NATIONAL CENTER For HEALTH STATISTICS | Series 1 Number

VITAL and HEALTH STATISTICS
PROGRAMS AND COLLECTION PROCEDURES

plan and initial program of the

Health Examination Survey

A description of the first-cycle program of the Survey, including the statistical design, the pattern of examination, and the field procedures.

Washington, D.C. July 1965

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Anthony J. Celebrezze
Secretary

Public Health Service
Luther L. Terry
Surgeon General

NATIONAL CENTER FOR HEALTH STATISTICS

FORREST E. LINDER, PH. D., *Director*
THEODORE D. WOOLSEY, *Deputy Director*
O. K. SAGEN, PH. D., *Assistant Director*
WALT R. SIMMONS, M.A., *Statistical Advisor*
ALICE M. WATERHOUSE, M.D., *Medical Advisor*
JAMES E. KELLY, D.D.S., *Dental Advisor*
LOUIS R. STOLCIS, M.A., *Executive Officer*

OFFICE OF HEALTH STATISTICS ANALYSIS
IWAO M. MORIYAMA, PH. D., *Chief*

DIVISION OF VITAL STATISTICS
ROBERT D. GROVE, PH. D., *Chief*

DIVISION OF HEALTH INTERVIEW STATISTICS
PHILIP S. LAWRENCE, SC. D., *Chief*

DIVISION OF HEALTH RECORDS STATISTICS
MONROE G. SIRKEN, PH. D., *Chief*

DIVISION OF HEALTH EXAMINATION STATISTICS
ARTHUR J. MCDOWELL, *Chief*

DIVISION OF DATA PROCESSING
SIDNEY BINDER, *Chief*

Public Health Service Publication No. 1000-Series 1-No. 4

PREFACE

A description of the Health Examination Survey plan and the "first-cycle" program is presented in this report. The Health Examination Survey is a part of the program of the U. S. National Health Survey. The first cycle consists of the administration of a specialized health examination to a probability sample of the adult, civilian, noninstitutional population of the United States. This will be succeeded by other cycles dealing with different age groups of the population or different types of examination, but all making use of the same general procedure—direct examination of national probability samples of persons.

The impetus for and direction of the Health Examination Survey's first-cycle plans and operations was initially in the hands of Dr. Oswald K. Sagen, who has since been succeeded by Mr. Arthur J. McDowell as Chief, Health Examination Survey Branch. The examination phase of the plan was worked out by Dr. Alice M. Waterhouse, Medical Advisor to the U. S. National Health Survey, Dr. James E. Kelly, Dental Advisor, and Dr. Lawrence E. Van Kirk, of the Division of Dental Public Health and Resources, Public Health Service. Mr. Walt R. Simmons, Statistical Advisor, was responsible for the sample design. Many other aspects of the plan and the field procedures were developed, tested, and carried out by Dr. Ruth E. Dunham, Assistant Medical Advisor, Mr. Marshall C. Evans, Chief Health Survey Representative, and Mr. Elijah White, Survey Statistician.

In the planning and operation of the first cycle, valuable assistance was received from many individuals and groups within the Public Health Service and elsewhere. In particular, however, mention should be made of the staff of the Bureau of the Census who participated in building the survey design and have since been carrying out several important parts of the Survey on behalf of the National Health Survey, as will be detailed later. Special acknowledgment also is made of the contributions to the Survey from Dr. Joseph J. Bunim, Clinical Director of the National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, and members of his staff; Dr. R. C. Arnold, Former Chief, and Dr. Arthur Rikli, Chief, of the Heart Disease Control Branch, Division of Chronic Diseases, Bureau of State Services; Dr. Gerald R. Cooper, Chief, Standardization Laboratory of the Heart Disease Control Branch, and his staff; Mr. Ad Harris, Director, Venereal Disease Research Laboratory, Communicable Disease Center, and his staff; Dr. Thomas R. Dawber, Director, Framingham Heart Project, National Heart Institute, National Institutes of Health, and his staff; and Dr. Aram Glorig, Director of Research, Subcommittee on Conservation of Hearing, American Academy of Ophthalmology and Otolaryngology.

A large share of the staff nursing services in the field operation of the Survey was provided on a reimbursable arrangement with the Division of Hospitals and with the Medical Officer in Charge and the Director of Nurses of the San Francisco Hospital of the Public Health Service. Through their co-operation, staff nurses were detailed on a rotating basis, thus providing a source of nursing personnel for the Survey, and a unique experience for the nurses who participated.

Space does not permit acknowledgment, either individually or by organizational affiliation, of all of the many persons who have given advice and assistance in the work of the Survey. Mention must be made, however, of the outstanding contribution of one group whose excellent performance was a sine qua non of success, namely, the field staff of the Health Examination Survey.

This report was prepared by the following members of the National Health Survey staff: Mr. Walt R. Simmons, Dr. Ruth E. Dunham, Mr. Tavia Gordon, Dr. James E. Kelly, Mr. Nicholas E. Manos, Mr. Marshall C. Evans, Dr. Alice M. Waterhouse, Mr. Theodore D. Woolsey, and Mr. Arthur J. McDowell. Mr. McDowell also served as editor.

CONTENTS

	Page
Preface	iii
Introduction	1
The Role of the Health Examination Survey in the National Health Survey	1
General Plan of First-Cycle Examinations	2
Concepts and Purposes	2
Logistic Considerations	3
Methodological Studies in Planning	4
Advance Arrangements in Each Area	4
Professional Relations	4
General Publicity	5
Other Advance Arrangements	5
Selecting and Contacting the Sample Persons	5
Identifying the Sample Persons	5
The Household Interview	5
The Appointment Procedure	6
The Examination and Examining Process	8
Pattern of the Examination	8
Measures to Insure Standardized Examinations	10
Post-Examination Procedures at the Examination Center	11
The Data Collected	11
The Medical History Data	11
Medical Data Related to Special Interest Conditions	11
Additional Data From the Examination	12
Other Data Collected in the HES Operations	12
Quality Control	13
Study of Characteristics Associated With Nonresponse	13
Measures to Insure Uniformity and Reproducibility of Data	14
Special Calibration Studies	14
Statistical Design and Estimation	15
Introductory Note	15
The Design Problem	15
Summary of the Sample Design	16
Estimation Technique	18
Reliability and Evaluation of Results	19
Plans for Analysis and Publication of Data	20

CONTENTS—Continued

		Page
Appendix I.	Areas in the Health Examination Survey's Sample----------	22
Appendix II.	Routes Followed by Mobile Health Examination Centers in Moving From One Location to Another----------	23
Appendix III.	A. Floor Plan—Mobile Examination Center—Caravan I-----	24
	B. Floor Plan—Mobile Examination Center—Caravan II----	25
Appendix IV.	Example of Leaflet Distributed in Advance of Interviewer's Visit----------	26
Appendix V.	Household Interview Questionnaire of the Health Examination Survey----------	28
Appendix VI.	Leaflet Given Examinee When Appointment is Made--------	34
Appendix VII.	Selected Medical History Questions----------	35
Appendix VIII.	Notes on Statistical Design----------	40
	Outline of Design Development----------	40
	Definition of Universe---------- ----------	41
	On Basic Estimation Technique- ----------	41
	Within PSU Sampling Variations ----------	41
	The Master Control Card---------- ----------	42
	Illustration of Selection of a Stand----------	42

PLAN AND INITIAL PROGRAM OF THE
HEALTH EXAMINATION SURVEY

INTRODUCTION

The Role of the Health Examination Survey in the National Health Survey

The National Health Survey Act (P. L. 652, 84th Congress), the legislative authorization for the U. S. National Health Survey (NHS), states that "it is ... the purpose of this Act to provide (1) for a continuing survey and special studies to secure on a non-compulsory basis accurate and current statistical information on the amount, distribution, and effects of illness and disability in the United States and the services received for or because of such conditions; and (2) for studying methods and survey techniques for securing such statistical information, with a view toward their continuing improvement."

In fulfilling the purposes of the Act the U. S. National Health Survey is attempting to meet the need for a wide variety of morbidity and related data for use in many types of public and private endeavors. Even before the passage of the Act it was recognized that these needs could not all be met by a single method or from a single source. The report of the Subcommittee on National Morbidity Survey, of the U. S. National Committee on Vital and Health Statistics, published in October 1953, recommended: ". . . that a series of 'special studies be undertaken in addition to the continuing national [household] survey. The principal purposes of these studies would be as follows:

(a) To obtain data on undiagnosed and nonmanifest disease, by means of laboratory screening, detection, and physical examinations of subsamples drawn from the general surveys.

(b) To provide other types of auxiliary data, and to study methodological problems relating to the measurement of morbidity."

Thus, from the outset it was an accepted principle that the program of the National Health Survey would consist of, not one, but several surveys designed to meet diverse statistical needs. Further thought on this problem and the actual day-to-day experience of supplying statistics on morbidity and related data, since the program was established, have led to the conclusion that it is necessary to produce statistics of at least three entirely different types collected from three different sources.

The three sources are: first, the people themselves, by means of direct interviews; second, clinical tests, measurements, and physical examinations, by means of direct application of such techniques to samples of persons; and, third, the places where people receive medical care, particularly hospitals and doctors' offices, by means of sampling records of patient care in such establishments.

It is clear that each of these sources provides information which cannot be obtained as well or at all from the others. The interview is the best source for comprehensive statistics on disability, including work and school absenteeism, bed-days, and morbidity; the incidence of acute illness and injury of a minor nature, particularly untreated conditions of this kind; the circumstances of accidental injury; volume of use of medical and dental care; and similar types of health statistics. Furthermore, the family interview affords an especially useful and versatile source of demographic, social, and economic information regarding the population to which the health characteristics are to be related.

The direct examinations coupled with clinical tests and measurements are the only source of diagnostic data regarding unrecognized and untreated diseases, and are by far the best source when standardized clinical, physical, and physiological data are desired. In general, it can be said that whenever the requirements of the statistics call for uniform appraisals by physicians or dentists, or the performance in a standardized manner of a test or measurement, the direct examination of a sample is necessary.

Finally, if what one needs is quantitative information about treatment and the details of services provided in medical, dental, or nursing care, the logical place to look is in records created by

hospitals and other establishments, or persons, providing the care. These records may have been prepared for other uses, or they may have to be created for the purposes of the statistics.

The National Health Survey will be making use of all three of these basic sources as a part of its continuing program. Already, the Health Interview Survey (HIS) has produced a number of reports on the subjects covered in the family interviews. A description of this survey, which was set underway in July 1957, has been published.[1, 2] The Health Records Survey, which will utilize data from the third source described above, is still in the planning and pretesting phase.

The Health Examination Survey (HES), following three field pretests, began the examination of a sample of the civilian, noninstitutional, adult population of the United States in November 1959. At the time of this writing more than half of the first sample, or "cycle," has been examined. However, the rate at which persons in the sample were being examined did not reach the planned full-scale level until the spring of 1961. Completion of field work on this cycle is expected in the last part of 1962. Statistical processing of data is underway, but final analysis will not begin until all the data are collected. The tempo of field work, analysis, and publication is slower in the Health Examination Survey than in the Health Interview Survey.

This report depicts the sampling plan, examination, and other field procedures as they were being carried out in the latter part of 1961. There were minor differences in plan when the examination for the first cycle began on a small scale in November 1959. No further changes of any consequence are contemplated before the first cycle comes to an end late in 1962.

GENERAL PLAN OF FIRST-CYCLE EXAMINATIONS

Concepts and Purposes

The over-all plan of the Health Examination Survey is to identify separately specific segments of its broad goal and to concentrate on these segments through separate cycles of examinations. Thus, the broad primary purposes are: (1) to provide statistics on the medically defined prevalence in the total U. S. population of a variety of specific diseases, using standardized diagnostic criteria; and (2) to secure distributions of the general population with respect to certain physical and physiological measurements. The segment selected for study in the first cycle of examination, however, is limited to the adult population, defined as those persons between the ages of 18 and 79, inclusive. Moreover, this first cycle focuses attention particularly upon certain cardiovascular diseases, arthritis and rheumatism, and diabetes. This, of course, in no way implies lack of, or less, interest in other groups in the population or in other diseases. Successive cycles in the program will study other segments.

A key characteristic of the plan of the Health Examination Survey is to make actual physical examinations of, and tests upon, the individuals selected in the sample. Such examinations and tests can yield morbidity information unobtainable through the other mechanisms of the National Health Survey. They can provide information not only about diagnosed conditions which persons fail to report or are incapable of reporting in a survey based upon individual interviews, but they can also reveal previously undiagnosed, unattended, and nonmanifest chronic diseases. In addition to serving this primary purpose, the first-cycle examinations are intended to obtain baseline data on certain physical and physiological measurements, such as blood pressure, serum cholesterol, auditory and visual acuity, skinfolds, various heights, weight, and electrocardiographic tracings. Data such as these on a defined population have been either nonexistent or inadequate. They are needed to understand departures from normal, as well as to carry out certain specific programs dependent upon human engineering information.

Another key characteristic of the Health Examination Survey, one which is shared with other NHS programs, is the use of a nationwide probability sample of the population in order to obtain the desired statistics in an efficient way, and in such a manner that the statistical reliability of results is determinable. A description of the sample design and the sampling method is given elsewhere in this report. Here it need be described only in terms of the general concepts.

The basic decision to limit the first-cycle examinations to the adult population was followed by decisions on certain additional limitations. Persons on active duty with the Armed Forces

---

[1] U. S. National Health Survey. *The Statistical Design of the Health Household-Interview Survey.* Health Statistics. Series A-2. PHS Publication No. 584-A2. Public Health Service, Washington D.C., July 1958.

[2] U. S. National Health Survey. *Concepts and Definitions in the Health Household-Interview Survey.* Health Statistics. Series A-3. PHS Publication No. 584-A3. Public Health Service, Washington, D.C., September 1958.

were not to be included, nor were persons in Alaska or Hawaii. Likewise excluded were persons resident in institutions (penitentiaries, hospitals for long-term treatment of chronic disease, etc.). The size of the sample to be selected was keyed to the numbers necessary to yield reliable data on the conditions studied. Actually, of course, the determinations of the size of sample and of the conditions to be studied were interrelated and interdependent, and a factor in these determinations was the number of examinations which could be accomplished within three years. The sample size is also a function of the available budget and of the structure of the examining process and of the statistical design. The selection process provided that the sample be stratified with respect to broad geographic region and size of place of residence (rural areas, small cities, etc.). The method is generally like that used for the Health Interview Survey, and, in fact, the sample is drawn by the Bureau of the Census from among the Primary Sampling Units (PSU's) used for this Survey.

The national sample selected for the first cycle of examinations is a probability sample representative of the adult, civilian, noninstitutional population. It includes approximately 7,500 individuals, a number which should result in about 6,300 examinations of sample persons after allowance is made for persons who will not be examined. These individuals are located in 42 different areas, with each area consisting of a county or a small group of contiguous counties. These 42 areas in which the examining is done are located in 29 different states. They are grouped into three subsamples of 14 areas, each representative of the total population.

The plan of the first cycle calls for special, single-visit examinations of each individual selected in the sample. It also provides that data like those collected in the Health Interview Survey be obtained for the households which include each of the sample persons. These interviews are conducted prior to the special examination and, in fact, the interview process is used as the means for the last stage of selection of the sample of persons included in the Health Examination Survey. This process is described in more detail later in this report.

Logistic Considerations

The logistic problems involved in conducting the examinations are considerable. It is necessary to carry out special medical examinations in a standardized manner, involving tests and procedures requiring special equipment, and to do this on thousands of persons located from one end of the United States to the other. About 150 of these examinations are accomplished in each of the 42 different areas (or "stands" as they have been designated) throughout the country. The examining is done in a Mobile Health Examination Center which is moved into the area for a period of about three weeks. The Health Examination Survey has two such Centers in operation simultaneously. The routes followed in making the moves are shown in Appendix II. One consists of three specially built tractor-drawn trailers, one of which contains the X-ray and laboratory facilities. The other, containing the same facilities, consists of two somewhat larger specially designed tractor-trailers. The floor plans of each of these mobile centers are shown in Appendix III.

A Mobile Health Examination Center is manned by a staff consisting of two physicians, one dentist, two nurses, two X-ray-laboratory technicians, and two receptionist-interviewers. The above staff constitutes what is referred to as a full team. For the two Centers there are only one and one-half full teams. This is made possible by a carefully planned "leap-frog" pattern of scheduling. It involves grouping the staff into three "half teams," each consisting of one of each of the above kinds of personnel, except that one of the half teams has no dentist. One of these two Health Examination Centers, say Caravan I, will operate on a full-examination schedule with a full team (two of the three half teams, but only one dentist) for roughly the first half of the three-week period it is at a particular stand. Meanwhile, at another stand, the other Health Examination Center, Caravan II, is in the last half of its examining period and is operating on a reduced schedule with only a half team. Then, one half team from Caravan I will move to a new stand to join there the half team with Caravan II which has now completed operations at its previous stand, and together they will conduct full-schedule operations at the new stand. The pattern is then repeated. The above description is, of course, oversimplified; for example, it does not consider such factors as travel time between stands. It will, however, suggest the kind of carefully scheduled pattern which has made it possible to operate effectively with a limited staff.

