house who smoke compared with no others in house who smoke	0.55 (0.33, 0.94)	0.03
Number of previous quit attempts: No previous quit attempts compared with previous quit attempts	0.29 (0.12, 0.71)	0.02

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The reason for restarting smoking most commonly reported was stress (36%), followed by addiction to or satisfaction from nicotine/smoking (20%), weight concerns (10%), and loss of motivation (10%). Withdrawal symptoms were given as a reason for restarting by 6% of respondents.

When asked for suggestions for other support the IPA or practice could provide that might make quitting easier, the most common response was ‘none’ (35%), with 13% suggesting further follow-up appointments, 9% suggesting more counselling, and 12% suggesting support groups might be helpful. These responses were similar for both smokers and non-smokers, except for the suggestion of support groups: nearly 90% of respondents who made this suggestion were smokers.

Discussion

Preventive care is regarded as a core feature of primary care and this study indicates that smoking cessation can be very effectively delivered in the primary care context. The programme had a good uptake, with enrolment of an average of 16 patients for every GP per year (full or part time).

Figure 1. Socioeconomic distribution of programme participants

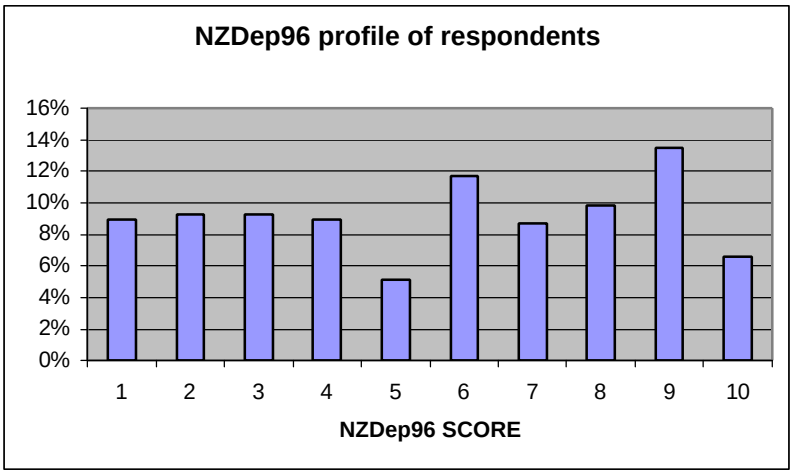

Figure 1 shows the socioeconomic spread of those enrolled in the programme. It is reassuring to see that the programme is reaching the lower socioeconomic group as it is not uncommon for middle and higher socioeconomic groups to have a greater rate of uptake of preventive programmes. There is still room for improvement, however, as proportions in this study sample still do not match the nationwide proportions of smokers in the more deprived groups (Figure 2). The penetration of the programme into non-European ethnic groups is not so good. Numbers in non-European ethnic groups were too small to allow sub-analysis. In particular, Maori and Pacific Island enrolment rates were lower than population proportions and Asian participants were notable by their absence. This is of concern as Census data indicate that Maori have higher rates of smoking in the New Zealand population than Europeans. The reasons for this low uptake need further exploration.

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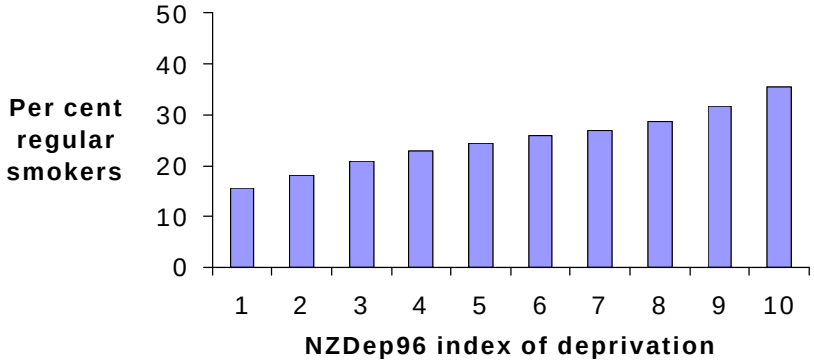
Figure 2. Percentage of regular smokers in New Zealand by NZ index of deprivation (source: Dr P Crampton, Health Services Research Centre, Victoria University, Wellington)



In this study, the population of participants was highly mobile. Whilst this is not an unexpected finding it is important in planning service delivery and programme follow up. It is interesting to note that while deprivation is a predictor of starting smoking it did not appear to influence programme outcome using NZDep96 as an indicator.

