Abstract
The present study describes the short- and long-term efficacy and program evaluation of a Quit and Win smoking cessation campaign, organized in The Netherlands. To be able to fine-tune smoking cessation contests to the needs of the target population, utilization, appreciation and efficacy of various contest elements were investigated. Data from 1551 Quit and Win participants and 244 control respondents were collected by web-based surveys at baseline (pre-contest) and 1 and 12 months after the contest. Demographic and contest predictors of successful quitting were determined by logistic regression analyses. Quit and Win proved to be an effective as well as highly appreciated program among participants. Conservative 1-month (35%) and continuous 12-month abstinence (12%) rates were significantly higher in Quit and Win participants than in the control group (1 month: 11%; continuous: 3%). Use of a supportive e-mail message service predicted short- and long-term abstinence. A buddy support system was the most used and highly appreciated cessation aid, and its use significantly predicted short-term abstinence. Radio commercials and Internet advertisements were the most effective recruitment channels. Although non-exhaustive, implementation of the results and recommendations discussed in this study could lead to an increased use, appreciation and efficacy of future smoking cessation campaigns.

Introduction
Quit and Win campaigns are internationally organized smoking cessation contests that have gained increasing popularity in recent years [1]. Quit and Win competitions aim to mobilize large amounts of smokers to make a joint attempt to stop smoking for a specific period of time. Cash and other prizes are offered to participants who succeed in remaining abstinent for at least 1 month. Quit and Win offers smokers a specific date and reason to quit and thereby provides opportunities for action that strengthen the connection between the intention and the actual decision to quit smoking [2, 3].

The Quit and Win contest is a method to encourage smoking cessation on a large scale and has generated a beneficial cost–effect ratio at the population level [4]. Although positive effects of Quit and Win campaigns on smoking abstinence have been established in several single studies [3, 5–8], reviews regarding their efficacy have been inconclusive [9, 10]. Combining large media campaigns, such as Quit and Win, with interpersonal intervention strategies has been shown to benefit campaign efficacy [11]. It is therefore important to optimize future Quit and Win campaigns by developing new, promising techniques and further elaborating effective, existing contest elements.
In order to identify strong and weak points of a health-promoting intervention, a thorough investigation of the utilization, appreciation and efficacy of program elements should be implemented [12]. In contrast with multiple studies assessing the efficacy of Quit and Win campaigns as a whole, in-depth analyses of program element efficacy have not, or only sporadically, been investigated. Most studies that incorporated program evaluation items have used a limited number of questions [5, 7, 13] or focused on personal determinants of successful quitting, such as gender or educational level [14, 15]. None of these studies has emphasized the evaluation of specific program elements.

With the aim of fine-tuning Quit and Win contests to the needs of the target population and optimizing the effectiveness of future campaigns, the present study describes the general utilization, appreciation and efficacy of a Dutch Quit and Win contest, as well as the evaluation of various add-on campaign elements.

**Methods**

**Campaign**

The Dutch Quit and Win contest took place in May 2005 and was organized and coordinated by the Dutch Cancer Society. The main objective was to encourage respondents to abstain from smoking for at least 1 month. Recruitment of participants was promoted on a national as well as regional level. Regionally, several municipal health centers suspended campaign posters and distributed brochures to the public and placed advertisements in regional newspapers. On a national level, several radio stations and newspapers drew attention to the contest. Participants were obliged to meet four criteria: (i) a minimum age of 18, (ii) living in The Netherlands, (iii) having smoked for at least 1 year and (iv) daily smoking. Upon entry, participants were offered various additional cessation supports. All contest participants who provided an e-mail address received supportive e-mail messages from the Quit and Win organizational team [16, 17]. In total, five supportive e-mail messages were sent to the participants. One message was sent before the quit date to give participants information on how they could prepare the quit attempt, and four messages containing practical information on how to sustain the quit attempt were sent during the following contest weeks. Furthermore, participants were offered the opportunity to receive computer-tailored cessation advice [18], support from a telephonic coach [19, 20] and they could enroll in an e-mail counseling program, all of which were provided by the Dutch Foundation on Smoking and Health (STIVORO) (A more detailed description of the provided cessation aids can be obtained from the authors.) Participants were also asked to name a buddy, whom they could call upon for support during their cessation attempt. After 1 month, prizewinners were randomly selected from a pool of successful quitters. Winners of prizes (first prize: €1.000 and 11 regional prizes of €450) were obliged to undergo a urine cotinine test to verify their abstinence from smoking.

