

# The effect of advance telephone prompting in a survey of general dental practitioners in Scotland: A randomised controlled trial

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**Objectives** Evaluation of advance telephone prompting on the response rate to a postal, self-completed questionnaire. To provide an estimate of the cost of such a strategy. **Method** A sample of 315 GDPs was randomly selected from a randomised database of GDPs practicing in Scotland. 157 GDPs were randomly allocated to receive an advance telephone prompt, via the practice receptionist; 158 were allocated to a control group. Four days after prompting all trial participants were mailed identical questionnaires, cover letter and postage paid return envelope. **Results** Response rates: 53% - advance telephone prompt group and 40% - control group. The effect size, 13%, was found to be statistically significant,  $p = 0.026$ . Total estimated strategy costs: £74.00. The incremental cost was estimated to be £4.93 for each additional response. **Conclusions** Advance telephone prompting of GDP's, via the practice receptionist, statistically significantly improves the response rate to a postal self-completed questionnaire. This is estimated to be a cost effective strategy for improving response rates to postal questionnaires.

*Key words:* Analysis, controlled trial, cost, questionnaire, randomised response rate.

## Introduction

Self-completed postal questionnaires are used to survey geographically dispersed populations, in a cost effective manner (Dillman and Frey, 1974; Edwards *et al.*, 2002; McColl and Jacoby *et al.*, 2001a; 2001b). Studies of survey methods have largely concentrated on the social setting and there is a lack of evidence for the design and conduct of surveys in the health setting (McColl *et al.*, 2001a; 2001b; Edwards *et al.*, 2002).

McColl *et al.* (2001b) highlight six key areas in survey design and conduct: Response rate; achieving a representative sample; the nature, volume and complexity of the data to be collected; response bias; other sources of bias such as sampling bias and practicalities. These practicalities are associated with costs and methods of survey administration. Examples include: Recruiting sufficient numbers of personnel, travel, and training in order to conduct face-to-face or telephone interviews.

The main threat to the validity of survey findings arises from low response rates, which fail to provide information about all individuals sampled (Dillman and Frey, 1974; Edwards *et al.*, 2002; McColl *et al.*, 2001a; 2001b; Moser and Kalton, 1971; Oppenheim 1992). The source of this bias lies in the non-responders possessing different characteristics to those who do respond. This can lead to spurious conclusions being drawn from small surveys (Altman, 1999; Edwards *et al.*, 2002; Gough and Hall, 1977; McColl *et al.*, 2001b; Sheikh and Mattingly, 1981; Siemiatycki and Campbell, 1984).

In a systematic review of interventions to improve survey response rates Edwards *et al.* (2002) found that

a number of strategies have been evaluated in randomised controlled trials (RCTs). These included, the provision of monetary incentives, the appearance of the questionnaire, and the number of contacts between researchers and sample individuals. They found a non-significant effect from advance mail prompts compared with advance telephone prompts in two trials. A single randomised trial in a population of Australian primary care dental practitioners found that telephone prompting was significantly more effective than mail prompting in improving response rates in a survey on smoking cessation (Rickard-Bell and Ward, 2000).

Tan and Burke (1997) carried out a review of 77 publications to assess the effectiveness of strategies designed to increase response rates in the dental primary care setting. They suggested four key strategies to improve response rates: Enclosing a reply paid envelope, telephone or mail follow-up, placement of respondent's names in a cash draw and shorter questionnaires. No evaluations of advance prompts were included in the review.

The reviews by Edwards *et al.*, (2002), Tan and Burke (1997) and Rikard-Bell's (2000) randomised trial do not state comparative costs of strategies versus controls or alternative strategies.

Falling rates of clinician response to surveys have been highlighted by McAvoy and Kaner (1996) in general medical practice. They state that the danger of poor response in surveys may weaken the collective voice of primary care practitioners and therefore their ability to influence planning and policy.

Research to assess the effectiveness of single strategies, designed to increase response rates in Scottish primary care dental are rare.

The primary aim of this study is to evaluate the single strategy of advance telephone prompting versus no prompting in a dental primary care population (GDPs) in Scotland. The secondary aim is to estimate the incremental (additional) cost to the researcher, of advance telephone prompting versus no prompting.

## Methods

Two developmental pilot trials were registered with the local primary care research network – EastReN (formerly TayReN, Tayside Research Network). Firstly, face-to-face, semi-structured interviews were carried out with a purposive sample of GDPs. A four-step qualitative analysis was used (Malteraud, 1993) to synthesise a pilot questionnaire. Secondly, the pilot questionnaire was mailed to GDPs registered with TayReN for self-completion and return. The trial protocol was submitted for ethical consideration by MREC and we were advised that a full ethical application was not required. A questionnaire was subsequently developed to determine GDPs use of the Index of Orthodontic Treatment Need (IOTN).

