

## Do behavioral smoking reduction approaches reach more or different smokers? Two studies; similar answers

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### Abstract

There is a need for innovative approaches capable of reaching smokers who would not otherwise participate in efforts to modify their smoking. This paper reports on two studies to determine whether a smoking reduction intervention would appeal to additional or different types of smokers than do cessation interventions. Study 1 attempted to contact 160 HMO smokers scheduled for outpatient surgeries. In Study 2, actual pilot reduction and cessation programs were offered to 531 smokers about to undergo out-patient surgeries or procedures. In Study 1, 39% of those eligible elected smoking reduction; and 38% selected cessation. In Study 2 of those eligible, 22% began participation in the smoking reduction program; 12% preferred a cessation approach; and 65% declined. There were few demographic or smoking history differences among those who elected smoking reduction, cessation, or declined. Among this understudied population, a sizable proportion in both studies agreed to participate in smoking reduction. If replicated, this suggests that comprehensive programs that include a smoking reduction component could substantially increase their reach.

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## 1. Introduction

Most approaches to smoking cessation attract only a minority of smokers, and may have reached a plateau in terms of their effectiveness at somewhere around 25–35% long-term maintenance (Cummings & Hyland, 2004; Fiore, 2000; Hughes, 1996; Hughes, 2000; Lerman, Patterson, & Berrettini, 2005; Lichtenstein, 1997; Maske, Miller, Moyer, Phaneuf, & Cameron, 2004). Even if these calculations are under estimates by a factor of two, there are two important corollaries. The first is that there remain vast numbers of smokers who will not participate in the types of smoking cessation programs available in most communities (Abrams et al., 2003; France, Glasgow, & Marcus, 2001; Glasgow, Lando, Hollis, McRae, & LaChance, 1993; Jenrikus et al., 2005; Lichtenstein & Hollis, 1992; McDonald, 1999). The second is that the large number of smokers who are unsuccessful at quitting could use some assistance, rather than just becoming intransigent or relapsing to baseline levels. Recent publications have underlined the importance of collecting information on the reach (participation rate and representativeness) of different health promotion interventions, since overall impact of a program is a function of Reach x Effectiveness ([www.re-aim.org](http://www.re-aim.org)) (Abrams et al., 2003; Abrams et al., 1996; Forelicher & Lorig, 2002).

Partly in response to these issues, there has been a resurgence of interest in smoking harm reduction (Carpenter, Hughes, Solomon, & Callas, 2004; Cinciripini, Wetter, & McClure, 1997; Glasgow, Klesges, Klesges, Vasey, & Gunnarson, 1985; Hughes, 1996; Hughes, 1995; Jolicoeur, Richter, Ahluwalia, Mosier, & Resnicow, 2003), new target populations, and recruitment approaches that can potentially increase the number of smokers reached (Gilpin & Pierce, 2003; Linnan, Emmons, & Abrams, 2002; Linnan et al., 2002; Niaura & Abrams, 2002). The term harm reduction has been used to refer to a variety of strategies ranging from different tobacco products, use of other devices, changing the way cigarettes are smoked, to reducing the number of cigarettes smoked (Shiffman et al., 2002). In this paper, we are *concerned with and only recommended smoking reduction (in number of cigarettes smoked)*. It is possible that a focus on smoking reduction could reduce long-term cessation rates, but empirical data suggest this is not the case (Carpenter et al., 2004; Farkes, 1999; Glasgow, Morray, & Lichtenstein, 1989; Jimenez-Ruiz et al., 2002). Rather, data suggest that smokers who make reductions are equally or more likely to stop completely in the future and may experience improvements in biomarkers and respiratory symptoms if they reduce (Gilpin & Pierce, 2003; Falba, Jofre-Bonet, Busch, Duchovny, & Sindelar, 2004; Hatsukami et al., 2002). Although still controversial, most experts recommend more research on harm reduction approaches given the population-based data that most current smokers cannot or will not quit completely (Falba et al., 2004; Gray & Henningfield, 2004; Hatsukami, Henningfield, & Kotlyar, 2004; Hatsukami et al., 2002).

