Appendix A.
Definitions and Questionnaire: 1993

GENERAL DEFINITIONS

Introduction. Definitions for some items have changed over time. For a discussion of historical changes, see appendix C. The definitions in this appendix represent the situation at the time of this survey. To help find topics in this appendix, readers may want to use the Subject Index at the back of this book.

The American Housing Survey was conducted by personal interview. The survey interviewers were instructed to read the questions directly from the questionnaire. The definitions and explanations given for each subject are, to a considerable extent, drawn from various technical and procedural materials used in the collection of the data. These materials helped the field interviewers to understand more fully the intent of each question and, thus, to resolve problems or unusual cases. Additional explanatory information has been added to this portion of the text to assist the user in understanding the statistics.

Medians. We estimate each median from the printed distribution. If there are 10 million homes of a particular type, the median is the 5 millionth, or halfway point of these homes. Therefore, if 4 million homes are below $400 rent, then the median is the millionth home above $400. Finally, if the next interval printed in the book (from $400 to $449), has 3 million homes, the median is assumed to be one-third of the way through the interval (at $417). Actually, this technique overestimates medians by a few percent since most homes cluster at the bottom of their intervals. The clustering happens because landlords ask for rent in round numbers, like $400, and people give answers in round numbers, like $20,000 income, or 40 years old. There are two special cases in calculating medians: For education, we assume that an interval like ''completed twelve years'' means 12.00 to 12.99, so one-third of the way through is 12.33. For numbers of people or rooms, we assume an interval like 3 means 2.50 to 3.49, so one-third of the way through is 2.83. This method is used rather than just saying that the median is 3, in order to give a more detailed picture of the distribution. We do not show the median at all if the distribution is estimated to have fewer than 25 sample cases (50,000 homes in the national report, smaller numbers in the metropolitan reports).

Comparability with 1990 Census of Population and Housing data. The concepts and definitions are essentially the same for items that appear in both the 1990 census and the national reports.

There is a major difference, however, in the time period of the recent mover classification. In the American Housing Survey, recent movers are households that moved into their unit during the 12 months prior to interview, a period of 1 year or less. In publications for the 1990 Census of Housing on mover households, the time period was from January 1, 1989, through March 31, 1990, a period of 15 months or less.

A variety of data on mortgages and homeowner properties will be presented in publications from the Residential Finance Survey. Differences in the concepts and definitions in this survey and the American Housing Survey publications include the following: the basic unit of tabulation in AHS is the housing unit; in Residential Finance publications, it is the property. All the data in AHS are provided by the occupant; in Residential Finance publications, mortgage is reconciled with responses from the lender.

In the American Housing Survey, units are classified as new construction if constructed 4 years or less from the date of interview. In publications from the 1990 Census of Housing, units are classified as new construction if constructed in 1985 through 1990.

Data on poverty level in the 1990 Census of Housing do not contain the income of household members unrelated to the householder. In the American Housing Survey, data on poverty level include the income of all household members whether or not they are related to the householder.

Income data in the American Housing Survey are based on income for the 12 months prior to interview for those household members 14 years and older. The 1990 Census of Housing income data are for calendar year 1989 and for income of household members 15 years and older.

In the 1990 Census of Population, data for years of school completed were based on responses to two questions: the highest grade or year of regular school each household member attended, and whether or not that grade was completed. The response categories for persons who have attended college were modified from earlier censuses, because there was some ambiguity in interpreting responses in terms of number of years of college completed. This modification enhances the reporting of the number of college graduates. In the AHS, data for years of school completed were based on responses to a single question: the highest grade or year of regular school completed by the householder. Therefore, the AHS may overstate the education level of the householder; that is,

respondents may have reported the grade or year the householder was currently enrolled in or had last been enrolled in whether or not the grade or year was completed.

Differences between the American Housing Survey data and the 1990 census may also be attributed to several other factors. These include the extensive use of self-enumeration in the census in contrast to personal interview in the survey; differences in processing procedures and sample designs; the sampling variability associated with the sample data from both the AHS and the census; the nonsampling errors associated with the survey estimates; and the nonsampling errors associated with census data.

Comparability with Current Construction Reports from the Survey of Construction. The Census Bureau issues several publications under the general titles, ''Current Construction Reports.'' The data for these reports are primarily from the Survey of Construction.

The Survey of Construction consists of approximately 8,300 permit-issuing places throughout the United States. The reports from the survey contain current data on housing starts and completions, construction authorized by building permits, new one-unit structures sold and for sale, characteristics of new housing, and value of new construction put in place. The concepts and definitions used in this report differ from some of those used in the Survey of Construction. The major difference is that the Survey of Construction shows counts and characteristics of housing units in various stages of construction through completion. The American Housing Survey shows counts and characteristics of the existing housing inventory. Additional differences between the American Housing Survey and the Survey of Construction may be attributed to factors such as the sampling variability and nonsampling errors of the data from the two surveys, survey procedures and techniques, and processing procedures.

AREA DEFINITIONS

The data shown in this report relate to areas as defined for the 1980 census for urban, rural, farm, and nonfarm; and as of 1983 as defined by OMB for metropolitan and nonmetropolitan areas. The area definitions used in this report were not updated to include any OMB decisions after 1983 or the 1990 census results.

Regions. The standard census geographic regions are used in the tables of this report. States contained in each region are as follows: Northeast—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, and New Jersey; Midwest—Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, and South Dakota; South—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Kentucky, Arkansas, Louisiana, Oklahoma, and Texas; West—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho, Alaska, Washington, Oregon, Nevada, California, and Hawaii. Data for the regions are shown in chapters 1 through 11, tables 4 and 5; and chapters 1 and 2, table 6.

Places. Two types of places are recognized by the Census Bureau, incorporated places and census designated places as defined below.

Incorporated places. Incorporated places are those that are incorporated under the laws of their respective States as cities, boroughs, towns, and villages.

Census designated places (CDP's). The Census Bureau has delineated boundaries for closely settled population centers without corporate limits. To be recognized for the census, CDP's must have a minimum population. If located in urbanized areas that have one or more cities of 50,000 or more population, CDP's must have a minimum population of 5,000. All other areas except for areas in Alaska and Hawaii require a minimum population of 1,000. The requirements are a population of 25 in Alaska and 300 in Hawaii.

Place size as shown in national reports reflects the place size as of the 1980 census. More detailed information on places appears in the 1980 Population Census PC (1)-A reports.

Urban and rural residence. As defined for the 1980 census, urban housing comprises all housing units in urbanized areas and in places of 2,500 or more inhabitants outside urbanized areas. More specifically, urban housing consists of all housing units in (a) places of 2,500 or more inhabitants incorporated as cities, villages, boroughs (except in Alaska and New York), and towns (except in the New England States, New York, and Wisconsin), but excluding those housing units in the rural portions of extended cities; (b) census designated places of 2,500 or more inhabitants; and (c) other territory, incorporated or unincorporated, included in urbanized areas. Housing units not classified as urban constitutes rural housing. Information on the historical development of the urban-rural residence definition appears in the 1980 Census of Population report, *Characteristics of the Population, Number of Inhabitants,* PC801-A.

Urbanized areas. The major objective of the Census Bureau in delineating urbanized areas is to provide a better separation of urban and rural housing in the vicinity of large cities. In the 1980 census, an urbanized area comprised an incorporated place and adjacent densely settled (1.6 or more people per acre) surrounding area that together have a minimum population of 50,000. For more information on urbanized areas, refer to the 1980 Population Census PC(1)-A reports.

Farm-nonfarm residence. In rural areas, occupied housing units are subdivided into rural-farm housing (which comprises all rural units on farms) and rural-nonfarm

housing (which comprises the remaining rural units). Occupied housing units are classified as farm units if the sales of agricultural products amounted to at least $1,000 during the 12-month period prior to the interview. Occupied units in rural territory that do not meet the definition for farm housing are classified as nonfarm.

Metropolitan statistical areas. Metropolitan statistical areas (MSA's) shown in the American Housing Survey are defined by the Office of Management and Budget. By current standards, as published in the Federal Register on January 3, 1980, an area qualifies for recognition as an MSA in one of two ways: if there is a city of at least 50,000 population, or a Census Bureau-defined urbanized area of at least 50,000 with a total metropolitan population of at least 100,000 (75,000 in New England). Except in the New England States, an MSA is defined in terms of entire counties. In New England, MSA's are composed of cities and towns. In addition to the county containing the main city, additional counties are included in an MSA if they are socially and economically integrated with the central county. An MSA may contain more than one city of 50,000 population and may cross State lines.

Primary metropolitan statistical areas. Within the metropolitan statistical areas classified as Level A (population size of 1,000,000 or more), some areas may qualify for separate recognition as primary metropolitan statistical areas (PMSA's). A PMSA is a large urbanized county, or cluster of counties, that demonstrates very strong internal economic and social links, in addition to close ties to the other portions of the Level A metropolitan statistical area.

Consolidated metropolitan statistical area. A consolidated metropolitan statistical area (CMSA) is a Level A metropolitan statistical area when at least two primary metropolitan statistical areas are defined.

Central cities. Every metropolitan statistical area has at least one central city, which is usually its largest city. Smaller cities are also identified as central cities if they have at least 25,000 population and meet the following two commuting requirements. First, the city must have at least 75 jobs for each 100 residents who are employed. Second, no more than 60 percent of the city's resident workers may commute to jobs outside the city limits. In addition, any city with at least 250,000 population or at least 100,000 persons working within its corporate limits qualifies as a central city even if it fails to meet the above two commuting requirements. Finally, in certain smaller metropolitan statistical areas, there are places with between 15,000 and 25,000 population that also qualify as central cities, because they are at least one-third the size of the metropolitan statistical area's largest city and meet the two commuting requirements.

Standard metropolitan statistical areas. The definitions of standard metropolitan statistical areas (SMSA's) used in the Annual Housing Survey prior to 1984 corresponded to the 243 SMSA's used in the 1970 census. Except in the New England States, an SMSA is a county or group of contiguous counties that contains at least one city of 50,000 inhabitants or more, or ''twin cities'' with a combined population of at least 50,000. In addition to the county or counties containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are socially and economically integrated with the central city. In the New England States, SMSA's consist of towns and cities instead of counties. Each SMSA must include at least one central city, and the complete title of an SMSA identifies the central city or cities.

SUBJECT CHARACTERISTICS

Living Quarters

Living quarters are classified as either housing units or group quarters. Usually, living quarters are in structures intended for residential use (e.g., a one-unit structure, apartment house, hotel or motel, boarding house, or mobile home or trailer). Living quarters may also be in structures intended for nonresidential use (e.g., the rooms in a warehouse where a watchman lives), as well as in places such as tents, caves, and old railroad cars. We count these as living quarters if they are occupied.

Housing units. A housing unit is a house, an apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants do not live and eat with any other persons in the structure and that have direct access from the outside of the building or through a common hall that is used or intended for use by the occupants of another unit or by the general public. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements (except as described in the section on group quarters).

Group quarters. Group quarters are any living quarters which are not classified as housing units. Institutional group quarters are living quarters occupied by one or more persons under care or custody, such as children in an orphanage, persons in a nursing home, and prisoners in a penitentiary. Noninstitutional group quarters include living quarters such as college-owned and/or operated dormitories, fraternity and sorority houses, nurses' dormitories, and boarding house. In addition, noninstitutional group quarter include any living quarters which are occupied by 9 or more persons unrelated to the householder, or by 10 or more unrelated persons.

Hotels, motels, rooming houses, etc. Occupied rooms or suites of rooms in hotels, motels, and similar places are classified as housing units only when occupied by permanent residents; i.e., persons who consider the hotel as their

usual place of residence or have no usual place of residence elsewhere. Vacant rooms or suites of rooms are classified as housing units only in those hotels, motels, and similar places in which 75 percent or more of the accommodations are occupied by permanent residents.

If any of the occupants in a rooming or boarding house live and eat separately from everyone else in the building and have direct access, their quarters are classified as separate housing units. The remaining quarters are combined. If the combined quarters contain eight or fewer roomers unrelated to the householder, they are classified as one housing unit; if the combined quarters contain nine or more roomers unrelated to the householder, or person in charge, they are classified as group quarters. In a dormitory, residence hall, or similar place, living quarters of the supervisory staff and other employees are separate housing units if they satisfy the housing unit criteria; other living quarters are considered group quarters.

Staff living quarters. Living quarters of staff personnel are separate housing units if they satisfy the housing unit criteria. Other living quarters are considered group quarters.

Occupied housing units. A housing unit is classified as occupied if a person or group of persons is living in it at the time of the interview or if the occupants are only temporarily absent, for example, on vacation. However, if the unit is occupied entirely by persons with a usual place of residence elsewhere, the unit is classified as vacant. By definition, the count of occupied housing units is the same as the count of households.

Race. The classification ''race'' refers to the race of the householder occupying the housing unit. The concept of race as used by the Census Bureau does not denote a clear-cut scientific definition of biological stock. Race was determined on the basis of a question that asked for self-identification of a person's race. Figures on tenure are given separately for White, Black, and other householders in table 2-1. Detailed characteristics of units with Black householders are presented in chapter 4.

