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PHYSICIAN RESPONSE TO A MAILED SURVEY
AN EXPERIMENT IN TIMING OF PAYMENT

SANDRA H. BERRY AND
DAVID E. KANOUSE

Abstract This article reports the results of an experiment in obtaining physician response to a mailed questionnaire. Each physician was eligible for a payment of $20. A randomly selected half received the payment *with* their initial questionnaire and cover letter; half were told they would receive their payment *after* they completed and returned the questionnaire. The same mail and telephone followup procedures were used for both groups. Overall, prepayment had significant positive effects on response rates. This paper examines these effects in terms of response rates for various specialties, field efficiencies, cost, and representativeness of the sample.

The ability to make unbiased inferences about populations based on sample survey data depends on having complete information about all selected sample units or establishing that the nonrespondents do not differ from respondents in any important way (Fowler, 1984). Since it is difficult to rule out biased nonresponse, it is desirable to obtain high response rates.

This can be especially challenging with some populations. Physicians, for example, are widely believed to be a difficult population from which to collect survey data (Sudman, 1985). Physicians are frequently

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approached for surveys, the demands on their time are great, and their office staffs are vigilant in protecting them.

As key decisionmakers in the health system, however, physicians are of considerable research interest, and a good deal of effort has been devoted to improving methods of obtaining information from them. Much of this effort has focused on providing physicians with financial incentives to participate in research.

In this paper, we report the results of an experiment that tested the timing of payment in a mailed survey of physicians. The results are not only of practical interest, they also raise important questions about how payment "works" in eliciting high response rates.

Background

Small monetary incentives both prepaid and promised, have been shown to be useful in improving survey response rates in general populations (Armstrong, 1975; Baumgartner and Heberlein, 1984; King, 1979; Sudman and Ferber, 1974). Promised incentives have been shown to improve response rates in populations of physicians (Gunn and Rhodes, 1981; Weber, Wycoff, and Adamson, 1982). Gunn and Rhodes experimented with paying physicians for participating in a 15–30 minute telephone interview on attitudes toward influenza immunization. They tested payments of $0, $25, and $50 with groups of general and family practitioners, internists, pediatricians, and industrial physicians. With about 40 physicians assigned to each payment level, they obtained response rates of 58%, 69%, and 77% for the respective levels. Response rates varied considerably across specialties. Pediatricians and industrial physicians had high rates regardless of payment category, but general and family physicians were very sensitive to payment—37% responded with no payment and 64% with the $50 payment.

These same levels of incentives affected physicians' response rates in a personal interview survey conducted by Market Facts, Inc. (Weber et al., 1982). A total of 1317 general and family physicians, internists, and cardiologists were offered incentives of $0, $25, and $50, which resulted in response rates of 38%, 67%, and 73%, respectively. Based on this test, Market Facts settled on a $25 payment level and obtained response rates of 66% and 62% in subsequent waves of interviewing.

Mizes, Fleece, and Roos (1984) compared the effectiveness of $1 and $5 prepayments along with no payment for a mail survey of 200 physicians. With a 5-item postcard questionnaire, they obtained a response rate of 53% with no payment compared with 74% for both the

$1 and $5 payments. With a questionnaire printed on the back of the check, they obtained response rates of 53% with a $1 payment and 72% with a $5 payment. While payment per se was effective with the postcard questionnaire, the level of payment influenced response for the questionnaire printed on the back of the check. They concluded that while payment was generally effective, the unusual format of the questionnaire on the back of the check confused respondents and that the $1 payment was not sufficient to overcome the confusion.

There is no research on differential effects of substantial levels of payments to physicians for completing lengthy mailed surveys (Baumgartner and Heberlein, 1984). However, nonexperimental evidence (Carter, Robyn, and Singer, 1983) suggests that mailed surveys of physicians with payments of $25 can achieve response rates as high as 98%.

Why payments are effective in improving response rates is not well understood. Gunn and Rhodes (1981) suggest that physicians view payments as remuneration for their time, but informal discussions indicate that physicians place a value on their time that far exceeds the amount of even the more generous payments for interviews. Heberlein and Baumgartner (1978) suggest that payments and other factors, such as personalization and repeated contacts, improve response by convincing respondents of the survey's *importance,* thereby increasing the perceived benefit of responding.