We report on two studies to evaluate the appeal of a low-intensity phone counseling and printed mail smoking reduction program that offered option of cessation (recommended) and to a novel target group: smokers about to undergo outpatient surgery or other invasive out-patient procedures. While there has been a large amount of research on smoking interventions in primary care (Lancaster & Stead, 2004; Ockene, 1987; Orleans, 1993; Swartz & Hays, 2004), among hospitalized smokers (France et al., 2001; Jenrikus et al., 2005; Ong, Cheong, Prabhakaran, & Earnest, 2005; Rigotti, Munafo, Murphy, & Stead, 2003), and among patients post-MI (Allende-Vigo, 2004; Arnow, 2004; Houston et al., 2005), to our knowledge, there has been little research on the increasingly common out-patient surgery/procedure population as a time and setting to initiate smoking modification.

The specific objectives of the paper are to (1) evaluate the reach and attractiveness to smokers of smoking reduction, and (2) investigate and compare the characteristics of those who select reduction, cessation, and those who decline to participate. We were able to study a defined population by obtaining information from electronic HMO medical records on consecutive smokers scheduled to undergo outpatient procedures.

## 2. Methods

### 2.1. *Setting and participants*

Both studies were conducted in the Kaiser Permanente Colorado (KPCO) health care system and received institutional IRB approval. KPCO is a not-for-profit staff model, managed care organization serving approximately 400,000 members. Smoking status is available on approximately 99% of members via electronic medical records (EMR) and adult smoking prevalence was estimated at 18% when the studies were conducted. Both studies tested the feasibility and logistics of a recruitment protocol and estimated participation rates for both smoking reduction and smoking cessation interventions. (They had slightly different inclusion criteria and were not designed to assess outcomes.)

Participants were recruited from population-based samples of KPCO smokers about to undergo outpatient surgery (Study 1) or outpatient surgery and GI procedures (i.e., colonoscopy and sigmoidoscopy) (Study 2). All patients, age 18 and above, who were identified in the EMR as current smokers and scheduled for an out-patient procedure within the next 3 weeks, were notified about the program by letter from the Chief of KPCO's Department of Preventive Medicine. A descriptive brochure was included to provide additional detail about the smoking control opportunities; smokers who did not wish to be contacted could decline this invitation by returning an "opt-out" postcard to the research staff. In Study 2, an informed consent form and HIPAA statement were included with the letter.

One to two weeks after receiving the introductory letter and brochure, patients who did not decline were called and had the program options explained by trained interviewers from a Computer Assisted Telephone Interviewing (CATI) Unit located at the AMC Cancer Research Center. In Study 1, those who were interested, recruited, and consented for one or the other intervention option then received a second mailing 1 week prior to their surgery that provided specific information, including strategies to help cut down or quit smoking. This study terminated after this mailing. In Study 2, the caller conducted baseline data collection immediately after participants agreed.

### 2.2. *Recruitment procedures and measures*

Interviewers introduced themselves as calling on behalf of the KPCO Department of Preventive Medicine and confirmed smoking status. After receiving permission to proceed, the interviewer described the "Options" program (Study 1) and "Smoking Less, Living More" (Study 2) and mentioned the quitting and reduced smoking options. The patient's upcoming procedure was described as a time that many members found appropriate to quit or make changes in their smoking. Members were told that they would receive mailed materials, as well as supportive phone calls to (a) help them quit or (b) to reduce the number of cigarettes smoked by two-thirds. Members who were undecided or who currently smoked less than 10 cigarettes per day were encouraged to select cessation but were allowed to make

their own decision in Study 1. In Study 2, those who smoked less than 10 cigarettes were referred to cessation counseling and were ineligible for reduction.