The setting for the trial and questionnaire was the Scottish General Dental Services (SGDS). All GDPs working in Scotland were eligible trial participants if they had a current health board list number. A list of GDPs was provided by the Dental Health Services Research Unit (DHSRU). This was cross-referenced with the General Dental Council register in order to identify specialist orthodontic practitioners. Participants were ineligible for trial participation if they had - retired, moved practice and could not be traced, been removed from the dental register or were operating a specialist orthodontic practice.

We tested the hypothesis that advance telephone prompting would increase the response rate to a self-completed, postal questionnaire. The cost of any additional responses generated by prompting was estimated.

Prompt and control groups received identical covering letters, questionnaires and a postage paid return envelopes.

A prepared statement was read to the practice receptionists in the telephone-prompting group of the trial by a single prompter. They were advised of the GDP to whom the questionnaire was targeted; told the purpose of the questionnaire and the value of having it returned. Finally they were asked to remind the dentist to return it to the DHSRU and thanked for their assistance.

Where contact could not be made with the practice receptionist (or the dentist was found to be ineligible), the next name on a randomised list was selected. This protocol was applied one further time to the re-selected GDPs. Non-contactable GDPs were re-allocated to the control group at this stage.

Questionnaires were discreetly colour coded to identify control and intervention groups. Researchers were blind to the individual identity of respondents. Respondent anonymity meant that targeted follow-ups and analysis of non-respondents was not possible.

Costs were estimated in pounds sterling per additional

questionnaire returned.

The outcomes measured were group response difference (effect size) and incremental cost effectiveness ratio (ICER).

A sample size was calculated, a-priori, by a consultant statistician. This was based on the requirements of the GDP IOTN questionnaire: An assumed 8% utilisation of IOTN with standard deviation set at 0.03 from the observed population - gave a sample size of 315 - based on two tailed analysis. It was estimated that there was an 80% power to detect a 10% effect size. Evidence for an estimated effect size was taken from an Australian study of GDPs (Rickard-Bell and, 2000).

Computer software (Excel 2000) was used to randomise the DHSRU list, randomly select a sample and randomly allocate participants to prompting and control groups. In order to conceal allocation, the latter was carried out by a colleague unconnected with the trial (Dr Colin Tilley). Additionally, random number table B13 in Altman (1999) was used to aid sample selection. GDPs were allocated: 158 - control group, 157 - prompting group.

Success of randomisation was assessed by testing for significant differences between the demographic variables.

Data was entered into SPSS version 11.0 and CIA (CIA, 2002) for statistical analysis. Significance testing was performed using  $\chi^2$  and Fisher's exact test where appropriate. The confidence interval was calculated using the traditional method (CIA, 2002; Gardner and Altman, 2002; Newcombe and Altman, 2002). Two tailed significance tests were used.

Costs considered for the ICER were - telephone calls, estimated by multiplying the average length of call: One minute by the national call rate: 7.91 pence/minute, plus cost of prompter's time - based on secretarial rate of £7.50 per hour - total eight hours: Intervention ( $c_i$ ) minus control ( $c_j$ ). The effect size of the telephone prompt is the number of responses from the intervention group ( $e_i$ ) minus the number of responses in the control group ( $e_j$ ) (see table 1). The ICER was calculated thus (Drummond *et al.*, 2000):

