Token monetary incentives improve mail survey response rates and participant retention: results from a large randomised prospective study of mid-age New Zealand women

Sara Boucher, Andrew Gray, Sook Ling Leong, Heidi Sharples, Caroline Horwath

Abstract

Aim To examine if a small token monetary incentive (NZ$5) increases mail survey response rates and participant retention of 40–50 year old New Zealand women.

Method In 2009, 2500 women were randomly selected from the New Zealand electoral rolls for a prospective study investigating factors related to the prevention of weight gain. At baseline, 400 women were randomly assigned to receive NZ$5 with the initial survey mail-out in addition to nonmonetary gifts to encourage participation (pen, tea bag, entry in lottery draw) received by all women. At 2 years, 400 women (200 received NZ$5 at baseline and 200 had not) were randomly assigned to receive the same token monetary incentive. At 3 years, all women identifying as an ethnic minority (n=234) and 300 randomly selected women of other ethnicities received the token monetary incentive with the initial mail-out.

Results The baseline response rate for women who received NZ$5 was significantly higher than for women who did not (76% vs 64%, p<0.001). At 2 years, retention rate for all women who received NZ$5 was significantly higher than for women who did not (88% vs 80%, p<0.001). At 3 years, among those women not identifying as an ethnic minority, the retention rate for those who received NZ$5 was significantly higher than for those who did not (84% vs 77%, p=0.014).

Conclusion Inclusion of a small token monetary incentive significantly increases mail survey response rates and participant retention in mid-age New Zealand women.
monetary incentive values from NZ$0.50\textsuperscript{9} to US$50 (NZ$61, approximately)\textsuperscript{10} have been included with mail surveys of the general population.\textsuperscript{11} Yet, it may not always be financially feasible within study budgets to include a large monetary incentive for each participant. However, token incentives may still result in larger sample sizes.\textsuperscript{12}

A 2005 meta-analysis by Edwards, Cooper, Roberts and Frost found that for incentives above US$0.50 the effects on response rates were statistically significant up to US$5.\textsuperscript{11} Similarly, a $5 incentive resulted in a higher response rate than a $2 incentive (74.3% vs 67.4%, p<0.033) in a postal survey of 1800 health care plan enrollees’ digestive health status.\textsuperscript{13} Likewise, in New Zealand, Brennan found that token monetary incentives (as small as 50 cent or $1 coins) were effective at achieving response rates above 60%.\textsuperscript{14}

Internationally, longitudinal surveys have experienced varying rates of attrition.\textsuperscript{2} For instance, over the course of five study waves in the European Community Household Panel, the retention rate ranged from 57% in Ireland to 82% in Portugal.\textsuperscript{15} Retaining participants in the sample of a longitudinal study is crucial for examining potential causal relationships between variables and outcomes.\textsuperscript{2}

Despite an abundance of research on the use of token monetary gifts with cross-sectional surveys, few studies have investigated retention strategies in population-based longitudinal studies.\textsuperscript{11} A systematic review investigating the effectiveness of retention strategies in prospective population-based cohort studies found incentives were associated with an increase in retention rates, which improved with higher values (up to $100).\textsuperscript{11} However, the influence of incentives on response rates across the sample varied by age, education, and socioeconomic status despite receiving the same monetary incentive.\textsuperscript{11}

In longitudinal studies, the effectiveness of token monetary incentives in establishing sufficiently high baseline response rates and subsequent retention rates among mail survey participants is unclear, particularly in a New Zealand context. Furthermore, there is a dearth of research on the effectiveness of token monetary incentives on the retention of hard to reach populations (e.g. specific ethnic and socioeconomic groups).

Therefore, the purpose of the present study was to investigate the effect of a token $5 incentive on survey response and retention rates in a large prospective study of factors associated with the prevention of weight gain among mid-age New Zealand women (aged 40–50 at baseline and 43–53 at the most recent follow-up).