Hispanic. The classification ''Hispanic'' refers to the origin of the householder occupying the housing unit. Detailed characteristics of housing units with Hispanic householders are presented in chapter 5. Hispanic origin was determined on the basis of a question that asked for self-identification of persons living in the unit who were Hispanic or Spanish American. Hispanic persons may be of any race.

Data on Hispanic households shown in American Housing Survey National reports are collected in the 50 States and the District of Columbia, and therefore do not include households in Puerto Rico.

Tenure. A housing unit is owner occupied if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for. Also, a cooperative or condominium unit is owner occupied only if the owner or co-owner lives in it. All other occupied housing units are classified as renter occupied, including housing units rented for cash rent and those occupied without payment of cash rent.

Suitability for year-round use. A housing unit is suitable for year-round use if it is built as a permanent structure, properly equipped and insulated for heating as necessitated by the climate, and if it has a heating system that would be adequate during extended cold periods.

Recent movers. In this report, data for recent movers are shown for units where the householder/respondent moved into the present unit during the 12 months prior to the interview.

Utilization Characteristics

Persons. All persons occupying the housing unit are counted. These persons include not only occupants related to the householder but also any lodgers, roomers, boarders, partners, wards, foster children, and resident employees who share the living quarters of the householder. The data on persons show categories of the number of one person through seven-or-more-person households. The median for persons is rounded to the nearest tenth.

A person is counted at the usual place of residence for that person. This refers to the place where the person lives and sleeps most of the time. This place is not necessarily the same as a legal residence, voting residence, or domicile.

Rooms. The statistics on rooms are for the number of housing units with a specified number of rooms. Rooms counted include whole rooms used for living purposes, such as bedrooms, living rooms, dining rooms, kitchens, recreation rooms, permanently enclosed porches that are suitable for year-round use, lodgers' rooms, and other finished and unfinished rooms. Also included are rooms used for offices by a person living in the unit. The median for rooms is rounded to the nearest tenth.

A dining room, to be counted, must be a separate room. It must be separated from adjoining rooms by built-in floor-to-ceiling walls extending at least a few inches from the intersecting walls. Movable or collapsible partitions or partitions consisting solely of shelves or cabinets are not considered built-in-walls. Bathrooms are not counted as rooms.

Persons per room. Persons per room is computed for each occupied housing unit by dividing the number of persons in the unit by the number of rooms in the unit. The figures shown refer, therefore, to the number of housing units having the specified ratio of persons per room.

Structural Characteristics

New construction. Housing units built in the 4 years prior to the date of the interview are classified as new construction.

Year structure built. Year structure built refers to when the building was first constructed, not when it was remodeled, added to, or converted. The figures refer to the number of housing units in structures built during the specified periods and in existence at the time of the interview. For mobile homes and trailers, the manufacturer's model year was assumed to be the year built. Median year built is rounded to the nearest year.

Units in structure. In determining the number of housing units in a structure, all units, both occupied and vacant, were counted. The statistics are presented for the number of housing units in structures of specified type and size, not for the number of residential structures.

A structure is a separate building if it has either open space on all sides or is separated from other structures by dividing walls that extend from ground to roof. Structures containing only one housing unit are further classified as detached or attached.

A one-unit structure is detached if it has open space on all four sides even though it has an adjoining shed or garage. A one-unit structure is attached if it has one or more walls extending from ground to roof that divide it from other adjoining structures and does not share a furnace or boiler with adjoining structures such as in rowhouses, townhouses, etc.

Mobile homes and trailers are shown as a separate category. When one or more rooms have been added to a mobile home or trailer, it is classified as a mobile home. Prior to the 1984 AHS reports, these units were classified as a house, apartment, or flat.

Plumbing Characteristics

Water supply stoppage. Water supply stoppage means that the housing unit was completely without running water from its regular source. Completely without running water means that the water system servicing the unit supplied no water at all, that is, no equipment or facility using running water (in kitchen and bathroom sinks, shower, in bathtub, flush toilet, dishwasher, and other similar items) had water supplied to it, or all were inoperable. The reason could vary from a stoppage because of a flood or storm, to a broken pipe, to a shutdown of the water system, to a failure to pay the bill, or other reasons.

Data on water supply stoppage are shown if they occurred in the 3 months prior to the interview, or while the household was living in the unit if less than 3 months, and if the breakdown or failure lasted 6 consecutive hours or more. Housing units with water supply stoppage are also classified according to the number of times the stoppages occurred.

Sewage disposal and sewage disposal breakdowns. A public sewer is connected to a city, county, sanitary district, neighborhood, or subdivision sewer system. Included are only systems operated by a government body or private organization sewage treatment system serving six or more units. Small sewage treatment plants, which in some localities are called neighborhood septic tanks, are classified as public sewers. A septic tank or cesspool is an underground tank or pit used for disposal of sewage (serving five or fewer units). A chemical toilet, which may be inside or outside the unit, uses chemicals to break down or dissolve sewage. Housing units for which sewage is disposed of in some other way are included in the ''other'' category.

The data on breakdowns in the means of sewage disposal are limited to housing units in which the means of sewage disposal was a public sewer, septic tank, or cesspool. Breakdowns refer to situations in which the system was completely unusable. Examples include septic tank being pumped because it no longer perked, tank collapsed, tank exploded, sewer main broken, sewer treatment plant not operating as a result of electrical failure or water service interruption, etc.

Data on breakdowns are shown if they occurred in the 3 months prior to the interview or while the household was living in the unit if less than 3 months, and if the breakdown lasted 6 consecutive hours or more. Housing units with a breakdown in sewage disposal are also classified according to the number of breakdowns.

Flush toilet and flush toilet breakdowns. A privy or chemical toilet is not considered a flush toilet. Flush toilets outside the unit were not counted. The statistics on breakdowns of flush toilet are shown for housing units with at least one flush toilet for the household's use only. The flush toilet may be completely unusable because of a faulty flushing mechanism, broken pipes, stopped up soil pipe, lack of water supplied to the flush toilet, or some other reason.

Data on breakdowns are classified by whether any of the flush toilets were working in the 3 months prior to the interview, or while the household was living in the unit if less than 3 months, and the number of times the breakdown lasted 6 hours or more.

Equipment Problems

Heating problems. For breakdowns of heating equipment, statistics are shown for housing units occupied by the householder during the winter prior to the interview. The

data are classified by whether the housing unit was uncomfortably cold for 24 hours or more, the number of times equipment breakdowns occurred lasting 6 hours or more, and causes for the breakdowns.

The heating equipment is broken down if it is not providing heat at its normal heating capacity through some fault in the equipment. Utility interruptions occur when there is a cut off in the gas, electricity, or other fuel supplying the heat. Inadequate heating capacity refers to heating equipment that is providing heat at its normal capacity, but the housing unit is still too cold for the occupants. Inadequate insulation refers to air drafts through window frames, electrical outlets, or walls that are cold.

Housing and Neighborhood Quality

Selected amenities:

Porch, deck, balcony, or patio. The porch, deck, balcony, or patio must be attached to the sample unit, not just to the building or free standing. Porches may be enclosed or open.

Telephone available. A housing unit is classified as having a telephone if there is a telephone for receiving calls available to the occupants of the unit. The telephone may be located outside or inside the housing unit, and one telephone may serve the occupants of several units. The number of housing units with a telephone available, therefore, does not indicate the number of telephones installed in homes.

Usable fireplace. Excludes the following: fireplaces that have been blocked off or whose chimney or flue have been filled, decorative or artificial fireplaces, and Franklin stoves. Free-standing fireplaces are included in this item.

Separate dining room. A separate dining room is an area separated from adjoining rooms by a built-in floor-to-ceiling wall extending at least a few inches from its intersecting wall. Built-in walls do not include movable or collapsible partitions or partitions consisting solely of shelves and cabinets.

Living rooms, recreation rooms, etc. Includes family rooms, dens, recreation rooms and/or libraries.

Garage or carport. The garage or carport must be on the same property but does not have to be attached to the house. Off street parking is considered driveway or parking lot privileges that is paid for as part of the rent.

Selected deficiencies:

Signs of rats. The statistics on signs of rats refer to respondents who reported seeing rats or signs of rats inside the house or building during the last 3 months or while the household was living in the unit if less than 3 months. Signs of rats include droppings, holes in the wall, or ripped or torn food containers.

Holes in floors. Data are shown on whether there are holes in the interior floors of a housing unit. The holes do not have to go all the way through to a lower floor or to the exterior of the unit. The holes must be large enough to cause someone to trip.

Open cracks or holes (interior). Statistics are presented on whether or not there are open cracks or holes in the interior walls or ceilings of the housing unit. Included are cracks or holes that do not go all the way through to the next room or to the exterior of the housing unit. Hairline cracks or cracks that appear in the walls or ceilings but are not large enough to insert the edge of a dime and very small holes caused by nails or other similar objects are not considered to be open cracks or holes.

Broken plaster or peeling paint (interior). The area of peeling paint or broken plaster must be on the inside walls or ceilings and at least one area of broken plaster or peeling paint must be larger than 8 inches by 11 inches.

Electric wiring. A housing unit is classified as having exposed electric wiring if the unit has any wiring that is not enclosed, either in the walls or in metal coverings, or if the unit has any wiring outside the walls enclosed in some material other than metal. Excluded from the tabulation are appliance cords, extension cords, chandelier cords, and telephone, antenna, or cable TV wires.

Electric wall outlets. A housing unit is classified as having rooms without electric wall outlets if there is not at least one working electric wall outlet in each room of the unit. A working electric wall outlet is one that is in operating condition; i.e., can be used when needed. If a room does not have an electric wall outlet, an extension cord used in place of a wall outlet is not considered to be an electric wall outlet.

Severe physical problems. A unit has severe physical problems if it has any of the following five problems:

Plumbing. Lacking hot or cold piped water or a flush toilet, or lacking both bathtub and shower, all inside the structure for the exclusive use of the unit.

Heating. Having been uncomfortably cold last winter for 24 hours or more because the heating equipment broke down, and it broke down at least three times last winter for at least 6 hours each time.

Electric. Having no electricity, or all of the following three electric problems: exposed wiring; a room with no working wall outlet; and three blown fuses or tripped circuit breakers in the last 90 days.

Upkeep. Having any five of the following six maintenance problems: water leaks from the outside, such as from the roof, basement, windows, or doors; leaks from inside structure such as pipes or plumbing fixtures; holes in the floors; holes or open cracks in the walls or ceilings; more than 8 inches by 11 inches of peeling paint or broken plaster; or signs of rats or mice in the last 90 days.

Hallways. Having all of the following four problems in public areas: no working light fixtures; loose or missing steps; loose or missing railings; and no elevator.

Moderate physical problems. A unit has moderate physical problems if it has any of the following five problems, but none of the severe problems.

Plumbing. On at least three occasions during the last 3 months or while the household was living in the unit if less than 3 months, all the flush toilets were broken down at the same time for 6 hours or more.

Heating. Having unvented gas, oil, or kerosene heaters as the primary heating equipment.

Upkeep. Having any three or four of the overall list of six upkeep problems mentioned above under severe physical problems.

Hallways. Having any three of the four hallway problems mentioned above under severe physical problems.

Kitchen. Lacking a kitchen sink, refrigerator, or burners inside the structure for the exclusive use of the unit.

Overall opinion of structure. The data presented are based on the respondent's overall opinion of the house or apartment as a place to live. The respondent was asked to rate the structure based on a scale from 1 to 10, where 10 is the best and 1 is the worst.

Overall opinion of neighborhood. The data presented are based on the respondent's overall opinion of the neighborhood. The respondent defines neighborhood. The respondent was asked to rate the neighborhood based on a scale from 1 to 10, where 10 is the best and 1 is the worst.

Neighborhood conditions. The statistics presented in table 3 are based on the respondent's opinion and attitude toward the neighborhood. The respondent defines neighborhood.The respondent was asked a two-part question: (1) If anything about the neighborhood bothered the respondent and (2) if so, what? The interviewer coded the responses into the following categories: crime; noise; traffic; litter or housing deterioration; poor city/county services; undesirable commercial, institutional, or industrial property; people; and other. Multiple responses were allowed. The respondent may not have the same opinion as a neighbor about neighborhood conditions. The respondent's opinion may or may not reflect the actual neighborhood situation.

Neighborhood conditions and neighborhood services. The statistics presented in table 4, as a percent of the total occupied units, are based on the respondent's opinion and attitude toward the neighborhood in which he/she lives. Thus, the respondent's answer may or may not reflect the actual description of the neighborhood. Furthermore, the respondent may not have the same opinion as a neighbor about the neighborhood services; for example, the respondent may feel that the street lighting or neighborhood shopping facilities are inadequate but a neighbor may not.

Neighborhood conditions and wish to move. Data on neighborhood conditions and wish to move in table 4 are based on the respondent's answers to a three-part question concerning specific neighborhood conditions. The respondent was asked (1) if the condition was present, (2) if the condition was bothersome, and (3) if the condition was so objectionable that the respondent would like to move from the neighborhood.

a. Street noise or heavy street traffic—Street noise refers to noise made by children playing outdoors, noise from a factory or business, or any other sounds that the respondent considers street noise. Traffic refers to the amount of vehicular traffic that the respondent considers ''heavy.''
b. Neighborhood crime—This category refers to all forms of street and neighborhood crime such as petty theft, assaults against the person, burglary, etc., or any related activities that the respondent judges to be a crime.

