# A STUDY OF THE EFFECT OF REMUNERATION UPON RESPONSE IN A HEALTH AND NUTRITION EXAMINATION SURVEY

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In April 1971, a major new national health survey was undertaken by the National Center for Health Statistics (NCHS). This survey, the Health and Nutrition Examination Survey (HANES), is the fourth health examination type survey to be conducted by NCHS in compliance with the National Health Survey Act of 1956.

The present program is similar to the past surveys in that the sample design is a highly stratified, multistage probability type so that national and regional estimates by various socioeconomic and demographic characteristics can be made of the findings. It also utilizes the same data collection mechanism of mobile examination centers employed in the previous surveys.

There are two primary differences which distinguish HANES from the other surveys. First, it is a dual purpose-to measure and monitor the nutritional status of the American people and to collect information on the health and health care needs of the adult population. Secondly, the target population includes all persons 1-74 years of age rather than a specific, narrower, age segment of the population. The previous three surveys were concerned with characterizing the health status of adults 18-79 years, 6-11 years and 12-17 years, respectively.

The design of HANES calls for a sample size of approximately 30,000 persons from 65 primary sampling units across the nation. The persons selected for the examination are chosen so as to provide a representative sample of the total population with oversampling of groups at high risk of malnutrition. In keeping with the dual purpose concept of HANES, a subset of persons aged 25-74 years receive, in addition to the nutrition examination, a more detailed examination designed to detect certain chronic diseases.

Data are collected by three teams of specialized personnel operating simultaneously in various parts of the United States. The examinations take place in specially built and equipped mobile examination centers which consist of three interconnecting trailers. The staffs of the mobile examination centers include physicians, dentists, nurses, laboratory and health technicians, and dietary interviewers.

As in past surveys, the first contact with a sample household is made by a Bureau of the Census interviewer. At that time, a household questionnaire is completed which identifies the household composition and obtains various socioeconomic and demographic items. The Census interviewer explains that if anyone in the household is selected in the sample, a representative of the U.S. Public Health Service will call again within a week or so to explain the survey.

After the household interviews are completed, and the sample of persons to be examined is selected, HANES interviewers visit the sample persons to administer a health questionnaire and to make appointments for them to be examined.

Even though a household questionnaire and medical history forms may have been completed, and an appointment made for the examination, a person is not considered a respondent unless he actually participates in the examination. Past HES samples and present HANES sample are defined as of the time of the first household contact. Consequently, in addition to the nonresponse due to refusal to participate, there is also a certain amount of built-in nonresponse since persons who move, go on vacation, become ill, or for other reasons are not physically available, cannot be examined. If the nonrespondents differ from respondents for a given measurement, the amount of nonresponse bias introduced into an estimate generally would be expected to vary with the amount of nonresponse. Therefore, response rates for a survey such as HANES are important indicators of possible nonresponse biases. Response rates for the first three surveys were 87, 96, and 90 percent, respectively.

As HANES progressed through 1971, it became increasingly apparent that the response rate would not nearly approach the rates of the previous surveys. Interviewer techniques and procedures were appraised, and retraining and observations were made of individual interviewers. Other measures were also undertaken such as seeking more publicity about the survey at individual locations, 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 remained below satisfactory levels. By the end of the first 15 stands or sample locations, only 64 percent of the total sample had been examined, the response rates for the stands ranging from 46 to 82 percent. If the survey was to succeed, it was obvious that some additional means had to be found for motivating people to respond.

A proposal was made that response might be increased if some remuneration was offered to those who would participate in the examination. In past surveys conducted by NCHS, the response rate was high enough so that payment for participation had not been considered necessary. It was felt that for HANES such payment would be reasonable in aiding response since the time involved in traveling to and from the mobile examination center and the examination itself requires more of the examinee's time than in the past surveys, resulting in many instances in loss of time from work with subsequent loss of pay, or requiring the housewife to hire a baby sitter. In addition, it was felt that there might be offsetting economies in terms of the reduced number of visits required by HANES interviewers to seek cooperation. Finally, if remuneration could increase response to a satisfactory level, the additional cost would be relatively small as compared to the importance of the total program.

Necessary clearances were submitted and plans and procedures developed in November 1971 to institute a study of the effect of remuneration upon response. The earliest possible date that the study could be started was January 1972, at which time operations would be starting at three sites - Tucson, Arizona; West Palm Beach, Florida; and San Antonio, Texas. The latter was selected for two primary reasons—a sample size of about 600 as compared with 350 and 500 at the other two; and the fact that the San Antonio population was expected to be more typical of future HANES stands, particularly with respect to income and age distributions, than either Tucson or West Palm Beach.