We hypothesized that women randomly assigned to receive a token monetary incentive (NZ$5) with the initial survey mail-out in addition to the small gifts to encourage participation (pen, tea bag, entry in lottery draw) received by all women would have an appreciably higher response rate than women who only received small gifts with their questionnaire.

**Methods**

The University of Otago Human Ethics Committee approved all aspects of the study. Additionally, the research proposal was approved by Ngāi Tahu Research Consultation Committee, an academic committee set up to ensure that research involving Māori people is consistent with the needs and aspirations of the Ngāi Tahu iwi (South Island Māori).

**Questionnaires**—Each of the baseline, 2-year and 3-year follow-up surveys included a mailed questionnaire examining factors potentially influencing eating behaviour and weight along with self-reported anthropometry and demographics. The questionnaires comprised 21, 8, and 13 pages of questions, respectively, and were estimated to take up to 40 minutes to complete. Prior to each survey, the questionnaire was pretested to improve the layout, appearance, instructions, clarity, and ease of completion among a sample of 30–40 Dunedin, New Zealand women in the target age group (for example, 40–50 years of age for pre-testing the baseline study).
Participants—Eligible respondents were women between the ages of 40–50 at baseline who were able to read and understand English. The cohort was recruited in 2009 from a nationwide sample of New Zealand women aged 40–50 years randomly selected from the general electoral rolls and the Māori electoral rolls.

The New Zealand electoral rolls contain up-to-date mailing details from approximately 97% of the estimated eligible population of people aged 40–49 living in New Zealand. While the electoral rolls do not indicate the sex of voters, provided titles and a database of female names were used to identify the sampling frame. Respondents were excluded if they stated that they were male, pregnant, or breastfeeding at the time of the survey, or if there was reason to question the validity of their responses (e.g. geometric patterns in responses).

Design and procedures for baseline and follow-up surveys—All survey procedures were based on a modification of Dillman’s tailored design method. Potential participants were not sent a preliminary letter about the study; the first contact was when they were mailed a questionnaire with a personally addressed and signed cover letter.

This letter informed participants they would be entered into a lottery draw if their completed questionnaire was returned within the first 2 weeks of the initial mailing. The initial package also included a list of frequently asked questions (for example, how the participant was selected and how she could opt out of the study), and a postage-paid return envelope.

A thank you/reminder postcard was sent to all women approximately 1 week after the first mailing, followed by a replacement questionnaire and a postage-paid return envelope to non-respondents approximately 3 weeks after the first mailing. A final reminder postcard was sent to non-respondents approximately 4 weeks after the first mailing. No alternative modalities were used to contact the women.

Women who participated in the baseline survey and consented to participate in the longitudinal study were contacted for 2-year and 3-year follow-up surveys that followed similar procedures. Participants in all surveys were informed in the cover letter that by completing and returning the questionnaire, this would be taken as their consent to take part in the study.

To formally withdraw from the study potential participants were instructed in the cover letter to return the questionnaire without answering questions in the supplied envelope. These women were then deleted from the database of participant contact information.

Token monetary and nonmonetary incentives—In 2009, a pilot survey was conducted among 100 women aged 40–50 years randomly selected from the New Zealand electoral rolls (including Māori rolls). The pilot study, which included a complimentary pen with the initial mail out, resulted in a 56% response rate. The survey design for the baseline and subsequent surveys was refined to include additional incentives in order to improve the response and retention rates for baseline and follow-up surveys. Therefore, an individually wrapped teabag and a complimentary pen were included in the initial mail-out.

Inclusion of the pen and teabag had the added benefit of making the package bulkier, drawing special attention to its content and reducing the likelihood that the package would be ignored or discarded. Furthermore, all women who returned a completed questionnaire within the first 2 weeks of the initial mailing were entered into a draw to win one of three NZ$200 cash prizes or 10 NZ$100 cash prizes. Women who returned a completed questionnaire in response to the second mailing were entered into a draw to win one of four NZ$100 cash prizes.