**Participants**

The total number of Quit and Win registrants was 3694. E-mail addresses were available for 2887 registrants and these persons were approached by e-mail to participate in an online survey. Baseline measurement (T0) took place in the week prior to the start of the contest. Program-evaluative data were collected immediately after the contest month (T1) and 12 months after the start of the contest (T2). At T0, 1551 Quit and Win participants (54%) agreed to participate and filled out a short questionnaire.

In order to obtain a comparable control group, a random sample of 7500 Dutch smokers was approached by e-mail. They were asked to fill out the same questionnaire, supplemented by three questions regarding the Quit and Win criteria and one question that assessed the respondents’ intention to quit smoking. Only those control respondents who met the Quit and Win criteria and explicitly indicated the intention to quit smoking within 1 month were eligible for participation in the study. Of the 1147 subjects who filled out the questionnaire, 244
(21.3%) met these criteria and were enrolled in the control group.

At T1, 1129 respondents filled out the questionnaire (63%): 183 control respondents (75%) and 946 (61%) of Quit and Win participants. At the T2 follow-up, 810 respondents participated (45%): 125 in the control group (51%) and 685 in the Quit and Win group (44%).

**Questionnaires**

The baseline and follow-up questionnaires for the contest were based on Quit and Win evaluation guidelines [21]. The following concepts were assessed:

(i) Demographics (T0): demographic questions inquired after age, gender, educational level, ethnicity and marital status of the participants.

(ii) Smoking behavior (T0): smoking behavior was assessed by four questions: the number of years participants had been smoking, number of cigarettes smoked daily, time at which the first daily cigarette is smoked and number of previous quit attempts.

(iii) Channel (T0): one question assessed by which channel respondents had learned of the campaign (radio, advertisement, folder, poster, by acquaintance, by health specialist or another channel).

(iv) Reasons for participation (T0): two questions assessed respondents’ most important reason (improvement of health status, chance of winning a prize, independency of cigarettes, costs of smoking, to set an example for children, having a buddy, use of cessation aids or another reason) and goal (to quit smoking forever or to quit smoking for 1 month) to participate in Quit and Win.

(v) Cessation aids (T1): three questions regarding cessation aids measured (a) the utilization of the cessation aids offered during the intervention month (buddy support, Quit and Win e-mail messages, e-mail counseling program, Quit and Win Web site, computer-tailored cessation advice and telephone coach), (b) which of these aids helped respondents most to remain abstinent and (c) what other cessation methods were used in the contest month [nicotine replacement therapy (NRT), Allen Carr method, pharmacotherapy, help of general practitioner, acupuncture, soft laser therapy, smoking cessation course, hypnosis and other aids]. Overall evaluation of the Quit and Win cessation aids was assessed on a scale from 1 to 10 and by questions concerning their perceived usefulness (1 = not useful to 4 = very useful), practicability (1 = not practicable to 4 = very practicable) and pleasantness (1 = not pleasant to 4 = very pleasant).

(vi) Prize (T1): opinions concerning the prize rate were asked (1 = too high, 2 = too low and 3 = appropriate) and respondents were asked whether the chance to win a prize had helped them to maintain their quit attempt (1 = helped very much, 2 = helped much, 3 = helped a little and 4 = did not help).

(vii) Overall evaluation (T1): participants were asked to evaluate the overall campaign on a scale from 1 to 10.

(viii) Suggestions for improvement (T1): in an open question, respondents were asked to give suggestions for improvement of the campaign.

(ix) Smoking abstinence (T1, T2): 1-month abstinence was measured by complete abstinence during the entire contest month. Continuous abstinence was measured by complete abstinence in the 12 months after the start of the contest.

**Statistical analyses**

Descriptive statistics were used to describe program-evaluative concepts and demographic distributions and smoking behavior within the study sample. Baseline differences between the control and experimental groups were tested by means of $\chi^2$ tests for categorical variables and independent samples $t$-tests for continuous variables. Group differences in outcome measures and determinants of successful smoking cessation were investigated by logistic
regression analyses. Baseline variables were included as covariates to increase statistical power by reducing unexplained variance [22]. All analyses were conducted using statistical software (SPSS version 13.0 for Windows; SPSS, Chicago, IL, USA) and significance was set at \( P < 0.05 \).