This programme compares favourably with six-month quit rates for NRT-based programmes reported in the international literature of 14–22%. Rates in primary care settings are often at the lower end of the range. Deception rates in self-report were tested in the previous study with carbon monoxide assessments[10] and were found to be 14%, which is consistent with rates in the literature[3] and does not substantially affect this judgement of effectiveness.

The reasons for the apparent success of the PEGS programme cannot be inferred directly from this study, but some features of the programme would seem likely to increase its potential for effect. The programme was introduced as a modification of a well-established programme (the Smokescreen Programme) after evaluation in a local context.[10] Key features of the modified programme were: the flexible team approach, NRT subsidisation, and an effective programme coordinator.

Use of the Di Clemente and Prochaska states of change model ensures the programme is delivered to those who are more likely to be ready to quit.[9] A team approach gives flexibility of role in delivery, ensuring that the most suitable person in the practice team is able to deliver the programme. Increased PN involvement also reduces access barriers by reducing costs and increasing potential contact time for the patient. It would appear that programme delivery by PNs could be more cost effective; however, care is needed in interpreting the comparative outcome result. Practices in the study were given the flexibility to implement the programme as it best suited their teams' strengths and weaknesses and prescribed roles would reduce this flexibility and could affect outcomes.

The context within which the programme was developed was also favourable; at the time, the 'smoke free' theme had a high profile in NZ, with gradually increasing public acceptance of and demands for more smoke-free areas, and with political

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support in legislation for smoke-free environments. There had also been a significant increase in tobacco prices in May 2000. The programme was branded as a locally modified product, and arrived at a time when enthusiasm for the Pegasus Health IPA was high and there was good practice-level acceptance. The application of an evidence-based approach to practice was already well established and of proven effectiveness within the organisation's Clinical Practice Education Groups (CPEGs) to which all GPs and most PNs belong. The programme coordinator provided training and resources to practices and facilitated the implementation of the programme in a way that was tailored to each particular practice's working style and patient population.

A response rate of 70% or greater is usually considered ideal and, as with all studies, no conclusions can be drawn about outcomes for those who were not contactable. As described, strenuous efforts were made to contact all enrolled patients in the cohort, and it is clear that this is a highly mobile patient group. Almost all the remaining non-responders had moved and had no identifiable, current contact address.

Smoking cessation is very cost effective when compared with other preventive interventions.[14] This study shows it can be effectively implemented in a primary care setting. The effectiveness of an NRT-based smoking cessation programme in a general primary care setting appears to have been significantly enhanced by local adaptation, NRT subsidisation, use of the strengths of a flexible primary-care-team approach, and effective coordination and facilitation responsive to individual practice needs. The programme could be improved by testing the effectiveness of the addition of the most common patient suggestions (longer follow up and support groups).

A description of practices in primary care smoking cessation in 2000 indicated a gap between reported and recommended practice in primary care in this area.[7] The success of this programme in helping individual patients quit as well as its successful implementation in a wide primary care setting suggests General Practice has an important role to play in a country with a high burden of disease from smoking-related illnesses. The PEGS programme is congruent with the 2002 Guidelines for Smoking Cessation endorsed by the Royal New Zealand College of General Practitioners.[15] Widespread adoption of this kind of model in IPA/PHO settings throughout New Zealand should be encouraged and, more importantly, supported. Pegasus Health is a large IPA that has a well-developed infrastructure and resources that allowed it to develop and facilitate the implementation of the PEGS programme. IPAs with different levels of infrastructure development should be supported in providing the required evidence-based education, coordination and practice communication necessary to implement this type of programme.

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