Neighborhood services. Data on neighborhood services are based on the respondent's answer to a series of questions concerning neighborhood services.

The respondent was asked a three-part question on public transportation: (1) if service is available, (2) if service is satisfactory, and (3) if any member of the household used the service at least once a week.

Data were also collected on satisfaction with neighborhood shopping such as grocery stores and drug stores, and whether or not these stores are located within 1 mile of the neighborhood.

Respondents were asked a three-part question on public elementary schools: (1) if children within the household attended public elementary school or private elementary school, (2) if the public elementary school is satisfactory, and (3) if the public elementary school is within 1 mile of the neighborhood.

Journey to Work

Workers. Includes all persons aged 14 years and over who held a job any time the previous week of the survey within the United States.

Principal means of transportation last week. Means of transportation refers to the principal mode of travel used to get from home to work. Householders who used different means of transportation on different days of the week were asked to specify the one used most often. Householders who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip. Mass transportation refers to bus or streetcar and subway or elevated railroad.

Travel time from home to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report in to a central location to begin work each day.

Distance from home to work. The one-way, ''door-to-door'' distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel rounded to the nearest mile.

Departure time to work. Refers to the time (hour and minutes) the respondent left for work. The categories begin with 12:00 a.m. and progress to 11:59 p.m.

Financial Characteristics

All of the financial characteristics shown in this report are shown for all renters and/or all owners. In 1983 and earlier, the Annual Housing Survey reported financial characteristics for specified owners and specified renters. Specified owners are single-family, owner-occupied units on less than 10 acres with no business or medical office. Specified renters exclude single-family units on 10 acres or more. This report does not present financial characteristics for specified owners and specified renters. See *The American Housing Survey for the United States in 1993*, series H150, for data on specified owners and renters.

Value. Value is the respondent's estimate of how much the property (house and lot) would sell for if it were for sale. Any nonresidential portions of the property are excluded from the cost. For vacant units, value represents the sale price asked for the property at the time of the interview, and may differ from the price at which the property is sold. Medians for value are rounded to the nearest dollar.

Income. The statistics on income in the American Housing Survey are based on the respondent's reply to questions on income for the 12 months prior to the interview and are the sum of the amounts reported for wage and salary income, self-employment income, interest or dividends, Social Security or railroad retirement income, public assistance or welfare payments, alimony or child support, and all other money income. The figure represents the amount of income received before deductions for personal income taxes, Social Security, union dues, bond purchases, health insurance premiums, Medicare deductions, etc. Medians for income are rounded to the nearest hundred dollars.

In this report, the statistics are shown separately for the money income of the household (the sum of the income of the householder and all other household members 14 years old and over). Household income is shown separately for family households and nonfamily households.

Wage or salary income is defined as the total money earnings received for work performed as an employee at any time during the 12-month period prior to the interview. It includes wages, salary, piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay. Self-employment income is defined as money income received from a business, professional practice, partnership, or farm in which the person was self-employed. Social Security or pensions includes cash receipts of Social Security pensions; survivors' benefits, disability insurance programs for retired persons, dependents of deceased insured workers, or disabled workers; and deductions for Medicare and health insurance premiums. Cash receipts of retirement, disability, and survivors' benefit payments made by the U.S. Government under the Railroad Retirement Act are also included. Separate payments received for hospital or other medical care are not included.

Income from all other sources includes money income received from sources such as periodic payments from interest or dividends; net rental income (or loss) from property rentals; net receipts from roomers or boarders; net royalties; public assistance or welfare payments which include cash receipts received from public assistance programs, such as old age assistance, aid to families with dependent children, and aid to the blind or totally disabled; unemployment insurance benefits; workmen's compensation cash benefits; periodic payments by the Veteran's Administration to disabled veterans; public or private pensions; periodic receipts from insurance policies or annuities; alimony or child support from persons who are not members of the household; net gambling gains; and non-service scholarships and fellowships.

Receipts from the following sources were not included as income: Value of income ''in kind,'' such as, free living quarters, housing subsidies, food stamps, or food produced and consumed in the home; money received from the sale of property (unless the recipient was engaged in the business of selling such property); money borrowed; tax refund; withdrawal of bank deposits; accrued interest on uncashed savings bonds; exchange of money between

relatives living in the same household; gifts of money; and lump-sum payments from inheritances, insurance policies, estates, trusts, gifts, etc.

The income statistics and the characteristics of the household refer to different periods in time. Income data refer to the 12 months prior to the interview, whereas the household characteristics refer to the date of interview. Thus, family or household income does not include amounts received by persons who were members of the family during all or part of the income period if these persons no longer resided with the family at the time of the interview. On the other hand, family or household income includes income reported by persons who did not reside with the household during the income period but who were members at the time of the interview. For most households, however, the income reported was received by persons who were members of the household throughout the income period.

There may be significant differences in the income data between the American Housing Survey and other Bureau surveys and censuses. For example, the time period for income data in the American Housing Survey refers to the 12 months prior to the interview while other income data generally refer to the calendar year prior to the date of the interview. Additional differences in the income data may be attributed to factors such as the various ways income questions are asked, the sampling variability and nonsampling errors between the American Housing Survey and other Census Bureau surveys and censuses, survey procedures and techniques, and processing procedures.

Current income. Two new questions were added to the American Housing Survey in 1989. Upon completion of the detailed income questions, respondents were asked, ''Is your total family income THIS MONTH about the same as it was a year ago?'' ''About the same'' was defined as within 10 percent or just cost of living adjustments. If the respondent answered ''no,'' a second question was asked, ''What do you expect your total family income to be in the NEXT 12 MONTHS?'' Current income for families whose most recent month's income was NOT about the same as a year ago is the ''total expected family income in the NEXT 12 MONTHS.'' Current income for families whose most recent month's income WAS about the same as a year ago is ''family and primary individual income.'' For the majority of families, current income equals income of families and primary individuals. Data on current income is not published separately. It's used in the calculation of ''Ratio of value to current income,'' and ''Monthly housing costs as percent of current income.'' It is felt that respondents who have only recently entered the job market and those who changed jobs during the past year often report a previous year's income, which is too low to accurately reflect their current financial situation as it relates to the value of their home and their housing costs.

Poverty status. The poverty data in this report differ from official poverty estimates in two important respects. The first important difference is the use of a poverty definition that is based on household income in place of the official method that is based on the income of the family or the unrelated individual. Under the official approach, the poverty status of two unrelated individuals living together would be determined by comparing the income of each individual to the poverty threshold for an unrelated individual. The result might be that both were in poverty, both were out of poverty, or one was in poverty and one was not. Under the approach used in this report, the two unrelated individuals were treated as members of a two-person family and their poverty status was determined by comparing their combined income to the poverty threshold for a two-person family. The effect of using a poverty concept that is based on household income is to undercount the number of persons in poverty relative to the official estimate. A study based on the March 1975 Current Population Survey found that poverty estimates based on a household income concept were about 6 percent lower than official estimates. For more information, see Technical Paper X, Effect of Using a Poverty Definition Based on Household Income, U.S. Department of Health, Education, and Welfare, 1976. A second important difference between the poverty estimates in this report and the official poverty estimates has to do with the method used to measure income. The official annual poverty estimates are based on data collected in the March supplement to the Current Population Survey. The income questions asked in that survey are very detailed and measure the amount of income received during the previous calendar year. The income questions asked in the AHS are much less detailed and measure the amount received during the previous 12 months. Because interviews were conducted during the period July through December, the income measures do not pertain to a fixed period. Many of the income questions in the AHS were asked on a household rather than an individual income basis. The lack of data for individuals made it necessary to adopt a poverty definition based on household income.

Officially, families and unrelated individuals are classified as being above or below the poverty level using the poverty index originated at the Social Security Administration in 1964 and revised by the Federal Interagency Committees in 1969 and 1980. The poverty index is based solely on money income and does not reflect the fact that many low-income persons receive noncash benefits such as food stamps, Medicaid, and public housing. The index is based on the Department of Agriculture's 1961 Economy Food Plan and reflects the different consumption requirements of families based on their size and composition. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index (CPI). For further details, see Current Population Reports, Series P-60, No. 181, Poverty in the United States: 1991.

Mortgage status on property. The owner or the owner's spouse was asked the status of mortgages or similar loans

currently in effect on second homes or investment properties. Units were reported as with mortgage or as being owned free and clear. A mortgage or similar debt refers to all forms of debt where the property is pledged as security for payment of the debt. It includes such debt instruments as deeds of trust, trust deeds, mortgage bonds, and vendors' liens. In the first three arrangements, usually a third party, known as the trustee, holds the title to the property until the debt is paid. In the vendor lien arrangements, the title is kept by the buyer, but the seller (vendor) reserves, in the deed to the buyer, a lien on the property to secure payment of the balance of the purchase price. Also included as a mortgage or similar debt are contracts to purchase; land contracts, and lease-purchase agreements where the title to the property remains with the seller until the agreed upon payments have been made by the buyer.

Monthly housing costs. The data are presented for owner- and renter-occupied housing units. Monthly housing costs for owner-occupied units is the sum of monthly payments for all mortgages or installment loans or contracts, real estate taxes (including taxes on mobile homes or trailer sites if the site is owned), property insurance, homeowners association fee, cooperative or condominium fee, mobile home park fee, land rent, utilities (electricity, gas, water, and sewage disposal), fuels (oil, coal, kerosene, wood, etc.), and garbage and trash collection. As of 1989, data on the costs of electricity and gas are collected differently (see ''Monthly costs of electricity and gas'' definition). Because of this, ''Monthly housing costs'' in 1989 and beyond may not be entirely comparable with data published in previous years. Monthly housing costs are not computed for households with a mortgage or similar debt that failed to report the amount of their loan or contract payment.

For renter-occupied housing units, monthly housing costs include the contract rent plus the estimated average monthly cost of utilities (electricity, gas, water, and sewage disposal), and fuels (oil, coal, kerosene, wood, etc.); property insurance, mobile home land rent, and garbage and trash collection if these items are paid for by the renter (or paid for by someone else, such as a relative, welfare agency, or friend) in addition to rent. Renter housing units occupied without payment of cash rent are shown separately as no cash rent. For rental units subsidized by a public housing authority, the Federal government, or State or local governments, the monthly rental costs reflect only the portion paid by the household and not the portion subsidized. Before 1991, the monthly rental costs may have included the amount subsidized for many subsidized units.

Monthly housing costs are shown for all renters and all owners. Medians for monthly housing costs are rounded to the nearest dollar.

Monthly housing costs as percent of current income. The yearly housing costs (monthly housing costs multiplied by 12) are expressed as a percentage of the total current income (see definition of current income.) This percentage is calculated for the same owner- and renter-occupied housing units for which ''Monthly housing costs'' were computed (for exclusions see ''Monthly housing costs''). The percentage was computed separately for each unit and rounded to the nearest percent. The measure was not computed for units where occupants reported no income or a net loss.

Before 1989, the item ''Monthly housing costs as percent of income,'' was computed by using the income of family and primary individuals only. It was felt that respondents who only recently entered the job market or who changed jobs during the past year often reported a previous year's income, which was too low to accurately reflect their current situation. In addition to a change in the source of income used in calculations, the item uses new procedures to estimate the costs of electricity and gas (see ''Monthly costs of electricity and gas'' definition).

Monthly costs for electricity and gas. Beginning in 1989, two procedures were introduced that attempt to correct the overreporting of electricity and gas costs in the AHS. In the first procedure, respondents were asked the amount of their electricity and/or gas bill for the previous months of January, April, August, and December. These months are the best predictors of annual costs. If the respondent provided data for at least 3 of the 4 months, the results were used to provide an annual estimate of costs. This estimate was then divided by 12 to provide average monthly costs.

The second procedure was applied to the remaining units. If the respondents did not know the amount of their electricity and/or gas bill for at least 3 of the 4 months, we used their estimate of average monthly costs. A factor was then applied that, in effect, lowered these costs to make them consistent with electricity and gas costs reported in the Residential Energy Consumption Survey sponsored by the United States Department of Energy. Before 1989, respondents were only asked to provide an estimate of average monthly costs. Research has shown that this approach produces 15 to 20 percent overestimates of the electricity and gas costs. The new procedures produce lower and more accurate estimates. On average, more than one-third of the respondents provided answers for at least 3 of the 4 months.

Monthly costs for electricity and gas are not shown separately in this report but are included as part of the monthly housing costs.

Household Characteristics

Household. A household consists of all the persons who occupy a housing unit. By definition, the count of households is the same as the count of occupied housing units.

Householder. The householder is the first household member 18 years old and over who is the owner or renter of the sample unit. If no household member occupying the

sample unit owns or rents the unit, the householder is the first household member listed who is 18 years old or older. In cases where no household member listed owns or rents the unit or is 18 years or older, the first household member listed is the householder.

Family Type

Family. Family refers to the householder and all (one or more) other persons living in the same household who may be related to the householder by blood, marriage or adoption. Married couples related to the householder of a family are included in the family and are not considered as separate families unless they reside in separate living quarters.

Married couple. Each household in this group consists of the householder and spouse and one or more other persons, if any.

Male householder, no wife present. This category includes families with male householders who are married, but with wife absent because of separation or other reason where husband and wife maintain separate residences; and male householders who are widowed, divorced, or single.