The field staff which accomplishes the Health Examination Survey is a team composed of three elements. One of these is the examining staff which has already been described. A second element is the Bureau of the Census interviewer group, while the third is the HES field administrative staff. The Census interviewer group includes from four to seven individual interviewers and a supervisor. The personnel vary from stand to stand. They are selected from among the experienced Census interviewers used on the Health Interview Survey, and receive additional training for the special problems of the Health Examina-

tion Survey. Their task is to complete the last stage of the sample selection process, to conduct the household interview, and to invite the selected sample persons to arrange an appointment for examination. The logistics of the survey make it desirable that the interviewing be conducted within the space of a few days immediately prior to the period scheduled for the examinations.

The third component of the field team, the HES field administrative staff, consists of an Administrative Officer in Charge, an Administrative Assistant, and from two to five Health Examination Representatives. The scheduling of the administrative staff represents a "leap-frogging" arrangement similar to that described for the examining staff. In the first part of the period of the Survey in a particular location, more Health Examination Representatives are needed; then some move on to join others at another location, while part stay until the examining in the area is completed. These Health Examination Representatives complete any unfinished portion of the Census interviewers' work and—most important—assist in producing the maximal examination response by rescheduling broken appointments and making additional efforts to explain the Survey to, and obtain the co-operation of, those persons who have not initially accepted an appointment. The Administrative Officer in Charge carries out extremely varied and complex duties, such as completing all of the arrangements for the trailer site, contracting for the utilities, supervising the work of the administrative staff, and acting as administrative officer for the entire field staff.

Methodological Studies in Planning

Prior to undertaking the first cycle of examinations, it was recognized that certain methodological studies needed to be made to provide the basis for planning the survey. Moreover, the survey plan needed to be pretested and modified on the basis of actual experience, and the plan, finally designed, tried out in pilot studies. Four such methodological studies were carried out prior to commencing operations, and have been reported separately. One was concerned with the development of a medical-history questionnaire and appropriate interviewing techniques for use in this first cycle of examinations.[3] A second study was aimed at the development of a single-visit cardiovascular examination.[4] The other two studies were concerned with the problems of response, co-operation, and attitudes toward co-operation in examination surveys.[5, 6]

On the basis of the findings of the methodological studies and general knowledge of the problems involved, tentative plans for the first cycle were developed and pretested in Washington, D.C., in June 1958. The results of this pretest were carefully studied and some modifications of the survey plans were made on the basis of this experience. Pilot studies of the revised survey plan for the first-cycle examinations were made in 1959 in Ft. Wayne, Indiana, and Cresco, Iowa, after which the final survey plan was formulated. Actual operations in examining sample persons selected for the first cycle of the Health Examination Survey were begun shortly thereafter.

ADVANCE ARRANGEMENTS IN EACH AREA

Professional Relations

The first step toward conducting the Survey in any given sample area consists of fully informing the health professions at the state level and in the particular locality selected. Typically, this takes the form of a series of meetings with representatives of the State Health Department, Medical Society, Osteopathic Society, and Dental Society, and with counterpart local organizations. At these meetings a complete description of the objectives and method of operation is given. The individual private practitioners in the sample area are also informed of the Survey by means of an article in their own state or county professional society publication or by individual mailings, according to the advice of the professional societies.

In addition to a detailed description of the content of the special examination, operating policies of the survey are presented at these professional meetings. Several of these policies have proved to be important factors in eliciting the co-operation of the professional organizations as

---

[3] U. S. National Health Survey. *A Study of Special Purpose Medical-History Techniques.* Health Statistics. Series D-1. PHS Publication No. 584-D1. Public Health Service, Washington, D. C., January 1960.

[4] U. S. National Health Survey. *Evaluation of a Single-Visit Cardiovascular Examination.* Health Statistics. Series D-7. PHS Publication No. 584-D7. Public Health Service, Washington, D.C., November 1961.

[5] U. S. National Health Survey. *Co-operation in Health Examination Surveys.* Health Statistics. Series D-2. PHS Publication No. 584-D2. Public Health Service, Washington, D.C., June 1960.

[6] U. S. National Health Survey. *Attitudes Toward Co-operation in a Health Examination Survey.* Health Statistics. Series D-6. PHS Publication No. 584-D6. Public Health Service, Washington, D. C. July 1961.

well as that of the sample persons. The policies include: (1) confidentiality, guaranteed to all participants in the Survey; names or other information which would identify individual participants cannot be revealed; (2) information is not given to examinees on any findings of their examinations; (3) each examinee is encouraged to sign an authorization to have a report of the findings of his examination sent to the physician and dentist whom he names; (4) these reports are objective rather than interpretative (e.g., simultaneous duplicate electrocardiograms are obtained, and one complete tracing, rather than an interpretation, is sent to the private physician); and (5) the private physician is notified by telephone in the event of any finding which the examining physician believes is "urgent."

General Publicity

In addition to this publicity directed toward members of the health professions, moderate amounts of general publicity are obtained through the news media in each area. Because volunteers cannot be accepted for examination, and because a relatively small number of sample persons are involved, no attempt is made to obtain large amounts of space or long series of articles in the local newspapers. However, a release is provided to the newspapers, timed to appear just before the visits to the households begin. Besides serving the usual purpose of providing general information, the resultant articles provide clippings from a local source for the Survey staff to use in contacts with the sample persons.

The persons who are in the neighborhoods of the population segments from which the sample persons will be chosen also receive advance publicity in the form of a leaflet announcing the fact of the Survey and giving some general information about it. Such a leaflet, specific to the particular stand area, is distributed, either by mail or by direct-to-door distribution, a few days before the start of the Survey in each of the neighborhoods selected for household interviews. An example of these leaflets is shown in Appendix IV.

Other Advance Arrangements

Prior to operations at each of the stand areas, letters are sent to various authorities in the area (e.g., the Chief of the Police Department) to inform them about the pending activities. A member of the HES staff also makes advance arrangements for space for trailers, utilities, other office space, and other administrative matters.

SELECTING AND CONTACTING THE SAMPLE PERSONS

Identifying The Sample Persons

The operation which identifies specific sample persons might be regarded as the first step in the process of data collection. As noted above, this operation is one in which selected households are visited and the interviews are conducted and this process is used as the means of the last stage of selection of the sample persons.

The entire sampling process is described in more detail later in this report. At the time the first element of the HES field team moves into a particular location, this process has produced a list of households in particular subsegments of the PSU, which is the area for that stand or location. The list which the HES field team takes into the location will include about four households for each of the subsegments. It is the address, the house, or other dwelling unit in which each of these households lives, that is the starting point of the Survey. The households currently residing at each of these addresses are the "sample households" to be interviewed and out of which the sample persons are to be selected.

The sample households are visited by specially trained Census Bureau interviewers who conduct an interview to determine who lives in the households and to gather information on the personal characteristics, health status, and attitudes toward health surveys of these persons. Everyone living in the sample household at the time of the interview is eligible to be a sample person if he meets the criteria of the Survey (18-79 years of age, not an active member in any military service, etc.). Of those eligible, every other one is designated as a sample person.

The Household Interview

The household interviewing begins about nine days before the date of the first examination. The Census interviewer knocks on the door, introduces herself, and asks for the head of the household. If the head of the household is not present, she will conduct the first portion of the household interview with any responsible adult member of the household. The questionnaire used is shown in Appendix V. It contains four kinds of questions:

(1) household, (2) personal, (3) health, and (4) attitudes.

The interviewer will have entered information for some of the household questions beforehand. After necessary additional questions about the household as a whole have been asked, the interviewer asks questions about the individuals whose names appear on the second page of the form. After she has asked questions 1-7 and written down the name, relationship, age, and other personal information for each member of the household, she pauses to check those who are eligible, and, in addition, to circle every alternate eligible, thus indicating that they are sample persons. She then asks questions 8-17, which are related to the health of members of the household. Each adult person who is at home is interviewed for himself. Any responsible adult, however, can answer these questions for children and for other adults who are not at home, provided they are related. Unrelated household members who are not at home must be interviewed for themselves on return visits by the interviewer. The general interview ends with questions 18-21 which cover some additional personal information, and question 22 on the total family income.

If there are no sample persons in the household, the interview is terminated. The remaining questions, 23-34, are asked only of sample persons and each sample person must be interviewed for himself. Questions 23-33 concern his attitudes and background knowledge about health and health surveys. One purpose of this series of questions is to create the necessary rapport for a favorable response to question 34, the invitation to come to the Health Examination Center for an examination. Another important purpose is to obtain some insight into the attitudes of those who at first refuse the offer of an examination. This may be of use in the follow-up efforts to persuade him to accept.

The questions on health, attitudes, etc., are all asked before the person is informed that he is a sample person; this order is followed to avoid bias in the answers.

The household interviews are conducted in the same manner as those in the regular Health Interview Survey of the National Health Survey. The basic core questions from the questionnaire of the regular Health Interview Survey have been incorporated in the questionnaire for the Health Examination Survey with the wording unchanged. The HES questionnaire (Appendix V) differs in that questions on attitudes have been added, and questions on special subjects such as X-rays, medical insurance, etc., have been deleted.

Since the Census interviewers who administer the household questionnaire are selected from those who are working on the regular Health Interview Survey, they have already had intensive training and experience in maintaining standard procedures and in asking the questions uniformly. Those selected are interviewers expected to have the aptitude for handling the complicated procedures of this survey and for establishing rapport while inviting the sample person to come in for an examination. At each stand, the first effort is to borrow qualified interviewers from the Census Regional Office in which the stand is located, in order to minimize travel costs. It is often necessary, however, to bring others from nearby regional offices. Good interviewers may be kept on for more than one stand so that there is some continuity in the interviewing staff. However, because of the constant turnover in a large portion of the staff, special efforts are taken to achieve homogeneity by training. One full day is devoted to training on the day before interviewing begins. The purpose of this training is not only to familiarize these experienced interviewers with the details of this particular survey, but also to establish and maintain standardized procedures. After the interviewers have completed one day of interviewing they meet for a half day of discussion of the problems encountered, in order to standardize the way in which the problems are to be met. The Census operation in all stands is supervised centrally from the Washington office of the Census Bureau and there is a Census supervisor at each stand who co-ordinates the work with the Washington office. This supervisor is one of a small group of three or four persons that the Census Bureau has designated as eligible to be a field supervisor for this operation. Thus, the supervisor at a stand is usually a person who has had considerable experience in this work. In those stands where the supervisor is new, a Census representative is sent from the Washington office to teach him the procedures.

The Appointment Procedure

If the sample person accepts the offer to make an appointment for a survey examination, the Census interviewer telephones the Health Examination Center and confirms arrangements for a time that is convenient to the sample person. She then fills out an appointment slip and leaves it with the sample person. This slip shows the date and time of the appointment and the address of the Health Examination Center. A duplicate copy of this appointment slip is mailed to the sample person, as a reminder, two days before the date of his appointment. Duplicate copies of the appointment slips are also used for record-keeping purposes at the Health Examination Center. At the time the appointment is made, the

sample person is also given a leaflet containing some general information on what the examination is like (see Appendix VI).

In order to provide maximum convenience for the sample persons, many of whom are employed, the Health Examination Center is open on Saturdays, and, on some days, in the evenings. There are about 14 examining days at a stand out of which the sample person usually can select a convenient time. An attempt is made, however, to schedule appointments during the early part of the two-week period, insofar as possible. This is done so there will be more time in which broken appointments can be rescheduled. The examining hours are from 9 a.m. to 5 p.m. on some days and from 1 p.m. to 9 p.m. on others. During the interviewing operation there is someone available at the Center from 9 a.m. to 9 p.m. to receive the calls from the interviewers and to keep a central record of appointment times filled and the ones still available. For each appointment that is phoned in, two kinds of records are made. The name and address of the sample person, the date and time of the appointment, and the name of the interviewer, all are entered in an "Appointment Log," along with a notation concerning the mode of transportation the sample person has chosen to use. (Frequently, transportation by taxi is provided by the Survey, although in some instances the individual chooses to provide his own transportation.) The second entry is in the "Schedule of Appointment" where the fact that this particular appointment time has been filled by the specific sample person is recorded.

If the sample person is not at home at the time of the household interview the interviewer makes return visits in an attempt to interview him. Since the Census interviewing work is limited to a period of about five days, there may be some sample households and some sample persons for whom the interviewing is still incomplete at the end of this phase of operations. The Census supervisor refers uncompleted work to the HES Administrative Officer in Charge so that the Health Examination Representatives may make further follow-up visits. In instances where the sample person does not accept the Census Interviewer's offer to arrange an appointment, the interviewer makes no effort to persuade the sample person. It is recognized that many of the persons who show initial reluctance can nevertheless be examined, but the process of resolving their doubts and misapprehensions may require considerable time and skillful handling and this follow-up effort is made by the Health Examination Representatives.

The Health Examination Representatives perform three principal functions. The first is to continue and complete the unfinished portions of the work of the Census interviewers. The second and most important is to contact the persons who have been interviewed but have not agreed to come for an examination. The third function is to visit and reschedule for examination those persons who made but did not keep their appointments. It is expected that at the average stand between two thirds and three fourths of the sample persons will accept the initial offer of an appointment. The majority of the remaining sample persons will agree to be examined after one or more visits by the Health Examination Representative. Perhaps 15 percent of all those who make an appointment will fail to keep it, sometimes telephoning to cancel the appointment and sometimes simply not appearing; more than one half of these persons can be rescheduled (perhaps several times) and finally examined. Thus the work performed by the Health Examination Representatives greatly lessens the possibility that the findings of the examination will be markedly biased by nonresponse.

It was recognized, a priori, that the proportion of persons willing to be examined and the extent to which appointments would be broken would vary considerably from one stand to another. There is, however, a compelling reason for wanting to know what the response characteristics are at a specific stand at the time operations at that stand are in an early stage. This reason is that the number of PSU subsegments assigned at a particular stand is variable, depending in part upon the number of eligible households and eligible sample persons per subsegment, and in part upon the proportion of the selected sample persons which will be examined. It is desired to obtain approximately 150 examinations at each location. This will be accomplished at a stand at which 90 percent of the sample persons are examined if the total number of sample persons is only 165, but if the response rate falls to, say, 75 percent, this number of examinations requires that there be about 200 sample persons. The subsegments within the PSU's have been randomly ordered and as many as are required can be included in the sample, but each one which is added must be completed. Thus the critical determination desired is the number of subsegments which will yield approximately the required number of examinations without overtaxing the capabilities of the Health Examination Center and the examining staff, and without spreading too thinly the efforts of the Health Examination Representatives. The more sample persons there are to be visited, the less time per person is available for the repeated visits often necessary to obtain a high response rate. The day-by-day reports of early stand operations are watched very carefully and projections, based on the experience at the stand

considered along with all the previous experience, are made in order to determine how many additional subsegments (beyond the initial sure-to-be-needed ones) are to be assigned.

THE EXAMINATION AND EXAMINING PROCESS

Pattern of the Examination

The special examination was developed during the presurvey period of planning, consultation, methodologic studies, and pilot studies. It is not intended to be a complete physical examination, but is tailored to the objectives and the limitations of the Survey. These include: (1) interest in chronic conditions and in certain physical and physiological measurements; (2) examination procedures which can be performed in a standardized way and which can produce medically significant information from a single-visit examination; (3) exclusion of procedures to detect conditions which occur too rarely to provide reliable prevalence data from a sample of the given size (about 6,000); (4) exclusion of certain procedures which are not acceptable to some of the public (e.g., genital examination), and which might therefore decrease participation in the Survey; and (5) limitation to an average of two hours for the entire examination of each individual.

The procedures included and the approximate time required for each group of procedures are shown in table 1 in the sequence usually followed in this examination. The basis for grouping is that all of the procedures in a group are performed at one examination station, or location within the Mobile Health Examination Center.

The following is a brief description of each procedure of the examination.

Identification data.—The information collected is minimal, limited to verifying name and address, and adding sex and date of birth. Other identifying information has been recorded in connection with the household interview.

Table 1. Approximate time required for examination, by procedure group

Specific procedure, or part of examination	Group number	Time in minutes
Obtain identification data Obtain authorization for M.D.-D.D.S. reports Take glucose drink Medical history—self administered and supplemental	I	25
X-rays, chest, hands, and feet Height and weight Audiometry	II	15
Body measurements	III	10
Physician's review of history Physician's examination Venipuncture Electrocardiogram Collect urine specimen	IV	40
Dental examination Vision examination	V	15
Exit interview	VI	5
Total examination		120[1]

[1]Includes an additional 10 minutes allowed for dressing and undressing and for movements between examination stations.

Authorization to send findings to personal physician and dentist.—Each examinee is encouraged to sign such an authorization. Names and addresses of physicians and dentists named by the examinees are verified by means of directories and local contacts.

Glucose drink.—The first medical question asked is about a history of diabetes. All examinees except known diabetics under regular care (as determined by the examining physician) are given a modified glucose tolerance test—50 grams of glucose solution diluted to 150 cc. are administered orally. Since the examinations occur without control of previous intake of food, this glucose administration occurs at various times after eating. Time elapsed since the most recent meal, and broad categorization of content of that meal and of any subsequent "snack," are recorded, however. A venous blood specimen is obtained one hour later, and a urine specimen from 1½ to 2 hours after the glucose challenge.