To test the effects of a token monetary incentive on response and retention rates in a New Zealand setting and to maximise the response and retention rates for the study within the constraints of the survey budget, a random sub-sample of women received with the initial mail-out a token NZ$5 incentive in addition to the lottery draws, teabag and pen.

In the baseline study, a sub-sample of 400 women was randomly selected to receive the token monetary incentive. In the 2-year follow-up study of women who responded at baseline, we compared the effect of including $5 on response rates among 200 women who had received the token monetary incentive at baseline and 200 who had not received $5 with the baseline survey.

In the 3-year follow-up survey, again, of women who responded at baseline, all women (n=234) identifying as being of Māori, Pacific or Asian ethnicity received a NZ$5 note with the initial mail-out in order to optimise the response rate and minimise response bias due to lower than representative participation from these groups.
Additionally, a random sub-sample of 300 women of other ethnicities (selected without regard to whether they received a token monetary incentive in an earlier survey) received NZ$5 with the initial questionnaire. As the effect of the token monetary incentive was confounded with ethnicity in the 3-year follow-up survey, only women from non-minority ethnicities were included in the analysis of this wave of the study. Figure 1 provides a flowchart showing the study design.

**Figure 1. Participants recruited and retained for a mail survey in New Zealand**

![Flowchart showing study design](image-url)
The baseline study had 80% power to detect an improvement in response rate of 8% between the teabag, pen and lottery only group (n=2100) and the teabag, pen and lottery plus NZ$5 group (n=400). At 2 years, 400 women were randomly assigned to the lottery plus NZ$5 group, providing approximately equivalent power for this wave.

Formal statistical power calculations were not performed for the 3-year survey where giving the token incentive to all women who self-identified as being part of an ethnic minority group, along with a sample from women self-identifying as other ethnicities, was used to try to maximise the representativeness of respondents in that wave, with the total number receiving the incentive (n=534) being slightly larger than earlier waves. A more complete description of methods and results from the study have been reported elsewhere.17-19

**Statistical analysis**—The overall response rate for each survey was calculated as the percentage of returned questionnaires with analysable data of all eligible potential participants. Returned questionnaires not considered analysable (due to nonsensical responses) were not included in the numerator when calculating this rate but remained in the denominator, and responses from participants who were not eligible for inclusion (for example, women who were pregnant) were excluded from both the numerator and denominator.

Differences between incentive groups in responding to the initial and follow-up questionnaires were examined using logistic regression, both before and after adjusting for other potential effects on response rates. Interactions were used to explore any effect modification of the token monetary incentive by ethnicity (Māori descent for the baseline survey or self-reported ethnicity for follow-up surveys), socioeconomic status (NZ Deprivation Index for baseline and New Zealand Socioeconomic Index for follow-up), and education (follow-up only).

Multiple ethnicities could be provided by participants, and ethnicity was prioritized in the following order: Māori, Pacific, Asian, Other, and European. Ethnicity was collapsed to three levels (Māori, New Zealand European, and Asian, Pacific Islander and Other ethnicity) to test the interaction between the token monetary incentive and ethnicity because there were not enough participants in the five categories for analysis.

Analyses at baseline and 2-year follow-up are also shown stratified into Māori and non-Māori. For the 3-year follow-up survey mailing, the effect of the token monetary incentive on retention rates was only analysed for women who self-identified themselves as an ethnicity other than Māori, Asian, or Pacific Islander. All statistical tests were two-sided and significance was determined by p<0.05. All analyses were performed using Stata 11.2.22

**Results**

**Response rate**—In the baseline study, 47 questionnaires were undeliverable and 29 were excluded from analysis because they did not meet inclusion criteria (not in the age range, male, pregnant, or breastfeeding), there was reason to doubt the reliability of the answers (geometric patterns were made by circling answers, the respondent simultaneously answered opposite ends of a scale, the questionnaire was answered on behalf of someone else, or the respondent indicated a poor understanding of English) or the potential respondent was deceased. One respondent was excluded from analysis because it was impossible to determine whether or not she was assigned to the monetary incentive group after the identification number had been removed from the questionnaire prior to its return.