For Study 1 smokers preferring the quitting option, the “Clearing the Air” brochure was mailed, while smokers preferring the reduced smoking option were mailed a targeted fact sheet providing guidance, motivational messages, and suggestions for reducing their consumption. For Study 2, cessation options consisted of existing in-person or telephone-based HMO and state-sponsored programs that included pharmacological and behavioral treatment, while smokers choosing the reduction option were enrolled in the study.

An attempt was made to collect demographic, smoking history, and medical information on all those reached to compare those selecting each program to each other and to non-participants. Demographic information included age, gender, education level, race/ethnicity, and income level. Smoking related information included age started smoking, cigarettes per day, type of medical procedure, time after waking to first cigarette (Heatherton, Kozlowski, Frecker, Rickert, & Robinson, 1989) if considering quitting within the next 6 months (and next month); if they had been advised by a health professional to quit; and number of quit attempts in the past year. Although admittedly not a lengthy list of variables or a highly theoretical set of potential predictors, these descriptors are strongly related to health risk, health disparities, and probability of successful quitting. More extensive measures were deemed impractical since one of our goals was to collect information from non-participants.

### 2.3. Analyses

Analyses consisted of descriptive statistics on reach (Abrams et al., 1996; Glasgow, McKay, Piette, & Reynolds, 2001; Forelicher & Lorig, 2002) ([www.re-aim.org](http://www.re-aim.org)) or the percentage and representativeness of smokers participating in each program option. Kruskal Wallis non-parametric analyses of variance (due to non-normal distributions on several variables) or Fisher Exact Tests, as appropriate, were used to compare the demographic, medical, and smoking history characteristics of participants who selected smoking reduction vs. cessation vs. declined both options.

## 3. Results

### 3.1. Study 1

Fig. 1 illustrates the recruitment results for Study 1. Of 160 total patient names and phone numbers provided, 39% of those contacted and determined to be eligible elected to participate in the smoking reduction intervention and 38% selected the cessation program.

The characteristics of smokers selecting smoking reduction vs. cessation vs. declining are summarized in Table 1. As can be seen, there were few differences between groups, with readiness to change being the primary exception to this general pattern. As one might expect, those selecting smoking cessation were more likely to report a readiness to quit in the next month (84%), compared to eligible smokers selecting the reduced smoking option (32%) or declining to participate (17%) ( $p=0.001$ ). Although readiness to reduce smoking in the next month also showed significant differences across the three groups, this difference occurred with respect to those who declined both programs (44%) vs. either of the two option programs (reduced smoking=88%; cessation=95%). Also, males were more likely to select