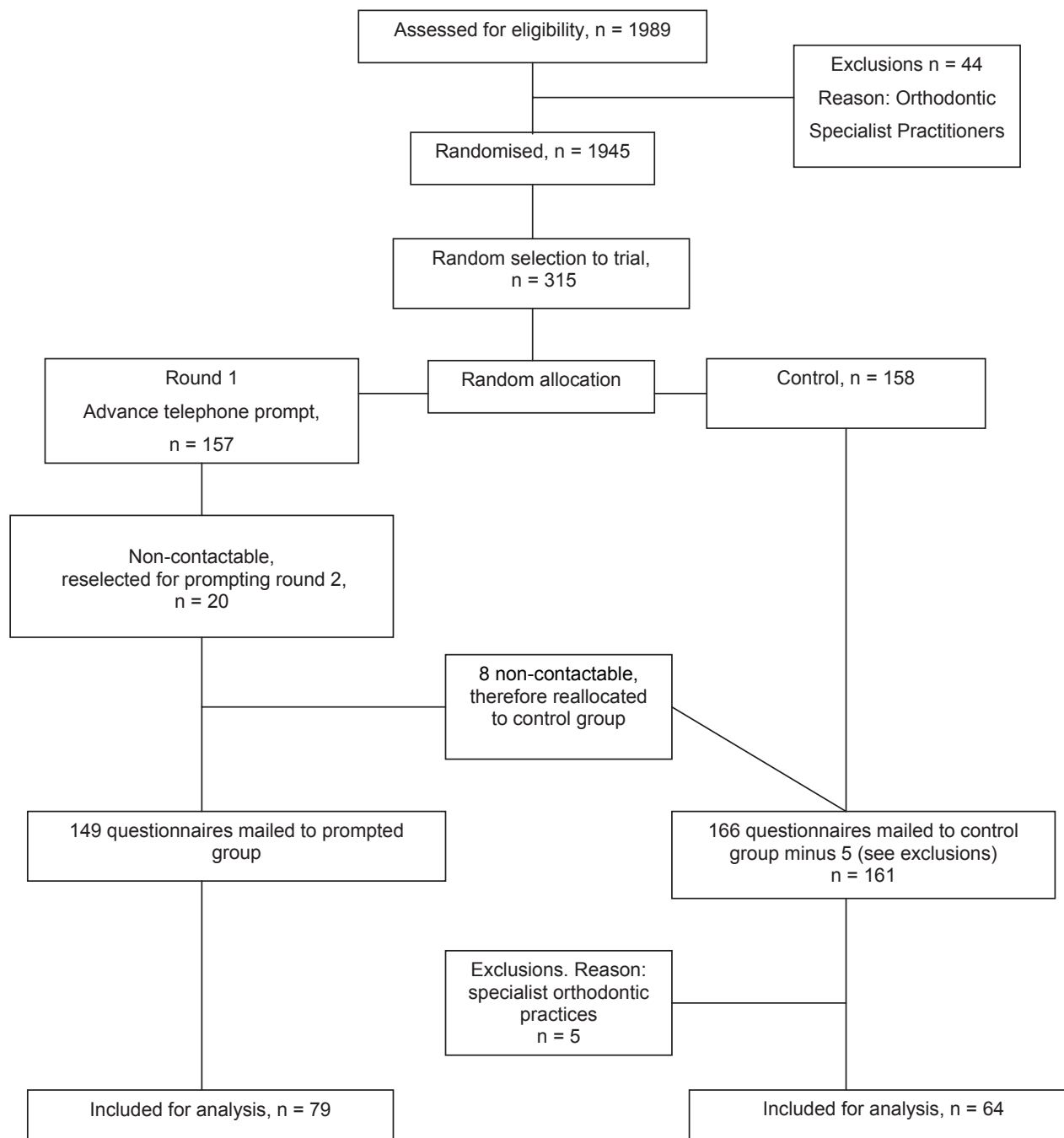
$$ICER = \frac{c_i - c_j}{e_i - e_j}$$

## Results

On 11.8.03 the first round of prompting calls to 157 GDP practices in the intervention group of the trial, was conducted. Twenty practices were non-contactable. Following re-selection a second round of calls was made. A further eight practices were non contactable, and subsequently allocated to the control group. Four days later the questionnaires were mailed out to both groups. Responses were collected up to the end of week five after mailing (see figure 1).

Response rate for the telephone prompted group was 53% (n = 79), for the control group 40% (n = 64) giving an overall response rate of 46% (n = 143). All returned questionnaires were entered for analysis.

Advance telephone prompting achieved a successful contact rate of 84% (n = 149).



**Figure 1.** Response rates of dentists in randomised, controlled trial of telephone prompting.

**Table 1.** Incremental costs of telephone prompting.

<i>Intervention</i>	<i>Number of responses</i>	<i>Costs £</i>
Advance telephone prompt (intervention -)	79 (e <sub>i</sub> )	74 (c <sub>i</sub> )
No prompt (control)	64 (e <sub>j</sub> )	0 (c <sub>j</sub> )
Increment of intervention over control (ICER)	15	(14 + 60 /15) 4.93

A statistically significant difference was detected between the prompted and unprompted groups. Group response difference = 13% (n=15); 95% C.I. 2% to 24%;  $p = 0.026$ .

In Scotland 34% of GDPs was female at the time of the study; in the sample studied 26% was female, a more significant difference  $\chi^2 = 1.967$ ,  $p = 0.161$ . Respondents were most likely to have qualified from one of three Scottish universities Glasgow - 47%, Edinburgh - 24% and Dundee - 22%. Respondents work mainly in the NHS and urban settings 78% and 65% respectively. No statistically significant differences were detected between demographic variables: Year qualified:  $p = 0.63$ ; University qualified:  $p = 0.37$  (data missing for one case); NHS, Private/Independent, Mixed:  $p = 0.625$ ; Urban, Rural or Mixed:  $p = 0.738$ . Due to respondent anonymity, it was not possible to conduct a drop-out analysis of non-respondents.

There was no statistically significant difference detected between gender variables in the sample and the sample frame (see appendix 1).