Therefore, 1597 of 1627 returned questionnaires were available for analysis. The final response rate for those where their incentive status was known was 66% (1597/(2500-47-29-1)). A summary of the baseline survey results was sent to the 1,435 respondents who consented to participate in the longitudinal study. As a result of this mailing, 16 women were withdrawn from the study (14 non-deliveries and 2 declined to participate).

At the 2-year follow-up survey, 36 questionnaires were undeliverable and four women were deceased. Five women did not meet inclusion criteria because they were pregnant. One respondent was excluded from survey analysis because she indicated that she had been drinking alcohol while completing the questionnaire and thus there was reason to doubt the validity of her answers. Therefore, the retention
rate for the 2-year follow-up survey was 82% (1125/(1419-36-4-6)). Prior to the 3-year follow-up survey, all women from the original cohort who had been retained in the study were mailed a summary of the 2-year survey results. Following the summary mailing, 21 women were withdrawn from the study (19 non-deliveries and two declined to participate).

In the 3-year follow-up survey, there were 26 non-deliveries and four women declined to participate. Four pregnant women were excluded from the analysis. Four questionnaires sent to women who were to receive an token monetary incentive were returned as undeliverable; however, we were able to phone these women and send a replacement questionnaire to the new mailing address, but did not include NZ$5 with the questionnaire (two of these women were Māori) as they had already intended to complete the questionnaire upon receipt.

The retention rate for the 3-year follow-up survey was 78% [1025/(1348-26-4)]. Figure 1 depicts participant flow through the three nationwide surveys.

**Sample characteristics**—Table 1 depicts the demographics from women who responded to each survey. The mean (±SD) age of respondents to the baseline, 2-year follow-up and 3-year follow-up surveys were 45.5±3.2 years, 47.6±3.2 years, and 48.6±3.2 years, respectively.

At baseline, respondents were similar to the general New Zealand population; however, over time the women who remained in our sample included a higher proportion of university-educated women and women self-identified as New Zealand European and other non-Asian, non-Māori, and non-Pacific Islander ethnicities.

**Table 1 Demographic characteristics of New Zealand respondents compared with national data.**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Baseline</th>
<th>2-year follow-up</th>
<th>3-year follow-up</th>
<th>National datab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Highest education level attained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary and some secondary school</td>
<td>488</td>
<td>30.8</td>
<td>325</td>
<td>29.0</td>
</tr>
<tr>
<td>Completed secondary school</td>
<td>153</td>
<td>9.7</td>
<td>105</td>
<td>9.4</td>
</tr>
<tr>
<td>Technical/grade school or polytechnic</td>
<td>437</td>
<td>27.6</td>
<td>312</td>
<td>27.9</td>
</tr>
<tr>
<td>University</td>
<td>508</td>
<td>32.0</td>
<td>378</td>
<td>33.8</td>
</tr>
<tr>
<td>Prioritised ethnicityc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>85</td>
<td>5.3</td>
<td>50</td>
<td>4.4</td>
</tr>
<tr>
<td>New Zealand European and others</td>
<td>1283</td>
<td>80.3</td>
<td>939</td>
<td>83.5</td>
</tr>
<tr>
<td>Māori</td>
<td>181</td>
<td>11.3</td>
<td>109</td>
<td>9.7</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>48</td>
<td>3.0</td>
<td>27</td>
<td>2.4</td>
</tr>
<tr>
<td>Socioeconomic status (NZSEI) categoryd</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10–29</td>
<td>234</td>
<td>14.7</td>
<td>143</td>
<td>12.8</td>
</tr>
<tr>
<td>30–59</td>
<td>1065</td>
<td>66.7</td>
<td>743</td>
<td>66.2</td>
</tr>
<tr>
<td>60–90</td>
<td>298</td>
<td>18.7</td>
<td>236</td>
<td>21.0</td>
</tr>
</tbody>
</table>

*Percentages may not add to 100% due to rounding.