Results

Demographics of the respondents

Respondents’ ages varied from 18 to 81 years, with a mean age of 36.9 years. Females were slightly overrepresented (60.4%). The majority of respondents had a partner (70.9%) and was of Dutch ethnicity (96.2%), 29.7% had a low level of education (primary or basic vocational school), 44.5% had medium-level education (secondary vocational school or high school) and 25.7% had a high level of education (higher vocational school or university). Comparison between the study groups showed that respondents from the control group were older \( (t = 5.58; P < 0.001) \) and lower educated \( (\chi^2 = 18.81; P < 0.05) \) than respondents from the Quit and Win group.

Smoking behavior

On average, respondents had smoked for 19.6 years. The mean number of cigarettes smoked per day was 18.5 and the majority of respondents (69.9%) smoked their first cigarette within 30 min after awakening. Most respondents (44.3%) had previously made one or two quit attempts, whereas 8.6% had never attempted to quit. Comparison between the groups showed that respondents from the control group had been smoking longer \( (t = 4.05; P < 0.001) \), had made less previous quit attempts \( (\chi^2 = 13.73; P < 0.01) \) and smoked their first daily cigarette earlier than respondents from the Quit and Win group \( (\chi^2 = 6.99; P < 0.05) \).

Attrition analyses

Logistic regression analysis indicated that attrition from T0 to T2 was predicted by gender and 1-month abstinence status of respondents. Men [odds ratio (OR) = 0.71; 95% confidence interval (CI) = 0.57–0.89; \( P = 0.002 \)] and participants who did not succeed in remaining abstinent for 1 month \( (OR = 0.38; 95\% \text{ CI} = 0.30–0.48; P < 0.001) \) were more likely to be lost to follow-up.

Quit and abstinence rates

Table I shows the 1-month and continuous abstinence rates of Quit and Win participants and respondents in the control group. Two estimates are presented: the proportion of abstainers among the respondents (respondent only) and the proportion of abstainers among the overall sample, considering all non-respondents at T1 and T2 as smokers (intention to treat). On both the short- and long-term measurements, Quit and Win participants were significantly more likely to have remained abstinent.

Program evaluation

Channel

The majority of the Quit and Win participants indicated that they had been made aware of the campaign by radio (52.3%). Respondents were also

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<th>Table I. One-month and continuous (12 months) abstinence rates</th>
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<tr>
<td>One-month abstinence (%)</td>
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<td>15.3</td>
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<td>Intention to treat</td>
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<td>10.9</td>
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<td>Continuous abstinence (12 months, %)</td>
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<td>Intention to treat</td>
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<tr>
<td>2.9</td>
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<tr>
<td>Quit and Win</td>
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<td>57.7</td>
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<td>35.4</td>
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<td>27.1</td>
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<td>11.9</td>
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<td>OR (95% CI)</td>
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<td>7.83 (4.89–12.54)</td>
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<tr>
<td>4.70 (3.02–7.31)</td>
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<tr>
<td>3.03 (1.98–4.63)</td>
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<td>2.46 (1.64–3.68)</td>
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frequently informed by friends (26.2%) and advertisements in newspapers (19.9%). Most participants who were not informed by any of the listed channels responded in an open question that information on the Internet brought the contest to their attention.

**Participation**

Improvement of individual health status was reported most frequently (37.9%) as the main reason to participate, followed by the wish to break the nicotine dependence (28.0%) and the chance to win a prize (17.1%). Frequently specified other reasons were pregnancy, current illness and the fact that smoking is unhealthy for people in the social environment. The vast majority reported that their main aim was to abstain from smoking for good (92.5%).

**Use of cessation support**

**Quit and Win cessation support**

The majority of respondents indicated that they had used support of a buddy (69.5%). Quit and Win e-mail messages (46.3%) and the e-mail counseling program (36.9%) were also frequently used. Computer-tailored cessation advice was used by 18.8% of respondents, whereas relatively few respondents indicated that they had used support from a telephonic coach (1.7%). Seventeen percent indicated that they did not use any of the offered cessation aids.