The estimated total group costs were: Advance telephone prompting group (Ci) £74; control group (Cj): £ 0. The incremental cost (ICER) was estimated to be £4.93 per additional response (Table 1).

## Discussion

The overall response rate to this survey was 46%: 53% in the prompting group vs. 40% in the control. The difference of 13% is statistically significant. The hypothesis that this strategy would increase response rate was accepted. The mechanism by which this occurred might be due to the additional contact provided by the telephone prompt.

The paucity of single response aiding strategies vs. control in the literature (Edwards *et al*, 2002) makes the cost of £4.93 per additional response difficult to place in context. Many trials compare multiple response-aiding strategies. The effect and cost effectiveness of a single strategy is difficult to interpret from such trials "without knowing the response at baseline without the strategy" (Edwards *et al*, 2002).

Rickard-Bell and Ward (2000) compared postal prompts with those by telephone. They estimated an effect size of 19% by day 15 and a final, statistically significant, effect size of 11%; their overall survey response rate was 83%. This confirms previous evidence that advance prompting by telephone increases the *speed* of response. Its effect is mainly observed in early responses; overall effectiveness has been questioned in social research (Dillman and Frey, 1974).

A low response rate to the GDP IOTN questionnaire is possibly due to two main factors: Firstly the questionnaire topic may have lacked salience. Secondly there were a minimal number of contacts.

A high response rate is considered important in producing valid and reliable data from which to make conclusions about the beliefs or behaviour of the population surveyed (Altman, 1999; McColl and Jacoby *et al.*, 2001a). However response rate alone cannot automatically guarantee the validity of the findings in a survey (McColl and Jacoby *et al.*, 2001a; Moser and Kalton, 1971; Oppenheim, 1992).

Following evidence for best practice enhances validity in healthcare surveys. Much of this evidence relies on social or psychological research settings (Edwards and Roberts *et al*, 2002; McColl and Jacoby *et al*, 2001a; McColl and Jacoby *et al*, 2001b). The design of the GDP IOTN questionnaire was informed by evidence based best practice where possible.

Survey methods, which endeavour to address non-response bias, depend on collecting data about non-respondents. This requires sensitivity and careful consideration of the ethics of such a strategy (Moser and Kalton, 1971). Where information on the non-respondents is unavailable it may be more appropriate to compare characteristics known about the respondents with those readily available for the sample frame. Again ethical consideration needs to be given to such a strategy.

Other methods to assess non-response bias include multivariate and regression analyses (Oppenheim, 1992; Tan and Burke, 1997). These indicate the direction bias might lie in. They can only be used with metric data (Oppenheim, 1992).

The results of multiple statistical analyses must be interpreted with caution: The greater the number of variables analysed, the more likely a statistically significant result will occur by chance alone (Consort Statement, 2004; Oppenheim, 1992).

McColl *et al* (2001b) found the effects of anonymity on survey response rates to be equivocal. Follow up contacts, which may have increased the response rate would have required this survey to use an anonymised rather than anonymous trial design. An anonymous strategy did not require a full ethics submission. Additional mailings would have increased the cost of postage and producing questionnaires. The decision to employ anonymity was based on ethical considerations, trial practicalities and available resources.

## Cost

Advance prompting by mail was found to be cost-effective by Rikard-Bell and Ward (2000). They recommend this in favour of advance telephone prompting directly to the dental practitioner. This may be due to their mail prompt strategy achieving an adequate response rate of 78% (the telephone prompt elicited a response rate of 89%. Successful direct telephone contact was made with 70% of dentists). They did not give a comparative cost breakdown of the two strategies.

It was anticipated, that direct contact with a dentist would necessitate a longer call time as he/she is alerted to the call, and interrupt their clinical work in order to take it. Alternatively a second call is necessitated at a pre-arranged time. For this trial, contact was made at receptionist level, cutting the amount of time spent on the telephone. We contend that minimal practice and patient costs were incurred, whilst producing a significant and cost-effective intervention effect size.

Another strategy might involve enclosing a monetary incentive with the questionnaire. The sum of \$1 was found to double the odds of response over no incentive (Edwards *et al*, 2002).

The sum of £1 enclosed with the intervention group would have cost a total of £157. If the incentive was assumed to have an equivalent effect, an increase in re-

response rate from 40% to 57% is predicted. The incremental cost of this is a little over £9.20 per additional response almost double the cost of telephone prompting.

### Conclusions

An advanced telephone prompt, via the practice receptionist, statistically significantly increased the response rate to questionnaires in the Scottish dental primary care setting. This response aiding strategy is recommended where the ability to target non-respondents in a cost-effective manner is not possible. It may also be of value where a low response rate is expected.

Further research is required to estimate the cost effectiveness of response aiding strategies.

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