Female householder, no husband present. This category included families with female householders who are married, but with husband absent because of separation or other reason where husband and wife maintain separate residences; and female householders who are widowed, divorced, or single.

Nonfamily households. Housing units where the householder lives alone or with nonrelatives only. A lodger, servant, or other person unrelated to the householder is considered a member of the household but not of the family.

Own children under 18 years old. Statistics on presence of own children of households are shown in this report. A child under 18 years old is defined as an own child if he or she is a single (never married) son, daughter, stepchild, or adopted child of a householder. Own children of subfamilies are excluded from the total count of own children.

Age of householder. The age classification refers to the age reported for the householder as of that person's last birthday.

Elderly. Data for elderly include all households with a householder of 65 years of age and over.

Additional Residential Properties

Ownership. This refers to households owning additional residential property in addition to their usual residence. The property may be owned for vacation or investment purposes as well as other reasons.

Reasons for ownership. Respondents indicated the reason for owning additional residential property. The categories include previous usual residence, used for recreational purposes, investment purposes, unable to sell property, inherited property, and other reasons.

Vacation units. Vacation homes or recreational homes characteristics are only shown for the first vacation home listed. Vacation homes exclude multiunit buildings and units with ownership shared with nonhousehold member. Units reported as both vacation and investment properties are classified as vacation units.

Investment properties. Investment properties characteristics are shown for up to six additional properties. Investment properties include units or multiunit buildings but exclude those properties used also for recreational purposes. Units reported as both vacation and investment properties are classified as vacation units.

Shared ownership. This item is restricted to owner-occupied housing units. Shared ownership includes properties where the ownership of the investment property is shared with one or more nonhousehold members.

Type of housing unit. This item refers to the type of housing unit used for vacation or recreational purposes. The types include single-family home, unit in multiunit building, mobile home, or other type.

Type of property. This item refers to the type of residential property used for investment purposes. These units used for both recreational and investment purposes are excluded from this category. The types include single-family homes, multiunit buildings, unit in a multiunit buildings, mobile homes, or other type.

Value of property. Refers to the amount that the property (vacation or investment) is perceived to sell for on today's market. The value of shared ownership property is limited to respondent's share only.

Location of property. Refers to the distance from current residence to the vacation or investment property. Statistics are shown for within 150 miles or 150 miles and greater from current residence.

Nights spent at vacation unit. Refers to the number of nights spent at the unit during the past year. The median number of nights is rounded to the nearest whole number.

Nights unit rented. Refers to the number of nights rented during the past year for investment properties only. The median number of nights rented is rounded to the nearest whole number.

Appendix B.
Sample Design, Weighting, and Telephone Experiments

SAMPLE DESIGN

This report is based on data from a sample of housing units interviewed between July and December 1993. The same basic sample of housing units is interviewed every 2 years until a new sample is selected. We update the sample adding newly constructed housing units and units discovered through coverage improvement efforts every enumeration.

For the 1993 American Housing Survey−National (AHS-N), we selected approximately 56,700 sample housing units for interview. About 3,300 of these units were ineligible because the unit no longer existed or because the unit did not meet our definition of a housing unit.

We classified about 2,300 of the remaining units (both occupied and vacant housing units), as ''type A'' noninterviews because (a) no one was at home after repeated visits, (b) the respondent refused to be interviewed, or (c) the interviewer was unable to find the unit.

SAMPLE SELECTION

We have interviewed the current sample of housing units since 1985. First, we divided the United States into areas made up of counties or groups of counties and independent cities, which we refer to as primary sampling units (PSU's). We selected a sample of these PSU's. Then we selected a sample of housing units within these PSU's.

Selection of sample areas. The sample for AHS is spread over 394 PSU's. These PSU's cover 878 counties and independent cities with coverage in all 50 States and the District of Columbia. If there were a sufficient number of housing units in a PSU, the PSU was known as a *self-representing* PSU and was in sample with certainty. The sample from the PSU represents only that PSU. There are 170 self-representing PSU's.

We grouped the remaining PSU's into strata and selected one PSU per stratum to represent all PSU's in the stratum. We refer to these PSU's as *nonself-representing PSU's.* The sample nonself-representing PSU's for AHS are a subsample of the Current Population Survey's (CPS) sample areas.

Selection of sample housing units. The AHS sample consists of the following types of housing units:

- Housing units selected from the 1980 census
- New construction in permit issuing areas
- Housing units missed in the 1980 census
- Other housing units added since the 1980 census

Housing units selected from the 1980 census. We selected a sample of housing units from the 1980 decennial census files using an overall sampling rate of about 1 in 2,148. We determined the within-PSU sampling rate so the overall probability of selection for each sample housing unit was the same (e.g., if the probability of selecting a NSR PSU was 1 in 10, then the within-PSU sampling rate would be 1 in 214.8).

We classified the areas within a PSU into two types based on (a) the completeness of the addresses in the areas that make up the PSU and (b) the presence of a system to monitor new construction through building permits.

The two types of areas were known as address enumeration districts (ED's) or area enumeration districts. We selected the sample of 1980 census units differently in the two types of areas.

In *address ED's,* most of the housing-unit addresses were complete, and the construction of new housing units was monitored by building permits. We selected a sample of housing units from the list of units that received long-form questionnaires in the 1980 census.

We also used the census files to select a sample of living quarters in address ED's that did not meet the definition of a housing unit (e.g., military barracks, college dorm). We use this sample to identify units that convert to housing units after the 1980 census.

In *area ED's,* 4 percent or more of the 1980 census addresses were either incomplete or inadequate or new construction was not governed by building permits (mostly rural areas).

We selected a sample of housing units from the list of units that received 1980 census long-form questionnaires in several steps. First, we grouped area ED's based on certain characteristics of interest. Then we selected a systematic sample of ED's. We selected a sample of land areas in these ED's. Finally, we selected a sample of housing units that received 1980 census long forms within the land areas.

New construction in permit issuing areas. The building permit frame covers only non-mobile home new construction. We selected the sample of permit new-construction housing units from permits that were expected to be completed after, April 1, 1980. In certain permit areas and for structures of certain sizes, we included permits issued as early as March 1979. But, for the most part, we included permits issued since July 1979. Within each PSU, we selected building permits monthly, based on certain geography characteristics. We created clusters of approximately four housing units and subsampled units within these clusters at the rate of 1 in 4, yielding clusters of size 1. The overall probability of selection of these units is about 1 in 2,148.

Housing units missed in the 1980 census. The Census Bureau conducted a special study, called the Housing Unit Coverage Study (HUCS), as part of the 1980 census. This study identified units at addresses missed or inadequately defined in the 1980 census. We included a sample of the units identified in the HUCS in the AHS sample.

Housing units added since the 1980 census. We pick up two other types of units added since the 1980 census: (a) units added within structures containing sample units and (b) whole structure additions that did not contain living quarters at the time of the 1980 census.

Within structure additions. These additions have a chance of being in sample, because there is at least one unit that existed at the time of the 1980 census that was eligible for selection. We identified these adds in structures with at least one unit selected from the 1980 census sample and the HUCS sample. We also pick up adds in permit new construction, e.g., units added since the structure was completed. The rules for identifying within structure additions differed in certain types of areas and frames.

In *area ED's,* all within-structure additions in structures containing at least one sample unit were interviewed for the AHS.

In *address ED's and in the HUCS and building permit frames,* we interviewed all within-structure additions in 1-15 unit structures containing at least one sample unit for AHS. In 16-or-more unit structures, we only interviewed a sample of units.

Whole structure additions. These types of additions are units in structures that contained no living quarters at the time of the 1980 census. We used area sampling methods to identify these in all types of areas. Under area sampling, we list all housing units within a land area and then select a systematic sample.

To identify whole structure additions in *address ED's,* we used land areas in sample for the National Health Interview Survey (NHIS). The NHIS uses an area sampling approach in all its sample ED's. We only used NHIS areas that were in AHS PSU's or in NHIS PSU's adjacent to AHS PSU's. Only units that were not already assigned to NHIS were eligible.

We matched these units to the 1980 census address registers. If the address matched to the census, the unit was ineligible. (Only the basic address, i.e., 801 Main Street, had to match. Apartment number, mobile home site number, etc., did not have to match.)

When we listed all the units in structure, we screened eligible units further to pick up units with no previous chance of selection. (The screening eliminated units such as non-mobile home new construction, which is covered by building permits, and census misses.) We updated these areas in 1991.

In *area ED's where new construction is not governed by building permits,* we used all land areas chosen for the area ED sample. We selected an expected four units, using area sampling methods, within these land areas to identify whole structure additions. However, we did not match this sample to the census. Instead, we screened this sample, using criteria similar to those used in address ED's. One important difference to note is that we did not eliminate new construction during the screening process. In 1989, we only updated one-third of all segments (2 of 6 panels). In 1991, we only updated one-sixth of the segments (1 of 6 panels) but we used twice as many units. In 1993, we updated half of the segments (3 of 6 panels).

In *area ED's where new construction is governed by building permits,* we only used one-third of the land areas chosen for the area ED sample. We selected an expected eight units using area sampling methods within these areas to identify whole structure additions. We screened this sample using the same criteria as for address ED's. Again, we did not match this sample to the census. The screening process eliminated non-mobile home new construction, because it is covered by the building permit frame. In 1991, we increased the expected number of units by 50 percent and updated one-half of the areas (1 of 2 panels). In 1993, we updated the other half.

WEIGHTING

We assigned each unit a weight to reflect the correct probability of selection. After applying this weight, the AHS-N weighting procedure consists of two phases.

1. **First phase**

   In the first phase, we make a series of adjustments to account for units that could not be interviewed for a number of reasons. For each of these adjustments, we compute a factor and apply it to the appropriate units. The factors equal the following ratio:

$$\frac{\text{Interviewed housing units + Housing units not interviewed}}{\text{Interviewed housing units}}$$

   The interviewed housing units have the above factor applied to them. The first of these adjustments, done only in permit segments, accounts for permits that could not be sampled and units that could not be

found. Records representing these two situations were treated as noninterviews. These noninterviews make up ''housing units not interviewed.'' The ''interviewed housing units'' for the first adjustment actually include both interviews and noninterviews (excluding unable to locate units).

The second of the adjustments accounts for units in structures built before the 1980 census that could not be found. The unlocatable units are represented by both interviews and noninterviews (excluding unable-to-locate units).

The last of these adjustments accounts for ''type A'' noninterviews (excluding unable-to-locate units). (See the section on Sample Design for a description of ''type A'' noninterviews.)

When prior year AHS-N or 1980 census data are available, we use this information to determine the noninterview adjustment cell. The cells include the following characteristics:

- Tenure (i.e., owner or renter)
- Geography
- Type of housing unit (i.e., mobile home or non-mobile home)
- Units in structure
- Number of rooms

When previous data are not available, we compute adjustment factors using more general characteristics such as type of area and type of housing unit (i.e., mobile home, non-mobile home).

2. **Second phase**

The second phase involves a three-stage ratio-estimation procedure that adjusts for the following: (a) sampling of nonself representing PSU's, (b) known sampling deficiencies in new construction, and (c) differences between sample estimates and estimates derived from independent sources for key characteristics.

The *first stage* of this procedure reduces the portion of the variance due to the sampling of nonself-representing PSU's. The procedure accounts for differences that existed at the time of the 1980 census between housing units estimated from the nonself representing sample PSU's and the 1980 census count of housing units from all nonself-representing strata.

We compute factors accounting for these differences separately for the following characteristics: (a) region, (b) tenure, (c) metropolitan area status, and (d) urban or rural status. In addition, we use ethnicity (i.e., Hispanic, non-Hispanic) in the South and West regions and race in the South region.

The first stage factor equals the following ratio:

$$\frac{\text{1980 census housing units for all nonself-representing strata in a cell}}{\text{Number of 1980 housing units in the same cell estimated from the sample nonself-representing PSU's}}$$

We calculate the numerators of the ratios by summing the 1980 census housing-unit counts for each cell across all nonself-representing strata. We compute the denominators by weighting the 1980 census housing-unit counts from each nonself-representing sample PSU by the inverse of the probability of selection for that PSU. Then we sum the weighted counts across all nonself-representing sample PSU's.

The *second stage* of the ratio estimation procedure adjusts the AHS sample estimate of new construction (i.e., units built since the 1980 census) to account for known deficiencies (see the section on nonsampling error in appendix D).

For non-mobile homes, we control the sample estimates to independently derived estimates from the Survey of Construction. For mobile homes we control the most current sample estimates to independently derived estimates from the Survey of Mobile Home Placements. These estimates are the best estimates available for these types of units.

We compute factors separately for each region. The second stage factor equals the following ratio:

$$\frac{\text{Independently derived estimate for a cell}}{\text{AHS sample estimate in that cell}}$$

We compute the denominators of the above ratio by summing the existing weight on each record after the first stage of ratio estimation over all records for each cell in each region. The numerators come from either the Survey of Construction or the Survey of Mobile Home Placements.

The *third stage* of the ratio estimation procedure adjusts the AHS sample estimate of housing units to independently derived current estimates for key characteristics. We believe these characteristics are highly correlated with other characteristics of interest for AHS.