Buddy support was most frequently mentioned as the most helpful aid in the cessation process (36.2%), followed by the supportive Quit and Win e-mail messages (11.5%) and the e-mail counseling program (11.4%).

**Other cessation support**

Approximately, one-third (33.1%) of all participants indicated that they had used other cessation methods than those offered in the contest, of which NRT (16.7%) and the Allen Carr method (7.8%) were most frequently reported. Use of pharmacotherapy (bupropion; 3.7%) and help of a general practitioner (2.0%) were also reported.

**Evaluation of Quit and Win cessation support**

**Buddy (n = 606)**

Support of a buddy was experienced as useful or very useful by 70% of the respondents, and 72.6% found the buddy support pleasant or very pleasant. On average, buddy support was evaluated with a 7.6.

**E-mail counseling program (n = 321)**

Most respondents who had used the e-mail counseling program indicated that they found the program useful or very useful (65.3%), practicable or very practicable (70.2%) and pleasant or very pleasant (83.9%). On average, the e-mail counseling program was valued with a 7.2.

**Computer-tailored cessation advice (n = 161)**

Most respondents thought that the tailored cessation advice was useful or very useful (57.5%) and practicable or very practicable (54.3%). Of all participants, 74.4% found it pleasant or very pleasant to receive advice specified to their personal situation. On average, the advice was valued with a 7.0.

**Quit and Win e-mail messages (n = 431)**

Of those participants who used the e-mail messages of the Quit and Win team, most thought these messages to be a little useful or useful (72.4%) and 76.9% perceived them as a little practicable or practicable. Receiving these supportive messages was experienced as pleasant or very pleasant by most respondents (61.2%). They were valued with an average rating of 6.3.

**Telephone coach (n = 15)**

Of the participants who indicated to have used support from a telephone coach, 78.6% found the support useful or very useful, as well as practicable or very practicable. Almost all respondents experienced the contact as pleasant or very pleasant (92.9%). Support from the telephone coach was overall valued with a 7.9. These results should,
however, be interpreted carefully, as only few people \((n = 15)\) used this cessation support.

**Overall evaluation of the Quit and Win campaign**

**Prize**

After the intervention month, 57.2% of the participants indicated that the chance of winning a prize had helped to remain abstinent. Most respondents (83.0%) thought the amount of the cash prize was appropriate; 11.2% thought it was too low and 5.8% thought it was too high.

**Overall evaluation**

The overall Quit and Win campaign was valued with a 7.6 by the respondents, indicating that respondents were pleased with the content of the campaign. A large majority (91.8%) indicated that the support and cessation aids offered by Quit and Win had helped them to remain abstinent during the contest month.

**Suggestions for improvement**

Several suggestions were mentioned to improve the campaign. First, respondents suggested that the supportive Quit and Win e-mail messages should be sent more frequently. In addition, the content of these e-mails could be sterner, more explicit and more personalized. Participants would also like to continue receiving e-mails after the contest month so that more maintenance support would be experienced and chances of relapse could be reduced.

The opportunity to gain cash prizes was for most respondents an extra motivation to quit. Therefore, participants would like more prizes to increase the chance of winning, as well as small prizes for all people who remained abstinent for a month. Furthermore, participants suggested the use of a forum or discussion board on the Quit and Win Web site, where they could share their experiences and difficult moments during their cessation attempts.

**Predictors of quit attempts and 1-month abstinence**

Demographic variables, smoking behavior and use of campaign cessation aids were entered into logistic regression models in order to predict short- and long-term abstinence status. Only intention-to-treat measures were used for these analyses.

**Demographic and smoking variables**

One-month abstinence was significantly predicted by level of education, the time at which the first cigarette is smoked and number of previous quit attempts (see Table II). Participants with a higher education, those who had made less previous quit attempts and those who smoked their first cigarette later on the day were more likely to maintain their quit attempt for the entire contest month. Further analyses on 1-month abstinence (Table III) were