According to this notion, the size of the incentive payment may be one of several cues that respondents can use to judge a survey's importance. Presumably, the size of the research budget reflects, at least in part, the seriousness and importance of the research. An ample incentive payment implies, more surely than a modest payment does, that the research project is a substantial one, and therefore worth the trouble of participating in. Moreover, the payment's size indicates the value of a completed survey questionnaire to the investigator. For these reasons, larger incentive payments might be expected to lead to higher response rates quite apart from their obvious role as behavioral incentives.

The mode of payment may offer additional cues about the importance of the research. Payment in advance, in particular, may be an effective way to signal that the investigator considers the research—and the respondent's participation therein—sufficiently important to justify a rather bold and unusual gesture. To the extent that advance payment does provide such a signal, we would expect that a payment made in advance would lead to higher response rates than an equivalent amount paid only upon completion of the questionnaire.

That advance payment may be more effective is also suggested by a

social exchange perspective (Homans, 1961). When respondents are asked to fill out a questionnaire with a promise of subsequent payment, control over the initiation of an exchange is left to them. Until they actually fill out the questionnaire, no obligation exists on either side.

In contrast, advance payment initiates an exchange transaction that many respondents are likely to feel obligated to complete. To be sure, they can remove the obligation by returning the check rather than completing the questionnaire; but to bring closure to the transaction they have to do something, and in this circumstance many respondents will find it nearly as easy—and more gratifying—to complete the questionnaire rather than send back the check. As for cashing the check without filling out the questionnaire, norms of equity in social exchange (Adams, 1965; Homans, 1961) are apt to make many respondents feel uncomfortable with the idea of getting something for nothing.

The effectiveness of advance payment is likely to depend, however, on the perceived legitimacy of the request and on the subtlety with which it is presented. A heavy-handed or blatantly manipulative approach might very well create "reactance" (Brehm, 1966; Brehm and Brehm, 1981; Wicklund, 1974) as prospective respondents feel that their freedom to choose is being restricted. To be most effective, advance payment should make prospective respondents feel that they really ought to fill out the questionnaire without making them feel coerced into doing so.

Study Design

The effectiveness of advance payments was tested in a survey carried out on a national sample of 2147 physicians as part of an evaluation of the National Institutes of Health Consensus Development Program. The questionnaire was designed to measure physicians' overall familiarity with the Consensus Development Program and gauge the extent to which they followed procedures recommended by NIH consensus panels in their own practices. It also obtained background information about the physicians' characteristics and preferred information sources. The questionnaire differed somewhat by specialty and ranged in length from 20 to 32 pages. It took about 25 minutes to complete.

The sample was chosen to represent physicians in specialties relevant to eight Consensus Development Conferences held during 1979 and 1980. The sample was drawn from the American Medical Association Physician Masterfile. This file contains information on both mem-

bers and nonmembers of the AMA and is updated monthly. The sample we requested consisted of physicians actively practicing in either office or hospital settings; residents were excluded, however. Specialties were general practice, family practice, internal medicine, cardiology, cardiac surgery, thoracic surgery, obstetrics and gynecology, oncology, and general surgery. Sample sizes varied across specialties in approximate proportion to the frequency with which physicians in each specialty performed or made referrals for the procedures covered in the evaluation.

Of the physicians selected for the study, 93% were male, 60% were in solo practice, 22% were in group practice, and 18% were in hospital-based practices. Sixty-one percent had one or more board certifications. The mean age for the selected group was 48.

We obtained OMB approval to pay physician respondents up to $25, but we were uncertain whether it would be best to pay physicians at the time of the initial mailing or only after they had returned a completed questionnaire. To test the effect of timing of payment on response rates, we divided the mail survey sample in half, randomly assigning half of each specialty group to receive a check with the first mailing (prepayment group) and the other half to receive a promise of payment with the first mailing, but not to receive payment until they had returned a completed survey (postpayment group). To allow for the potential additional cost of prepayment, we set the total payment at $20 per physician.