## **Experimental Design and Survey Procedures**

The design for the study was superimposed on the HANES sample design for the San Antonio SMSA and the survey procedures that had been specified for the national survey. The sample was of fixed size and was selected in clusters or segments of an expected 6 households each. Segments located in Census enumeration districts (ED's) classified in the 1960 Census as having median family incomes of less than \$3,000 per year were selected at a rate of 8 times that of segments located in ED's with higher median incomes. The expected result was that about a fourth of the sample persons would have family incomes of less than \$3,000. The initial sample consisted of 651 households, of which 631 were interviewed. The 2,010 persons that composed the initial sample<sup>1</sup> were listed by age and sex, and a systematic sample of 603 persons was selected, oversampling preschool children, women 20-44 years of age, and persons over 65. These 603 persons came from 402 households and 138 segments.

The first step in the experimental design was to classify the segments by median family income according to the information that had been collected in the household interviews and by segment size. The segments were then sorted into 7 size-income classes as indicated by the following grid.

Number of occupied	Medium Annual Family Income of Segment					
nousenoias in segment	Under \$4,000	\$4,000+				
1						
2						
3						
4						
5						

Segments in each cell were randomly paired with another segment in the same cell. One segment of each pair was then randomly selected to have all of the sample persons in that segment told about the remuneration (Procedure A). The sample persons in the other segment of that pair were not told about the remuneration (Procedure B). It should be noted that all persons who were examined received \$10.00. The only difference was that some of them did not know that they would be paid until they arrived at the examination center.

The pairs of segments were randomly assigned to the interviewers so that each interviewer's assignment was composed of a representative subsample of the segments.

An attempt was made, therefore, to control on three variables thought to be related to response; namely income, segment size, and the interviewer. It seemed reasonable that an offer of \$10.00 would influence persons with low income more than it would those with higher incomes. Also, it is well known that some interviewers are more successful than others in obtaining response in surveys. Thus it seemed necessary to try to balance any effect the interviewers might have in the experiment. Segment size was selected as a control because of the possible interaction within segments between the sample persons, and to provide the ability to regulate the size of assignments to interviewers. This type of control was important because some of the interviewers could work only two weeks before they had to report to another HANES stand. The assignment of too many sample persons would make it impossible for an interviewer to complete all of the segments in her subsample, which was a necessary condition for the study.

The design of the study was thoroughly explained to the interviewers before the interviewing began. They were told that they must conduct the survey precisely as was their practice in other HANES stands, except for occasions where the procedures had been changed to accommodate the experiment. The major difference between their usual routine and the procedures to be followed in this stand was that they must offer remuneration to all sample persons so designated, and under no circumstances were they to offer remuneration to those not designated. If a person in Procedure "B" or "not-to-be-told" group had heard about remuneration, then he would be told that payment of \$10.00 would be made if he should be examined. In such cases, a record was made to indicate that he knew about the payment.

To assure that the interviewers used a standard approach in the offer of remuneration, a statement was prepared and made part of the introductory remarks that the interviewers normally make upon entrance to a household. The statement read: "\_\_\_\_\_ the United States Public Health Service is conducting a study on the health of the American people. The people chosen for the study are part of a carefully selected scientific sample, representative of all people in the United States. For the study to accurately picture the health of the Nation, we need your help. Today, I will ask some questions about your health and related matters. Then I would like to make an appointment for you to receive a free health examination at our special examination center. As an expression of appreciation for your help in this important survey, and as compensation for your time and inconvenience, you will receive a fee of \$10.00 after the examination. Also, we will send any significant findings of the examination to the physician and dentist that you may want to designate." (If more than one family member was in the sample the interviewer emphasized that each sample person would receive \$10.00.) This statement was either read or paraphrased for each sample person assigned to Procedure A. For those assigned to Procedure B, the statement was altered to exclude the part about remuneration.

The interviewers were told to stress several times during the interview the importance of keeping appointments and to explain the complete examination to each person. This was done to reduce the possibility that they would decide later to cancel the appointment because of their lack of understanding and appreciation for the examination.

At the appointed time, a taxi cab picked up the sample persons at their home or other designated place and drove them to the examination center.

When the examination was completed, each person was paid 10.00 in cash and asked to complete a form designed primarily to determine whether the sample person knew about the remuneration before the examination. The principal question asked was: "before coming for the examination, did you know that you would receive payment or compensation for your time if you came?" Those answering "yes," were asked how they knew.