History.—This is in two parts: several questions asked by the receptionist-interviewer, and a larger number of items included in a self-administered history. The examinee is shown how to indicate his answers by checkmarks. The history is not a complete one, since it is tailored to the special examination. When necessary, the receptionist-interviewer reads the questions to the examinee; she does not provide help in the way of defining terms, etc. Provision is made for the examinee to indicate "Don't Know" or "?" when this is appropriate. Questions so marked will be explored with the examinee later by the physician during his examination. The receptionist-interviewer reviews the completed history for completeness only, and asks and records the answers to any overlooked questions.

Examinee undresses.—Since the examination is not a general one and does not include abdominal or internal examinations, the examinee undresses (in the examining room) only down to the waist, and wears a short patient gown and paper slippers for the rest of the procedures. At this point the nurse describes to the examinee the content of the several parts of the examination to follow.

X-rays of chest, hands, and feet.*—A 14 x 17 P-A film of the chest is taken at a 6-foot distance; a film of both hands and one of both feet are made. A bone standard is x-rayed with each of these latter two films, for comparison of bone density with the standard. The three X-ray films for each examinee are developed immediately, while he moves on to other parts of the examination. At a later time, a copy of the chest film is made and sent with other findings to the examinee's physician.

Height.—This is automatically recorded. A camera which produces a finished print in 10 seconds records the height and the identifying number of the examinee, for later reading under office conditions. The height of the examinee is measured without shoes.

Weight.—An automatic-balancing, automatic-printing scale is used to print the weight directly on the examinee's record. The weight is taken with the examinee partially dressed and without shoes.

Audiometry.—A pure-tone audiometer is used to measure air conduction hearing thresholds at five frequencies in each ear. The examinee is seated in a soundproof booth during the procedure.

Body measurements.—In addition to height and weight, 16 other body measurements are made. In the standing position these include girths of the right upper arm, chest and waist, and skinfolds of the right upper arm and the right infrascapular area. A series of anthropometric measurements are also taken—(standing) biacromial diameter; (seated, in a very precise position), sitting height normal, sitting height erect, knee height, popliteal height, thigh clearance height, buttock-knee length, buttock-popliteal length, seat breadth, elbow-to-elbow breadth, and elbow-rest height.

Physician's review of history.—The physician goes over the completed history before he sees the examinee, then reviews significant answers with him to get additional data and, if necessary, clarification.

Physician's examination.—As is true for all other parts of the examination, standardized techniques are used for the physical examination. The examination is concentrated on cardiovascular disease and the arthritides. The cardiovascular examination includes: (1) three blood pressure determinations spaced over about 30 minutes; all are performed on the same arm, with the examinee in a sitting position; the arm is supported at atrial level, and the sphygmomanometer is supported at eye level for accurate reading by the physician; the systolic and both diastolic readings are recorded in intervals of two millimeters of mercury; (2) funduscopic examination; (3) palpation of peripheral arteries for sclerosity, tortuousity, and quality of pulsation; and (4) pal-

*Pregnant examinees are not x-rayed. The recommendations of the American College of Radiology for the control of radiation hazards have been followed in the X-ray equipment and procedures. The X-ray unit has a short exposure time and the primary beam is confined to the x-rayed area. The aluminum filter has been increased to a thickness of 3 mm. Lead rubber shielding protects the gonadal area of the examinee during the chest X-ray. Shielding is also used in the X-rays of the hands and feet. Periodically, radiation surveys of the equipment are done to guard against excess stray radiation.

pation and auscultation of the cardiac area in a very thorough, detailed, and standardized way. The arthritis examination progresses joint by joint, and includes inspection, palpation, percussion, active and passive motion to detect tenderness, swelling, deformity, limitation of motion, pain on motion, and other manifestations of arthritis and periarthritic diseases. Other portions of the physical examination are an otoscopic procedure and palpation of the thyroid gland. Additional abnormalities noticed during the examination are also recorded.

Venipuncture.—The time of the glucose drink has been recorded and a timer set when the examinee enters the examining room, so that the examination can be interrupted for the one-hour venous blood specimen for glucose determination. At the same time, blood specimens are obtained for determination of serum cholesterol, serum bentonite flocculation test for rheumatoid factor, serologic tests for syphilis, and microhematocrit.

Electrocardiogram.—A 12-lead electrocardiogram is obtained. A dual-writing instrument is used, which provides two simultaneous tracings of each lead. One tracing is used for survey purposes, and the other is sent to the examinee's physician as part of the objective report of the findings of the examination.

Examinee dresses—urine specimen.—At this point, the patient dresses and a urine specimen is taken. Later, the presence of sugar is determined by the Testape method, and, in males only, the presence of albumin, using the Bumintest method.

Dental examination.—The dental examination consists of determining the condition of each tooth, and of assessing through the use of indexes, periodontal disease, oral hygiene, and malocclusion. To determine the condition of the individual teeth on a uniform basis, objective criteria have been established and are followed throughout the entire examination procedure.

The indexes that are included in the examination are objective assessments of the oral hygiene status and of the severity of malocclusion and periodontal disease in individuals. The oral hygiene assessment is based upon the amount of debris and calculus on selected teeth. The assessments of malocclusion and periodontal disease are based, respectively, upon the number of malaligned teeth and their degree of malalignment, and upon the presence and extent of gingival inflammation and pocket formation.

The presence or absence of fluorosis and nonfluoride opacities of the maxillary anterior teeth is also recorded. A portable dental chair and a standard source of light are used during the mouth mirror and explorer examination of the teeth and gums.

Vision examination.—Visual acuity is measured with the Sightscreener. Both monocular and binocular acuity are obtained, for far and near distances. The examination is made without glasses, and appropriate parts are then repeated if the examinee wears glasses and has them with him.

Exit interview.—The examinee is offered refreshments before leaving the Examination Center, and is asked a few questions about his reactions to the examination, and his reasons for and any problems about coming for the examination. Throughout the examination, stress is put on cordial handling of examinees. Many favorable comments are received from the examinees on this point. It is another part of the essential effort to build and to keep good will and co-operative relationships in the Survey areas.

Measures to Insure Standardized Examinations

All the examining team members are Public Health Service staff, with the exception of the examining physicians, who are recruited on a temporary basis. They are residents or fellows in internal medicine in medical teaching centers throughout the United States. Usually they have just had at least two full years of residency, or have completed such a residency within the past few years. The usual arrangement with a medical teaching center allows the residents to work with the Survey during their vacations, which might cover all or parts of one, two, or three stands. Thus, there is a constant turnover of examining physicians; e.g., 18 consecutive stands in one calendar year had 27 different physicians. All new examining staff members are trained in the particular techniques developed for the Survey.

Since relatively few examining dentists are used in the Health Examination Survey—only 5 in the first 18 stands—the reduction of examiner differences is an unusually important consideration. Before joining the examining staff, each dentist is trained intensively in the various procedures of the examination. A final part of his training, the independent examination of at least 150 persons by the new examiner and by an original examiner, provides a means both of attaining greater uniformity in the examination procedures and of measuring persisting interexaminer differences.

Except for this specialized training of the dentists, most of the training of new staff members is provided by medical staff from headquarters and is given at the Mobile Health Examination Center. Any experienced personnel in the same category are included in the training, in

order to provide refresher training; however, to avoid drifts in technique, examining staff members do not train each other. Typically, for example, for the new examining physician, this consists of one day of training and practice in examination techniques, in recording, and in review and probing of the medical history. The following day the entire team participates in "dry-run" examinations, for the practice of all team members and for testing equipment. These are actual examinations but are scheduled with more than the usual 30-minute interval, and the examinees are not sample persons. The "dry-run" examinees may be members of local health department staffs who are often asked to assist the Survey in this way. The headquarters medical advisor observes and supervises the dry-run examinations and the first few days of sample-person examinations at a stand.

In the training and retraining of all examining staff members, stress is repeatedly put on (1) collection of high quality data in a uniform, standard, and prescribed way, and (2) accurate, complete, and legible recording. Each staff member who records data reviews that section of the basic document immediately for omissions; in addition, at the completion of an examination the entire individual record is reviewed for omissions and for legibility.

POST-EXAMINATION PROCEDURES AT THE EXAMINATION CENTER

Blood specimen.—The venous blood samples are refrigerated in the Examination Center overnight. On the following day, the hematocrit is determined by the micromethod. Two capillary tubes are filled at the time of venipuncture in case of breakage of one tube. The clotted specimen is centrifuged and the serum separated. The portion for serum cholesterol is frozen; those for serum bentonite flocculation and for the serologic tests for syphilis (STS) are kept refrigerated, as is the fluoridated specimen for glucose. Twice a week these specimens are airmailed to central laboratories for determinations; the serum cholesterol with dry ice, the serum bentonite flocculation and the glucose with water ice.

Urine specimen.—The determinations for presence of sugar (Testape method) and for the presence of albumin in males (Bumintest method) are made in the Examination Center shortly after the specimen is obtained.

THE DATA COLLECTED

The Medical History Data

As noted in the previous section, the medical examination is initiated by a brief history (HES-203) obtained by the receptionist-interviewer. The first questions asked concern diabetes. After this the examinee is handed a questionnaire (HES-204) to complete. This questionnaire is the chief means for obtaining the medical history. It contains 74 questions which are, in general, completed by checking the appropriate entry. The chief areas of the questionnaire are the following:

1. Cardiovascular disease—23 questions (see Appendix VII, A)
2. Arthritis and rheumatism—7 questions (see Appendix VII, B)
3. Diabetes—4 questions (see Appendix VII, C)
4. Mental health—9 questions
5. Vision and hearing—6 questions
6. Miscellaneous diseases and conditions—25 questions

The questions in this last group are scattered through the history; a large proportion are designed to parallel the information on chronic diseases and conditions obtained for the same person by the household interview.

If a "yes" or "?" is checked by the examinee for any of the key questions on cardiovascular disease or arthritis and rheumatism, the examining physician probes the answer, first using a standard probe question and then querying as he judges appropriate. He then modifies the record accordingly. He also completes any history questions which have been missed, resolves inconsistent entries, and tries to convert any entries of "?" to a definite "yes" or "no" by additional questioning. Otherwise, the examinee's undiscussed entry constitutes the source of historical information.

Medical Data Related to Special Interest Conditions

The medical examination focuses on two main areas of chronic disease—the cardiovas-

cular diseases and arthritis and rheumatism. The cardiovascular diseases that are the chief objectives of this examination are the heart diseases, hypertension, peripheral vascular disease, and cerebrovascular disease. Rheumatoid arthritis and osteoarthritis are the chief diagnostic categories on which the arthritis and rheumatism examination concentrates. In addition, tests are made to detect cases of diabetes.

For the heart diseases the chief sources of diagnostic information are the history, the physical examination of the heart, the chest X-ray (for heart enlargement), and the electrocardiogram. The three blood pressures taken during the physical examination will serve as the primary basis for diagnosing hypertention, supplemented by the history and the findings of the funduscopic examination. Peripheral vascular disease will be diagnosed chiefly by an examination of the peripheral arteries, but the history will provide a supplementary basis for diagnosis. The history will constitute the chief basis for diagnosing cerebrovascular disease, but it will be supplemented by whatever findings are noted on the physical examination; this part of the physical examination, however, is not standardized.

For rheumatoid arthritis, information obtained by the history is supplemented by the findings from the inspection and examination of the joints, the X-rays of the hands and feet, and the bentonite flocculation test of the serum. The X-rays of the hands and feet provide the primary information on the presence of osteoarthritis, but this is supplemented by the physical examination and history.

As already noted, a blood specimen is obtained from most examinees, one hour after glucose challenge. This is measured for blood glucose concentration, and this measurement is supplemented by a test for urine sugar. These findings, together with the information obtained from the history, provide an index of the prevalence of diabetes in the population.

Additional Data From the Examination

The dental examination will yield considerable detailed information not heretofore available on a representative sample of the total adult population. This examination has already been described. The data it yields will include, in addition to a determination of the condition of each individual tooth, an assessment of periodontal disease, the oral hygiene status, an indication of the severity of malocclusion if present, and the presence or absence of fluorosis and nonfluoride opacities.

In addition to the medical and dental examinations, some supplementary determinations are made during the course of the examination. These will make possible a scaling of the population by acuity of hearing and of vision, and distributions of some basic anthropometric measurements. There will be interest in relating some of these characteristics—in particular, height, weight, and skinfold thickness—to various medical findings, but a description of these population characteristics will be of interest by itself. The foregoing account of the examination has already indicated the specific measurements which are made.

Other Data Collected in the HES Operations

Certain demographic data are available from the interview questionnaire. Each household is designated as "rural" or "other" before the interview, on the basis of the area in which it is located. During the interview, data are gathered on whether the house is on a farm and, if so, the size of the farm. For each person, there are data on age, sex, race, marital status, family composition and income, schooling, and military experience. In addition, there are data on whether the person is working and if so, the occupation and industry in which he is engaged.

Certain health data are also available from the interview questionnaire. For each acute or chronic condition elicited by the exploratory questions 8-17, a line entry is made in Table I of the questionnaire. For each such condition, there are data on the number of days of restricted activity, number of days of bed disability, and number of days of work loss during the preceding two weeks. For each chronic condition, additional data are gathered on the number of bed-disability days over the past year, and the limitation of activity due to the condition. For each condition listed, the person is asked whether it was medically attended and, if so, the diagnosis given by the physician. For each hospitalization during the past year that is elicited by question 15, a line entry is made in Table II. For each such entry, there are data on the duration of the hospitalization, the date of entry to the hospital, and the name of the hospital. The person is also asked about the diagnosis which was made for the condition. If any operations were performed, he is asked the names of them.

The health data described above are similar to those collected in the Health Interview Survey. Thus, some comparisons may be made, and determining the extent to which the HES interview data reproduce certain findings of the larger

study may aid in evaluating the effectiveness with which the representative probability sample design has been carried out in the Health Examination Survey. These data will also aid in the analysis of some of the parts of the sample, as for example, the nonrespondents. Perhaps the principal utilization of the HES interview data, however, will be in conjunction with corresponding HIS data to improve the process of estimating from the HES examination data. This possibility is discussed in more detail in the section, "On Basic Estimation Technique," in Appendix VIII.

The attitude questions on the interview questionnaire are asked only of those persons who have been selected to be in the sample. Data are gathered on the sample person's opinion about the state of his own health and about the importance of regular checkups. There are data on whether the sample person has a physician and how often he consults him. Then there are data on the person's attitude toward health surveys and the need for co-operation in such surveys.

The interview questionnaire provides data on whether the sample person made an appointment with no persuasion. Auxiliary records are kept to show the appointment record of the sample person. These records provide data on the number of appointments made, the number kept, and the number which resulted in cancellations or which the sample person did not keep. There are data on the number of contacts made with the sample person for the purpose of persuasion. Special effort is made to gather data on the circumstances of the first appointment, such as: day of week, time of day, and date of the appointment, and the number of days between the date the appointment was made and the date of the appointment. All of these data related to response are analyzed for two different purposes: to guide the conduct of the survey in subsequent operations by providing more insight into the response problem, and to aid in evaluation of the impact of nonresponse on sample data.

QUALITY CONTROL

The Health Examination Survey is unusual, if not unique, not only in the group studied (a probability sample of the entire U. S. population) but also in the amount of effort devoted to problems of standardization of observations, validation of the measurement processes, and other aspects of quality control. Because this effort extends to all phases of the operation, it has been partially described in many parts of this report. The attention given to the sampling problem is discussed later in considerable detail. The response problem has received, deservedly, much attention. But even if the sample were perfectly representative of the total population and if every one of the sample persons could be examined, there would remain, of course, many problems in the area of standardization of the data collected and validation of the measurement processes used.

Study of Characteristics Associated With Nonresponse

It has been pointed out that methodological studies were conducted to help design the survey to maximize response and that the field staff of the Health Examination Survey is constantly concerned with this same effort. It is recognized, however, that in this Survey as in any such voluntary survey, there will be some persons who fell into the sample but were not included in the data collected, that is, in this case, were not examined. It was expected on the basis of previous survey experience and from the findings of the methodological studies that response would vary with the size of the place of residence, with better response in rural areas and small towns, and poorer response in large urban centers. Experiences also indicated that response would probably be better in the western and central parts of the United States and poorer in the eastern portion. Differences of this kind can be allowed for, quantitatively, in the estimating procedures, but no procedure will remove all risk from nonresponse. If the not-examined persons differ from the comparable examined persons with respect to any characteristic covered by the examination, the usual estimating procedures will lead to a biased estimate for that characteristic. In addition to attempting to minimize the size of the nonresponse group, therefore, it is necessary to be able to make some evaluation of the extent to which it differs, qualitatively, from the examined group.

Some information on this can be obtained from the household interview data referred to above. Comparisons will be made of the interview (household questionnaire) data collected in the course of the Health Examination Survey for the examined part of the sample and for the not-examined part, since questionnaire information is available on nearly all of the sample persons. These comparisons will be made with respect to the demographic data included (age, sex, etc.) and with respect to the health data (recent history of illnesses, etc.). For all of the examined sample persons and for

the great majority of the not-examined, the data produced by the attitudinal questions can also be compared. These include such items as the individual's evaluation of his own health and his statements as to regularity of visits to a physician. (This last category of information is not available on as high a proportion of not-examined persons as the other questionnaire information.) From the comparisons of the interview data it may be possible to reach some conclusions about differences between examined and not-examined persons.