*Population estimates for education level and prioritized ethnicity in mid-age women from the 2006 New Zealand Census; and total population NZSEI distribution from the 1999 New Zealand Census.21

*Multiple ethnicities could be provided by participants, and ethnicity was prioritised in the following order: Māori, Pacific, Asian, other and European.

*NZSEI, New Zealand Socioeconomic Index 1996.

**Results of NZ$5 randomisation**—In all three surveys, women assigned to receiving a NZ$5 token monetary incentive with the initial mail out were significantly more likely to respond than those who did not receive NZ$5 (unadjusted OR 1.77, 95%CI 1.38–2.27, p<0.001; OR 1.86, 95%CI 1.32–2.62, p<0.001; OR 1.56, 95%CI 1.10–2.22, p=0.014 respectively).
Table 2. Mid-age New Zealand women’s response to a mailed survey based on inclusion or exclusion of a token monetary incentive

<table>
<thead>
<tr>
<th>Variables</th>
<th>Potential</th>
<th>Eligible</th>
<th>%</th>
<th>Adjusted OR&lt;sup&gt;b&lt;/sup&gt;</th>
<th>95% CI (p-value)</th>
<th>Potential</th>
<th>Eligible</th>
<th>%</th>
<th>Adjusted OR</th>
<th>95% CI (p-value)</th>
<th>Potential</th>
<th>Eligible</th>
<th>%</th>
<th>Adjusted OR</th>
<th>95% CI (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Māori</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Non-Māori</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline Incentive</td>
<td>2424&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1597</td>
<td>65.9</td>
<td>1.86</td>
<td>1.43–2.42</td>
<td>58</td>
<td>211</td>
<td>58.9</td>
<td>2.50</td>
<td>1.25–5</td>
<td>2066</td>
<td>1386</td>
<td>67.1</td>
<td>1.76</td>
<td>1.33–2.34</td>
</tr>
<tr>
<td>No incentive</td>
<td>389</td>
<td>295</td>
<td>75.8</td>
<td>(&lt;0.001)</td>
<td></td>
<td>58</td>
<td>43</td>
<td>74.1</td>
<td></td>
<td></td>
<td>331</td>
<td>252</td>
<td>76.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-year survey</td>
<td>1373</td>
<td>1125</td>
<td>81.9</td>
<td>1.91</td>
<td>1.35–2.70</td>
<td>146</td>
<td>109</td>
<td>74.7</td>
<td>1.58</td>
<td>0.67–3.71</td>
<td>1227</td>
<td>1016</td>
<td>82.8</td>
<td>2.01</td>
<td>1.37–2.95</td>
</tr>
<tr>
<td>Incentive</td>
<td>388</td>
<td>341</td>
<td>87.9</td>
<td>(&lt;0.001)</td>
<td></td>
<td>47</td>
<td>37</td>
<td>78.7</td>
<td>(0.298)</td>
<td></td>
<td>341</td>
<td>304</td>
<td>89.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No incentive</td>
<td>985</td>
<td>784</td>
<td>79.6</td>
<td></td>
<td></td>
<td>99</td>
<td>72</td>
<td>72.7</td>
<td></td>
<td></td>
<td>886</td>
<td>712</td>
<td>80.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three-year survey&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1318</td>
<td>1025</td>
<td>77.8</td>
<td>1.59</td>
<td>1.12–2.27</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1227</td>
<td>1016</td>
<td>82.8</td>
<td>2.01</td>
<td>1.37–2.95</td>
</tr>
<tr>
<td>Incentive</td>
<td>296</td>
<td>249</td>
<td>84.1</td>
<td>(0.010)</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>No incentive</td>
<td>787</td>
<td>608</td>
<td>77.3</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> OR = Odds Ratio; 95%CI = 95% Confidence Interval.