In any experiment of this kind, it is inevitable that the design will not be followed exactly. One problem encountered in this study resulted from the need to have interpreters accompany interviewers to households where no one could speak English. The number of times that interpreters were used is not known exactly, but it probably was required in as many as 10-15 percent of the households. Some training was given to all the interpreters. However, they were not randomly assigned to treatment groups, and, consequently, the experimental results are probably contaminated to some extent by interviewer effects.

Another problem arose because some interviewers were not able to complete all of their assignment before having to leave San Antonio to work at another HANES stand. The goal was to have the assigned interviewer complete at least a first contact with a sample person, make remuneration offers, and attempt to make examination appointments. At the end of the fourth week of the survey, 4 of the 6 interviewers had departed without having completed first contacts with 109 sample persons; fifty were in the Procedure "A" group and 59 in Procedure "B". These were randomly reassigned to the two remaining interviewers.

Also, there may have been some effect on final response rates for the two treatment groups due to the use of temporary interviewers who were hired near the end of the study to follow up on persons who had refused to be examined, broke appointments, etc. These people were well-trained, experienced interviewers, however, and their assignments included similar proportions from both treatment groups.

## Findings of the Study

Remuneration had a positive effect on the response rate for the San Antonio stand; 82 percent of the sample assigned to Procedure "A" were examined as compared with 70 percent of those assigned to procedure "B". This difference of twelve percentage points is both statistically significant and large enough to have important implications for future HANES stands.

The differences observed between the two groups are probably conservative since some of the people were not told about remuneration when they should have been and a few were told when they should not have been. According to the records kept by interviewers there were 10 procedure "A" errors and 4 Procedure "B" errors. This may be an under count, however. According to answers given by the sample persons themselves in the Exit Interview, as many as 20 percent of the Procedure "A" group may not have known about remuneration, while 14 percent of those in the Procedure "B" group may have known. It is difficult to assess the accuracy of these figures, however, since there was some evidence that the questions were not thoroughly understood. This occurrence was apparent when a person specified how he knew about remuneration after answering "No" to the question: "Before coming for the examination, were you told that you would receive payment as compensation for your time if you came?"

The possible effects of this confounding should be kept in mind when interpreting the results, since the response rates were computed according to the original assignment to Procedure "A" and Procedure "B". Although the study design did not control on age and sex nor on income at the household level, it is instructive to examine the response rates within these domains.

Table 1 shows that there was a general improvement in the response rates among the various subclasses of the population. Although a few of the differences shown are not statistically significant, most of them indicate a 10 percentage point or more increase in response rates when remuneration was offered.

One might hypothesize that the effect of remuneration upon response rates increases with decreasing income. This was not true for this study. Eighty-five percent of the sample in Procedure "A" with annual incomes of \$4,000 or more were examined, a 13 percentage point increase over the rate for Procedure "B". For people with annual family incomes of less than \$4,000 per year, the rates were 78 percent for Procedure "A" and 67 percent for Procedure "B".

The effect of remuneration was greater for males than females. In fact, for females in the age groups 1-19 and 45-74 there was essentially no difference between the response rates of the two treatment groups, the rates being the same (85 percent) for the younger age group and 56 as compared with 52 percent for the older age group. This finding is also consistent with the response rates observed in previous HANES stands where relatively high rates were obtained for those under 20 with a noticeable decrease in the rate with increasing age.

There are probably many reasons why the older women did not respond including possibly fear or reluctance of being examined by a strange physician, fear of having certain physical conditions diagnosed, and reluctance to ride alone in a taxi across town.

In an attempt to refine the analysis to determine whether remuneration was the reason for improved response rates rather than other factors such as follow-ups, interviewer effects, etc., tabulations were made of the proportion of the sample making appointments at first contact and the proportion of these who kept the appointments. These findings are presented in Tables 2 and 3.

Although the differences shown in Table 2 are not statistically significant, the pattern of response rates by income, sex and age provides some evidence that remuneration did influence people to make appointments. Overall, 66 percent of those assigned to Procedure "A" and 61 percent of those assigned to Procedure "B" made appointments the first time they were contacted.

Table 3 shows that those expecting remuneration kept their appointments more often than those who did not expect to be compensated. Again, the sample sizes were too small to detect significant differences. However, the proportion keeping appointments is consistently larger for Procedure "A" than for Procedure "B" for all of the variables studied.

The primary criterion for measuring the success of this experiment and for making a decision to begin paying respondents in the national survey was whether such payment would cause a substantial increase in the response rate. However, as in all surveys, cost was also a factor, and an additional cost of \$10.00 per person would not be insignificant. The argument can be presented, however, that remuneration will not necessarily increase the survey cost in that some savings accrue because respondents are more cooperative and require fewer contacts to obtain response. The data in Table 3 provide some support to this argument. Eighty percent of the Procedure "A" sample kept their appointments without requiring multiple contacts as compared with 72 percent of the Procedure "B" sample. This greater degree of cooperation was observed for each of the age, sex, and income classes shown in the table.