Even more relevant information concerning possibly biasing differences is obtained by means of a special study of the not-examined group. At the conclusion of the household interview, a medical authorization is usually obtained which names the individual's physician and permits him to release information from the particular patient's medical records for use in the Health Examination Survey. Thus, for most of the not-examined persons, some information that is directly related to their health can be sought from the physicians. This is done for all not-examined persons for whom a medical authorization could be obtained. In the remaining instances the not-examined person is asked to forward the request for this information to his physician. In addition, for comparison, inquiries are sent to the physicians of a matched sample of examined persons.

Measures to Insure Uniformity and Reproducibility of Data

While the microhematocrit test for packed cell volume of the blood and the tests on the urine are performed in the Mobile Health Examination Centers, the other laboratory tests are performed for the Health Examination Survey at central laboratories. The serological tests for syphilis are performed by the Venereal Disease Research Laboratory, Communicable Disease Center, Public Health Service. Each specimen is tested by the VDRL, Mazzini, and Kolmer methods. The serum cholesterol determinations are made at the Standardization Laboratory of the Heart Disease Control Branch, Division of Chronic Disease, Bureau of State Services, Public Health Service. A ferric chloride method is used. The laboratory of the Arthritis and Rheumatism Branch, National Institute of Arthritis and Metabolic Diseases, Public Health Service, determines the serum bentonite flocculation. Blood glucose is determined by the Somogyi-Nelson method at the Diabetes Research Unit, of the Diabetes and Arthritis Branch, Division of Chronic Disease, Bureau of State Services, Public Health Service. Periodically, aliquots of the blood specimens taken from examinees are sent to an independent laboratory for a parellel measurement of serum cholesterol or blood glucose. Thus, in the case of these tests, the procedure and the interpretation is carried out in a standard, highly controlled manner.

There are a great many quality control steps taken in the course of the examining operation in addition to such measures as retraining of examining staff referred to in the description of the examining process. Thus, for example, the audiometers are checked and recalibrated regularly, the scales are checked at each stand, the anthropometry measurements are made by one person and recorded by another who is also familiar with the technique, and the X-rays are reviewed before the examinee leaves the Center. The fact that consultants have been brought in periodically to observe specific aspects of the examination (e.g., audiometric measurements) might be mentioned as another example of the efforts to insure that the recorded data will be of high quality.

The X-rays and electrocardiograms taken in connection with the Health Examination Survey are read and interpreted centrally by panels of expert consultants according to established classifications and defined criteria. In the case of the chest X-ray films, each member of a panel of three specialists independently reads each film for pulmonary and cardiovascular pathology. The electrocardiograms are each read independently by three readers; any disagreements are resolved in conference with a consulting cardiologist. A panel of three specialists in arthritis read the hands and feet X-ray films on each examinee, each reading independently, and then again review and resolve in conference any disagreements among the three results. Through these safeguards it is hoped to obtain an unusually high degree of standardized precision in the results of these examinations.

Despite the fact that many measures are taken throughout the Survey to insure that the findings are arrived at in a standardized and correct manner, it may be assumed that some amount of variability in the findings will be due, not to real differences in the subjects examined, but to differences in the examining physicians. Despite the safeguards to prevent or minimize the physician's contribution to variability in the data, some will inevitably remain. The specific examining physician is identified in the record and the analysis of the collected data will include consideration of this variable.

Special Calibration Studies

The tests for visual acuity are made by using a Sightscreener machine which eliminates

the need for the usual 20-foot distance between the examinee and the letters read. In order to be able to interpret the results of these tests in a standard manner, a special methodological study was arranged. This study, made with the Pennsylvania State College of Optometry, calibrates the results obtained by this kind of a test in terms of the results one would get with Snellen-type charts. The equipment used for audiometric testing is calibrated and checked regularly after each stand; the soundproofed booth in each of the mobile examination units has been tested by means of a special sound survey. The modified test for glucose tolerance is the subject of a special calibration study being conducted by the School of Public Health of the University of Michigan.

STATISTICAL DESIGN AND ESTIMATION

Introductory Note

The statistical design of the Health Examination Survey is almost classic in the sense that it is a blend of substantive purposes, explicit specifications, budgetary resources, logistical considerations, formal mathematical models, and organized speculation concerning population parameters and unit operating costs. Any comprehensive account of the design process would be much too extensive for inclusion in this report. The present chapter exhibits an outline and most of the key features of the design. Other chapters of the report discuss more fully several of the factors that had a significant influence on the design. Appendix VIII offers additional detail on a group of technical aspects of sampling and estimation.

The Design Problem

A rational survey design rarely if ever springs full-blown into existence at some instant in time. Yet if the undertaking is to be efficient in any useful sense, it must be planned in considerable detail prior to inauguration of operational stages. A project is likely to be successful to the degree that initial planning and design can take account of relevant factors and circumstances. There is no simple formula by which this accounting can be done, particularly for an undertaking as complex as the Health Examination Survey. From the statistician's point of view, the Health Examination Survey is an especially attractive problem because of the variety of conditions or specifications that encompass the subject. Leaving aside the broadest of administrative considerations, the leading characteristics or general specifications for the Health Examination Survey were these:

1. The coverage should be the entire adult, civilian, noninstitutional population of the United States.
2. The primary products should be of two kinds:
   (1) distributions of the population by specified characteristics such as height, weight, and blood pressure; and (2) estimates of prevalence in the population of selected chronic conditions, particularly those in the arthritic and cardiovascular groups.
3. The measurement processes mainly should be those obtained from a limited very highly standardized clinical examination.
4. The first cycle should be completed in approximately two to three years, although the Health Examination Survey is a continuing activity.
5. Results should be interpreted as being national averages for the two- to three-year period, rather than as showing trend over time, or differentials among geographic, economic, or sociological subgroups of the population. Yet it was apparent that analysis and understanding of collected data would be possible only in terms of age and sex of persons, and probably only when persons examined were classified by other sociodemographic factors.
6. Despite extensive efforts to standardize the examination process, it might be expected that substantial measurement variation would remain in collected data. For some of the measures there might be biases when compared with other measurement criteria.
7. While total budget was not rigidly specified, the general dimension of available resources was fixed. From the design point of view, an important fact was that the unit cost for examining an individual person was certain to be relatively great as compared with the cost of obtaining a single measurement in most social surveys.

8. All evidence pointed to a variety of difficulties in securing the co-operation of a representative sample of persons, and accordingly indicated the heavily weighted desirability of a design which provided data for a maximum number of persons chosen in the sample, or at least did not inhibit response.
9. Maximum target tolerances for sampling variability were set for several key statistics.
10. The Health Examination Survey definitely was not to be considered a technique for evaluating the Health Interview Survey of the National Health Survey. But there were compelling reasons for so planning the Health Examination Survey that some of its measurements could be relatable to those of the Health Interview Survey, since such a course might lead to better estimates or to better-understood estimates in either or both of the surveys.
11. The above requirements made it essential that the Health Examination Survey be conducted under a probability sampling design, in contrast to some possible alternative of a more subjective or volunteer selection of examinees. Perhaps the unique contribution of the Health Examination Survey would be that it would present findings that were carefully standardized measurements for a probability sample of the national, civilian, noninstitutional adult population.
12. An added specification—or planning decision perhaps—was that the design have flexibility. This was the label given a requirement that the over-all sample be divided into three subsamples in such a way that any one of the three was a representative sample of the defined population for the United States. There were several reasons for this requirement. One was that one subsample—to be examined early in the cycle—should be used experimentally to discover methods of maximum effectiveness in processing data and preparing estimates. A second reason was that this first third might produce highly preliminary estimates for a few characteristics common in the population. Such an outcome would be desirable since data from the entire cycle would not be available until perhaps five to six years after the project was initiated. A third reason was the possibility in a multiyear project that expected appropriations might not become available, or that costs might unduly exceed expectation. The three-part design would make it possible to salvage something from the undertaking if it had to be curtailed at the point of one third or two thirds of completion.
13. Study of examining requirements and available facilities for examination led to another major logistic decision which initially had not been a design specification. This added condition was that the examinations would have to be conducted in mobile trailer caravans, and that funds available for capital expenditure, along with associated availability of professional personnel, gave considerable weight to the use of precisely two caravans.

No effort is made here to show exactly how each of these specifications made its impact on the design. But each was taken into consideration. The reader will be able to see most of them reflected in the final statistical pattern. The pattern became a highly stratified multistage probability design with clustered groups of examinees, randomized in several dimensions. Considerable effort was devoted to optimization of design in the sense that maximum reliability of estimates would be secured within budgetary limitations. In the basic design every eligible person in the defined population had an equal chance for inclusion in the sample. Relatively minor modifications of this self-weighting feature were introduced to handle particular situations in the population, but in all situations adjustments were made so that the probability of inclusion of every sample person was known over the entire population.

Summary of The Sample Design

Building blocks.—The design is most easily understood when described in terms of a set of defined building blocks which are associated with the different stages of sample selection. The first of these is the Primary Sampling Unit. For use in the Health Interview Survey, the geographical territory of the mainland United States had been divided into 1,900 areas. Each area is a county or a small group of contiguous counties. With minor modifications, these areas became the PSU's of the Health Examination Survey. The PSU was divided geographically into segments, each containing an expected six households. From a listing of households within the segment, a random sampling procedure created a subsegment of approximately four households, each of which was interviewed. Every alternate person in the sample households who was an eligible adult (civilian, in the age range 18-79, etc.) became a sample person for inclusion in the HES panel. Thus the successive building blocks are

person, household, subsegment, segment, and PSU, and the sampling process was applied in successive stages to these blocks in reverse order to that just listed.

Stratification.—For use in the Health Interview Survey, the 1,900 PSU's had first been classified into 372 strata, and later into 500 strata. Details of this stratification have been published in reference 1. For the Health Examination Survey, these 372 strata were grouped further into 42 new strata. The latter stratification emphasizes geographic location and population density of the PSU's in the stratum. As nearly as was feasible, each stratum contained 3.5 million persons in 1950 (1960 Census data were not available when the sample was designed. This was unfortunate, but was treated in a manner which produced no bias in the results). The boundaries of these strata had been chosen so that the strata were approximately equal sized, and so that there were approximately equal numbers of strata in each of five population-density classes, in each of three geographic classes, and roughly in each of the 15 superstrata obtained from the cross-classification of density and geography. The stratification pattern is shown in table 2.

Selection of PSU's.—Appendix VIII outlines the route by which it was determined that there should be 42 PSU's in the Health Examination Survey. That decision, and the associated one that in order to take maximum advantage of the stratification there should be as many strata as PSU's, determined the number of strata. The 3 by 5 matrix of strata shown in table 2 had its origin in the flexibility requirement of the specifications. Within each of the three geographic categories, for the total sample, and with the strata quotas by population density, a sample of 14 PSU's was drawn by a modified Goodman-Kish controlled-selection technique, in such a way as to maximize spread among the States, and still to draw each PSU with probability proportionate to its 1950 population. After the 42-area total sample had been drawn, it was divided randomly into three rounds, using the 3 by 5 matrix. This latter step was accomplished effectively by exhausting the matrix through three replications of a pseudo-Latin-square selection of PSU's. To close approximation, each subsample, or round consisted of one third of each of the occupied 14 superstrata in the matrix. Each round is a probability sample of the population. The sample PSU's for each round are shown in table 3. The name given to each PSU is that of a principal town or city within the PSU.

Selection of sample persons.—Appendix VIII sketches the derivation of a total sample size of approximately 6,300 persons to be examined. This means an average of 150 examinees in each of the 42 PSU's or stands. A feature of the plan is that the details of a probability selection of a sample of about 150 examinees were adapted to the characteristics of the PSU, and varied from one place to another. Typical main features are set forth here. Some variations are noted in Appendix VIII.

Table 2. Number of strata in the Health Examination Survey, classified by geographic location and population density

Population density	Number of strata			
	U. S. total	North-east	South	West
All strata	42	14	14	14
Giant metropolitan areas	9	6	-	3
Other very large metropolitan areas (mostly over 500,000 population)	6	2	2	2
Other Standard Metropolitan Statistical Areas	9	3	3	3
Other urban areas	8	2	4	2
Rural (typically 40 percent or more ED's classified as rural)	10	1	5	4

Table 3. List of sample PSU's in Health Examination Survey, arranged by round number and size

Round I	Round II	Round III
New York, N.Y.-A	Los Angeles, Calif.	New York, N.Y.-C
Philadelphia, Pa.	New York, N.Y.-B	Boston, Mass.
Chicago, Ill.-A	Detroit, Mich.	Chicago, Ill.-B
Baltimore, Md.	Pittsburgh, Pa.	San Francisco, Calif.
Minneapolis, Minn.	Louisville, Ky.	Columbus, Ohio
Akron, Ohio	Savannah, Ga.	Providence, R.I.
Nashville, Tenn.	Ft. Wayne, Ind.	San Antonio, Tex.
San Jose, Calif.	York, Pa.	Topeka, Kans.
Muskegon, Mich.	Eufaula, Ala.	Newport News, Va.
Midland, Tex.	Kennett, Mo.	Carbondale, Ill.
Valdosta, Ga.	Biddeford, Maine	Auburn, N.Y.
Oxford, Miss.	Clinton, La.	Conway, S.C.
Butler, Mo.	Newport, Ark.	Rocky Mount, N.C.
Grand Coulee, Wash.	Washburn, Wis.	Winslow, Ariz.

NOTE: The New York-Northern-New Jersey territory was divided into three synthetic PSU's and the Chicago Standard Metropolitan Statistical Area into two PSU's.

Some 60 geographically bounded segments were drawn by systematic selection from the PSU, using a serpentine path throughout the area, so that all parts of the PSU were given an equal chance of inclusion in the sample. These segments were reduced to subsegments of an expected four households each, by a random two-in-three selection of listed households in the segment. Within the chosen households, every alternate person in the defined population became a potential sample person. The alternation began with the first person in an ordered sequence in one subsegment and with the second person in the next subsegment, in order to avoid bias of sample person in relation to the head of household.

The term "potential sample person" was used for a specific reason. For operational reasons, it was desired that the number of actually examined persons be close to 150. This was a consequence of the fact that movement of personnel and equipment was tightly scheduled, not more than about 16 persons could be examined in one day, and it was inefficient to have the examining staff idle for any extended period. Yet the vagaries of housing construction and demolition, population mobility, household size and composition, and response rates, meant that it was not possible to predict the exact number of examinees which would be produced by a fixed number of land segments. Accordingly, a second element of flexibility was introduced into the design. The 60 subsegments were randomized in sequence. On the average, it was found that about 50 subsegments would produce 150 examinees. First field assignments to interviewers included 40 subsegments. Progress through these segments in terms of apparent number of examinees determined whether 0, 1, 2, 3 . . . 20 additional subsegments would be assigned and included in the sample. Since the subsegments had been randomized in sequence, the only effect of this procedure on design, was to alter the within-PSU sampling fraction and weight.

Estimation Technique

Conceptually, the estimation process in the Health Examination Survey may be identified in terms of three routines.

Summary routine.—Suppose the survey and its basic estimation technique produce for the $a^{\underline{th}}$ age-sex population class an estimate of y''_a persons in the population, of which x''_a have a specified characteristic. Suppose further that y_a is the official Census independent estimate of population in the $a^{\underline{th}}$ age-sex class. The HES

final estimate of total number of persons in the population with the specified characteristic will be $x' = \sum_a x''_a \frac{y_a}{y''_a}$, and if $y = \sum_a y_a$, the proportion of population with the characteristic is estimated as $R' = \frac{x'}{y}$.

More generally, if $x''_{a\lambda}$ is the basic estimate for any $a\lambda^{\text{th}}$ subgroup of the population, and if $x'_{a\lambda} = x''_{a\lambda} \frac{y_a}{y''_a}$, then $x'_{.\lambda} = \sum_a x'_{a\lambda}$ is the final estimate for the λ-class of the population, and $R'_{.\lambda} = \frac{x'_{.\lambda}}{\sum y''_{a\lambda} \frac{y_a}{y''_a}}$ is the proportion of the population in the λ-class with the characteristic. Thus the purpose of the summary routine is to make the sample more closely representative of the population with respect to sex and age and thus reduce variance.

Basic routine.—The basic routine is the estimation technique which produces within the a^{th} age-sex cell the estimates x''_a, y''_a, and the proportion $R''_a = \frac{x''_a}{y''_a}$. Exact methodology for producing these estimates will be determined from experimental studies conducted with data from the Round I—the "first third" of the cycle of 42 stands. A prominent possibility is described in Appendix VIII, in the section "On Basic Estimation Technique."

Editing and imputation routine.—In a survey of the type of the Health Examination Survey, the procedures adopted for editing reported data and for handling instances of missing data can be critical. These topics are not treated in the present report despite their importance. The primary reason for this course is again that final decisions await investigation of Round I data. Two comments are in order at this point.

