

A STUDY OF THE EFFECT OF INCREASED REMUNERATION ON RESPONSE  
IN A HEALTH AND NUTRITION EXAMINATION SURVEY

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I. Introduction

This paper describes the methodology and results of a study designed to provide evidence on the effect of increased remuneration on response to the second National Health and Nutrition Examination Survey (NHANES II). NHANES II, conducted from 1976 to 1980 by the Division of Health Examination Statistics and the Division of Operations' Health Examination Field Operations Branch, both of the National Center for Health Statistics, was similar to the first NHANES in its purpose, sample design, and data collection methods.

NHANES II, like NHANES I, had two primary objectives: 1) to measure and monitor the nutritional status of the civilian, noninstitutionalized population of the United States, 1-74 years of age; and 2) to collect data on the general health status of persons in particular age groups.

The NHANES II sample design incorporated stratification and multistage probability selection to identify approximately 28,000 sample persons (SP's) from 64 geographic locations across the nation. Population groups at high risk of malnutrition were oversampled.

As in NHANES I, a Bureau of the Census interviewer made the first contact with the sample household and completed a questionnaire to obtain demographic and socioeconomic information. During this visit the interviewer used a predetermined sampling pattern to identify sample persons and, if there were any, obtained medical histories and made appointments for the sample persons to have the examination. Whenever there were refusals, noninterviews, or broken appointments, NHANES interviewers made additional personal contacts to try to persuade the sample persons to come for their examinations. Examinations were given in specially built and equipped mobile examination centers (MEC's) which consisted of three interconnecting trailers. A major factor considered in choosing a location for the examination center was ease of access to the MEC from the surrounding sample area because increased travel time to the center was believed to decrease the likelihood of a person's responding. (There has since been evidence that as travel time increases, response rates tend to decrease.<sup>1</sup>) Each examination center was staffed by a physician, a nurse, two laboratory technicians, three health technicians, two dietary interviewers, and a receptionist/coordinator. Two

MEC's were in operation simultaneously throughout the survey.

A sample person had to complete the household interview and the extensive examination at the examination center to be considered a respondent. Response to three earlier National Health Examination Surveys, two of which were conducted on children and teenagers, was quite high. Response rates for the household interview ranged from 95 to 99 percent, while examination response rates ranged from 87 to 96 percent. However, as the first NHANES progressed, it became apparent that the response rate would be considerably lower than it was in those earlier surveys. With a view to increasing response, interviewer procedures were reviewed; and individual interviewers were observed and retrained. Other measures were also taken such as seeking more publicity for the survey at each location, seeking assistance from community action groups, and using pamphlets to provide sample persons with more information about the survey. Although these measures may have improved the response rate to some extent, the rate still remained below satisfactory levels.

There was a proposal that response might be increased in NHANES I if some remuneration were offered to those who would participate in the examination. In past surveys the response rates were high enough that payment for participation had been considered unnecessary. But this time it seemed that for NHANES I such payment would be reasonable because a greater amount of time was required for the examination than in past surveys, resulting in many instances of lost time from work and thus lost pay, or of the necessity of hiring baby sitters. In addition, it was felt that the cost of remuneration might be offset if fewer visits were required by NHANES interviewers to seek cooperation. Finally, if remuneration could increase response to a satisfactory level, the additional expense would be relatively small compared to the cost of the total program and to the possible loss of data integrity because of a low response rate.

Although information was available on the effect of remuneration in a variety of mail surveys and in some household surveys, this information was insufficient to give an indication of the effect that remuneration might have in NHANES I. Therefore, a study to test the effect of offering sample persons \$10 to participate in NHANES I was designed and conducted in early 1972. The methodology and results of this study are reported in

detail elsewhere.<sup>2,3</sup> In the study location, offering \$10 to sample persons to participate increased the response in the test group from about 70 percent to about 82 percent. Payment of \$10 was subsequently adopted as standard practice in NHANES I.

In 1973 a small study was designed to obtain information on increased payment and differential payment by age in NHANES I. However, testing was restricted because of limited resources. Even though the sample size was too small for a complete analysis, the results indicated that increasing payment to \$20 would probably produce a further increase in the response rate of about five percentage points. The relatively small increase in response and existing resource limitations led to the decision to terminate testing and continue the policy of paying \$10 to respondents for the remainder of NHANES I and the beginning of NHANES II.

In addition to carrying over the \$10 remuneration from NHANES I to NHANES II to maintain the response rate, the NHANES II sample design was changed. The basis for this was the fact that, as previously mentioned, the more time sample persons spent in travel from their houses to the examination center the lower the response rate. Whereas in NHANES I many Standard Metropolitan Statistical Areas (SMSA's), each of which was a primary sampling unit (PSU), contained more than one county, in NHANES II those SMSA's that contained more than one county were split up into their respective counties one of which was randomly selected to become a PSU. Thus the PSU's in NHANES II were smaller in area on the average than those in NHANES I, and maximum distances between the sample housing units and the examination centers were reduced.