Another index of the amount of effort required in the attempt to get people to be examined is the rate of "disruptive" contacts made, that is, the number of contacts made following refusals, and broken appointments, per 100 sample persons. These rates are shown in Table 4 by Procedure according to age, sex, and family income. Again, it is apparent that less effort was made to complete the survey for those promised remuneration that for those not promised remuneration, the rate being 52 per 100 persons for Procedure "A" and 62 for Procedure "B". This difference did not prevail for all of the age, sex, income classes shown in the table, but it did for the majority of the classes.

# Epilogue

The findings of this study were considered significant enough to include remuneration as a routine procedure in the national survey. Remuneration of 10.00 per person examined was initiated simultaneously at the twenty-first (Avoyelles, Louisiana) and twenty-second (San Francisco, California) stands in the sequence of operations to cover the 65 stands scheduled for the survey. At the present time, operations have been completed at a total of 10 stands at which remuneration was made, including San Antonio. Of the 4,284 sample persons at those stands, 78.5 percent have participated in the examination. This compares with 67.2 percent for 19 preceding stands where remuneration was not offered.

Although it is not possible to assess just how much of this rather substantial response difference was due to remuneration, it seems clear that remuneration was a major factor. One other factor which may explain part of the difference is that the group of no-pay stands included a number of places in the Northeastern United States and other large metropolitan areas where, on the basis of our experience in previous health examination surveys, response was expected to be low. If these stands are excluded from both groups (7 pre-remuneration and 1 post remuneration stand) the response rates are 71.9 and 81.5, respectively.

The recent improvement in the response rate, for whatever reasons, is a welcome development. It should be realized, however, that even if the rate should continue at the 78 percent level for the remaining stands, we would not be content. Every effort will continue to be made, consistent with available resources, to make further improvements in the HANES response rate.

## FOOTNOTES

\*We wish to acknowledge the assistance of Dr. Saul Rosenberg, Miss Jean Findlay, and Mr. Kenneth Harris of NCHS, who participated in the various phases of this study.

<sup>1</sup>Information for the 20 nonresponding households was obtained from neighbors and their household members were included in the sampling frame.

	Exper	imental Proc	edure A	Exper	imental Proc	Standard	
variable	Sample size <sup>1</sup>	Proportion examined	Sampling variance	Sample size <sup>1</sup>	Proportion examined	Sampling variance	difference
 Total	303	.82	.00049	292	.70	.00072	•035
Total Income							
Under \$4,000 \$4,000+ Unknown	115 170 18	.78 .85 .72	.00149 .00075 .01073	99 173 20	•67 •72 •75	.00223 .00117 .00938	.061 .044 .142
Sex							
Male Female	128 175	•88 •78	.00083 .00098	123 169	•74 •67	.00156 .00131	.049 .048
Age and Sex							
l-19 years Male Female	<u>118</u> 56 62	•90 •95 •85	<u>.00076</u> .00085 .00206	<u>110</u> 55 55	<u>.83</u> .80 .85	.00128 .00291 .00232	<u>.045</u> .061 .066
20-44 years Male Female	<u>86</u> 27 59	<u>•86</u> •78 •90	<u>.00140</u> .00636 .00153	<u>85</u> 23 62	<u>•67</u> •74 •65	.00260 .00837 .00367	<u>.063</u> .121 .072
45-74 years Male Female	99 45 54	<u>.69</u> .84 .56	<u>.00216</u> .00299 .00456	<u>97</u> 45 52	<u>.59</u> .67 .52	<u>.00249</u> .00491 .00480	<u>• 068</u> • 089 • 097

Table 1. Proportion of Sample Persons Examined by Experimental Procedure According to Family Income, Age, and Sex: HANES Remuneration Study

<sup>1</sup>The initial sample contained a total of 603 sample persons of whom eight could not be contacted. Three of these were in experimental procedure A and five in B. Since these eight persons were not contacted, they are excluded from this analysis.