The first of these relates to the general matter of nonresponse and missing data. If there are missing measurements in a set of data, there is, of course, no way in which a risk of bias can be entirely avoided. All schemes of estimate must include either explicit or implicit imputation for missing measurements. In the Health Examination Survey two courses are being taken to minimize difficulties in this area. The first is assignment of extensive resources to cut nonresponse to a manageable size. Ever-present attention is being given to the nonresponse problem, since substantial nonresponse had been the experience in earlier studies offering clinical examination to sample groups. The other course is assembly of auxiliary data on both respondents and nonrespondents through household interview and reports from solicitant's personal physicians, in order to facilitate the residual imputational process.

A second comment is that in accord with policy of the National Health Survey, every effort will be made in publications of data from the Health Examination Survey to convey to users of the data an understanding of how the estimates have been produced, including the nature of all significant adjustments.

Reliability and Evaluation of Results

How good will the data from the Health Examination Survey be? This is a question to which there is, of course, no unique answer. Perhaps the most significant answer will be found over a period of time in the collective judgments of students and users of the data. It can be stressed, a priori, that the results will be the product of highly standardized measurements on a probability sample of the population, and that these measurements were selected initially because a good many qualified people thought them relevant to a wide variety of purposes.

Standard errors of published statistics will be presented by the National Health Survey. The standard error, as calculated, will include sampling error, and a portion of the measurement error, or measurement variation. It will not include any biases that may reside in the data. The design is such that good approximations can be secured for a number of components of variation. For example, it is expected that it will be possible to determine what proportion of the variance comes from the between-PSU component and what proportion from the within-community component. It is hoped that a rough estimate can be made of the contribution to variability of some items that arises from residual differences among physicians, despite efforts at standardization.

Elsewhere in this report there are brief descriptions of efforts being made to calibrate and to validate some of the measurement processes. As all investigators in health and medicine know, this latter work is in an area in which there is much to be done.

PLANS FOR ANALYSIS AND PUBLICATION OF DATA

All of the data collected in the first cycle of examinations are coded and punched into cards, transferred onto magnetic tape, and then tabulated by an electronic computer in the National Center for Health Statistics. The coding of the data is done by personnel of the Bureau of the Census under a contract with the National Health Survey.

In accordance with the general policies of the NHS program, the findings of the Health Examination Survey will be made available to interested governmental and other public and private agencies, to organizations or groups, and to the general public, as rapidly as possible. The size of the sample, however, and the plan of the first-cycle examinations require that most of the analysis must await collection of the data for the entire sample. The processing operation with respect to the early stages (e.g., coding) is going on simultaneously with the data collection. Likewise, the plans for the tabulations are being developed and preliminary tabulations are being made to aid in planning the final process of tabulation and analysis.

The findings of the first-cycle examinations made in the Health Examination Survey will be published in a separate series of health statistics reports. These will include presentation and analysis of the frequency distributions of the population for the various kinds of data which have been recorded in the survey; e.g., blood pressure readings, dental findings, serum cholesterol determinations, etc. In addition they will include estimates, derived from the examination findings, of the prevalence in the population of cardiovascular disease, arthritis, diabetes, etc. There are still decisions to be made with respect to the way in which final determinations are made of the diagnoses indicated by the findings. Consideration is being given to consultant panel review of the entire relevant portion of each of the records in order to arrive at a standard and valid diagnosis. The preliminary work to be done with the tabulations of data for the "first round" of the first cycle will aid in making the final plans in this phase of the operation. The diagnostic goal is a statistically satisfactory diagnosis, rather than a diagnosis sufficiently established in the individual case to govern the course of treatment for the patient. This means that the HES diagnostic procedure needs to be such that its expected value over a group of examinees is near the average that would be obtained for the group if all the individuals in the group were given a more comprehensive series of similar clinical examination—although the two sets of procedures would not necessarily produce identical results in each individual instance.

APPENDIX I

AREAS IN THE HEALTH EXAMINATION SURVEY'S SAMPLE

Caravan I

1. Philadelphia, Pennsylvania
2. Valdosta, Georgia
3. Akron, Ohio
4. Muskegon, Michigan
5. Chicago, Illinois
6. Butler, Missouri
7. Midland, Texas
8. Los Angeles, California
9. San Jose, California
10. San Francisco, California
11. Grand Coulee, Washington
13. Minneapolis, Minnesota
14. Chicago, Illinois
15. Detroit, Michigan
16. Fort Wayne, Indiana
18. York, Pennsylvania
21. New York, New York
22. New York, New York
23. Baltimore, Maryland
24. Nashville, Tennessee
27. Eufaula, Alabama
28. Clinton, Louisiana
30. Newport, Arkansas
32. Topeka, Kansas
35. Boston, Massachusetts
37. Conway, South Carolina
39. Winslow, Arizona

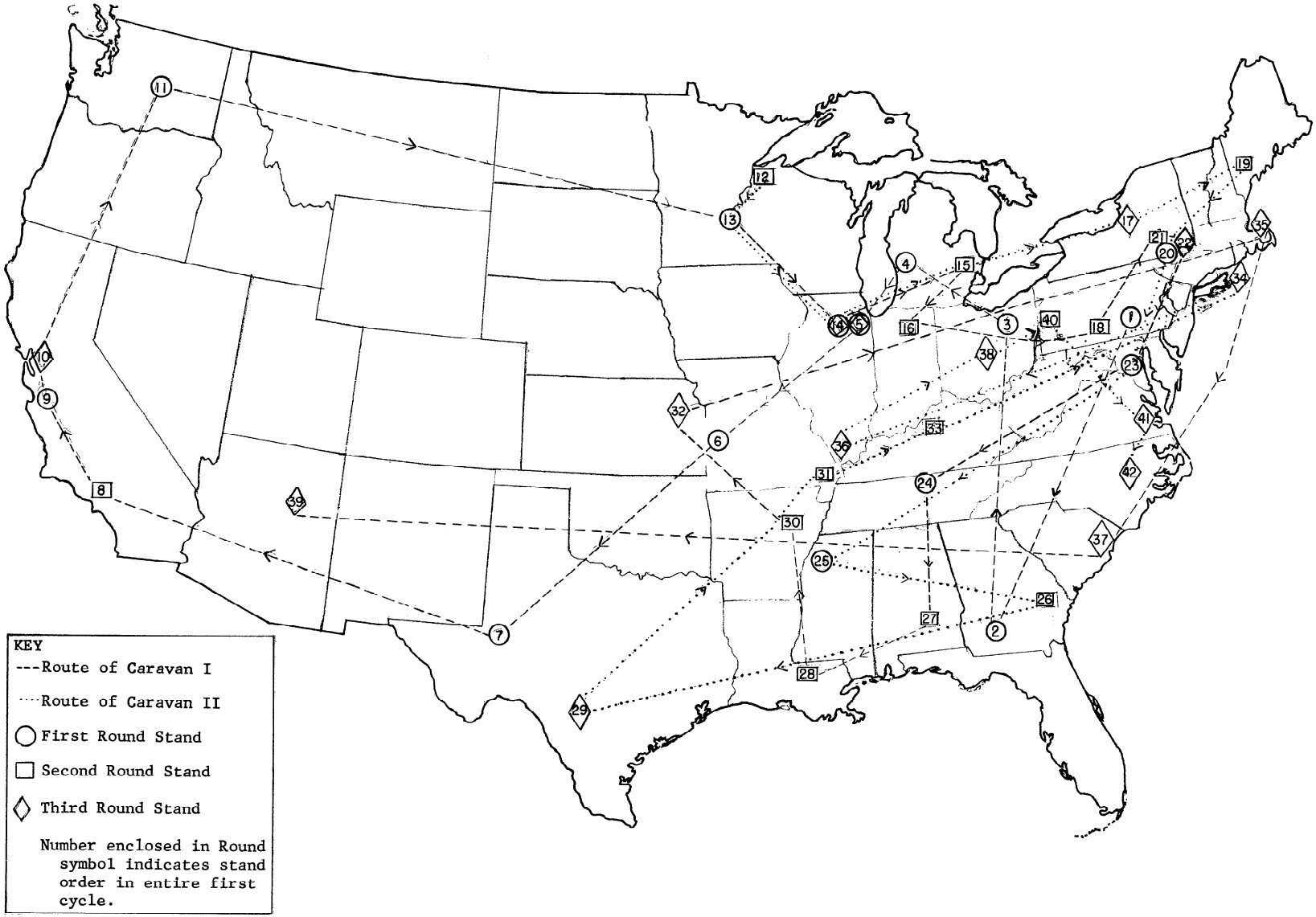
Caravan II

(During the early part of the Health Examination Survey only one Mobile Examination Center was used.)

12. Washburn, Wisconsin
13. Minneapolis, Minnesota
14. Chicago, Illinois
15. Detroit, Michigan
17. Auburn, New York
19. Biddeford, Maine
20. New York, New York
23. Baltimore, Maryland
25. Oxford, Mississippi
26. Savannah, Georgia
29. San Antonio, Texas
31. Kennett, Missouri
33. Louisville, Kentucky
34. Providence, Rhode Island
36. Carbondale, Illinois
38. Columbus, Ohio
40. Pittsburgh, Pennsylvania
41. Newport News, Virginia
42. Rocky Mount, North Carolina

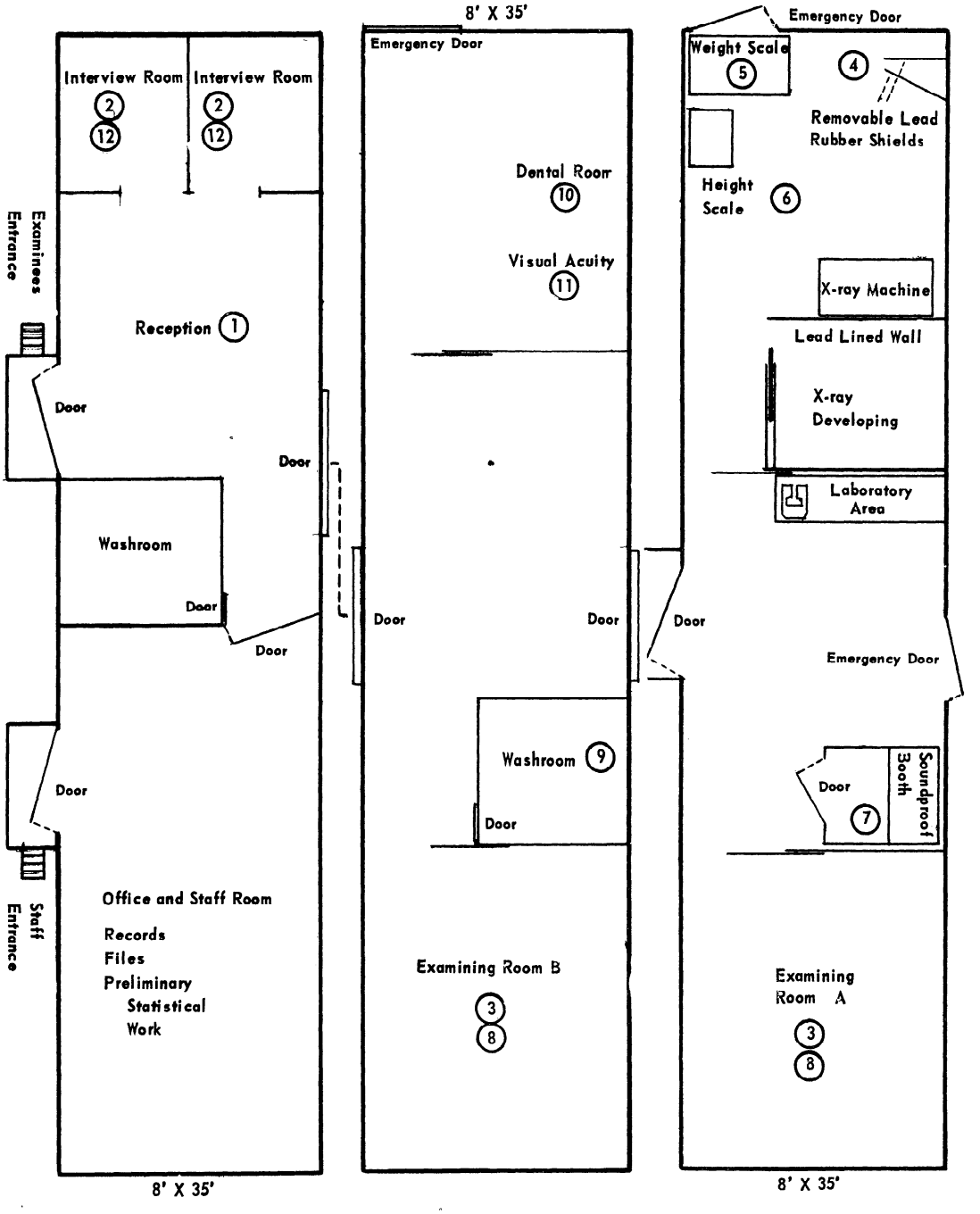
APPENDIX II

ROUTES FOLLOWED BY MOBILE HEALTH EXAMINATION CENTERS IN MOVING FROM ONE LOCATION TO ANOTHER

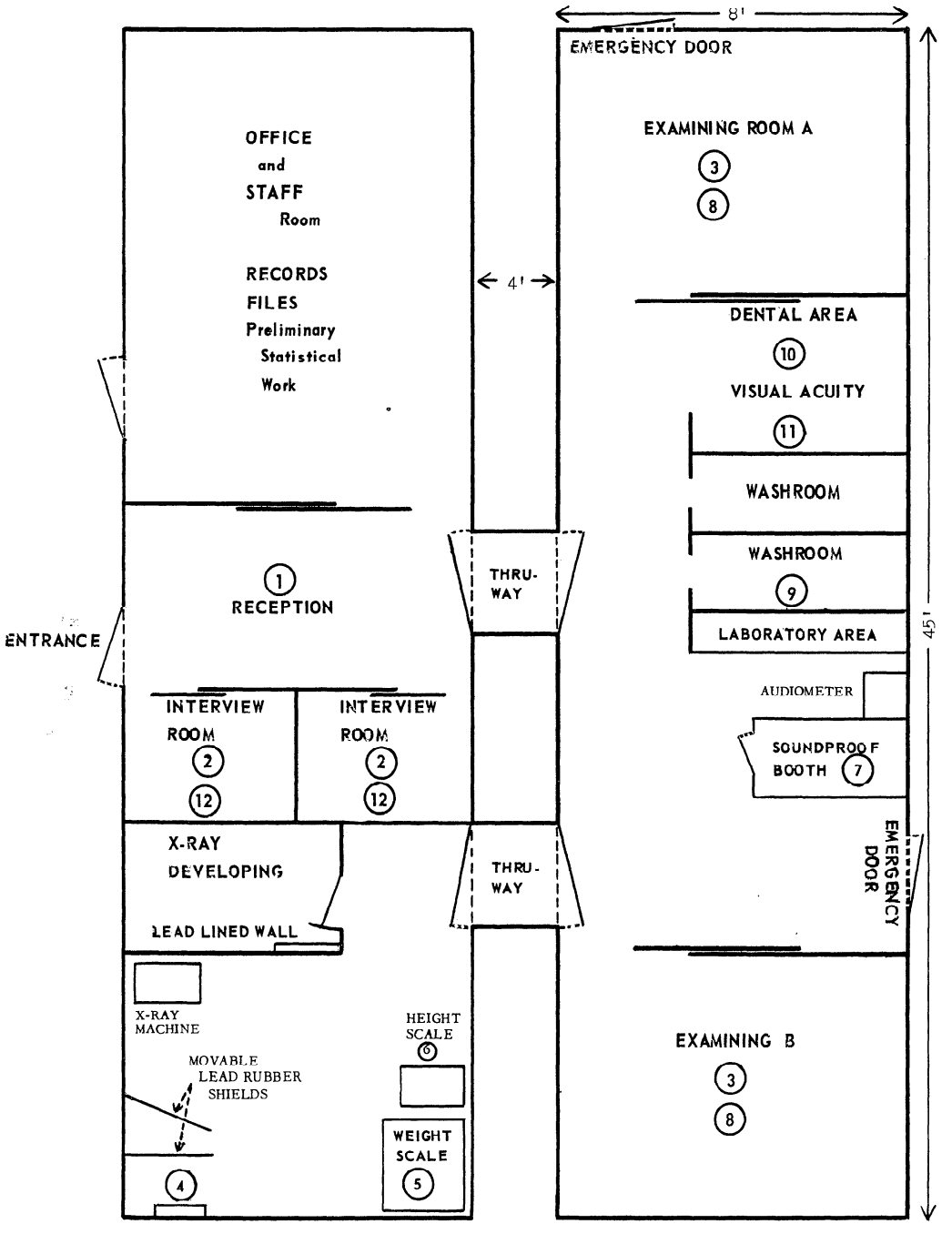


APPENDIX III

A. FLOOR PLAN–MOBILE EXAMINATION CENTER–CARAVAN I



B. FLOOR PLAN—MOBILE EXAMINATION CENTER—CARAVAN II



Scale - Width 1" 3'
Length 1" 5'

APPENDIX IV

EXAMPLE OF LEAFLET DISTRIBUTED IN ADVANCE OF INTERVIEWER'S VISIT

HEALTH

is

NEWS in Bexar County

A HEALTH EXAMINATION CENTER will be brought to San Antonio for the Health Examination Survey to begin February 16

U. S. Department of Health, Education, and Welfare

Public Health Service

U. S. National Health Survey

Washington, D. C.