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<th>Variables</th>
<th>One-month abstinence</th>
<th>Continuous abstinence</th>
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<tr>
<td></td>
<td>OR (95% CI)</td>
<td>(P) Value</td>
</tr>
<tr>
<td>Gender</td>
<td>1.019 (0.817–1.271)</td>
<td>NS</td>
</tr>
<tr>
<td>Age</td>
<td>1.010 (0.991–1.030)</td>
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</tr>
<tr>
<td>Education level</td>
<td>1.199 (1.032–1.393)</td>
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</tr>
<tr>
<td>Ethnicity</td>
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<td>Marital status</td>
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<td>NS</td>
</tr>
<tr>
<td>Years smoked</td>
<td>1.005 (0.985–1.025)</td>
<td>NS</td>
</tr>
<tr>
<td>Cigarettes per day</td>
<td>0.996 (0.981–1.012)</td>
<td>NS</td>
</tr>
<tr>
<td>Time of first cigarette</td>
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<td>&lt;0.01</td>
</tr>
<tr>
<td>Previous quit attempts</td>
<td>0.793 (0.701–0.897)</td>
<td>&lt;0.001</td>
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corrected for educational level, time of first daily cigarette and number of quit attempts.

Continuous abstinence was significantly predicted by marital status and number of previous quit attempts. Participants who had a partner and participants who had made less previous quit attempts were more likely to remain continuously abstinent. Further analyses on continuous abstinence (Table III) were corrected for both variables.

### Use of cessation aids

One-month abstinence was significantly predicted by use of buddy support and Quit and Win e-mail messages. Abstainers used these types of support more often than non-abstainers (see Table III).

Although buddy support was no longer significant, use of supportive Quit and Win e-mail messages remained a significant predictor in the analyses on continuous abstinence. A remarkable finding was the negative association of use of the e-mail counseling program and continuous abstinence. Those respondents that used this program were more likely to lapse or relapse in the 12 months after the intervention. This finding may be explained by results from in-depth analyses that showed that respondents who made use of the e-mail counseling program tended to be more strongly nicotine dependent than those who did not use the program, as indicated by having smoked for more years ($t = 3.706; P < 0.001$).

When use of cessation aids, other than the aids provided by Quit and Win, was entered into the analyses, this did not change the outcomes as described in Table III. Use of NRT was, however, negatively associated with continuous abstinence (OR = 0.591; 95% CI = 0.351–0.993; $P = 0.047$), a finding that may also be explained by the nicotine dependence status of NRT users. In-depth analyses showed that NRT users smoked more cigarettes per day ($t = -2.716; P = 0.007$) and tended to have smoked for more years ($t = -1.894; P = 0.058$) than non-users.

### Discussion

The present study is one of the firsts to thoroughly investigate multiple program characteristics of Quit and Win campaigns. Beyond establishing its efficacy, it sought to retrieve information regarding participants’ views on the campaign and yield recommendations for future campaigns.

Considering the achieved short- and long-term abstinence rates and the overall appreciation of the campaign, Quit and Win was an effective as well as a much appreciated initiative. In order to optimize future campaigns, it is advisable to adapt or omit relatively weak elements of the campaign and to extend those aspects that were highly used, effective and appreciated. In this context, several results are worth noting.

First, 1-month as well as continuous abstinence could be predicted by use of the e-mail support system. Those participants that indicated to have used the supportive information in these e-mails were more likely to successfully quit smoking. Although the e-mail messages were effective and relatively well used, the overall appreciation of these messages was rather low. Participants’ suggestions for

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<th>Cessation aids</th>
<th>One-month abstinence</th>
<th>Continuous abstinence</th>
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<tr>
<td></td>
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<td>$P$ Value</td>
</tr>
<tr>
<td>Buddy</td>
<td>1.407 (1.035–1.913)</td>
<td>&lt;0.05</td>
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<td>E-mail counseling</td>
<td>0.806 (0.595–1.093)</td>
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<td>Tailored advice</td>
<td>1.254 (0.863–1.820)</td>
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<td>Telephone coach</td>
<td>1.368 (0.441–4.249)</td>
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<td>Quit and Win Web site</td>
<td>0.947 (0.655–1.369)</td>
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<tr>
<td>Quit and Win e-mail</td>
<td>1.429 (1.063–1.921)</td>
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improvement of the messages indicated that the content of the messages could be sterner, more explicit and more personalized. In this way, the participant may feel more involved and individually addressed, making the messages more personally relevant and appealing. Furthermore, participants indicated that the frequency with which the e-mail messages were sent could be increased, and distribution of the messages should be continued after the contest month in order to prevent relapse.