Table 2.	Proportion of Sample Persons Making and Appointment at First Contact by Experimental	Procedure
	According to Family Income, Age and Sex: HANES Remuneration Study	

	Exper	imental Proc	edure A	Exper	imental Prod	Standard	
variable	Sample size <sup>1</sup>	Proportion appointed	Sampling variance	Sample size <sup>1</sup>	Proportion appointed	Sampling variance	difference
Total	303	•66	.00074	292	.61	.00081	•039
Family Income							
Under \$4,000	115	•74	.00167	9 <b>9</b>	.70	.00212	.062
\$4,000+	170	•64	.00136	173	•56	.00142	• 053
Unknown	18	•33	.01338	20	•65	.01138	.157
Sex							
Male	128	.73	.00154	123	.70	.00171	.057
Female	175	.61	.00136	169	•55	.00146	• 053
Age and Sex							
1-19 years	118	•68	.00184	110	.63	.00212	<u>•063</u>
Male	56	.71	.00368	55	. 75	.00341	.084
Female	62	•65	.00367	55	.51	.00454	.091
20-24 years	86	<u>.69</u>	<u>.00249</u>	<u>85</u>	<u>.66</u>	.00264	<u>•072</u>
Male	27	.74	.00713	23	.61	.01034	.132
Female	59	•66	.00380	62	•68	.00351	•085
45-74 years	<u>99</u>	<u>.62</u>	<u>.00238</u>	97	.56	.00254	<u>•070</u>
Male	45	• 73	.00438	45	.69	.00475	•096
Female	54	•52	.00462	52	• 44	.00474	.097

<sup>1</sup>See footnote on Table 1.

Table 3.	Proportion	of Sample	Persons	Keeping	Appointment	Made at	First	Contact	by Exper	rimental	Procedure
		According	to Famil	Ly Income	e, Age and Se	ex: HANES	S Remu	neration	Study		

Voriable	Exper	imental Proc	edure A	Exper	imental Proc	Standard	
Variable	Sample size	Proportion kept.appt.	Sampling variance	Sample size	Proportion kept appt.	Sampling variance	difference
Total	200	.80	.00080	179	• 72	.00113	.044
Family Income							
Under \$4,000 \$4,000+	85 108	.74 .84	.00226 .00124	69 97	•65 •75	.00330 .00193	•075 •056
Unknown	,7	• 86	0	13	•77	.01362	•117
 Male Female	93 107	•82 •79	.00159 .00155	86 93	•75 •68	.00218 .00234	.061 .062
Age and Sex							
1-19 years Male Female	<u>80</u> 40 40	<u>.86</u> .88 .85	<u>.00151</u> .00264 .00319	<u>69</u> 41 28	<u>.75</u> .78 .71	.00272 .00419 .00735	<u>.065</u> .083 .103
20-44 years Male Female	<u>59</u> 20 39	<u>.71</u> .65 .74	.00349 .01138 .00493	<u>56</u> 14 42	•63 •64 •62	<u>.00416</u> .01646 .00561	<u>.087</u> .167 .103
45-74 years Male Female	<u>61</u> 33 28	<u>.80</u> .85 .75	<u>•00262</u> •00386 •00670	<u>54</u> 31 23	• 76 • 77 • 74	<u>.00338</u> .00571 .00837	<u>•077</u> •098 •123

Table 4. Number and Rate Per 100 Sample Persons of Disruptive Contacts<sup>1</sup> by Experimental Procedure According to Family Income, Age and Sex: HANES Remuneration Study

	Experim	ental Proced	lure A	Experim	0+3		
Variable	Number of disruptive contacts	Rate per 100 sample persons	Sampling variance	Number of disruptive contacts	Rate per 100 sample persons	Sampling variance	error of difference
Total	158	52.15	.00207	182	62.33	.00283	•070
Family Income							
Under \$4,000 \$4,000+ Unknown	71 76 10	61.74 44.71 58.82	.00618 .00341 .04444	77 95 10	77.78 54.91 50.00	.01309 .00339 .04444	.139 .082 .298
Sex Male Female Sex and Age	56 102	43•75 58•29	•00403 •00402	67 115	54•47 68•05	•00883 •00376	.113 .088
1-19 years Male Female	45 22 23	<u>38.14</u> 39.29 37.10	•00404 •01018 •00647	44 21 23	<u>40.00</u> 38.18 41.82	.00437 .00841 .00922	. <u>092</u> .136 .125
20-44 years Male Female	<u>46</u> 16 30	<u>53.49</u> 59.26 50.85	<u>.00758</u> .01783 .01249	<u>71</u> 21 50	<u>83.53</u> 91.30 80.65	<u>.01704</u> .15777 .01102	<u>.157</u> .419 .153
45-74 years Male Female	67 18 49	<u>67.68</u> 40.00 90.74	.00759 .01051 .01626	67 25 42	<u>69.07</u> 55.56 80.77	<u>.00609</u> .01167 .01210	.117 .149 .168

<sup>1</sup>Disruptive contacts are defined as contacts made following refusals and broken appointments.