TURN THIS PAGE FOR THE STORY.....

A MESSAGE FROM THE PUBLIC HEALTH SERVICE

Bexar County is especially distinguished out of the 3,076 counties in the United States, because it is among the 109 counties which have been selected by the U. S. National Health Survey for its Health Examination Survey. The 109 counties, taken as a group, constitute a representative sample of the entire United States population, balanced between urban and rural, North and South, East and West, large cities and small cities.

The Health Examination Survey will soon give health examinations to about 150 adults from households in the County. To reach these people, interviewers from the U. S. Bureau of the Census are visiting the particular households in the sample to invite the selected persons to the health examinations.

The purpose of these health examinations is to answer the question: "How healthy are the people of the United States?" In 1956 the U. S. Congress thought this question so important that it passed a special law, which was supported by members of both major political parties, to set up the National Health Survey and get at the facts. Some of the facts can be learned by asking people questions about their health. However, actual tests and measurements from a health examination are needed to get much of the information.

The examinations done by the U. S. Public Health Service in the Health Examination Survey are focused on some of our most important health problems, such as heart trouble, diabetes, and arthritis and rheumatism. Information is collected on dental conditions, hearing, and vision. Also, there are various other scientific measurements made and laboratory tests performed by the specially trained team of physicians, dentists, nurses, X-ray and laboratory technicians, and medical-history interviewers.

The examination is not a substitute for a check-up by one's own physician or dentist. While the examination is quite thorough in some respects, it is not a complete examination; it does not require undressing below the waist, and no internal examinations are done. It is not painful or embarrassing in any way. None of the information collected about a person is revealed to anyone other than the person's own physician or dentist, and then only if the person specifically requests that the physician or dentist be given a report.

A good many of the people who read this handbill will either themselves be invited, or will be living close by people who will be invited, to take the health examination. It is very important that all the people invited—that is, all the people who are part of the sample—accept the invitation. No other persons can be accepted for the examination, no matter how much they would like to be examined. If you are one of those chosen, you will be personally informed of this fact.

Everyone is given free transportation to and from the examination, and everything about the examination itself is free. The examinations take place in a mobile Health Examination Center operated by the U. S. Public Health Service and are given at convenient hours during the day and in the evening. The center will be brought to Bexar County and set up in a convenient location, where examinations will be given beginning Friday, February 16.

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE

APPENDIX V

HOUSEHOLD INTERVIEW QUESTIONNAIRE OF THE HEALTH EXAMINATION SURVEY

The National Health Survey is authorized by Public Law 652 of the 84th Congress (70 Stat. 489; 42 U.S.C. 305). All information which would permit identification of the individual will be held strictly confidential, will be used only by persons engaged in and for the purposes of the survey, and will not be disclosed or released to others for any other purposes (22 FR 1687).

FORM HES-1 (3RD REVISION) (5-9-61)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
ACTING AS COLLECTING AGENT FOR THE
U.S. PUBLIC HEALTH SERVICE

HEALTH EXAMINATION SURVEY

1. Questionnaire ____ of ____ Questionnaires

2. (a) Address or description of location

3. Iden. Code | 3a. R.O. Code | 4. Sub-sample weight

5. Sample | 6. PSU No. | 7. Segment No. | 8. Serial No.

(b) Mailing address if not shown in (a): Include city and State

(c) Type of living quarters: ☐ Housing unit ☐ Other unit

(d) Name of Special Dwelling Place | Code

9. Is this house on a farm or ranch? ☐ Yes ☐ No

L

Ask Items 10 and 11 only, if "rural" box is checked: ☐ Rural ☐ All other

10. Do you own or rent this place? ☐ Own ☐ Rent ☐ Rent free

11. If "Own" or "rent free" in question 10, ask:

(a) Does this place have 10 or more acres?

If "rent" in question 10, ask:

(b) Does the place you rent have 10 or more acres?

☐ Yes → (c) During the past 12 months did sales of crops, livestock, and other farm products from the place amount to $50 or more? ☐ Yes ☐ No

☐ No → (d) During the past 12 months did sales of crops, livestock, and other farm products from the place amount to $250 or more? ☐ Yes ☐ No

12. Are there any other living quarters, occupied or vacant, in this building (apartment)? ..... ☐ Yes ☐ No

13. Does anyone else living in this building use YOUR ENTRANCE to get to his living quarters? .... ☐ Yes ☐ No

Ask at all units except apartment houses:

14. Is there any other building on this property for people to live in - either occupied or vacant? ..... ☐ Yes ☐ No

INSTRUCTIONS FOR Q. 12, 13, AND 14

If "Yes," to questions 12, 13, or 14 apply definition of a housing unit to determine whether one or more additional questionnaires should be filled and whether the listing is to be corrected.

15. What is the telephone number here? ☐ No phone

16. In case I've overlooked anything, what is the best time to call?

17. RECORD OF CALLS AT HOUSEHOLDS

Item		1	Com.	2	Com.	3	Com.	4	Com.	5	Com.
Entire household	Date										
	Time										
Calls for individuals (If call results in non-interview check first box that applies)	Date										
	Time										
	Col. No. ____			☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home		☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home		☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home		☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home	
	Date										
	Time										
	Col. No. ____			☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home		☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home		☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home		☐ No one home ☐ Sample P. not home ☐ Unrel. P. not home	

18. REASON FOR NON-INTERVIEW

TYPE	A	B	C	Z
Reason:	☐ Refusal *(Fill Item 19)* ☐ No one at home - repeated calls ☐ Temporarily absent ☐ Other *(Specify)*	☐ Vacant - non-seasonal ☐ Vacant - seasonal ☐ Usual residence elsewhere ☐ Armed Forces ☐ Other *(Specify)*	☐ Demolished ☐ In sample by mistake ☐ Eliminated in sub-sample ☐ Other *(Specify)*	Interview not obtained for: Cols. ____ ____ ____ ____ because: ____

19. Reason for refusal

Footnotes and comments

20. Signature of interviewer | 21. Code

1. (a) What is the name of the head of this household? (Enter name in first column) **(b) What are the names of all other persons who live here?** (List all persons who live here.) **(c) Do any (other) lodgers or roomers live here?** ☐ No ☐ Yes (List) → **(d) Is there anyone else who lives here who is now temporarily in a hospital?** ☐ No ☐ Yes (List) → **(e) Away on business?** ☐ No ☐ Yes (List) → **(f) On a visit?** ☐ No ☐ Yes (List) → **(g) Is there anyone else staying here now?** ☐ No ☐ Yes (List) → **(h) Do any of the people in this household have a home elsewhere?** ☐ No (leave on questionnaire) ☐ Yes (apply household membership rules; if not a household member, delete)	Last name (1) ☐ EA First name and initial
2. How are you related to the head of the household? (Enter relationship to head, for example: head, wife, daughter, grandson, mother-in-law, partner, lodger, lodger's wife, etc.)	Relationship Head
3. How old were you on your last birthday? (Check "EA" box in question 1 for all persons 18-79 years old)	Age ☐ Under 1 year
4. Race (Check one box for each person)	☐ White ☐ Negro ☐ Other
5. Sex (Check one box for each person)	☐ Male ☐ Female
If 17 years old or over, ask: **6. Are you now married, widowed, divorced, separated or never married?** (Check one box for each person)	☐ Under 17 years ☐ Married ☐ Divorced ☐ Widowed ☐ Separated ☐ Never married
If 17 years old or over, ask: **7. (a) What were you doing most of the past 12 months --** (For males): **working, or doing something else?** (For females): **working, keeping house, or doing something else?** If "Something else" checked, and person is 45 years old or over, ask: **(b) Are you retired?**	☐ Under 17 years ☐ Working ☐ Keeping house ☐ Something else ☐ Yes ☐ No
NOTE: Determine which adults are at home and record this information. Beginning with question 8 you are to interview for himself or herself, each adult person who is at home.	☐ Under 17 years ☐ At home ☐ Not at home
8. Were you sick at any time LAST WEEK OR THE WEEK BEFORE? (That is, the 2-week period which ended last Sunday)? **(a) What was the matter?** **(b) Anything else?**	☐ Yes ☐ No
9. Last week or the week before did you take any medicine or treatment for any condition (besides . . . which you told me about)? **(a) For what conditions?** **(b) Anything else?**	☐ Yes ☐ No
10. Last week or the week before did you have any accidents or injuries? **(a) What were they?** **(b) Anything else?**	☐ Yes ☐ No
11. Did you ever have an (any other) accident or injury that was still bothering you last week or the week before? **(a) In what way did it bother you?** **(b) Anything else?**	☐ Yes ☐ No
12. AT THE PRESENT TIME do you have any ailments or conditions that have lasted for a long time? (If "No") Even though they don't bother you all the time? **(a) What are they?** **(b) Anything else?**	☐ Yes ☐ No
13. Has anyone in the family - you, your --, etc. - had any of these conditions DURING THE PAST 12 MONTHS? (Read Card A, condition by condition; record any conditions mentioned in the column for the person)	☐ Yes ☐ No
14. Does anyone in the family have any of these conditions? (Read Card B, condition by condition; record any conditions mentioned in the column for the person)	☐ Yes ☐ No
15. (a) Have you been in a hospital at any time DURING THE PAST 12 MONTHS? If "Yes," **(b) How many times were you in the hospital overnight or longer?**	☐ Yes ☐ No _____ No. of times
16. If baby under one year listed as a household member, ask: **(a) Was the baby born in a hospital or at home?** If "hospital" in q. 16(a) and 1 or more in q. 15(b), ask: **(b) Was this hospitalization included in the number you just gave me?** (Check proper boxes for **both** mother and child.)	☐ Hospital ☐ Home ☐ Yes ☐ No
17. (a) During the past 12 months has anyone in the family been a patient in a nursing home or sanitarium? If "Yes," ask: **(b) Who was this?** **(c) How many times were you in a nursing home or sanitarium?**	☐ Yes ☐ No _____ No. of times
R (For q. 8-17) For persons 17 years old or over, show who responded for (or was present during the asking of) q. 8-17. If persons responded for self, show whether entirely or partly. For persons under 17 show who responded for them.	☐ Responded for self-entirely ☐ Responded for self-partly Col. ____ was respondent

Table I - ILLNESSES, IMPAIRMENTS, AND INJURIES

Line number	Col. No. of person (a)	Question No. (b)	**Did you EVER at any time talk to a doctor about . . . ?** (c)	Ask for all illnesses and present effects of old injuries: (a) If doctor talked to: **What did the doctor say it was? - - did he give it a medical name?** (b) If doctor not talked to: Record original entry and ask:(d-2) - (d-5) as required. Ask for all injuries during past 2 weeks: **What part of the body was hurt? What kind of injury was it? Anything else?** (d-1)	Ask if the entry in Col. (d-1) is: An Impairment, or a Symptom, or came from question 11 or 14: **What was the cause of . . .?** (d-2)	Ask only if 6 years old or over and blindness, poor vision, or eye trouble of any kind. **Can you see well enough to read ordinary newspaper print with glasses?** (d-3)	Ask for any entry in Col. (d-1) or Col. (d-2) that includes the words: Allergy* Asthma Cyst Growth Stroke* Tumor "Condition" "Disease" "Trouble" **What kind of . . . is it?** *For an allergy or stroke ask: **How does the allergy (stroke) affect you?** (d-4)	Ask only for: Impairments and injuries And for: Abscesses Aches Bleeding Blood Clot Boils Cancer Cyst Growth Infection Inflammation Neuralgia Neuritis Pains Sores Soreness Tumor Ulcers Weakness **What part of the body is affected?** Show detail for: **Ear or eye** - (one or both) **Head** - (Skull, scalp, face) **Back** - (Upper, middle, lower) **Arm** - (Shoulder, upper, elbow, lower, wrist, hand; one or both) **Leg** - (Hip, upper, knee, lower ankle, foot; one or both) (d-5)
1			☐ Yes ☐ No		x	☐ Yes ☐ No x	x	x
2			☐ Yes ☐ No		x	☐ Yes ☐ No x	x	x
3			☐ Yes ☐ No		x	☐ Yes ☐ No x	x	x
4			☐ Yes ☐ No		x	☐ Yes ☐ No x	x	x
5			☐ Yes ☐ No		x	☐ Yes ☐ No x	x	x
6			☐ Yes ☐ No		x	☐ Yes ☐ No x	x	x

Table II - HOSPITALIZATION DURING PAST 12 MONTHS

Line number	Col. No. of person (a)	Question No. (b)	**When did you enter the hospital?** (Month, year) (c)	**How many nights were you in the hospital?** (d)	To Interviewer: How many of these -- nights were in the past 12 months? (e)	To Interviewer: Will you need to ask Cols. (f) and (g)? (x)	To Interviewer: How many of these -- nights were last week or the week before? (f)	To Interviewer: Was this person still in the hospital on last Sunday night? (g)	**What did they say at the hospital the condition was -- did they give it a medical name?** (If "they" didn't say, ask): **What did the last doctor you talked to say it was?** (Entry must show "Cause," "Kind," and "Part of Body" in same detail as required in Table I) (h)
1			Mo:____ Yr:____	____ Nights	☐ All or ____ Nights	☐ Yes ☐ No	____ Nights ☐ None	☐ Yes ☐ No	
2			Mo:____ Yr:____	____ Nights	☐ All or ____ Nights	☐ Yes ☐ No	____ Nights ☐ None	☐ Yes ☐ No	
3			Mo:____ Yr:____	____ Nights	☐ All or ____ Nights	☐ Yes ☐ No	____ Nights ☐ None	☐ Yes ☐ No	

Table I - ILLNESSES, IMPAIRMENTS, AND INJURIES

LAST WEEK OR THE WEEK BEFORE did ... cause you to cut down on your usual activities for as much as a day? Check one: No (Go to Col. (k)) (e)	Yes → (f)	How many days, including the Saturdays and Sundays? (g)	How many of these -- days were you in bed all or most of the day? (h)	If 6 - 16 years old ask: How many days did ... keep you from school last week or the week before? (i)	If 17 years old or over ask: LAST WEEK or the WEEK BEFORE, how many days did ... keep you from work? (For females add) not counting work around the house? (j)	Did you first notice ... (did it happen) during the past 3 months OR before that time? Check one: Before 3 mos. (Go to Col. (n)) (k)	During 3 mos. → (l)	Did ... start during the past 2 weeks or before that time? (If during past 2 weeks, ask): Which week, last week or the week before? (m)	To interviewer: CONTINUE if Col. (k) is checked, or the condition is on Card A or is an impairment; otherwise, STOP (aa)	About how many days during the past 12 months, has ... kept you in bed for all or most of the day? (n)	If 1 or more days in Col. (n) and Col (e) is checked, ask: How many of these days were during last week or the week before? (o)	Ask after completing last condition for each person: Please look at this card and read each statement. Then tell me which statement fits you best, in terms of health. (Show Cards D-G, as appropriate) (p)	If "1," "2" or "3" in Col. (p): Is this because of any of the conditions you have told me about? (q)	If "Yes" in Col. (q): Which? (Enter X on line for each condition named) (r)	Line number
		____ Days	____ Days or ☐ None	____ Days or ☐ None	____ Days or ☐ None			☐ Last week ☐ Week before ☐ Before 2 wks		____ Days or ☐ None	____ Days or ☐ None		☐ Yes ☐ No		1
		____ Days	____ Days or ☐ None	____ Days or ☐ None	____ Days or ☐ None			☐ Last week ☐ Week before ☐ Before 2 wks		____ Days or ☐ None	____ Days or ☐ None		☐ Yes ☐ No		2
		____ Days	____ Days or ☐ None	____ Days or ☐ None	____ Days or ☐ None			☐ Last week ☐ Week before ☐ Before 2 wks		____ Days or ☐ None	____ Days or ☐ None		☐ Yes ☐ No		3
		____ Days	____ Days or ☐ None	____ Days or ☐ None	____ Days or ☐ None			☐ Last week ☐ Week before ☐ Before 2 wks		____ Days or ☐ None	____ Days or ☐ None		☐ Yes ☐ No		4
		____ Days	____ Days or ☐ None	____ Days or ☐ None	____ Days or ☐ None			☐ Last week ☐ Week before ☐ Before 2 wks		____ Days or ☐ None	____ Days or ☐ None		☐ Yes ☐ No		5
		____ Days	____ Days or ☐ None	____ Days or ☐ None	____ Days or ☐ None			☐ Last week ☐ Week before ☐ Before 2 wks		____ Days or ☐ None	____ Days or ☐ None		☐ Yes ☐ No		6

Table II - HOSPITALIZATION DURING PAST 12 MONTHS

Were any operations performed on you during this stay at the hospital? If "Yes," (a) What was the name of the operation? (b) Any other operations? (i)	What is the name and address of the hospital you were in? (Enter name, city and State; if city not known, enter county) (j)	To Interviewer: Carry this condition through Table I, if it does not appear there AND 1 or more nights in Col. (f), OR condition is on Card A, or is an impairment. Will you need to fill Table I? (xx)	Line number
☐ Yes ☐ No		☐ Yes ☐ No	1
☐ Yes ☐ No		☐ Yes ☐ No	2
☐ Yes ☐ No		☐ Yes ☐ No	3