Nevertheless during 1978, about midway through NHANES II, the response rate had again dropped to around 70 percent even though payment of \$10 to respondents had been continued. At this time the decision was made to design and field a study to investigate the effect of increased payment on response. The methodology and results of this study are described in the remaining sections of this paper.

## II. Methodology

Three of the NHANES II locations (stands), ones which were to start operations in June and July of 1978, were selected for the study; Greenville, Michigan; Racine, Wisconsin; and Detroit, Michigan. These three would provide an adequate sample size as well as urban, small city, and rural representation. The design of the study was compatible with the NHANES II sample design and operational procedures. In NHANES II the sample in each PSU was selected as

clusters of housing units, called segments, that contained an expected number of eight households each. The segments were classified as poverty or nonpoverty based upon whether or not the enumeration districts they were drawn from had less than 13 percent (nonpoverty) or 13 or more percent (poverty) of persons below the poverty level as defined by the 1970 Census. The poverty indexes for households were based on 1969 income, family size, sex and age of the head of the family, and nonfarm status.

In the three locations chosen for this study, each segment was paired with another segment similar to it with regard to poverty/nonpoverty status and distance from the examination center. One of each pair of segments was randomly designated to have the sample persons in it told that they would receive \$20 for participating in the examination while the other of the pair was to have the SP's in it told that they would receive \$10. In fact, however, all persons who participated were given \$20 after their examinations no matter which amount they were originally told they would receive. The reason all people in a segment were told the same amount of money was that there was concern that neighbors in a segment might discuss their upcoming examinations and discover that some of them had been offered \$20 to participate while others had only been offered \$10. So that most interviewers would be responsible for interviewing in three segments in accordance with the usual Census field office assignment criteria during regular NHANES stands, each Census interviewer was assigned at least one pair of segments; then the remaining segments were unpaired and assigned singly to the interviewers. In this way there was an effort to divide the payment amounts equally among the interviewers while maintaining the usual cost efficiency procedures used in making Census interviewer assignments for NHANES. The interviewers were asked to complete all interviews in the paired segments before beginning any single segment assignments.

The design of the study was thoroughly explained to the Census interviewers before each stand during their customary half-day training session and to the NHANES staff at each stand. The interviewers were asked to follow the usual procedures at any NHANES stand except for the changes required for this study. The usual procedures called for the interviewers to obtain the household demographic information, select the sample persons, explain the survey and obtain medical history data from them, and make appointments for them to have the physical examination. Part of this procedure involved explaining that NHANES would furnish a taxi to take the sample

person to the MEC and home again or would pay him mileage if he wished to drive to the MEC and that he would receive \$10 for his participation in the examination.

For this study the major change in the usual procedures was that the Census interviewers were asked to tell the sample persons in the \$20 segments that they would receive \$20 after their examinations. Also for the \$20 segments the interviewers were to modify the sentence in the sample person brochure that reads, "And in addition you receive \$10.00 for your cooperation." The interviewers were to cross out "\$10.00" and write in "\$20.00" on the brochures to be passed out to all sample persons in the \$20 segments. The interviewers were instructed to tell all persons in the \$10 segments that they would receive \$10 for coming in for the examination. However, the Census supervisor stressed that if an interviewer made a mistake in quoting the amount of money an SP would receive, he was not to correct himself during the interview. Instead he should make a note of the error and report it to the field office so that the error could be taken into account during the analysis of the data.

If an SP failed to keep his appointment for the examination, or never made an appointment in the first place, a NHANES interviewer followed up with a personal contact to explain the survey further and to persuade the SP to come for the examination. During these follow-up contacts the same amount of money originally offered the SP was offered again. The NHANES interviewers were asked not to increase, from \$10 to \$20, the amount of payment offered to SP's who were reluctant to come for the examination no matter how tempting that option might be.

After a sample person was examined, he was asked to complete an exit interview form. The main purpose of the exit interview was to determine how much the examinee thought he was going to receive for participating in the examination. The principal question asked was: "Before coming for the examination, you were told that you would receive a certain amount of payment as compensation for your time and inconvenience if you came. What was the amount you were told?"