The third stage is done in two steps for occupied units. First, we control the sample estimate of occupied housing units to independently derived estimates for the following characteristics:

- Region
- Tenure
- Ethnicity (i.e., Hispanic head of household and non-Hispanic head of household)
- Household status (husband-wife, other male, or other female)
- Age of household head

Then we apply the factor from this step to the interviewed occupied units. Next, we control the new sample estimate of occupied housing units to independently derived estimates for similar characteristics. We substitute race for ethnicity in this step but all other characteristics are the same. We control the sample estimate of vacant housing units to an independently derived estimate for four type-of-vacant cells for each region.

We calculate all third stage factors similarly using the following ratio:

$$\frac{\text{Independently derived estimate of housing units in a cell}}{\text{AHS sample estimate of housing units in that cell}}$$

For occupied units, we derive the numerators of the factors in three steps. First we compute an independent intercensal estimate of total housing units for 1993 based on 1990 census counts. Then we determine the occupied portion of this independent control based on the sample proportion. Finally, we allocate the occupied portion of the independent control based on the Current Population Survey distribution for the third stage occupied cells.

For vacant units, we allocate the vacant portion of the independent control based on the distribution of vacant units from the Housing Vacancy Survey. This survey is a quarterly vacancy survey conducted by the Bureau of the Census.

We compute the denominators of the factors by summing the weights, with all previous factors applied, on all records in a cell. For the Hispanic/non-Hispanic and vacant cells, we use the weight after the second-stage of the ratio estimation procedure. For the Black/non-Black cells, we use the weight after the Hispanic/non-Hispanic portion of the third stage of the ratio estimation procedure.

We repeat the second stage and third stage of the ratio estimation procedure to bring the AHS sample estimate into closer agreement with the independent estimates. We used the final weight resulting from all iterations for the tabulations in this report.

As a result of the estimation procedure, the sampling error for most statistics is less than if the sample were simply weighted by the inverse of the probability of selection.

This is the second year we're using controls based on the 1990 census. The method for computing the controls also changed in 1991. We believe this method is better than the previous one because, using 1980 census data, it predicted the 1990 census count of housing units better than the previous method. As a result, the 1990-based control is about 2.5 percent lower than the 1980-based control.

We have included 1990-based estimates of the occupied and vacant housing inventory for 1985, 1987, and 1989 for selected items in table H of appendix C of this report. Estimates of change between 1993 and previous years using data from this table are reliable. However, estimates of change between 1993 and previous years for items involving old construction in the United States will be understated by about 2.5 percent.

TELEPHONE EXPERIMENTS

In 1993, we used three different methods of interviewing: personal visit, decentralized telephone interviewing, and computer assisted telephone interviewing (CATI). Seventeen percent of the interviews (10,486) were completed using CATI and thirty-one percent by decentralized telephone interviewing (18,958). However, most interviews were conducted by personal visits (31,482).

CATI was generally assigned to areas where it is difficult to hire and retain field representatives. These areas are typically large urban PSU's.

1. **Decentralized telephone interviewing**

   Possible effects of decentralized telephone interviewing on the data—We conducted a large scale decentralized telephone interviewing experiment for the 1983 AHS-National. Prior to 1983 all interviews were done by personal visits. The experiment provided more detailed information about the effects of decentralized telephone interviewing on the data. We concluded telephone interviewing had the following effect on the data: (a) Telephone interviewing increased the item nonresponse rate for income items although this effect did not appear to cause changes in the published estimates. (b) Problems with neighborhood quality were underreported, although this effect was minimal.

2. **Computer assisted telephone interviewing (CATI)**

   We conducted large-scale Computer Assisted Telephone Interviewing (CATI) experiments as part of the 1987 (6,400 CATI interviews), 1989 (5,800 CATI interviews), and 1991 (6,142 CATI interviews) enumerations for AHS-N. Although there were differences between CATI and non-CATI data in 1987, 1989, and 1991, we recommended continuing CATI for the 1993 AHS-N. We identified many positive aspects of CATI. One positive aspect is that with CATI supervisors have the ability to monitor and observe inexperienced CATI interviewers while they collect data. Another benefit of CATI is if we use CATI in geographic areas with interviewer retention problems, we could hire fewer new interviewers. Therefore, the CATI data we obtain would be at least as good as the non-CATI data we would settle for otherwise. We will continue to use CATI in these areas to reconcile questionable results from previous enumerations and to improve AHS data quality.

Possible effects of computer assisted telephone interviewing (CATI) on the data—There is strong evidence differences exist in data collected by CATI versus non-CATI. We do not know for sure, however, which method produces better data. Analysis of the CATI experiment conducted in 1987 indicated CATI had a substantial effect on some AHS-N characteristics.

Based on the results from the 1987 and 1989 analyses, we made the following changes to the CATI interview in 1991:

- We moved the heating equipment reconciliation from the end of the interview to right after the question. We also changed the response based on the reconciliation answer.
- We added a probe and reconciliation to the question on the presence of a mortgage. We also changed the response based on the reconciliation answer.
- We added a probe for lot size, units-in-structure, and the age of household appliances (e.g., refrigerator) if the respondent initially replied they did not know.
- We improved the training for CATI interviewers, putting more emphasis on probing and dealing with ''don't know'' responses, and CATI supervisors.

Use of the probes resulted in substantial reductions in ''don't know'' answers. Most of the items where probes were added showed at least 50 percent fewer ''don't know'' responses in 1991 compared to 1989. Other information from the 1991 experiment confirmed the results of the experiments conducted in 1987 and 1989.

We used the same method of analysis for the 1987, 1989, and 1991 experiments. We weighted data from the CATI and non-CATI treatment panels separately using the AHS-N estimation procedure described in the section on estimation. We produced estimates from the two treatments in data tables for characteristics provided in chapter 2 of the AHS-National publication. We used t-statistics to test differences between estimates from the CATI and non-CATI treatments.

The 1987 and 1989 analyses of the t-tests yielded similar results. The percents of significant differences observed at the 10 percent, 5 percent, and 1 percent significance levels were higher than what we expected by chance (e.g., we expected 10 percent of the tests to yield significant results, by chance, when tested at the . α = .10 significance level). For 1991, results show fewer significant differences than in 1987 and 1989, although the proportion is still higher than expected. It appears the changes introduced in 1991 had some effect on the CATI responses.

T-Test Results

Survey year	Proportion of significant tests (percent)		
	α = .10	α = .05	α = .01
1987	11.1	6.2	1.9
1989	11.7	6.8	2.3
1991	10.2	5.9	1.7

For characteristics of total occupied units, the significant differences for estimates for panels assigned to CATI versus panels assigned to non-CATI treatment ranged from about 6 to 40 percent.

The following table shows which groups had the most significant differences between CATI and non-CATI estimates for 1987, 1989, and 1991.

Groups With Differences Between CATI and Non-CATI Estimates

Groups	1987	1989	1991
Owner occupied housing units	Y	Y	Y
Urban housing units	Y	Y	Y
Housing units with moderate physical problems	Y	Y	Y
Total occupied housing units		Y	Y
Housing units in the suburbs (in MSA's)		Y	Y
Housing units which moved in the past year		Y	Y

For both 1987 and 1989, the analyses also revealed CATI had an effect on certain items within the groups. The following table contains those items and indicates whether CATI (C) or non-CATI (N) estimates were higher. If neither estimates were higher, the results were termed inconclusive (I).

Items Within Groups Showing Differences Between CATI and Non-CATI Estimates

Items	1987	1989	1991
Lot size	I	I	I
Water leakage	N	N	N
Income	I	I	I
Monthly housing costs as percent of income	N	N	N
Housing ownership shared by person not living at the unit	C	C	C
Utilities paid separately from rent	C	C	C
Owners with a mortgage	N	N	N
Routine maintenance costs	I	I	I
Heating equipment	I	I	I
Other (additional) heating fuels	N	N	N

We used data from both CATI and non-CATI treatments to produce the data presented in the 1987, 1989, and 1991 publications. The 1987, 1989, and 1991 published estimates for the groups and items mentioned previously are different than if we used maximum decentralized telephone interviewing for all units. You can get detailed information

on which specific characteristics are affected and the extent of the effect by writing to:

Demographic Statistical Methods Division
Bureau of the Census
Washington, DC 20233

Conclusions. The 1991 results confirmed the findings from both the 1987 and 1989 studies. There is strong evidence there are differences in data collected using CATI versus non-CATI methods. We do not know which method provides better data. However, we speculate that CATI income estimates are probably better than non-CATI, but that some other estimates are probably worse.

For income, CATI ensures all questions are asked. The computer will not allow the interviewer to skip any questions. For other items, we believe non-CATI estimates are more accurate because it is unlikely people would over-report things like water leaks.

These findings affect various types of estimates and comparisons. In particular, change estimates across 1985, 1987, 1989, and 1991 are biased and longitudinal analysis is adversely affected since we used CATI in 1987, 1989, and 1991. Personal visits were the only type of data collection done for 1985. The extent to which we use CATI in the future will determine the impact on longitudinal analyses involving data from 1985.

Reconciliation experiment. As part of the CATI, we conducted reconciliation studies in 1987, 1989, 1991, and 1993. If the responses for a particular year differed from the previous year, we asked the respondent to explain the difference. Our goal was to determine if there was a change since the previous year or if one of the responses was wrong.

1987 reconciliation study. The 1987 reconciliation study indicated respondents had difficulty reporting items such as the following: (a) presence of basement, (b) heating equipment, and (c) heating fuel.

The number of respondents who said their 1985 response was wrong was about the same as the number who said their 1987 response was wrong. Since we interviewed all households by personal visit in 1985, this indicates an effect due to certain questions rather than the mode of interview.

1989 and 1991 Reconciliation Studies. We conducted reconciliation studies in 1989 and 1991 with some of the questions from the 1987 study. The results were similar to the 1987 study. Results indicate problems reporting the presence of a basement, and type of heating equipment. More respondents indicated the prior year response, rather than the current year response, was wrong.

1991 moderate physical problems (MPP's) study. In 1991, an experiment was done to determine why CATI reported fewer moderate physical problems (MPP's) than non-CATI. The low estimates of MPP's found by CATI, relative to non-CATI in 1987 and 1989 AHS-N were likely caused by CATI underestimating MPP's and non-CATI overestimating MPP's. Thirty-seven percent of the differences between CATI and nonCATI were attributed to CATI missing a true MPP. And forty-two percent of the differences were attributed to non-CATI recording MPP's which reconciliation showed did not exist.

Appendix C.
Historical Changes

INTRODUCTION

The American Housing Survey National (AHS-N) was first conducted in 1973. Between 1973 and 1981 it was conducted every year and was called the Annual Housing Survey. The last even-numbered year for the AHS-N was 1980. Since 1981, the survey has been conducted every other year. In 1985, the name was changed to the American Housing Survey. Other historical changes in the survey are listed below by subject area. The year refers to the year the change was made. In some cases multiple years are mentioned together. In these cases either corrections were made to the data in more than one year or there are specific years for which data are not comparable.

Only changes are noted in this appendix. For example, ''Book Titles'' has no entries for 1975 through 1977, since the same titles were published for those years as in 1974.

Book Titles

1973. Annual Housing Survey: 1973

Part A. *General Housing Characteristics* (compared central city, suburban, and nonmetropolitan areas).

Part B. *Indicators of Housing and Neighborhood Quality.*

Part C. *Financial Characteristics of the Housing Inventory.*

Part D. *Housing Characteristics of Recent Movers.*

Supplement report number 1, *Financial Characteristics by Indicators of Housing and Neighborhood Quality.*

1974. Parts A, B, C, and D stayed the same.

Part E was added, *Urban and Rural Housing Characteristics.*

Supplement report number 1 was changed to part F, *Financial Characteristics by Indicators of Housing and Neighborhood Quality.*

1978. Parts A, C, D, and E stayed the same.

Parts B and F from earlier years were combined into a new Part B, *Indicators of Housing and Neighborhood Quality by Financial Characteristics.*

A new part F, *Energy-Related Housing Characteristics* was added.

1985. Parts A, B, C, D, E, and F, were combined in one report, *American Housing Survey for the United States.*

A new report was added, *Supplement to the American Housing Survey for the United States* with data on family types, neighborhood quality, commuting, and ownership of additional residential units.

Computer Assisted Telephone Interviewing (CATI)

1987. Large-scale CATI experiments were conducted as part of both the 1987, 1989, and 1991 AHS-N. Preliminary analysis of the CATI experiments indicated that CATI has a significant effect on the data. The experiments revealed that characteristics' data for owner housing, urban housing, and housing with moderate physical problems exhibited high numbers of significant differences between CATI and non-CATI estimates. The moderate physical problems subgroup had the highest incidence of significant differences. The analysis also showed significant differences for total occupied, suburban housing units, and moved in past year.

Little is known at this time about whether CATI or non-CATI produces better data. It is felt, however, the estimates of change in AHS-N between 1985 and 1987, 1985 and 1989, and 1985 and 1991 will be biased for many characteristics as a result of the introduction of CATI. Also see the discussion under the topics ''Buildings and Neighborhood'' and ''Telephone Interviewing.''

Head of Household/Householder

1980. Beginning in 1980, the concept head of household was dropped and replaced by householder. The head of household was the person regarded as the head by the respondent. However, if a married woman living with her husband was reported as the head, her husband was considered the head. The householder is the first household member listed by the respondent who is 18 years old or over and is an owner or renter of the sample unit.