To maximize response we used personalized cover letters and an endorsement letter from NIH. Each physician was sent a reminder letter one week after the initial mailing; nonrespondents received a second mailing, including a new questionnaire, four weeks after the initial mailing, and a follow-up telephone call shortly thereafter. We spoke directly with the physician whenever possible, but conveyed a reminder through receptionists if we could not reach the physician. Physicians who agreed to complete the survey but who no longer had a copy of the questionnaire were sent a third mailing. We tracked cases returned as undeliverable through local directory assistance and local medical societies.

Before the end of the field period it became clear that the advance checks were having a substantial positive effect on response. To test the effectiveness of prepayment at a later stage in the contact process, we identified a group of physicians who were not scheduled to receive payment in advance, but who had been contacted by telephone and who had promised to mail in their completed survey. We sent this group a special mailing with a check, thus creating a subgroup of the original postpayment sample.

Results and Discussion

Overall response rates and the results of the prepayment test are summarized below.

RESPONSE TO THE PHYSICIAN SURVEY

We define response rate as the number of completed surveys divided by the total number of eligible cases. The cases excluded as ineligible include deceased, incorrect specialty designation, and cases for which we were unable to obtain a valid address after tracking. About 5% of the cases were declared ineligible for these reasons. Refusal rate is defined as the number of explicit refusals (by mail or telephone) divided by the total number of eligible cases. The remaining cases consist of physicians who were contacted and did not refuse but never completed the survey and physicians whom we were never able to contact by mail or telephone.

The overall response rate for the survey was 72% and the overall refusal rate was 13%. This compares favorably with response rates reported by Gunn and Rhodes (1981) and Market Facts, Inc. (Weber et al., 1982) for telephone and personal interviews using similar incentive levels, even though these methods typically yield higher response rates than mailed surveys. About one percent were contacted but neither refused nor completed the survey. The remainder, 15%, were never contacted.

The timing of payment had a significant effect on response rates. The group that received a check with the initial mailing had a response rate of 78% ($N = 1011$), compared with 66% for the group that received a check after a completed survey was returned ($N = 1017$).[1] The portion of the postpayment group that received a check after agreeing to mail back the survey, but who had been part of the original postpayment group, had a final response rate of 77% ($N = 200$), indicating that prepayment was effective even when it was used late in the contact process. For purposes of making comparisons of the effects of prepayments, we adopted the conservative strategy of including the 200 cases who received a payment late in the contact process with the postpayment cases.

Refusals were lower for the prepayment group (11%) than for the postpayment group (14%).[2]

1. The difference in response rates for the two groups is significant at the $p < .0001$ level by chi-square test with $df = 1$.
2. The difference in refusal rates for the two groups is significant at the $p < .05$ level by chi-square test with $df = 1$.

Prepayment increased the percentage of cases ever contacted (including ineligibles, completions, refusals, and those who were contacted but did not complete the survey) from 82% in the postpayment group to 91% in the prepayment group. The proportion of cases declared ineligible was identical in the two groups.

Response rates varied markedly by specialty, with some specialties more sensitive to timing of payment than others, as shown in Table 1. With the exception of oncologists, all specialty groups responded at higher rates with prepayment than with postpayment. This difference is statistically significant ($p < .05$) in four of the nine specialty comparisons. Although the prepayment effects are more often significant for primary care physicians than for specialists, this is probably due simply to the smaller sample sizes for the specialist groups in this survey.

In addition to studying prepayment, we also examined other factors that may have influenced response. Drawing on the information available from the tape we obtained from the AMA, we carried out OLS regressions using four models. These analyses were conducted on the sample of eligible respondents.

The first model regressed completion of the questionnaire (1 = complete, 0 = nonresponse) on a set of indicator variables for physician specialty. The model explained little of the variance in response (adjusted R-squared = .01, F with $df = 12,2015 = 5.165$, $p < .0001$); the only significant predictor was the indicator variable for oncology, whose coefficient indicated a positive effect on response rate.

Table 1. Response Rates by Payment Group and Specialty

Specialty	Percent Complete[a]			Total Number of Eligibles	Payment Test Significance Level[b]
	Pre-payment	Post-payment	Total		
General practice	72	63	67	351	.05
Family practice	76	71	74	390	ns
Internal medicine	78	61	69	378	.01
Cardiology	66	54	60	141	ns
Cardiac surgery	88	70	79	71	ns
Thoracic surgery	69	60	64	70	ns
Obstetrics-gynecology	84	72	78	385	.01
Oncology	86	86	86	72	ns
General surgery	81	60	71	170	.01
Total	78	66	72	2028	.0001

[a] Postpay group includes respondents who received a prepayment late in the contact process.