### III. Results

Telling a sample person that he would receive \$20 rather than \$10 for his participation in the examination affected response positively at the three test stands. Out of 720 persons offered \$20 for participation, 79 percent were examined, while among the 716 persons offered \$10, only 74 percent were examined. This difference is significant at the .05 level. The differences are

probably conservative because there were ten cases where interviewers recorded that they had mistakenly told the wrong payment amount to the sample persons. Seven SP'S were told \$20 when they should have been told \$10, and three were told \$10 when they should have been told \$20. There were five more cases where the interviewers recorded that they had told SP's reluctant to come for examinations \$20 after originally telling them \$10. These cases may be an underestimate though, because 47 SP's in the \$10 group answered on the exit interview that they thought they would be paid \$20, while 14 SP's in the \$20 group answered that they thought they would receive \$10. It is hard to assess the accuracy of these answers; but in any event, these cases make very little difference in the examination rates of the two groups no matter how they were classified. But for the purposes of analysis, all response rates have been computed according to the original designation of payment amounts.

Although the design of the study did not control for age, race, or sex, it is interesting to look at the response rates for groups within these categories. The amount of remuneration offered seems to affect men in a similar way no matter how old they are; that is, there is a four to six percentage point increase in response gained by offering any age group of men \$20 rather than \$10. However as far as women are concerned, offering \$20 and not \$10 is most effective with girls up to nineteen years old, where there is a ten percentage point increase in response, and least effective with women 45-74 years old, where there is only a two percentage point gain in response. These results are shown in Table 1.

Table 1. Number of sample persons and proportion examined by remuneration status according to age and sex: NHANES II Remuneration Study, 1978.

Age and Sex of Sample Person	\$20		\$10		Increase in Response
	Number in Sample	Proportion Exam'd	Number in Sample	Proportion Exam'd	
<b>Both sexes</b>					
1/2-74 yrs	720	.79	716	.74	.05
1/2-19 yrs	296	.92	296	.85	.07
20-44 yrs	163	.79	174	.73	.06
45-74 yrs	261	.63	246	.61	.02
<b>Males</b>					
1/2-74 yrs	342	.82	358	.76	.06
1/2-19 yrs	158	.92	148	.87	.05
20-44 yrs	81	.77	90	.71	.06
45-74 yrs	103	.69	120	.65	.04
<b>Females</b>					
1/2-74 yrs	378	.76	358	.72	.04
1/2-19 yrs	138	.92	148	.82	.10
20-44 yrs	82	.82	84	.75	.07
45-74 yrs	158	.60	126	.58	.02

Shown in Table 2 are response rates by race. Here, increased remuneration from \$10 to \$20 is more effective with whites where there is a six percentage point increase than with blacks where there was only a two percentage point increase in response.

Table 2. Number of sample persons and proportion examined by remuneration status according to race: NHANES II Remuneration Study, 1978.

Race of Sample Person	\$20		\$10		Increase in Response
	Number in Sample	Proportion Exam'd	Number in Sample	Proportion Exam'd	
All races *	716	.79	712	.74	.05
White	579	.79	552	.73	.06
Black	137	.78	160	.76	.02

\* Excludes 8 persons of other or unknown race.

Table 3 shows response rates according to annual household income. Remember that the study design controlled on household income in that the segments were paired as much as possible by poverty/nonpoverty status. Although one might think that increasing the amount of remuneration from \$10 to \$20 would increase response more among lower income households than among those with higher incomes, that did not seem to be true. Among SP's in households with an annual income of less than \$10,000, increased remuneration resulted in an increase of seven percentage points in response, while among those SP'S in households where the annual income was \$10,000 or more, the higher level of payment effected a gain in response of six percentage points.

Table 3. Number of sample persons and proportion examined by remuneration status according to annual household income: NHANES Remuneration Study, 1978.

Annual Household Income	\$20		\$10		Increase (Decrease) in Response
	Number in Sample	Proportion Exam'd	Number in Sample	Proportion Exam'd	
All incomes	720	.79	716	.74	.05
Less than \$10,000	245	.78	222	.71	.07
\$10,000 or more	428	.86	448	.80	.06
Unknown	47	.17	46	.30	(.13)

Table 4 shows response rates by the number of sample persons in a household. Payment of \$20 rather than \$10 had little effect in households with one sample person. However, in households with two and three or more SP's, payment of \$20

rather than \$10 increased response 8 and 16 percentage points respectively. In the \$20 payment group, the response rates for 1, 2, and 3 or more SP's per household groups were 70, 85, and 96 percent respectively. This rather dramatic improvement with increased number of SP's per household suggests there may be an important cumulative payment effect within households. However the increased response rates may be partially due to an age effect since (1) young people tend to respond better, and (2) the proportion of young people in a household tends to increase as the number of people (and therefore the number of SP's) in a household increases.

Table 4. Number of sample persons and proportion examined by remuneration status according to number of sample persons in the household: NHANES II Remuneration Study, 1978.