Second, although substantial variation in contest elements takes place across participating countries, the appointment of a buddy is often a key component of Quit and Win campaigns [1]. The present study shows that this component earns its place as the buddy support system was the most often used as well as highly appreciated cessation aid and significantly predicted 1-month smoking abstinence. Buddy support, or in a larger context social support, may therefore be a main factor in determining the campaign’s success. The importance of social support was also reflected in the finding that participants who had a partner were more likely to remain continuously abstinent and the participants’ suggestion to employ a forum or discussion board on the Quit and Win Web site where participants can seek and provide support to each other. Our results regarding buddy support and partner status confirm several other studies that have found relatively high buddy utilization rates [23] and denote buddy support, and particular partner support, as an important predictor of successful quitting [14, 23–26], thereby pleading for continuation or extension of this support aid in future campaigns.

As the efficacy of other program components have only sporadically been investigated, comparison of our results to previous findings in this respect is difficult. In studies by Gomez-Zamudio et al. [13] and Hahn et al. [7], none of the available add-on support aids significantly predicted abstinence. However, these studies mostly investigated different types of support than those that were currently examined. Online and telephone support were the only cessation aids comparable to our study, and we also found no predictive effect of telephone and e-mail counseling in the present study, thereby corroborating previous findings.

The findings concerning the effectiveness of cessation aids should be interpreted with caution. It cannot be excluded that the results may be biased due to selection effects, indicating that people who are more motivated to quit smoking may be more likely to use the proffered cessation aids. The increased abstinence may therefore be a result of increased motivation and not per se of utilization of cessation aids. Although these types of selection effects cannot be eliminated completely, they may be reduced by providing easier access to cessation aids and proffering them in a more proactive manner. Future studies and campaigns should take this into account.

Other interesting findings pertain to the evaluation of the prizes and the efficacy of recruitment channels. The large majority of respondents found the cash prizes appropriate and did not think they should be increased or decreased. However, frequently reported suggestions for improvement of the campaign were (i) to increase the number of prizes, and thereby increase participants’ chances of winning and (ii) to award small encouragement prizes or incentives to all participants who succeed in abstaining from smoking in the contest month. Although evidence for the efficacy of incentives in increasing long-term smoking abstinence has been indecisive [9, 27], financial and other incentives have been associated with increased short-term abstinence and recruitment rates [28–31], thereby expectedly yielding higher absolute numbers of successful quitters. It may therefore be worthwhile to take these suggestions into consideration when developing future cessation contests.

Radio commercials were the most effective recruitment channel, by far outweighing the more traditional advertising in newspapers and the effort-and-time-consuming distribution of brochures and posters. For those respondents who were not informed of the contest through one of the listed channels, banners and information on Internet sites were the most effective recruitment method. In order to optimize recruitment in future campaigns, use of more advanced information channels, such
as radio broadcasting, Internet and possibly television, is therefore recommended.

The relatively low participation rate, the substantial attrition suffered from baseline to follow-up and the finding that attrition was not random are limitations to this study that should be acknowledged. Although considerable drop out seems characteristic to a wide array of eHealth interventions [32], it may limit generalizability of the present results. Another word of caution with regard to generalizability pertains to the cultural specificity of the results. As the content of Quit and Win campaigns may vary between countries, results with regard to use of support aids may, to some extent, be specific to the Dutch contest and the Dutch cultural situation. Future studies should therefore look into differences and similarities in utilization and efficacy of support aids between countries.

Furthermore, differences in baseline characteristics between the control group and the experimental Quit and Win group indicate that the study groups were not entirely comparable, which may have influenced the results. These group differences are not uncommon [15] and may follow from self-selective sampling in smoking cessation competitions and contests such as Quit and Win [10]. In order to keep the results as accurate as possible, all analyses were corrected for baseline characteristics.

In conclusion, the findings of this study indicate that the Quit and Win campaign, besides achieving high abstinence rates, is generally highly appreciated by participants. Seeing that one million smokers are expected to have participated worldwide in the latest contest in 2006 [33], Quit and Win is rapidly growing in popularity and provides a strong platform for cessation support, a platform that should be utilized to its full potential. Although non-exhaustive, implementation of the results and recommendations discussed in this study could lead to an increased use, appreciation and efficacy of future campaigns.

Conflict of interest statement

None declared.

References


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