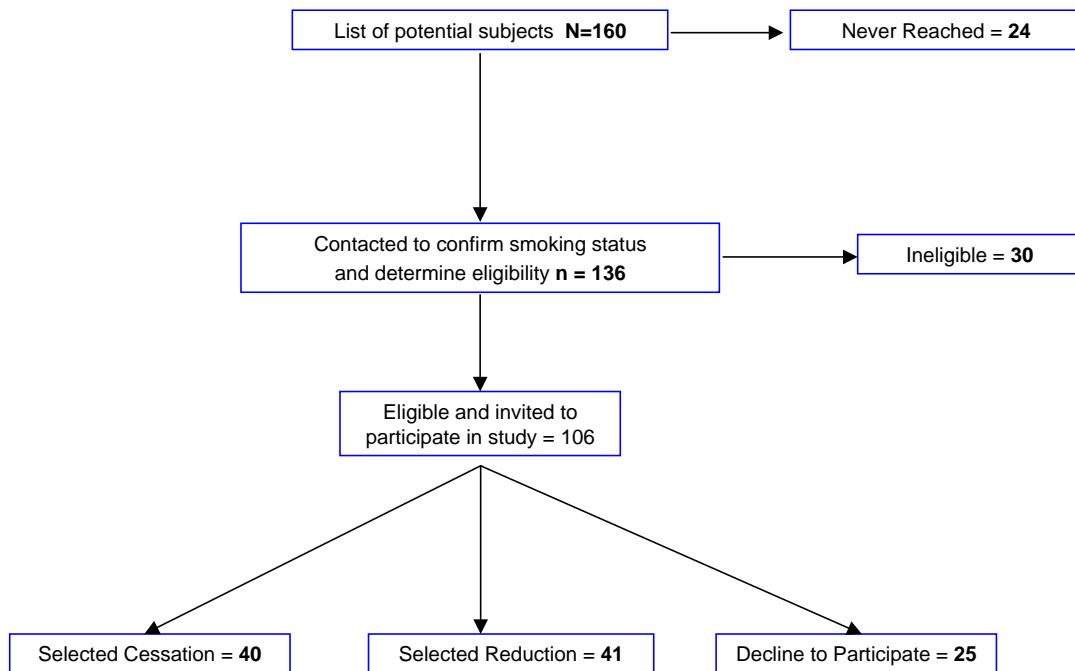


Fig. 1. Recruitment summary—Study 1.

cessation, while females were more likely to decline or choose smoking reduction. There were no differences across the three comparison groups on any of the eight remaining variables in Table 1, which included both demographic (e.g., age, education, race/ethnicity) as well as several smoking-related variables (e.g., quit attempts, number of cigarettes smoked per day, age started smoking, smoking within 30 min of waking).

Table 1  
Characteristics of Study 1 smokers selecting smoking reduction, cessation, or declining to participate

Characteristic	Smoking reduction ( <i>n</i> = 41)	Cessation ( <i>n</i> = 40)	Non-participants ( <i>n</i> = <sup>a</sup> )	Significance ( <i>p</i> ≤)
Age (years)	57.7 (53.7–61.6)	55.6 (51.0–61.2)	63.2 (56.4–69.9)	0.24
Female	66%	35%	67%	0.009
Non-Hispanic white	88%	78%	89%	0.45
High school graduation or less	59%	35%	61%	0.06
Age started smoking	17.5 (16.4–18.8)	18.0 (16.0–20.2)	17.5 (14.0–21.8)	0.94
Cigarettes per day	16.6 (14.0–19.5)	15.7 (12.2–19.6)	16.2 (11.2–22.0)	0.84
Smoke within 30 min of waking	68%	63%	50%	0.41
Attempted to quit past year	41%	57%	28%	0.10
Clinician advised to quit	78%	63%	72%	0.32
Considering quitting in next month	32%	84%	17%	0.001
Considering cutting down in next month	88%	95%	44%	0.001

Percent or mean (95% confidence interval).

<sup>a</sup> Non-participant *n* varies from 18–25 depending on the number of non-participants who answered various questions.