If 17 years old or over, ask: **18. (a) What is the highest grade you attended in school?** (Circle highest grade attended or check "None") **(b) Did you finish the -- grade (year)?**	☐ Under 17 years Elem: 1 2 3 4 5 6 7 8 High: 1 2 3 4 College: 1 2 3 4 5+ ☐ None ☐ Yes ☐ No
If Male and 17 years old or over, ask: **19. (a) Did you ever serve in the Armed Forces of the United States?** If "Yes," ask: **(b) Are you now in the Armed Forces, not counting the reserves?** (If "Yes," delete this person from questionnaire) → **(c) Was any of your service during a war or was it peace-time only?** If "War," ask: **(d) During which war did you serve?** If "Peace-time" only, ask: **(e) Was any of your service between June 27, 1950, and January 31, 1955?**	☐ Fem. or und. 17 yrs. ☐ Yes ☐ No ☐ Yes ☐ No ☐ War ☐ Peace-time only ☐ WW II ☐ Korean ☐ Other ☐ Yes ☐ No
Ask for all persons 17 years old or over: **20. (a) Did you work at any time last week or the week before?** If "No," ask 20(b) and (c). **(b) Even though you did not work last week or the week before do you have a job or business?** **(c) Were you looking for work or on layoff from a job?**	☐ Under 17 years ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No
21. If "Yes," in question 20(a), (b), or (c), ask: If "Yes" in q. 20(c); q. 21(a) - (e) applies to the person's last full-time civilian job. **(a) For whom did you work?** **(b) What kind of business or industry was this?** **(c) What kind of work were you doing?** **(d) Class of worker** (Fill from information above; or, if not clear, ask): Ask only for persons 20 years old or over: **(e) Have you been a --, or doing this kind of work for the past three years?**	Name of employer: Industry: Occupation: ☐ Private-paid ☐ Gov't ☐ Own ☐ Non-paid ☐ Under 20 years ☐ Yes ☐ No
22. Which of these income groups represents your total family income for the past 12 months, that is, your's, your---'s etc? (Show Card H.) **Include income from all sources, such as wages, salaries, rents from property, pensions, help from relatives, etc.**	Group
S Ask only for sample persons not at home at time of interview: **What is the best time to find---at home?**	Time/day

TO BE FILLED BY INTERVIEWER AFTER INTERVIEWING SAMPLE PERSON(S) -- **NOT** TO BE ASKED OF RESPONDENTS

Section 1

(a) Did anyone ask one or more questions about the health examination? ☐ Yes ☐ No If "Yes," (b) What were the questions?

Section 2

Please write in below your suggestions for overcoming problems during follow-up visits. ☐ No problems observed

ASK ONLY OF SAMPLE PERSON(S)		
Enter name and column number of sample person (from question 1).	Name Column number	Name Column number
23. Would you say your own health, in general, is excellent, good, fair, or poor?	1 ☐ Excellent 2 ☐ Good 3 ☐ Fair 4 ☐ Poor 5 ☐ DK	1 ☐ Excellent 2 ☐ Good 3 ☐ Fair 4 ☐ Poor 5 ☐ DK
24. How important do you think it is for people to have a regular check-up . . . very important, fairly important, or hardly important at all?	1 ☐ Very important 2 ☐ Fairly important 3 ☐ Hardly important 4 ☐ DK	1 ☐ Very important 2 ☐ Fairly important 3 ☐ Hardly important 4 ☐ DK
25. (a) Do you have a doctor you usually go to? If "Yes," (b) What is his name and address?	1 ☐ Yes 2 ☐ No _____ _____	1 ☐ Yes 2 ☐ No _____ _____
26. How long has it been since you last talked to any doctor about yourself?	_____ Mos. or _____ Yrs. ☐ Less than 1 mo. ☐ Never	_____ Mos. or _____ Yrs. ☐ Less than 1 mo. ☐ Never
27. Do you get check-ups from a doctor AS OFTEN as once every two years?	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No
28. (a) Do you have a dentist you usually go to? If "Yes," (b) What is his name and address?	1 ☐ Yes 2 ☐ No _____ _____	1 ☐ Yes 2 ☐ No _____ _____
29. How long has it been since you last saw a dentist about yourself?	_____ Mos. or _____ Yrs. ☐ Less than 1 mo. ☐ Never	_____ Mos. or _____ Yrs. ☐ Less than 1 mo. ☐ Never
30. Do you go to a dentist AS OFTEN as once every year?	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No
31. (a) Have you heard or read anything recently about the National Health Survey and the special health examinations being given in this area? If "Yes," (b) In a newspaper or magazine? On TV? Radio? From somebody telling you about it? *(Check all that apply)* If "newspaper," (c) Which newspaper?	1 ☐ Yes 2 ☐ No *(Show clipping)* 3 ☐ NHS newspaper 4 ☐ Other newspaper 5 ☐ TV programs 6 ☐ Radio programs 7 ☐ Somebody telling	1 ☐ Yes 2 ☐ No *(Show clipping)* 3 ☐ NHS newspaper 4 ☐ Other newspaper 5 ☐ TV programs 6 ☐ Radio programs 7 ☐ Somebody telling
32. How important do you think it is for people to cooperate on surveys such as this . . . very important, fairly important, or hardly important at all?	1 ☐ Very important 2 ☐ Fairly important 3 ☐ Hardly important 4 ☐ DK	1 ☐ Very important 2 ☐ Fairly important 3 ☐ Hardly important 4 ☐ DK
33. As you might expect, the Public Health Service cannot learn all they need to know about health in the nation just by asking questions. For some things they need actual measurements and tests obtained in a health examination. (a) How do you think most people will feel about helping in this way -- will they certainly come, probably come or probably not come for such a health examination?	1 ☐ Certainly come 2 ☐ Probably come 3 ☐ Probably not come 4 ☐ DK	1 ☐ Certainly come 2 ☐ Probably come 3 ☐ Probably not come 4 ☐ DK
34. Throughout the United States, the Public Health Service is giving a health examination to a sample of adults and you are in this sample. For your community, a special examination center has been set up at _____ and the examinations will be given from _____ through _____. The examination is not painful or embarrassing in any way and free transportation to and from the center will be provided. From our past experience we know that most people are glad to come for the examination. Appointment times are available during morning, afternoon and evening hours. (a) We would like to make an appointment for you -- which time would be most convenient for you to come?	Preferred times: ☐ Appointment made: _____ No. Date _____ Time _____ *(Specify any problems mentioned about coming)* ☐ Appointment not made *(Specify reason for no appointment)*	Preferred times: ☐ Appointment made: _____ No. Date _____ Time _____ *(Specify any problems mentioned about coming)* ☐ Appointment not made *(Specify reason for no appointment)*
35. Present medical authorization for signature	☐ Signed ☐ Refused to sign ☐ Not asked	☐ Signed ☐ Refused to sign ☐ Not asked

19. (a) Did you ever serve in the Armed Forces of the United States? If "Yes," ask: Rem. or und. 17 yrs. ☐ Yes ☐ No

APPENDIX VI

LEAFLET GIVEN EXAMINEE WHEN APPOINTMENT IS MADE

YOU

AND THE

HEALTH

EXAMINATION

SURVEY

Why you?

If you have been asked to come to our examining center, you are one member of a very important group of people who, taken all together, make up a representative sample of the people of the United States. From this sample will come important scientific information on the health of the entire United States. You will be the representative of thousands of others who are just like you--the same age, same schooling, and most important of all, the same level of health. However, the fact that there are thousands of other people whom you represent does not mean that there is anyone who can take your place. The scientific sampling method has led us to YOU. If you are not there to represent those thousands, their part in the health picture is missing and the picture may be misleading.

What to expect:

The health examination which you will receive is very thorough in some respects, but is not a complete examination. For example, no internal examinations will be done. All of our staff--the receptionist, the physician, the nurse, the dentist, the technician--will do everything to make your visit to the examining center a pleasant experience.

At the start, you meet the receptionist who will ask if you would like the findings of the examination sent to your own physician and dentist. This is so that your own doctor can tell you about the results. Then the receptionist gives you a sweet, lemon-flavored soft drink. After that, she helps you fill out a questionnaire that contains the kinds of questions your doctor asks when he gets your medical history.

After this, the nurse will be with you during the rest of the examination, explaining each step. She shows you to an examining room, asks you to undress to the waist and put on a white gown.

After you meet the doctor, he reads over your medical history and asks a few questions about it. He examines your eyes and ears, takes your blood pressure several times, and makes a complete examination of your heart by listening to the sounds it makes.

After you meet the dentist, he checks over your teeth and mouth. He also gives you an eye test--if you have eyeglasses, please be sure to bring them with you, because we need to test your vision both with and without glasses.

In another part of the examination the nurse makes a record of the impulses of your heart with an electrocardiograph (EKG)--for this test you lie down, relax, and even go to sleep if you wish. But you can't sleep long because this test takes a very short time. Some simple body measurements, such as arm and chest size, shoulder width, etc., will also be done.

Other parts of the examination include; a hearing test; x-rays of your chest, hands and feet; height and weight; blood and urine specimens.

After you have dressed, you are invited to enjoy refreshments while you give us your opinion and reactions to the health examination. Knowing what you think about it helps us to improve and to make the examination even more comfortable and convenient.

THE U. S. NATIONAL HEALTH SURVEY

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Washington 25, D.C.

U.S. NATIONAL HEALTH SURVEY

HES-4
9-59

APPENDIX VII

SELECTED MEDICAL HISTORY QUESTIONS

(Excerpts From HES-204, Medical History—Self Administered)

A. Cardiovascular Disease

1. a. In the past few years have you had any headaches? YES NO ?
   If YES b. How often? Every few days Less often
   c. Do they bother you quite a bit just a little

2. a. In the past few years have you had any nosebleeds? YES NO ?
   If YES b. How often? Every few days Less often
   c. Do they bother you quite a bit just a little

3. a. At any time over the past few years, have you ever noticed ringing in your ears or have you been bothered by other funny noises In your ears? YES NO ?
   If YES b. How often? Every few days Less often
   c. Do they bother you quite a bit just a little

4. a. Have you ever had spells of dizziness? YES NO ?
   If YES b. How often? Every few days Less often
   c. Do they bother you quite a bit just a little

5. Have you ever fainted or blacked out? YES NO ?

6. a. Have you ever had a stroke? YES NO ?
   If YES b. Have you had a stroke in the past 12 months? YES NO ?
   c. Have you ever seen a doctor about it? YES NO ?

7. Has any part of your body ever been paralyzed? YES NO ?

9. Was there anytime in your life when you had a lot of bad sore throats? YES NO ?

16. a. Have you ever been bothered by shortness of breath when climbing stairs? YES NO ?
   If YES b. How often? Almost everytime Less often
   c. Does it bother you quite a bit just a little

17. a. Have you ever been bothered by shortness of breath when doing physical work or exercising? [YES] [NO] [?]

If YES b. How often? [Almost everytime] [Less often]

c. Does it bother you [quite a bit] [just a little]

18. a. Have you ever been bothered by shortness of breath when you were not doing physical work or exercising? [YES] [NO] [?]

If YES b. How often? [Every few days] [Less often]

c. Does it bother you [quite a bit] [just a little]

19. a. Have you ever been bothered by shortness of breath when you are excited or upset about something? [YES] [NO] [?]

If YES b. How often? [Almost everytime] [Less often]

c. Does it bother you [quite a bit] [just a little]

20. a. Have you ever waked up at night because you were short of breath? [YES] [NO] [?]

If YES b. How often? [Every few nights] [Less often]

c. Does it bother you [quite a bit] [just a little]

21. a. In the past few years, have you ever had any pain, discomfort, or tightness in your chest? [YES] [NO] [?]

IF YES, please answer questions b through j below.

b. How often? [Every few days] [Less often]

c. Does it bother you [quite a bit] [just a little]

d. Where does it bother you? (Check every place it bothers you.)

[Front] [Back] [Right side] [Middle] [Left side]

[Somewhere else] State where _____

e. Does it usually [stay in one place] [move around] [?]

f. How long does the pain usually last?

[Just a few minutes] [Few minutes to an hour] [More than an hour]

g. Does it usually come [When you take a lot of exercise] or [when you are quiet] or [is there no difference]

h. Does it usually come [when you are upset] or [doesn't this make any difference]

j. Do you take any pills or medicine for it? [YES] [NO] [?]

22. a. In the past few years, have you ever had any pain, discomfort, or trouble in or around your heart? YES NO ?

IF YES, please answer questions b through j below.

b. How often? Every few days Less often

c. Does it bother you quite a bit just a little

d. Where does it bother you? (Check every place it bothers you.)

Front Back Right side Middle Left side

Somewhere else State where _____

e. Does it usually stay in one place move around ?

f. How long does the pain usually last?

Just a few minutes Few minutes to an hour More than an hour

g. Does it usually come When you take a lot of exercise or

when you are quiet or

is there no difference

h. Does it usually come when you are upset or

doesn't this make any difference

j. Do you take any pills or medicine for it? YES NO ?

23. a. Sometimes, our hearts "act funny" (odd) like missing a beat, or beating real fast, or seem to turn over. Have you ever noticed your heart do anything like that? YES NO ?

If YES b. How often? Every few days Less often

c. Does it bother you quite a bit just a little

24. a. Have you ever been bothered by your heart beating hard? YES NO ?

If YES b. How often? Every few days Less often

c. Does this bother you quite a bit just a little

25. a. Are your ankles ever swollen at bedtime? YES NO ?

If YES b. Is the swelling gone by morning? YES NO ?

26. a. When you walk, do you have pains or cramps in your legs? YES NO ?

If YES b. How often? Every few days Less often

c. Does it bother you quite a bit just a little

65. a. Has a doctor ever told you that you have hardening of the arteries? YES NO

If YES b. Have you had this condition in the past 12 months? YES NO ?

66. a. Have you ever had any reason to think you may have high blood pressure? [YES] [NO] [?]

If YES or ? b. Did a doctor tell you it was high blood pressure? [YES] [NO]

c. How long ago did you first start having it?
[1 year] [1-5 years] [over 5 years]

d. Have you had it in the past 12 months? [YES] [NO] [?]

e. Do you take any pills or medicine for it? [YES] [NO] [?]

If YES f. Give name of the medicine_____

67. a. Have you ever had any reason to think you may have heart trouble? [YES] [NO] [?]

If YES or ? b. Did a doctor tell you that you had heart trouble? [YES] [NO]

If YES, what did he call it?_____

c. How long ago did you first start having it?
[1 year] [1-5 years] [over 5 years]

d. Have you had it in the past 12 months? [YES] [NO] [?]

e. Do you take any pills or medicine for it? [YES] [NO] [?]

If YES f. Give name of the medicine_____

B. Arthritis and Rheumatism

27. a. Have you ever had morning stiffness, or weakness when you get up? [YES] [NO] [?]

If YES b. How often? [Every few days] [Less often]

c. Does it bother you [quite a bit] [just a little]

28. a. How about swelling of the joints? Have you noticed anything like that? [YES] [NO] [?]

If YES b. How often? [Every few days] [Less often]

c. Does it bother you [quite a bit] [just a little]

29. a. How about pain in the joints? Have you noticed anything like that? [YES] [NO] [?]

If YES b. How often? [Every few days] [Less often]

c. Does it bother you [quite a bit] [just a little]

30. a. How about tenderness of the joints? Have you noticed anything like that? [YES] [NO] [?]

If YES b. How often? [Every few days] [Less often]

c. Does it bother you [quite a bit] [just a little]

61. a. Have you ever had any reason to think you may have rheumatism or arthritis? YES NO ?

If YES or ? b. Did a doctor tell you it was rheumatism or arthritis? YES NO

c. How long ago did you first start having it?

1 year | 1-5 years | over 5 years

d. Have you had it in the past 12 months? YES NO ?

e. Do you take any pills or medicine for it? YES NO ?

62. a. Has a doctor ever said you had rheumatic fever (inflammatory rheumatism) YES NO

If YES b. Have you had it in the past 12 months? YES NO ?

c. Are you taking any pills or medicine for it? YES NO

If YES d. What is it? _____

64. Has a doctor ever said you had gout? YES NO

C. Diabetes

69. Have you had any recent increase in being thirsty (drink a lot of water)? YES NO ?

70. Have you had any recent increase in urination (pass a lot of water)? YES NO ?

71. a. Have you lost any weight recently (without trying to)? YES NO ?

IF YES:

b. How much weight have you lost? _____ lbs.

c. Over what period of time have you lost this weight? _____

72. a. Has any of your relatives ever had diabetes? YES NO ?

IF YES:

b. Please give relationship of this person or these persons to you: _____

APPENDIX VIII

NOTES ON STATISTICAL DESIGN

Outline of Design Development

This outline is restricted primarily to the more exclusively statistical aspects of the designing, and within that confine to a severely abstracted account.