[b] Based on chi-square tests for each specialty with 1 degree of freedom.

The second model regressed completion of the questionnaire on a set of physicians' professional and personal characteristics: specialty, age, whether or not the physician was board-certified in any specialty, and type of practice (solo, group, hospital). While this model also explained little of the variance (adjusted R-squared = .02, F with df = 13, 2014 = 7.261, $p < .001$), age and a specialty in cardiology were negatively associated with probability of responding, while board certification in any specialty and group practice were positively associated. Being an oncologist was not a significant predictor of response in this model, suggesting that its predictive value in Model 1 may result from its association with other factors not included in that model.

Model 3 included all the factors in Model 2 with the addition of prepayment. The results for Model 3 are shown in Table 2. Since questionnaire completion is a dichotomous outcome, two regression coefficients are reported. The first is the coefficient obtained from the ordinary least squares (OLS) regression. It indicates the approximate change in the probability of completing the questionnaire associated with a particular physician characteristic.

The second column is the discriminant function estimate of the logistic regression coefficient.[3] While prepayment is a highly significant factor in explaining questionnaire completion, other factors are also significant. The specialty of cardiology has a strong negative association with completion, as does the age of the physician. Being board-certified and being in a group practice have strong positive associations with completion.

A fourth model tested for interactions between prepayment and the physician characteristics included in Model 3. None were found to be significant and the results are not reported in detail.

Although prepayment affected response rates, it had little effect on the overall characteristics of the samples obtained, as shown in Table 3. The mean age for both the prepayment and postpayment groups was 47, and for all eligibles it was 48. In general, the prepayment and postpayment groups were quite similar, and both produced good representations of the sample as a whole. At the same time, however, respondents in both prepayment and postpayment groups differed significantly from nonrespondents in type of practice and board certification. Physicians in solo or partnership practice and those who were not board-certified were less likely to complete the questionnaire, regardless of timing of payment.

3. When certain normality assumptions are met, the maximum likelihood estimate of the regression coefficient for polytomous logit is the discriminant function estimate (Haggstrom, 1983).

Table 2. Regression of Questionnaire Completion on Model 3 Variables

	OLS Unstandardized Coefficient	Discriminant Function Estimate	t Statistic
Constant	72.1	1.0010	
PHYSICIAN SPECIALTY[a]			
General practice	2.4	.0047	.5
Family practice	.7	.0012	.1
Internal medicine	−2.2	−.0042	−.5
Cardiology	−13.1	.0254	−2.5
Cardiac surgery	3.7	.0073	−.5
Thoracic surgery	−8.0	−.0155	−1.2
Obstetrics-gynecology	5.6	.0108	1.3
Oncology	11.8	.0229	1.8
PHYSICIAN CHARACTERISTICS[b]			
Age	−.3	−.0005	−2.8
Board certification	6.2	.0121	2.7
Group practice	5.3	.0103	2.0
Hospital practice	3.7	.0071	1.3
PAYMENT STATUS			
Prepayment	11.2	.1938	5.7
Adjusted R-squared = .039			
Degrees of freedom 13, 2014			
$p < .0001$			

[a] General surgery is the omitted category.
[b] No board certification and solo practice/partnership are the omitted categories.

Table 3. Physician Characteristics for Completed Cases by Timing of Payment and for the Total Eligible Sample

	Percent of Complete Cases		
Physician Characteristic	Prepayment (N = 783)	Postpayment (N = 670)	Percent of All Eligibles (N = 2028)
Male	92	93	93
Female	8	7	7
Solo or partnership	56	60	60
Group	25	23	22
Hospital	20	18	18
No board certification	36	37	39
One or more boards	64	62	61