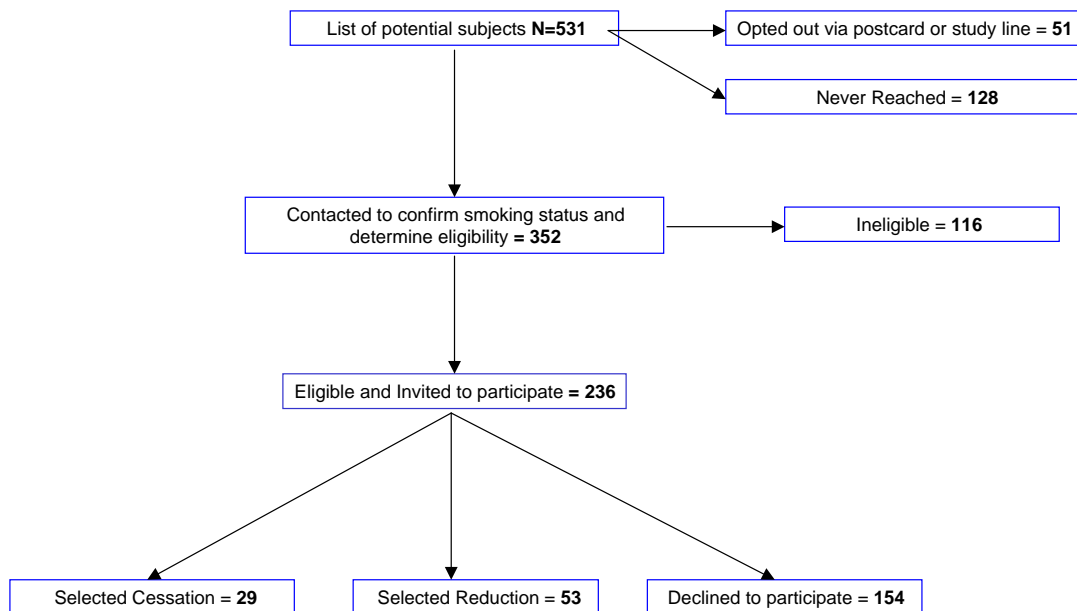


Fig. 2. Recruitment summary—Study 2.

### 3.2. Study 2

We attempted to contact 531 patients scheduled for an outpatient procedure, and were able to contact 352 to determine eligibility. Fifty-one potentially eligible patients returned a postcard declining contact. We were unable to contact 128 patients despite repeated call attempts. Fig. 2 illustrates the recruitment results for Study 2. Of the 352 patients contacted, 33% were ineligible (primarily because of smoking fewer than 10 cigarettes, having recently quit smoking, or having their procedure cancelled). Of the

Table 2

Characteristics of Study 2 smokers selecting smoking reduction, cessation, or declining to participate

Percent or mean (95% confidence interval)

Characteristic	Smoking reduction ( <i>n</i> = 53)	Cessation ( <i>n</i> = 29)	Non-participants ( <i>n</i> = <sup>a</sup> )	Significance ( <i>p</i> ≤)
Age (years)	55.1 (52.0–58.1)	51.5 (45.9–57.0)	56.0 (53.2–58.6)	0.27
Female	62%	52%	60%	0.68
White non-Hispanic	92%	75%	71%	0.012
High school graduation or less	28%	29%	44%	0.17
Aged started smoking	18.4 (16.5–20.3)	17.7 (15.9–19.5)	22.3 (18.3–26.3)	0.10
Cigarettes per day	21.1 (18.3–23.8)	21.9 (14.3–29.4)	19.7 (16.4–22.9)	0.56
Attempted to quit past year	32%	57%	54%	0.03
Clinician advised to quit past year	81%	75%	80%	0.82
Considering quitting in next month	17%	38%	22%	0.15

<sup>a</sup> Non-participant age and gender were obtained from the electronic medical record and available on all smokers. A varying number of non-participants reported ethnicity, tobacco-related behaviors, and intentions during a brief refusal-characterization interview. Non-participant *n* in the table varies from 50 to 120 except for quit intentions, *n* = 27.

remaining 236 eligible, 22% enrolled in the smoking reduction pilot study, and 12% preferred a cessation approach and were referred to the available programs at KPCO and the state Quitline.

Comparisons of participants and non-participants, using the information on the smokers on whom we had demographic and smoking pattern data revealed that there were no differences among those choosing smoking reduction, cessation, or declining participation on age, gender, education, cigarettes per day, quit attempts, whether advised to quit in the past year by a health care professional, or readiness to quit. There were, however, differences on ethnicity and quit attempts in the past year, and a marginal effect on age started smoking, with those selecting smoking reduction being more likely to be white, non-Hispanic (92% vs. 71% and 75%,  $p < 0.02$ ). Both those selecting reduction and cessation were somewhat more likely to have started smoking at an earlier age than those who declined ( $p < 0.10$ , see Table 2). Finally, as might be expected, those selecting smoking reduction were less likely to have made a quit attempt in the past year ( $p < 0.03$ ).