<sup>b</sup> The baseline model includes NZDEP2006 and Māori descent indicator; the 2-year follow-up survey model includes NZSEI, ethnicity, and education; and, the three-year follow-up survey model includes NZSEI and education.

<sup>c</sup> One questionnaire was returned with the identification number removed; thus, there is one extra “potential” responder.

<sup>d</sup> Only women who self-identified as New Zealand European or “other” at baseline.
Adjusted results were similar (Table 2). For women identifying as Māori, an especially important group for public health research in New Zealand, the response rate for those receiving a token monetary incentive was 71.7% (38/53) at baseline, 78.7% (37/47) at 2 years, and 71.0% (98/138) at 3 years.

The response rate for non-Māori women receiving the token monetary incentive was 76.5% (257/336) at baseline, 89.4% (303/339) at 2 years, and 80.6% (320/397) at 3 years. For the baseline survey, there was a significant effect of NZDep2006 score on response rate with response rates decreasing with greater deprivation (OR 0.91/decile, 95%CI 0.88–0.94, p < 0.001), but there was no statistically significant evidence of an effect of Māori descent on response rate (OR 0.80, 95%CI 0.62–1.02, p=0.075), although the confidence interval is wide.

There was also no evidence of an interaction between the monetary incentive and NZDep2006 (p=0.547) or Māori descent (p=0.426). For the 2-year sample, there were no significant effects of NZSEI score (p=0.438), ethnicity (which had been collapsed to three levels: Māori, New Zealand European, and Asian, Pacific Islander and Other ethnicity for this particular analysis) (p=0.464) or education status (p=0.124) on response rate.

For the 3-year sample, when looking at the subsample of New Zealand European and other women, there was no effect of education (p=0.727) nor NZSEI (p=0.548) on retention. Nor was there evidence of an interaction between the incentive and NZSEI (p=1.000) or education (p=0.695). Table 2 shows the main effects of the incentive at each time point, overall and stratified by Māori and non-Māori for baseline and 2-year follow-up.

Not shown in Table 2 is an analysis of the subsample of New Zealand European and other women not belonging to an Asian, Māori or Pacific Islander ethnic group. This analysis suggests that there is a diminishing effect of the token monetary incentive on retention rates from the 2-year follow-up survey (OR 1.90, 95%CI 1.28–2.83, p=0.002) to the 3-year follow-up survey (reported above).

**Discussion**

The 56% response rate to our pilot survey and 66% response rate to our baseline survey are higher than the response rates in similar mail surveys conducted in Australia and New Zealand. For example, a mailed survey on weight perceptions, weight concerns and weight control behaviours that utilised the Australian electoral roll as a sampling frame achieved a response rate of 42% from an original sample of 2500.24

Similarly, a mailed survey conducted among 1,200 men in New Zealand achieved a 45% response rate.25 In 1992, three New Zealand studies that utilised 50 cent and $1 monetary gifts to improve response rates of mail surveys among the general public achieved response rates of 59–68% in the monetary incentive groups versus 50-56% in the control (no monetary incentive) groups.8

Our results suggest that inclusion of a token NZ$5 incentive with the initial mail out significantly increases response rate and retention rates beyond those observed with the use of small non-monetary gifts and a lottery draw. This is consistent with social exchange theory6 and the novelty effect of including a token monetary incentive; however, among New Zealand European women and other women not belonging to Asian, Māori or Pacific Islander ethnic groups, this effect diminished in the 3-year follow-up. This could potentially be explained by a decline in the novelty value of repeated token monetary incentives.

Some researchers have suggested increasing the value of the monetary incentive in follow-up survey waves to improve retention rates.26 Also, it is possible that financial resources for mail surveys may be better spent on token monetary incentives with the baseline survey and first follow-up survey rather than equally distributed over multiple surveys.
In our study, there is a suggestion of possibly diminishing effects over time (ORs 1.86, 1.91, 1.59). However, all of the confidence intervals included all estimates and this pattern may be due to chance. While there was no evidence of differences in response rates by ethnicity, the wide confidence interval for women of Māori ethnicity when examining baseline response rates included values that would be of considerable importance, and meaningful effects cannot be ruled out here.