EFFECT ON FIELD PROCEDURES

In addition to the significant effects on response rates, prepayment also yielded noteworthy efficiencies in the field. Checks for the prepayment group could be prepared and mailed in one batch, which saved both labor and postage costs. Even greater efficiencies resulted from the reduced need for followup. For the prepayment group, only 44% of the physicians needed to be sent a second copy of the survey and contacted by telephone. In contrast, 62% of the physicians in the postpayment group needed to be contacted. About 40% of the physicians outstanding in each group at the beginning of followup eventually returned completed surveys. Thus, the timing of payments had relatively little effect on the success of the followup (except for those physicians in the postpayment group who received a prepayment as part of followup). Rather, the beneficial effects of prepayment resulted mainly from the boost it gave to early response rates, which reduced the number of cases requiring followup. From a survey management standpoint, improvements in response rates that occur early in the field process are preferable to improvements that occur later, because they save more in field costs.

EFFECT ON COST OF RESPONDENT PAYMENTS

The beneficial effects of prepayment need to be balanced against any additional costs. Perhaps the most obvious source of additional cost is the greater number of checks mailed and potentially cashable. If every physician who receives a check cashes it, the costs of incentive payments in the prepayment group will be higher, in inverse proportion to the response rate, and total costs will be increased by several dollars per completed case. In contrast, if physicians only cash checks when they have completed questionnaires, then there may be little or no additional cost associated with mailing the payments in advance.

We found that for the prepayment group, 95% of the respondents who completed surveys cashed checks, but that only 26% of those who failed to complete the survey cashed their checks. As a result, the average payment per completed questionnaire was $19.92 in the postpayment group and $21.45 in the prepayment group.

Conclusions

This survey demonstrates that with standard techniques and moderately sized payments to physician respondents it is possible to achieve

response rates comparable to telephone and personal interviews using mailed surveys. Further, providing the incentive payment along with the questionnaire substantially increases initial response to the survey, resulting in higher final response rates and reduced need for followup. Moreover, prepayment appears to be effective even if it is provided late in the contact process.

The overall level of response differed somewhat by specialty, but this difference was not associated with any obvious pattern, such as primary care physicians versus specialists. Prepayment was effective with all specialties except one (where overall response was exceptionally high).

Regressing questionnaire completion on physician characteristics and payment status confirmed the importance of prepayment in predicting response. However, other factors were also significant, including specialty, age, board certification, and being in a group practice.

Although prepayment significantly improved the response rate, it did so without affecting the representativeness of the sample. Not surprisingly, there were statistically significant differences between respondents and nonrespondents in type of practice and board certification. Physicians who completed questionnaires were similar across payment groups. And regardless of payment, those who completed the questionnaire closely resembled the original sample in terms of age, type of practice, and board certification.

Of course, a higher response rate will not always result in a more representative sample. In fact, some methods of boosting response rates may do so at the expense of introducing further bias. Because incentive payments may appeal more to some types of respondents than others, they certainly have this potential. We found little evidence of differential response in our study, at least for the limited array of physician characteristics measured. But those who wish to tinker with incentive payments or their timing as a way of improving the "quality" of a sample should keep the possible pitfalls in mind.

Prepayment yielded several efficiencies in fieldwork management. The prepayment sample required less clerical effort to prepare for mailing and needed less followup contact by mail and telephone, resulting in lower costs.

Most physicians who received a prepayment but did not respond to the survey did not cash their checks. For that reason, prepaying physicians added little to the average cost of respondent payments per completed questionnaire.

Our results lead us to conclude that prepaying physicians for participating in a mailed survey can be very useful in increasing response rates and may, as in our study, actually lower field costs. Whether that will be true in other situations will depend, of course, on the relative

costs of incentive payments compared with those associated with sample preparation and followup.

Prepayment should be considered for populations that are difficult to contact, such as lawyers or executives in large organizations, where traditional followup may be expensive.

Our data also suggest the potential effectiveness of a "mixed strategy," in which prepayment is used only at the time of followup. In the first mailing, respondents are promised payment *after* they have completed the questionnaire. Nonrespondents are then contacted by telephone. Those who appear willing to respond but have not yet done so can then be sent a letter confirming the conversation, accompanied by a prepayment check and a blank questionnaire. This mixed strategy avoids the necessity of sending a check to those who refuse, regardless of payment, but provides additional encouragement to those with good intentions.

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