#### 4. Discussion

Our results support the acceptability of a low-intensity smoking reduction intervention for HMO smokers scheduled for out-patient procedures. The most important finding is that an additional 22–39% of eligible smokers were willing to participate in the reduction program. Study 1 and Study 2, although conducted 2 years apart and using somewhat different procedures and somewhat different inclusion criteria produced similar conclusions. Offering the smoking reduction option at minimum doubled the number of smokers willing to participate in smoking control efforts in each study. We conclude from this preliminary evidence that this is a sizable enough portion of the population to justify evaluating a low-intensity reduction program in terms of its effectiveness, implementation, and maintenance (Abrams et al., 2003; Forelicher & Lorig, 2002; Glasgow et al., 2001; Linnan et al., 2002; McDonald, 1999).

Those smokers who elected reduction were similar to those declining to participate (and to smokers selecting the cessation program), with the exception of readiness to change and gender in Study 1, and race/ethnicity and past quit attempts in Study 2. It will be interesting to see if these findings on representativeness are replicated. To enhance generalization, eligibility criteria in Study 2 and in our ongoing study have been expanded to include both outpatient surgery and sigmoidoscopy/colonoscopy. This latter group was selected because they will also receive an invasive outpatient procedure, and they represent an additional large and “missed” population from which to draw patients.

Our recruitment protocols were different from what is typically done in smoking intervention studies, but arguably more similar to what is done in practice. We wanted to test how feasible it would be to describe two approaches, and then have patients choose one. It proved feasible to communicate to patients the complex message that (a) the best thing for them was to stop smoking, but (b) that we would support their efforts to reduce their smoking if they were not ready to quit. This is also seen as a more “real-world situation” in that health plan members often have a variety of health promotion options from which to choose.

This decision, however, places limitations on the conclusions we can draw. More definitive evidence might have been obtained if we had first determined if smokers would accept cessation assistance, and then offered reduction only if they declined cessation. However, the percentage of those willing to participate in a cessation program was estimated at 12–38% which is equivalent or higher than that reported in most other population-based recruitment efforts (Abrams et al., 2003; France et al., 2001;

Glasgow et al., 1993; Lichtenstein & Hollis, 1992; McDonald, 1999). Although the sample sizes for the representativeness comparisons place limits on our level of confidence in the conclusions, we were also encouraged that the smoking and demographic characteristics of those selecting reduction were generally similar to those declining. These data, although preliminary, suggest that reduction may appeal to and reach a representative group of smokers. In particular, smoking rate and history data suggest that those selecting reduction should be at similar risk to those declining or selecting cessation. A potential concern is that those of Hispanic ethnicity, and by extension, possibly lower health literacy in Study 2 appeared less likely to participate.

Strengths of this study were the defined population, the use of electronic medical records to identify and contact smokers, the choice of treatment options, and the novel target population of patients about to undergo out-patient procedures. The fact that the smoking reduction participation rate estimates for the two studies were similar also increases confidence in the results. There has been considerable research published on both primary care and on hospitalized smokers (France et al., 2001; Ockene, 1987; Orleans, 1993; Rigotti et al., 2003). However, to our knowledge, there has been no research published on this population of smokers undergoing out-patient procedures, who may be at a “teachable moment” and appear willing to consider changing their behavior.

Limitations are the limited sample size, and that both samples were drawn from a single managed care organization. Replications are needed to determine if these results are applicable to other settings and outpatient surgeries/procedures. Future studies should explore a wider array of patient demographic and medical condition variables to more comprehensively assess representativeness (Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2002) ([www.re-aim.org](http://www.re-aim.org)) and study the reach and impact of smoking reduction interventions (Falba et al., 2004; Forelicher & Lorig, 2002; Gray & Henningfield, 2004; Hatsukami et al., 2004; Jimenez-Ruiz et al., 2002) among representative samples of smokers.

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