Housing Costs and Value

1985. Beginning in the 1985 AHS-N; value, mortgage data, and taxes are shown for all owners; rent for all renters; and utilities for all of both groups. From 1973

through 1983, these items were shown only for ''specified'' owners and renters. For comparability, table 19 in of each chapter of the series H150 reports still shows data separately for ''specified'' owners and renters. ''Specified'' homes exclude 1-unit buildings on 10 or more acres, and owners in buildings with 2 or more units or with a business or medical office on the property.

Also in 1985 the terminology in the books changed. The new term ''Monthly housing costs'' includes the old terms ''Selected monthly housing cost'' for owners, ''Gross rent'' for renters, and ''Contract rent'' for vacant for-rent units.

1989. See the discussion under the topics, ''Income,'' and ''Monthly Housing Costs.''

Housing Unit Definition

1985. Beginning with the 1985 AHS-N there are two minor differences in the housing unit definition. A minor difference in the definition is the 1973 through 1983 requirement that a housing unit must have either direct access from the outside or through a common hallway, or complete kitchen facilities for the exclusive use of the occupants. In 1985, the complete kitchen facilities alternative was dropped with direct access required of all units. A second minor difference is in the definition of group quarters. In the 1973 through 1983 AHS-N, a household containing 5 or more persons unrelated to the householder was considered to be group quarters. In 1985, the cutoff was increased to 9 or more persons unrelated to the householder.

Income

1985. See the discussion under the topic ''Poverty.''

1989. A new item in 1989 replaced a similar item that was published in 1985 and 1987. It is ''Monthly housing costs as percent of current income.'' For income, this new item uses ''Current income.'' In 1985 and 1987, the item ''Monthly housing costs as percent of income'' used the ''Income of families and primary individuals in the last 12 months.'' See appendix A for a complete definition of ''Current income'' and ''Monthly housing costs as percent of current income.'' We recommend caution when comparing prior years' data with 1989 because of the differences in the definitions.

For comparative purposes, table A shows monthly housing costs as a percent of both income in the last 12 months and current income. For total households and owner households, the medians are the same for both types of income; for renter households, the medians are 29 and 27 percent, respectively.

Table A. **Monthly Housing Costs as a Percent of Income**

Characteristic	Median (percent)		
	Total	Owner	Renter
Monthly housing costs as percent of income using—			
Income in the last 12 months: 1987	22	18	29
1989	21	18	29
Current income: 1989	21	18	27

Table C in the introduction of the book *American Housing Survey for the United States in 1989,* series H150/89, shows the individual categories of percentages for 1989 for monthly housing costs as a percent of income in the last 12 months. Table 2-13 of the same report shows the individual categories for current income. For most households, current income is the same as income in the last 12 months. That is the situation for 83 percent of total households, 86 percent of the owners, and 78 percent of renters.

1993. Beginning in 1993, the questions on income sources of families and primary individuals were revised with the purpose of improved income reporting. The 1991 question, which reported interest or dividend income of $400 or more, was divided into two separate questions in 1993. One new question reports interest income from different sources and one reports dividends from stocks. Neither of these two questions have an amount limitation. Also, starting in 1993 in the ''Other'' income category, we now include income from education loans, grants, and scholarships. Prior to 1993, these sources of income were not collected. Caution should be used when making comparisons with the 1991 and earlier surveys and the 1993 and later surveys for item ''Household Income.''

Monthly Housing Costs

1985. See the discussion under the topic ''Housing Costs and Value.''

1989. Beginning in 1989, the monthly housing costs questionnaire items for renters were revised to improve the reporting of actual rental costs. In 1987, the questionnaire reflected the total amount reportedly paid for monthly rental costs. These amounts may have included the partially subsidized amount provided by the public housing authority, the Federal government, or State and local governments. The current questionnaire identifies those rental units that are subsidized and allows households to report only the costs they actually paid. The new procedures in 1989 produce lower and more accurate estimates. Also see the discussion under the topic ″Income.″

Name Change

1985. In 1985, the AHS-N changed its name from the Annual Housing Survey to the American Housing Survey. See the introduction of this section, ''Historical Changes.''

1985. The characteristics of new construction units are based on units constructed during the last 4 years in the 1985 AHS-N and later. Prior to 1985, characteristics of new construction were based on units built since the last survey year, which was a 1-year period except for the 1983 survey, which was a 2-year period.

Plumbing Facilities

1993. In 1993, there were 1,152,000 occupied housing units that reported a complete lack of plumbing facilities. The total number of units that reported such a lack decreased by about half between 1991 and 1993. Also, there was a decrease in these units between 1989 and 1991. Total occupied housing units with no plumbing facilities for exclusive use went from 2,253,000 in 1989 to 2,045,000 in 1991. In 1993, questionnaire item 29c on bathrooms for exlusive use was modified to provide more accurate estimates. The wording of the ''answer options'' to this question was changed to specify whether or not there was exclusive use of the facilities. Although the decrease between 1991 and 1993 seems unrealistic, we feel that the change in the 1993 questionnaire resulted in a better estimate. Caution should be used when making comparisons with the 1991 AHS-N survey and the 1993 and later surveys. The drop in the number of occupied units with no plumbing facilities also caused a drop in the number of units with severe physical problems from 2,874,000 in 1991 to 1,901,000 in 1993.

Poverty

1985. Beginning in 1985 the AHS-N provides housing characteristics for households with income below the poverty level. The AHS-N poverty data are not comparable to poverty data published from the Current Population Survey (CPS). Table B presents the differences.

Table B. **Households in Poverty in AHS and CPS: 1985, 1987, and 1989**

Year	AHS	CPS
1985	13,266,000	11,996,000
1987	11,969,000	11,807,000
1989	12,403,000	11,369,000
1985-1987 change	−1,297,000	−189,000
1987-1989 change	434,000	−438,000

Compared with the CPS, the AHS-N drop in poverty between 1985 and 1987 seems too large. The 1987 to 1989 AHS-N increase in poverty may be, in part, a compensation for the unrealistic 1985 to 1987 drop.

In general, AHS estimates of poverty are higher than the CPS estimates. Research indicates that the AHS-N slightly underreports income when compared with the CPS, thus overreporting poverty. Furthermore, the problem seems to be concentrated among elderly households. A detailed discussion of AHS-N poverty data is presented in the Census Bureau memorandum for the record, ''AHS Poverty Data, 1985 to 1989.'' A detailed discussion of AHS-N income data is presented in the Census Bureau memorandum for the record, ''Comparison of the 1989 AHS and CPS Income Reporting.'' Copies of these memoranda can be obtained by writing to the Housing and Household Economic Statistics Division, Bureau of the Census, Washington, DC 20233.

We wish to remind analysts that poverty data are published in the AHS-N not as an official count of households in poverty, but to show the housing characteristics of low-income households.

Questionnaire

1985. A new questionnaire was introduced in the 1985 AHS-N. Most of the changes on the questionnaire were made to improve the quality of the data. As a result of these changes, however, several items in the 1985 and later AHS-N supplement reports, H151, are not comparable to similar data for 1973 through 1983. A list of these items follows. A discussion of each item can be found under the topic of the same name.

Items changed on 1985 questionnaire:

- Units in structure
- Rooms in unit

A number of new items were introduced in the 1985 AHS-N including units with severe or moderate problems, elderly householder, and detailed information on mortgages, etc. For detailed definitions of these and other items, please see appendix A.

Rooms in Unit

1985. The number of households living in units with one or two rooms dropped from 3,215,000 in 1983 to 1,937,000 in 1985. As a result, the median number of rooms per unit increased from 5.2 to 5.3. This does not necessarily indicate an increase in the average size of housing units. In the 1983 AHS-N, respondents answered a single question asking for a total count of rooms in the unit. The potential to miss specific rooms is high in a question of this type. In the 1985 AHS-N, respondents were asked for a count of each specific type of room. The answers to these questions are then added together in the tabulations to provide a total count of rooms. Far fewer rooms are missed in this series of questions which has apparently resulted in lower counts of one- and two-room units. It is also possible, however, that a few rooms may be double counted. For example, a living room may also have been counted as a family room for a count of two rooms when only one room actually exists.

Sample

1985. A new sample was chosen for the AHS-N in 1985. In 1973 through 1983, a sample of housing units was selected from the 1970 census and updated to include units constructed since 1970. In 1985, a new sample was chosen from the 1980 census and updated to include units constructed since 1980. To the degree that the coverage of housing units is different between the 1970 and the 1980 censuses, comparisons of the results of the 1973 through 1983 surveys with the results of the 1985 and later surveys may be affected.

Severe and Moderate Problems

1985, 1987, and 1989. The data concerning units with severe and moderate problems in 1989 and later are not entirely comparable with similar data published in 1985 and 1987. Units lacking complete plumbing facilities are included in the count of units with severe physical problems. (Data on plumbing facilities in 1985 and 1987 were deficient because of the design of the questionnaire. As a result, the number of units with severe problems was underestimated in 1985 and 1987, and the number of units with moderate problems was overestimated. These deficiencies were corrected in the 1989 questionnaire. For additional discussion, see the topic ''Plumbing Facilities'' in the appendix C of the *American Housing Survey for the United States in 1993,* series H150/93.

1993. See the discussion under the topic ''Plumbing Facilities.''

Telephone Interviewing

1981. Beginning in 1981, decentralized telephone interviewing was conducted for a sample of units that were in sample during the previous enumeration. As a result of analysis conducted in both 1981 and 1983, it was concluded that data collected, using the decentralized telephone interviewing procedures, were not sufficiently different from data collected by regular personal interviews to preclude basing published data on both telephone and personal interview data. Also see the discussion under the topics ''Computer Assisted Telephone Interviewing.''

Units in Structure

1985. In 1973 through 1983, data on units in structure were based on the respondent's answer to one question, ''How many living quarters, both occupied and vacant, are there in this house (building)?'' In 1985 and later, data on units in structure are based on the respondent's answers to a series of questions (see item 20 through 23 on page 3 of the questionnaire in appendix A). The method of collecting units-in-structure data was revised in 1985 as previous AHS experience has shown the concept to be difficult for respondents. Respondents particularly had difficulty distinguishing between single-family attached and units in multiunit structures. Table C shows the change in the occupied inventory by units in structure between the 1983 and 1985 AHS using the published data.

Table C. **Change in the Occupied Housing Inventory by Units in Structure: 1983 to 1985**

Units in structure	1983	1985	1983-85 change
Single-family detached	53,544,000	55,076,000	1,532,000
Single-family attached	4,109,000	4,102,000	−7,000
2-or-more units in structure	22,985,000	24,492,000	1,507,000

It is estimated that the 1983 AHS-N overestimated single-family detached by 118,000 and single-family attached by 641,000 units. The 1983 AHS-N underestimated units in multiunit structures by approximately 788,000. Table D provides more reasonable (revised) levels of 1983 to 1985 growth by adding (1983 overestimates) and subtracting (1983 underestimates) to the 1983-85 change shown in table C.

Table D. **Revised Change in the Occupied Housing Inventory by Units in Structure: 1983 to 1985**

Units in structure	1983-85 change	Add 1983 over-estimate	Subtract 1983 under-estimate	1983-85 revised change
Single-family detached	1,532,000	118,000	–	1,650,000
Single-family attached	−7,000	641,000	–	634,000
2-or-more units in structure	1,507,000	–	788,000	719,000

Weighting

1981. The independent household estimates (control totals) used in the weighting of data in the 1981 and 1983 AHS-N are Current Population Survey (CPS) estimates derived from the 1980 census. The CPS independent household estimates used in the weighting of data in the 1973 through 1980 Annual Housing Surveys were derived from the 1970 census. The 1980-based estimates are about 2 percent larger than the 1970-based estimates. This 2 percent effect was equally distributed among all types of units. Therefore, percentages and medians calculated during the 1973 through 1980 time period should be comparable to similar data calculated in 1981 and 1983.

1985. In 1985, the 1980 census count of occupied units was adjusted for undercount and projected to 1985 using the 1980 to 1985 Current Population Survey's (CPS) rate of change. The 1985 AHS-N was then ratio-estimated to this number. In 1983 and earlier years the AHS-N was

ratio-estimated directly into CPS estimates. The procedure used in 1985 resulted in 200,000 additional occupied units that would not have been estimated if the 1983 procedures had been employed in 1985.

Beginning with 1985, estimates of mobile homes with a model year of 1980 or later were ratio-estimated into independent counts of mobile home placements from the Survey of Mobile Home Placements. The 1983 and earlier years counts of mobile homes may be deficient leading to unrealistically high estimates of change between 1985 and earlier years. For example, occupied mobile homes grew from 3,999,000 in 1983 to 4,754,000 in 1985, an increase of 755,000. This level of growth seems excessive as data from the Survey of Mobile Home Placements shows approximately 570,000 new mobile homes placed for residential use during the same time period.

1991. Beginning with 1991, the independent estimates (control totals) used in weighting the data are based on the 1990 census, plus change since then. The 1990-based weighting produces, on average, numbers that are about 2.5 percent lower than 1980-based weighting. This effect is not equally distributed among all types of units. Table E shows the effects of the weighting change by region for the year 1991.