As already noted in this report, a survey design is the product of an iterative process in which, in successive steps, a closer and closer match is attempted among objectives, feasible operating procedures, budget, other resources, and idealized mathematical models. In the Health Examination Survey, this process began in the summer of 1957 with review of earlier experience of others in related matters, with many staff discussions of problems and possibilities, and with the initiation of several exploratory and developmental projects. These latter projects were to be carried out mostly by research contractors, and were intended to shed more light on specific examining and measurement techniques and on methods of securing favorable response to the offer of a clinical examination. Soon there began the specifications and procurement of needed equipment.

By the fall of 1958, the general pattern of the Survey was emerging. It had been decided that the examinations would be conducted in mobile caravans, and would, for the first cycle, cover the adult, civilian, noninstitutional population. The general content of the examination itself was chosen. It seemed desirable that the regular HIS data be obtained for all prospective examinees prior to the examination. This step would be taken for two reasons: first, it was to be the fundamental sampling procedure, and second, it would provide data which might clarify the relationship between the Health Interview Survey and the Health Examination Survey.

Now a streamlined statistical model was developed. It contemplated a three-stage sampling process, with the first of these stages subdivided into parts, so that four levels of units were recognized: Primary Sampling Units, locations (of examining places within PSU's), clusters (of households), and persons. To convert the purely algebraic model to operational indicators, it was necessary to implement the mathematical analysis with estimates of likely values of a good many parameters.

Estimation of needed parameters in a new kind of undertaking is always difficult. For this part of the job, it included determinations of total budget, overhead costs, unit costs for scores of activities, population variances for quite a variety of groups of persons, and target tolerances for typical end products. The estimates were made. Experience in pretests and data from the Health Interview Survey played an important role here.

The formal solution for this first model yielded a plan with 38 PSU's, 1,347 clusters of households, and 5,538 examinees. The scheme envisaged an average of about 4 examinees per cluster, 36 clusters per PSU, and 146 examinees per PSU. The first results also pointed to one location per PSU in areas with low density of population, two locations in medium-density areas, and three locations in high-density areas. As planning work proceeded, there were many revisions of the estimated parameters, but the final design is very similar to the initial model.

Of technical interest was the conclusion that the "optimum is broad" for the circumstances of this survey. More specifically, it was decided that there was not a great difference in expected precision or cost for a design of 30 PSU's with 200 examinees per PSU, and one of 50 PSU's with about 120 examinees per PSU. Some of the scheduling and operating problems, however, would be rather different for these two situations.

Many questions remained to be settled before the design was complete. Some of these were decided on the basis of administrative or supervisory judgment. But wherever possible, data from the three pretests were utilized in conjunction with principles of securing either minimum variance, or minimum cost. Among the decisions which have a distinct effect on the design are these:

1. Making the design essentially self-weighting.
2. Introduction of the three subsamples or rounds.
3. Use of four or five interviewers at each stand.
4. Assignment of examinees alternately to each of two nurse-physician teams.
5. Selection of an average of one person per household from four households in a segment, rather than two persons from each of two households in a segment. (Both schemes were tested.)
6. Insistence that there be close to 150 examinees at each location. This step was taken with some loss from unequal sampling fractions, but for the reasons indicated in another section of this report.
7. Deletion of a procedure for taking the examination into the home of the sample person who would not come to the caravan center.
8. Decision to adopt but very limited use of auxiliary medical data for nonrespondents, as distinct from other possible courses of using such data wherever they might be found.
9. Introduction of multiple reading of X-ray and EKG charts.
10. Pretest tabulation of such readings as height and weight, in order to improve coding and recording instructions.

11. Establishing an itinerary which is geared subjectively to hoped-for maximum response, and moderate travel cost, rather than random sequencing. This meant, for example, examining all West Coast locations consecutively, avoiding northern Wisconsin in midwinter, and avoiding New York City in vacation-prevalent July and August. In addition, budget shortages at one point in time led to a rerouting which was somewhat less desirable than the original choice had been. This rerouting also has delayed the completion of Round I by approximately six months.

Definition of Universe

The universe to be covered by the Health Examination Survey is the "civilian, noninstitutional, population of the United States." But every word in this title needs more careful definition in the conduct of the Survey. The operational definition covers many pages of field manuals. Prominent characteristics are the following:

The United States is restricted for cost reasons alone to the mainland, excluding Alaska and Hawaii. The time period is considered the "average over the three-year period ending late in 1962." Noninstitutional is defined by exclusion through an extensive list of types of places. In particular, among the out-of-scope places are correctional institutions, resident hospitals and nursing-care homes, and homes for the needy. Civilian personnel resident at a miltary base are included.

There is a variety of special cases about which there may be difference of opinion as to whether they should or should not be within scope. Among these, for example, are American Indians living on reservations. It was decided that they should be included. There are several classes of cases for which inclusion or exclusion is largely a matter of semantics (and associated estimation procedures). These arise from the fact that the nature of the examining process is such that it is restricted to the physically available ambulatory population. For any other person, the choice is to consider him out-of-scope, or nonrespondent. Examples of such persons are: people who die between the time they are selected for the sample and the time they are scheduled for examination; persons who are in hospitals, or otherwise physically unable to go or be taken to the caravan center; persons in jail (local jails are not considered institutions); crews of vessels and other persons who are not at their place of residence at any time at which the HES examining team is available in their community.

On Basic Estimation Technique

Not so long ago estimates of population parameters were limited to inflation of sample data by the reciprocal of the sampling fraction. A wider range of possibilities exists today. This greater latitude is largely a function of the doctrine of making maximum use of all relevant information. The newer methods include such processes as ratio estimation—which will be used in the HES summary routine—and regression, difference, and poststratification techniques. Data from Round I will be used to explore the applicability of some of these processes. Of particular interest is possible use of the extensive HIS data (some 360,000 persons) in conjunction with the HES raw data.

Consider the situation within the $a^{\underline{th}}$ age-sex category. Assume that the HES interview sample (6,300 total persons) shows p''_{a1} as the estimated relative number of persons with a characteristic which is correlated with the x-characteristic. As an illustration, say p''_{a1} is the estimated proportion from the HES interview of persons with one or more chronic conditions in the arthritis or cardiovascular groups, and $\bar{x}'''_{a1}$ is a preliminary estimated relative number of persons in those groups with a positive cardiovascular examination statistical diagnosis. Similarly p''_{a2} is the HES-interview estimate of the proportion of persons without the indicated condition and $\bar{x}'''_{a2}$ is the examination estimate of the relative number in this latter group with the cardiovascular diagnosis.

There are from the Health Interview Survey (360,000 persons) estimates p'_{a1} and p'_{a2} which correspond, respectively, to p''_{a1} and p''_{a2}, and which have smaller sampling variance. It may be, then, that

$$x''_a = y''_a \sum_i p'_{ai} \bar{x}'''_{ai}$$ is a better estimate than

$$x'''_a = y'''_a \sum_i p''_{ai} \bar{x}'''_{ai}$$

would be, where both y''_a and y'''_a are sample estimates of total number of persons in the $a^{\underline{th}}$ class. Note that

$$x'''_a = y'''_a \sum_i p''_{ai} \bar{x}'''_{ai}$$ is exactly the estimate

which would have been obtained if all interview data had been disregarded.

Whether an estimate of the form x''_a will be utilized or the "preliminary" estimate x'''_a, will be determined from analysis of data from Round I.

Within PSU Sampling Variations

The typical procedure for selection of examinees within a PSU has been described previously in this report. It was stated that the detailed procedure varies somewhat from one place to another. Two of the variations, used in several places, are described briefly here.

In the later stands of the cycle, use is made of data which have become available from the 1960 Population Census. In order to reduce costs, the principal part of the sample is drawn from the address registers which were established as a part of the Census-taking process. These list samples are then supplemented with samples of new construction—obtained from building permit files—in order to cover addresses which were not in existence at the time of the Census. For the major part of the list sample, "Super-segments" of 20 adjacent addresses are drawn, and then subsampled to produce the standard HES subsegment of an expected four households.

For very large metropolitan areas, even with two or more locations of the examining caravan, it is quite difficult and costly to persuade sample persons from

all parts of the area to come to the examining center. For such areas, an additional subsampling stage has been introduced. This has been termed the "satellite" system. It is illustrated in the stylized figure 1. The metropolitan area is divided into seven subareas: a central city, and six radial arms. The final sample area consists of the central city, and two of the six satellite areas, the latter being drawn randomly and within-sampled more heavily so that they represent the total satellite territory. Two locations of the caravans are used, at places appropriate for travel to and from the chosen subareas—in figure 1, say, at points A and B, if satellite areas II and V are drawn into the sample.

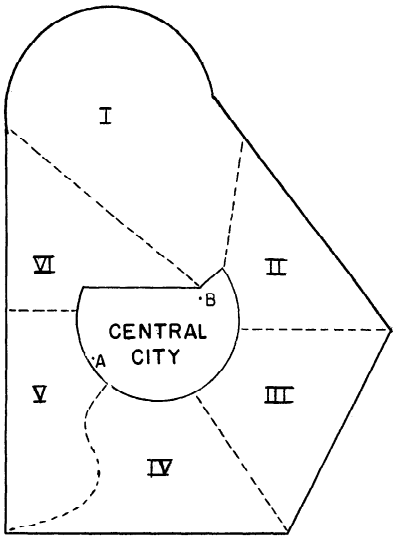


Figure 1. Locations A and B for a major metropolitan area in which the sample areas are the Central City and subareas II and V of the six satellite territories.

The Master Control Card

With the complex survey design, and many variable factors associated with the undertaking, it is necessary to know rather precisely the status of every sample person. For this purpose, and for ultimate use in instructing the electronic computer for data processing, a master control card is established for each sample person. Through the common tie of examinee number (which is assigned to each sample person, whether examined or not), information on the control card can be integrated with any other data which pertain to that examinee.

The master control card contains the following items: a set of eight basic design weights which account for all stages of sample selection and variations in the central design; a set of four estimation weights which reflect relevant interview data and population controls; a single one-digit summary weight for use in experimental and preliminary punchcard procedures; the examinee number; stand number (PSU); segment number; superstratum number (geography and population density); first-stage type (certainty or noncertainty); round number; second-stage selection code (satellite status); location code (within PSU); age; sex; and examination status (showing whether examined; if not, why; and if auxiliary data obtained, source of data).

Illustration of Selection of a Stand

The illustration is for the selection of one of the stands in the 15-cell matrix which represents "Other SMSA's in the South," and more specifically that one of the 42-strata described as "southern SMSA's with less than 141,000 population in 1950 plus 6 larger southern SMSA's with similar characteristics."

Table I. Data for selection of a stand (small southern SMSA's)

Substratum in 500 area design	Substratum population in millions in 1950	500 area sample PSU 1950 population
1. Orlando, Fla.	114	114
2. Baton Rouge, La.	156	156
3. Montgomery, Ala.	138	138
4. Lubbock, Tex. Wichita Falls, Tex.	199	101
5. Durham, N.C. Winston-Salem, N.C.	246	101
6. Jackson, Miss.	141	141
7. Gadsden, Ala. Lexington, Ky.	192	94
8. Roanoke, Va.	133	133
9. Greenville, S.C.	167	167
10. Waco, Tex. Galveston, Tex.	241	129
11. Savannah, Ga.	151	151
12. Asheville, N.C. Raleigh, N.C.	258	123
13. Augusta, Ga.	162	162
14. Mobile, Ala.	228	228
15. Amarillo, Tex. Laredo, Tex. San Angelo, Tex.	201	87
16. Corpus Christi, Tex.	164	164
17. Shreveport, La.	174	174
18. Macon, Ga.	134	134
Stratum total--	3,199	

Table I exhibits pertinent information. This stratum had 3,199,000 population in 1950. Some of the 18 substrata contain more than one PSU, but each substratum was represented in the 500-area design by a single PSU; namely the one for which 1950 population is shown in the right-hand column of the table. Controlled selection had determined earlier that in the 42-area design

this stratum was to be represented by either a Florida or a Georgia PSU. Consequently the Florida and Georgia PSU's (of the 500 area sample) were listed along with cumulative population:

PSU	Stratum 1950 population	Cumulative population
Orlando, Fla.	114	114
Savannah, Ga.	151	265
Augusta, Ga.	162	427
Macon, Ga.	134	561

Each of these areas had first been picked with probability proportionate to size (PPS) to represent its stratum; a single choice was made among the four, again with PPS, so that the total process is a selection with PPS. The random number in this instance was 119, and thus selected Savannah, Georgia, to represent the stratum of 25 PSU's. The reciprocal of over-all probability of selection of Savannah is 3,199,000/151,000, or 21.19. It should be noted in this process that the population weight ascribed to the PSU's among which selection is made is that of the stratum (in the 500 area design) from which it came, and not just the population of the selected PSU.

☆U. S. GOVERNMENT PRINTING OFFICE : 1965 O - 775-521

REPORTS FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Public Health Service Publication No. 1000

Series 1. Programs and collection procedures

No. 1. Origin, Program, and Operation of the U.S. National Health Survey. 35 cents.
No. 2. Health Survey Procedure: Concepts, Questionnaire Development, and Definitions in the Health Interview Survey. 45 cents.
No. 3. Development and Maintenance of a National Inventory of Hospitals and Institutions. 25 cents.
No. 4. Plan and Initial Program of the Health Examination Survey.

Series 2. Data evaluation and methods research

No. 1. Comparison of Two-Vision Testing Devices. 30 cents.
No. 2. Measurement of Personal Health Expenditures. 45 cents.
No. 3. The One-Hour Glucose Tolerance Test. 30 cents.
No. 4. Comparison of Two Methods of Constructing Abridged Life Tables. 15 cents.
No. 5. An Index of Health: Mathematical Models.
No. 6. Reporting of Hospitalization in the Health Interview Survey.
No. 7. Health Interview Responses Compared With Medical Records.
No. 8. Comparison of Hospitalization Reporting in Three Survey Procedures.
No. 9. Cooperation in Health Examination Surveys.
No. 10. Hospital Utilization in the Last Year of Life.

Series 3. Analytical studies

No. 1. The Change in Mortality Trend in the United States. 35 cents.
No. 2. Recent Mortality Trends in Chile. 30 cents.

Series 4. Documents and committee reports

No reports to date.

Series 10. Data From the Health Interview Survey

No. 1. Acute Conditions, Incidence and Associated Disability, United States, July 1961-June 1962. 40 cents.
No. 2. Family Income in Relation to Selected Health Characteristics, United States. 40 cents.
No. 3. Length of Convalescence After Surgery, United States, July 1960-June 1961. 35 cents.
No. 4. Disability Days, United States, July 1961-June 1962. 40 cents.
No. 5. Current Estimates From the Health Interview Survey, United States, July 1962-June 1963. 35 cents.
No. 6. Impairments Due to Injury, by Class and Type of Accident, United States, July 1959-June 1961. 25 cents.
No. 7. Disability Among Persons in the Labor Force, by Employment Status, United States, July 1961-June 1962. 40 cents.
No. 8. Types of Injuries, Incidence and Associated Disability, United States, July 1957-June 1961. 35 cents.
No. 9. Medical Care, Health Status, and Family Income, United States. 55 cents.
No. 10. Acute Conditions, Incidence and Associated Disability, United States, July 1962-June 1963. 45 cents.
No. 11. Health Insurance Coverage, United States, July 1962-June 1963. 35 cents.
No. 12. Bed Disability Among the Chronically Limited, United States, July 1957-June 1961. 45 cents.
No. 13. Current Estimates From the Health Interview Survey, United States, July 1963-June 1964. 40 cents.
No. 14. Illness, Disability, and Hospitalization Among Veterans, United States, July 1957-June 1961. 35 cents.
No. 15. Acute Conditions, Incidence and Associated Disability, United States, July 1963-June 1964. 40 cents.
No. 16. Health Insurance, Type of Insuring Organization and Multiple Coverage, United States, July 1962-June 1963. 35 cents.
No. 17. Chronic Conditions and Activity Limitations, United States, July 1961-June 1963. 35 cents.

Series 11. Data From the Health Examination Survey

No. 1. Cycle I of the Health Examination Survey: Sample and Response, United States, 1960-1962. 30 cents.
No. 2. Glucose Tolerance of Adults, United States, 1960-1962. 25 cents.
No. 3. Binocular Visual Acuity of Adults, United States, 1960-1962. 25 cents.
No. 4. Blood Pressure of Adults, by Age and Sex, United States, 1960-1962. 35 cents.
No. 5. Blood Pressure of Adults, by Race and Region, United States, 1960-1962. 25 cents.
No. 6. Heart Disease in Adults, United States, 1960-1962. 35 cents.
No. 7. Selected Dental Findings in Adults, United States, 1960-1962. 30 cents.
No. 8. Weight, Height, and Selected Body Dimensions of Adults, United States, 1960-1962.
No. 9. Findings on the Serologic Test for Syphilis in Adults, United States, 1960-1962.

Series 12. Data From the Health Records Survey

No reports to date.

Series 20. Data on mortality

No reports to date.

Series 21. Data on natality, marriage, and divorce

No. 1. Natality Statistics Analysis, United States, 1962. 45 cents.
No. 2. Demographic Characteristics of Persons Married Between January 1955 and June 1958, United States. 35 cents.

Series 22. Data from the program of sample surveys related to vital records.

No reports to date.