There was no evidence that the effect of the NZ$5 incentive differed by socioeconomic status or educational level. Therefore, this study suggests that targeting a token monetary incentive for low socioeconomic status or low education status women might not be beneficial.

When deciding whether or not to include a small monetary token of appreciation, researchers need to consider the financial costs associated with using incentives alongside any effects on response rates and sample representativeness. For this particular study, we estimated the cost per response for each survey wave by incentive group (i.e., for each wave/incentive group combination, the total costs for printing, postage, incentives and labour for initial mailings, reminder/thank you postcards, and replacement questionnaires were divided by the number of respondents in that incentive group).

The differences in cost per response received were below $5 but increased over the three survey waves. The mean costs per response for women who received $5 in the baseline, 2-year follow-up and 3-year follow-up surveys were $15.47, $12.60, and $13.41, respectively, and the mean costs per response for women who did not receive a small monetary gift were $11.52, $8.20, and $8.61, respectively.

Therefore, the differences in cost were $3.95, $4.40, and $4.80. This increased cost is below $5 due to the higher response rate with the incentive and fewer replacement materials being sent to women in the incentivised group. The weighing up of the additional financial costs of including an incentive against the possibly lower response rate without an incentive will depend on the unique circumstances of each study.

The strengths of this study include the use of a large sample size from a nationally representative sampling frame, good response and retention rates and reasonable representativeness of the baseline sample in terms of prioritized ethnicity and socioeconomic status. The over-70% response and retention rates achieved for Māori women were particularly encouraging.

The main limitation is that our study was not designed primarily to test the effect of token monetary incentives. Thus, we could not thoroughly investigate factors that may have contributed to women being non-respondents nor did we collect data to enable us to analyse the speed of response based on the inclusion or exclusion of NZ$5. A stronger design would include selecting a larger random sample at baseline only, offering that sample subsequent token monetary incentives at the two-year follow-up and three-year follow-up and then examining the final response rate for this group versus the group never offered a token $5 incentive.

It should be noted that our results apply to mid-aged women in New Zealand, and a token monetary incentive may be more or less effective with a sample of men or women of different age groups or in different countries in a similar prospective study. Finally, we have not examined the effects of patterns of token monetary incentives over time, in part due to smaller numbers in these groups when all three waves are considered. However, it seems plausible that the effects of earlier monetary incentives were largely or completely washed out at each wave.

In conclusion, token monetary incentives are useful for improving response and retention rates in mail surveys, thus enhancing the generalisability of study findings. Our findings suggest that public health researchers should consider including token financial incentives with mailed surveys to increase participation, particularly in the baseline survey and the first follow-up survey. In addition,
researchers may wish to consult with individuals who are representative of hard-to-reach populations for appropriate token incentive suggestions.

**Competing interests & funding disclosure:** This research was funded by the University of Otago Department of Human Nutrition PBRF funding. There are no conflicts of interest.

**Author information:** Sara Boucher, PhD candidate, Departments of Human Nutrition and Preventive & Social Medicine, University of Otago, Dunedin; Andrew Gray, Senior Research Fellow (Biostatistican), Department of Preventive & Social Medicine, University of Otago, Dunedin; Sook Ling Leong, PhD, Departments of Human Nutrition and Preventive & Social Medicine, University of Otago, Dunedin; Heidi Sharples, BSc, Department of Human Nutrition, University of Otago, Dunedin; Caroline Horwath, Associate Professor, Department of Human Nutrition, University of Otago, Dunedin

**Acknowledgements:** Grateful thanks go to Clara Madden for her contribution to mail survey implementation and to Fiona Hyland for data entry.

**Correspondence:** Caroline Horwath, PhD, Department of Human Nutrition, University of Otago, PO Box 56, Dunedin 9054, New Zealand. caroline.horwath@otago.ac.nz

**References**