Table F presents counts of occupied homes using 1990-based weighting. This weighting is consistent with the weighting used to produce the 1991 and later detailed tables in chapters 1 through 10 of the series H150 books. These data should be used when measuring the change in the size of the occupied inventory over time. These data provide the most accurate count of the total number of occupied homes for the years 1985, 1987, and 1989.

Table E. **Difference Between 1980- and 1990-Based Weighting as a Percent of 1980-Based: 1991**

Type of unit	United States	North-east	Mid-west	South	West
1991					
Occupied housing units	2.4	3.5	2.7	2.0	1.7
Built 1980 or later	0.1	0.0	0.1	0.1	0.1
Built before 1980	2.9	3.9	3.1	2.6	2.2

Table F. **Occupied Housing Units Using 1990-Based Weighting: 1985, 1987, and 1989**

(Numbers in thousands)

Characteristic	1985		1987		1989	
	Owner	Renter	Owner	Renter	Owner	Renter
United States	54,394	31,279	56,649	31,885	58,193	32,809
Northeast	10,922	7,106	11,418	7,089	11,660	7,011
Midwest	14,226	7,242	14,696	7,133	15,122	7,234
South	19,217	9,876	19,985	10,190	20,627	10,694
West	10,030	7,056	10,550	7,472	10,784	7,870
Race						
White and other	50,222	25,866	52,323	26,253	53,772	26,924
Black	4,172	5,413	4,326	5,632	4,420	5,885

Appendix D.
Errors

All numbers in this book are estimates. As in other surveys, errors come primarily from wrong answers, incomplete data, and sampling.

NONSAMPLING ERRORS

Nonsampling errors are usually the largest source of errors, larger than sampling errors. For example the changes in weighting in 1981 and 1991 (see appendix C) corrected some of the error due to incomplete data. Just that one correction averaged 2.5 percent in 1991. Worse errors from wrong answers and from incomplete data apply to some items, discussed in the next paragraphs.

Wrong answers. Wrong answers happen because people misunderstand questions, cannot recall the correct answer, or do not want to give the right answer. Table 1 shows which items have high inconsistency when people are reinterviewed after a few weeks. The actual survey cannot catch and reconcile these inconsistencies, so a high rate of wrong answers remains. Not all questions have been checked for inconsistencies. The ones checked were the questions where inconsistencies seemed likely. Questions measuring opinions were likely to have high inconsistencies.

The numbers in table 1 are percents. They are nearly the same as: 100 minus the correlation between answers in the original interview and the reinterview. For example, an inconsistency of 20 means a correlation of 80 percent, which is good. This is the correlation between answers to the same question, usually from the same respondents, a month apart. Wrong answers make results wrong, and mean that data on groups, for example income groups, are infected with data from people who really are not like the group at all. Readers should be wary of drawing firm conclusions from items with high inconsistency.

Coverage errors. Each home in the AHS-N sample represents a large number of other homes. However, because of incomplete sampling lists (i.e., undercoverage) the homes in the survey do not represent all homes in the country. Therefore, the raw numbers from the survey are raised proportionally so that the numbers published here match independent estimates of the total number of homes. These independent estimates are based on the 1990 Census of Housing, plus changes since then. Housing unit undercoverage is about 1.9 percent. Table A lists units that have known coverage deficiencies.

Table A. **Undercoverage Units**

Type of unit	Reason for undercoverage
Mobile homes.	Poor coverage of new mobile home parks in address enumeration districts
Conventional new construction	Permits issued fewer than 6 months before interviewing are not considered
New construction in special places	Not covered in either permit or nonpermit areas
Whole structure additions	These units are chosen with the aid of screening questions. Eligible units could be missed and ineligible units included because of incorrect answers to the screening questions.
Conversions from nonresidential units. .	Nonresidential units at the time of the 1980 census which converted to residential units were missed.

Incomplete data. Incomplete data happen because sampling lists are incomplete; and because people refuse the interview or some of the questions, or do not know answers. Table 2 (at the end of this appendix) shows which items have the least complete data. These are primarily items that people forget or consider personal: mortgages, other housing costs, and income. The computer may assign or ''impute'' values for these items. We do not know how close the imputed values are to the actual values. Incompleteness can cause large errors, since when even 10 percent of homes are missed by a particular question, they represent about 10 million homes which have to be estimated, on little or no basis (100 million homes are in the U.S.). The survey estimates them by assuming that they are like some group of homes which did give data, an assumption which is never exactly true. Thus, it is not surprising that large nonsampling errors are possible when the survey has data for only 50 to 90 percent of homes for particular items, as

shown in table 3. Again readers should be wary of items with highly incomplete data.[1]

Effect on income. The nonsampling errors interact particularly badly for income. It is inconsistently answered (table 1), incompletely answered (table 2), and the totals fall short of totals known from the National Income Accounts, especially for the elderly.[2]

SAMPLING ERRORS

Definition. Error from sampling reflects how estimates from a sample vary from the actual value. (Note: ''actual value'' means the value that would appear if all housing units had been interviewed, under the same conditions, rather than only a sample. A confidence interval is a range which contains our estimate with a specified probability.)

Counts. Most numbers in this book are counts of housing units (e.g., units with basements or units with an elderly person). These counts have error from sampling. Table B gives a convenient list of errors for a range of numbers. These errors are an overestimate for most items. To get a more accurate answer, use the appropriate formula shown in tables 4a and 4b (at the end of this appendix). As with the other types of errors, readers should be wary of numbers with large errors from sampling.

Table B. **Errors From Sampling to Compute a 90-Percent Confidence Interval**

When this book lists one of the following numbers—	The chances are 90 percent that the actual value is inside the range of plus or minus—
0	3
10	10
100	33
500	72
1,000	102
2,500	159
5,000	223
10,000	307
25,000	446
50,000	525
75,000	482
90,000	385
100,000	261

Source: These errors were computed based on a formula in table 4a or 4b with high error. This table represents a conservative example. The numbers are in thousands.

The error from sampling cannot be known exactly. We approximate it using the following formula for constructing a 90-percent confidence interval:

$$1.64 \times \sqrt{3.85 \times A - .000036 \times A^2}$$

where A is a number (a count of units) in this book.

This formula is an overestimate for most items. To get a more accurate estimate, use the appropriate formula in table 4a or 4b.

For example if A is 200:

$$1.64 \times \sqrt{3.85 \times 200 - .000036 \times 200 \times 200} = 45$$

The 90-percent confidence interval can then be formed by adding and subtracting this error to the survey estimate of 200 (i.e., 200 ± 45). Statements such as ''the actual value is in the range 200 ± 45 (155 to 245),'' are right 90 percent of the time and wrong 10 percent of the time.[3]

Numbers in the book are printed in thousands, so 200 means 200,000. The formulas are designed to use numbers directly from the book; do not add zeros. The result is also in thousands, so 45 means 45,000.

Percents. Any subgroup can be shown as a percent of a larger group. The error from sampling for a 90-percent confidence interval for this percent is:

$$1.64 \times \sqrt{3.85\ P\ (100 - P)\ /A}$$

where P is the percent; A is the denominator, or base of the percent.[4]

This formula is an overestimate for most items. To get a more accurate estimate, replace the first number under the square root sign with the first number under the square root sign of the appropriate formula in table 4a or 4b.

For example, the error from sampling for a 90-percent confidence interval for 40 percent of 200 (meaning 200,000) is:

$$1.64 \times \sqrt{3.85 \times 40 \times 60/200} = 11.1$$

Statements such as ''the actual percent is in the range 28.9 percent to 51.1 percent'' are right 90 percent of the time. This formula is an overestimate for most items. To get a more accurate estimate, change the first number under the square root sign here, 3.85, to the first number given under the square root sign of the appropriate formula in table 4a or 4b.

[1]Statistical note: The paper, *How Response Error, Missing Data and Undercoverage Bias Survey Data*, estimates that 90 percent of errors from incomplete data are less than: 200 + .58 x (lesser of A or 100,000 − A), where A is any count published in this book (in thousands, result also in thousands). Weights are adjusted to reduce these errors, but it is not known how much error remains. *How Response Error, Missing Data and Undercoverage Bias Survey Data* is available from HUD User at the address in the ''Explanations and Cautions'' section at the front of this book.

[2]Data are in the *Codebook for the American Housing Survey*, available from HUD User at the address in the ''Explanations and Cautions'' section at the front of this book.

[3]The formula in the text is based on 1.64 times the error from sampling. This formula gives ''90-percent confidence interval errors.'' For 95-percent confidence interval errors multiply by 1.96 instead of 1.64; for 99-percent confidence multiply by 2.58 instead of 1.64.

[4]This formula is actually $1.64 \times \sqrt{(p(100-p)/n)}$, since 3.85/A adjusts the data to the effective sample size.

Note that when a ratio C/D is computed where C is *not* a subgroup of D (for example, the number of Hispanics as a ratio of the number of Blacks) the error from sampling is different. The error from sampling for a 90-percent confidence interval for a ratio C/D[5] is:

$$(C/D)\sqrt{((\text{error for C})/C)^2 + ((\text{error for D})/D)^2}$$

Medians. The following steps calculate the error from sampling for a 90-percent confidence interval for medians.[6]

Steps for calculations	The formula	An example	Your data
How many total units is the median based on (in thousands, exclude "not reported" and "don't know")?	A	200	___
What are the end-points of the category the median is in?	X - Y	$50-74	___
What is the width of this category (in dollars, rooms, or whatever the item measures)?	W	$25	___
How many housing units are in this median category (in thousands)?	B	30	___
Then the error from sampling for the median is approximately:[7]	$\frac{1.8x\ W\ x\ \sqrt{A}}{B}$	$\frac{1.8\ x\ 25\ x\sqrt{200}}{30}$ = 21	___
The 90-percent confidence interval for the median is:	median $\pm\frac{1.8x\ W\ x\ \sqrt{A}}{B}$	median ± $21	___

[5]The error for C should be interpreted as the error for a 90-percent confidence interval for C. Likewise, the error for D should be interpreted as the error for a 90-percent confidence interval for D.

[6]For small bases use the more accurate approach in table 5.

[7]The factor 1.8 is a conservative estimate for most items. For a better approximation, find the appropriate formula in table 4 and divide the first number under the square root sign by 3.85. Take the square root of this answer and multiply by 1.8 to get your factor.

Differences. Two numbers from this book, like 34 and 40 or 40 percent and 45 percent have a "statistically significant difference" if their ranges of error from sampling for a 90-percent confidence interval do not overlap. When ranges of error for a 90-percent confidence interval do overlap, numbers are still statistically different if the result of subtracting one from the other is more than[8]:

$$\sqrt{(\text{error for 1st number})^2 + (\text{error for 2nd number})^2}$$

For example, if the first number is 34 and the second number is 40 with an error of 20, then the 90-percent confidence interval error for this difference of 6 is:

$$\sqrt{19^2 + 20^2} = 28$$

Since the difference is less than this error, these two numbers are not statistically different.

[8]Error for first number should be interpreted as the error for a 90-percent confidence interval for the first number. Likewise, error for second number should be interpreted as the error for a 90-percent confidence interval for the second number.

Table 1. **Different Answers a Month Apart**

Item	When measured[1]	Level of inconsistency	Confidence interval[2]
Other kinds of heating equipment (central warm-air)	89-MS	91	[73-100]
Mortgage payment include anything else (first mortgage)	90-MS	90	[72-111]
Water came in from other places	89-MS	81	[64-100]
Moved for other, financial/employment	85-MS	80	(62-104)
Moved for other, housing related	85-MS	79	(65-97)
Police protection problem in neighborhood	89-MS	78	[63-95]
Poor city/county service in neighborhood	89-MS	78	[63-95]
Moved for other reason	85-MS	73	(64-85)
Moved for better quality house	85-MS	69	(58-82)
Moved because other family/personal related	85-MS	68	(54-86)
Cost for water supply and sewage disposal	81-N	68	(61-76)
Other problem in neighborhood	89-MS	67	[61-74]
Undesirable industries/businesses in neighborhood	89-MS	66	[54-82]
Rats	89-MS	65	[54-69]
Noise in neighborhood	89-MS	64	[57-72]
Other kinds of heating equipment (none)	89-MS	63	[60-67]
Peeling paint on the ceiling	81-N	63	(49-80)
Other kinds of heating equipment (unvented room)	89-MS	62	[45-86]
How LIKELY to move to place prefer to live in 5 years	85-MS	62	(54-71)
How LIKELY to still be living in this unit in 5 years	85-MS	60	(49-74)
Gross income	82-MS	59	not available
Open cracks or holes in building	81-N	58	(47-72)
Electric fuses or breaker switches blown	81-N	58	(50-68)
Other major repairs over $500 each—repair done	85-MS	57	(50-64)
People in neighborhood	89-MS	57	[52-62]
Central air conditioning/dehumidifier	80-N	56	not available
Satisfactory police protection	77-N	55	(49-62)
Moved for lower rent or less expensive house to maintain	85-MS	55	(43-70)
Broken plaster or peeling paint	89-MS	55	[46-65]
Water came in from walls, doors, windows	89-MS	55	[45-67]
A working electric wall outlet	77-N	55	(42-71)
Other kinds of heating equipment (fireplace with no insert)	89-MS	54	[49-59]
Shopping	77-N	54	(47-61)
Broken plaster on the ceiling	81-N	53	(40-70)
Water came in from roof	89-MS	53	[46-60]
Payments the same during whole length of the mortgage	85-MS	52	(46-59)
Litter in neighborhood	89-MS	51	[44-60]
Main reason moved	85-MS	51	(47-55)
Which best describes place at that time	85-MS	51	(46-55)
Yearly cost for garbage	81-N	51	(43-62)
Rate the place (10 categories)	89-MS	51	[49-53]
Other major repairs over $500 each—someone in household do work	85-MS	51	(36-72)
Other kinds of heating equipment (other built-in electric)	89-MS	50	[38-66]
Holes in the floors	81-N	50	(33-74)
Oil, coal, kerosene, wood and any other fuel cost	81-N	50	(40-64)
Type of vacant	81-N	50	(38-65)
Central air fuel	85-N	50	(40-63)
At age 16, live in this area/different place	85-MS	50	(44-57)
Public transportation	77-N	50	(44-56)
Cookstove or range with oven	85-N	50	(39-64)
Traffic in neighborhood	89-MS	49	[43-54]
Moved to establish own household	85-MS	48	(38-59)
Rate the place (categories 1-6 combined)	89-MS	48	[46-51]
Other kinds of heating equipment (portable electric)	89-MS	47	[41-54]
Real estate taxes	81-N	47	(33-67)

See footnotes at end of table.