Number of Sample Persons in Household	\$20		\$10		Increase (Decrease) in Response
	Number in Sample	Proportion Exam'd	Number in Sample	Proportion Exam'd	
All	720	.79	716	.74	.05
1 SP	374	.70	367	.71	(.01)
2 SP's	246	.85	252	.77	.08
3 or more SP's	100	.96	97	.79	.17

In the \$20 payment group, for each of the 1, 2, and 3 or more SP per household groups, an age adjustment was performed by multiplying within each age group, the age specific rate by the corresponding proportion of the total number of SP's in the age group, and then adding across age groups. The resulting age adjusted rates for 1, 2, and 3 or more SP's per household groups were 73, 83, and 90 percent respectively. These age adjusted rates and the age specific rates in Table 1 both provide evidence that, in addition to the known association between response and age, there is also a positive association between response and cumulative payment within a household.

Obviously it was never expected that increasing the amount of remuneration per SP from \$10 to \$20 would produce an increase in response comparable to that obtained in NHANES I by offering \$10 rather than nothing at all. But as in the NHANES I remuneration study, there was hope that the difference in response rates would allow a clear decision to be made whether or not to start paying all NHANES II examinees \$20 rather than \$10. Of course, cost was a factor, and an additional \$10 per examinee would be a significant addition to the NHANES II budget. But there should be some offsetting reductions in the cost of the survey if the number of contacts per SP could be decreased because sample persons

would be more cooperative and require fewer persuasion calls. To see whether or not this was true, one can look at the result of the first contact of an SP by an interviewer and see that 68 percent of the SP's told they would receive \$20 were examined after one contact while only 61 percent of SP's told they would receive \$10 were examined after one contact. When that difference of about seven percent is considered over the course of a whole survey, it is clear that there would be a substantial savings of interviewer time and effort in making callbacks on these households. This picture is reinforced by comparing the broken appointment and refusal rates as a result of the first contact for the two remuneration groups. In the \$10 group, 15 percent of the SP's either cancelled their examination appointments made at the first contact or didn't show up for them; by contrast, only 11 percent of those in the \$20 group cancelled or "no showed" for their appointments made at first contact. Furthermore, 22 percent of SP's in the \$10 group refused to make an appointment at all on the first contact; but only 18 percent of SP's in the \$20 group refused to make appointments when an interviewer first contacted them.

As further evidence that there is a potential for economies to be made by cutting down on the number of persuasion contacts, one can look at the total number of contacts that were made with SP's in both remuneration groups. The interviewers made 1108 contacts with SP's in the \$10 group for an average of 1.55 contacts per sample person, while they made 1006 contacts with SP's in the \$20 group for an average of 1.40 contacts per sample person. The average number of contacts per examined SP were 2.09 for the \$10 group and 1.77 for the \$20 group. These figures all support the argument that the survey mechanism could become more efficient by offering respondents \$20 rather than \$10. They also tend to support the belief that increased remuneration was the cause of the increase in response during this study and not increased persuasion efforts on the part of the interviewers with respect to the \$20 remuneration group.

#### IV. Implementation

The findings of this study were considered decisive enough to begin paying \$20 routinely to all examinees in NHANES II. In the middle of the forty-eighth stand, Trenton, New Jersey, NHANES II began offering \$20 to all sample persons who would come for the examination and continued this practice for the last sixteen stands of the survey. Preliminary response data from the 64 stands of NHANES II show that 73.1 percent of the 27,805 sample persons were

examined. For the 44 stands at which \$10 was offered to SP's, the response rate was 71.8 percent. For those sixteen stands at which \$20 per examined person was given, the response rate was 75.6 percent, an increase of 3.8 percentage points. The three study stands and the Trenton stand were excluded from this comparison.

One of the most important findings of this study and one which has implications for the sample design of future Health and Nutrition Examination Surveys, is the sharp increase in response that occurred with increased numbers of SP's in a household. Those responsible for the sample design of the upcoming Hispanic HANES are planning to sample all members of selected families up to a maximum number. Although there are other reasons for selecting whole families in the Hispanic HANES, one important factor in the decision to do so would be the possibility for increasing response as a result of the cumulative payment effect within households with several sample persons.

#### V. Summary

1. The examination rate of those sample persons told they would receive \$20 after their examinations was 79 percent; the examination rate of those who were told they would receive \$10 was 74 percent.

2. When the number of sample persons in a household was considered, it was seen that much of the increase in response was due to a cumulative payment effect in those households with more than one sample person.

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#### References

- <sup>1</sup>Unpublished tables, NCHS, 1975.
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- <sup>3</sup>National Center for Health Statistics: A Study of the Effect of Remuneration Upon Response in the Health and Nutrition Examination Survey, United States. Vital and Health Statistics, Series 2-No. 67. DHEW Pub. No. (HRA) 76-1341. Washington. U.S. Government Printing Office, Oct. 1975.