Table 1. **Different Answers a Month Apart**—Con.

Item	When measured[1]	Level of inconsistency	Confidence interval[2]
Central air conditioning/none	80-N	47	not available
Crime in neighborhood	89-MS	47	[41-53]
Any additions built—repair done	85-MS	46	(35-61)
Water came in from basement	89-MS	45	[38-55]
Moved to change from owner to renter/renter to owner	85-MS	44	(36-55)
Number of living rooms	85-N	44	(33-57)
Major equipment, such as furnace or central air replace/added—repair done	85-MS	44	(35-55)
Five years from now, would you prefer living in this area or someplace else	80-N	44	(32-60)
Water leaked into home from outdoors	89-MS	43	[39-47]
Rate the place (four combined categories)	89-MS	43	[41-46]
Other kinds of heating equipment (fireplace with insert)	89-MS	43	[35-52]
Concealed wiring	89-MS	43	[33-57]
Siding replaced or added in last 2 years—repair done	85-MS	42	(32-56)
Heat breakdown	89-MS	41	[30-56]
Yearly cost of insurance (reported in $100 increments to $1,000)	89-MS	41	[38-44]
Moved to be closer to school/work	85-MS	41	(32-53)
Heating equipment broke down for 6 hours or more	89-MS	41	[30-56]
Cost for real estate taxes	81-N	40	(35-46)
Central air conditioning/portable fan	80-N	40	not available
Public elementary school satisfactory	89-MS	40	[34-47]
Mice or rats or signs of	76-N	40	not available
House/apartment cold for 24 hours	89-MS	40	[36-45]
Current mortgage same year as bought home	85-MS	39	(27-56)
Prefer to be living in another home in this area in 5 years	85-MS	38	(31-48)
Anything about the neighborhood that bothers you	89-MS	38	[35-41]
Change in taxes/insurance/principal balance	85-MS	37	(28-51)
Other kinds of heating equipment (stove)	89-MS	36	[28-47]
Bathrooms remodeled or added—repair done	85-MS	35	(28-45)
Married, widowed, divorced, or separated	85-MS	35	not available
Costs for gas for the month of August	89-N	35	[24-54]
All or part of roof replaced in last 2 years—repair done	85-MS	35	(29-42)
New storm doors or storm windows bought and installed—repair done	85-MS	33	(27 41)
Moved because needed larger house or apartment	85-MS	33	(26-41)
Number of other rooms	85-N	32	(28-38)
Kitchen remodeled or added—repair done	85-MS	32	(25-41)
Insulation added—repair done	85-MS	32	(25-44)
House and lot sell on today's market	90-MS	31	[29-34]
Moved for new job or job transfer	85-MS	30	(22-39)
Average monthly cost for gas	89-N	29	[23-37]
Average monthly cost for electricity	89-N	28	[24-34]
Number of dining rooms	85-N	27	(24-29)
Type of mortgage (for the first mortgage/loan) (non-CATI)	89-N	27	[21-36]
Change based on interest rates	85-MS	26	(18-38)
Year the building was built	85-MS	25	not available
All or part of roof replaced in last 2 years—someone in household do work	85-MS	25	(15-44)
Number of family rooms	85-N	25	(21-30)
Mortgage payment include homeowner's insurance (first mortgage)	90-MS	24	[21-27]
Prefer to be living in this house/apartment/someplace else	85-MS	24	(20-29)
Clothes washer age	85-N	22	(19-25)
Any other rooms	85-N	22	(20-25)
How many years for mortgage	85-MS	22	(17-29)
New storm doors/windows bought/installed—someone in household do work	85-MS	19	(11-35)
Attend a public school or a private school	89-MS	19	[15-25]
Oven/cooking burner age	85-N	18	(16-21)
Heating equipment broke	89-MS	18	[9-34]

See footnotes at end of table.

Table 1. **Different Answers a Month Apart**—Con.

Item	When measured[1]	Level of inconsistency	Confidence interval[2]
Clothes dryer age	85-N	18	(15-21)
Refrigerator age	85-N	18	(16-20)
Garbage disposal age	85-N	18	(15-22)
Insulation added—someone in household do work	85-MS	16	(8-33)
Monthly payment (first mortgage)	90-MS	16	[14-18]
Number of half bathrooms	85-N	16	(14-18)
New storm doors or storm windows bought and installed—job cost	85-MS	15	(8-32)
New assumed mortgage	85-MS	15	(11-22)
Mortgage payment include property tax (first mortgage)	90-MS	15	[12-18]
How much was borrowed	85-MS	14	(11-18)
Monthly payment (for first mortgage/loan) (non-CATI)	89-N	14	[11-19]
Dishwasher age	85-N	14	(11-17)
Where was mortgage borrowed (non-CATI)	89-N	13	[7-28]
Mortgage on this house/apartment	90-MS	13	[11-15]
How much was borrowed (for the first mortgage/loan)? (non-CATI)	89-N	13	[10-17]
Have property insurance	89-MS	12	[10-14]
Clothes dryer fuel	85-N	12	(9-14)
Number of room air conditioners	85-N	11	(9-15)
Interest rate on the mortgage (for the first mortgage/loan) (non-CATI)	89-N	10	[7-15]
Room air conditioners	85-N	10	(8-12)
Kitchen remodeled or added—someone in household do work	85-MS	9	(3-26)
Living quarters	85-N	8	(6-9)
Clothes washer	85-N	8	(6-9)
Number of units in building	85-N	8	(6-9)
Number of bedrooms	85-N	7	(6-8)
Number of full bathrooms	85-N	6	(5-8)
Dishwasher	85-N	6	(5-7)
Cooking fuel	85-N	5	(4-6)
Clothes dryer	85-N	5	(4-7)
Number of apartments	85-N	5	(4-8)
Garbage disposal	85-N	5	(4-7)
Central air conditioning	85-N	5	(4-6)

[1]This notation consists of the year followed by the survey from which the item was measured. For example, 89-MS means that the item was measured during the 1989 AHS-Metropolitan Survey (MS) and 81-N means that the item was measured during the 1981 AHS-National (N) Survey.

[2]The confidence intervals enclosed by square brackets are at the 90-percent significance level, all others are at the 95-percent significance level. The confidence intervals for the years prior to 1989 have a significance level of 95 percent, since that time it has been the policy of the U.S. Bureau of the Census to publish a 90-percent significance level for all testing.

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Table 3. **Standard Errors of Bias Resulting From Incomplete Data**

Publication estimate	Standard error of bias
0	126
10	126
25	126
50	127
100	129
250	135
500	144
1,000	162
2,500	216
5,000	307
10,000	489
15,000	670
25,000	1,033
40,000	1,578
50,000	1,941
75,000	1,200
90,000	655
100,000	292
106,611	126

Error Formulas From Sampling to Compute a 90-Percent Confidence Interval

All household items use the formulas in table 4a. Note that neighborhood items[1] for some groups have a different formula. All items for workers use formulas in table 4b.

Table 4a. **Error Formulas From Sampling to Compute a 90-Percent Confidence Interval for Most Items**

Characteristics	Error formulas
U.S. Elderly Mobile Homes (except (neighborhood items)) New Construction Black	$1.64 \times \sqrt{3.16 \times A - 0.000030 \times A^2}$
Midwest	$1.64 \times \sqrt{3.16 \times A - 0.000123 \times A^2}$
West	$1.64 \times \sqrt{3.16 \times A - 0.000142 \times A^2}$
Central City Hispanic Urban MSA-Suburb	$1.64 \times \sqrt{2.51 \times A + 0.000171 \times A^2}$
Northeast	$1.64 \times \sqrt{2.51 \times A - 0.000119 \times A^2}$
Rural(except (neighborhood items))	$1.64 \times \sqrt{3.02 \times A - 0.000028 \times A^2}$
South (except (neighborhood items))	$1.64 \times \sqrt{3.02 \times A - 0.000084 \times A^2}$
Outside MSA (except (neighborhood items)) Vacants	$1.64 \times \sqrt{3.23 \times A - 0.000030 \times A^2}$
Rural (neighborhood items)	$1.64 \times \sqrt{3.85 \times A - 0.000036 \times A^2}$
South (neighborhood items)	$1.64 \times \sqrt{3.85 \times A - 0.000101 \times A^2}$
Outside MSA (neighborhood items)	$1.64 \times \sqrt{3.53 \times A + 0.002859 \times A^2}$
Mobile Homes (neighborhood items)	$1.64 \times \sqrt{3.02 \times A + 0.001148 \times A^2}$

Note: The formulas are based on 1.64 times the error from sampling. These formulas give 90-percent confidence interval errors. For 95-percent confidence interval errors, multiply by 1.96 instead of 1.64; for 99-percent confidence interval errors, multiply by 2.58 instead of 1.64.

[1]Neighborhood items include all characteristics in ''neighborhood'' tables except ''mobile home in group.''

Table 4b. **Error Formulas From Sampling to Compute a 90-Percent Confidence Interval for Workers**

Characteristics	Error formulas
U.S. Elderly Mobile Homes New Construction Black Midwest West	$1.64 \times \sqrt{3.16 \times A}$
Central City Hispanic Urban MSA-Suburb Northeast	$1.64 \times \sqrt{2.51 \times A}$
Rural Mobile homes South	$1.64 \times \sqrt{3.02 \times A}$
Outside MSA Vacants	$1.64 \times \sqrt{3.23 \times A}$

Note: The formulas are based on 1.64 times the error from sampling. These formulas give 90-percent confidence interval errors. For 95-percent confidence interval errors, multiply by 1.96 instead of 1.64; for 99-percent confidence interval errors, multiply by 2.58 instead of 1.64.

Table 5. **Calculation of the 90-Percent Confidence Interval for Medians**

The following steps calculate the 90-percent confidence interval for medians. First we give some hypothetical cost data to work with (all numbers are in thousands):

		Cumulative number of housing units
Total housing units	209	-
Less than $25	50	50
$25 to $49	45	95
$50 to $74	30	125
$75 to $99	20	145
$100 or more	55	200
Not reported	9	-
Median	$54	-

Steps for calculations	Formula	Bottom limit		Top limit	
		Example	Your data	Example	Your data
How many total units is the median based on (in thousands, exclude 'not reported' and 'don't know')?	A	200			
Half the total, for the median (in thousands)	A/2	100			
Error from sampling for 50 percent of the base of this median (1st line)[1]	$161/\sqrt{A}$	11.4			
Multiply this percentage error by .01 to turn it into a fraction and by total units to give the error in housing units	$1.61\sqrt{A}$	23			
Bottom of error range (2nd line minus 4th line, in thousands)	B_{bottom}	77*			
Top of error range (2nd line plus 4th line, in thousands)	B_{top}			* 123	
* Start adding up the housing units in the table, category by category, cumulatively from the beginning of the table, until you exceed the starred number above. What interval does the starred number fall in?		$25-$49		$50-$74	
How many housing units are in all the categories before this one (in thousands)?	C	50		95	
How many housing units are in this category (in thousands)?	D	45		30	
What is the bottom limit of this category (in dollars, rooms, or whatever the item measures)?	E	$25		$50	
What is the bottom limit of the next category (in dollars, rooms, etc)?	F	$50		$75	
Formula to calculate the limits of confidence interval.	$\frac{B-C}{D}(F - E) + E$	$\frac{77-50}{45}(25) + 25$		$\frac{123-95}{30}(25) + 50$	
Limits of confidence interval (in dollars, rooms, etc)		$40		$73	

* Starting with the starred step, this worksheet is equivalent to interpolation, for those who are familiar with this term.

[1]Statistical note: This formula is based on the error from sampling for 50 percent (using the formula above, $1.64 \times \sqrt{(3.85 \times 50 \times (100-50)/A)} = 161/\sqrt{A}$). This formula is an overestimate for most items. For a more accurate answer, replace the first number under the square foot sign with the first number under the square root sign of the appropriate formula in table 4a or 4b.

Index to Table Numbers, Questionnaire Numbers, and Appendixes