

# **American Housing Survey**

## **Disability Variables in the American Housing Survey**

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## ***Executive Summary***

The 2009 American Housing Survey (AHS) included, for the first time, a battery of six questions on whether occupants suffer from disabilities. The six questions were taken from the American Community Survey (ACS), and the same six questions are used in the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP). The National Health Interview Survey (NHIS) and selected supplements to SIPP contain more detailed questions on disabilities and related health conditions. This paper compares the various surveys that use the ACS questions and analyzes the data from the 2009 AHS on disabilities.

Table ES-1 describes the key features of the AHS, ACS, CPS, and SIPP with respect to the questions on disabilities. The AHS is the only survey that tabulates the data at the household level and that provides both person-level and household-level variables in its public use file; the other surveys tabulate data at the person level and contain only person-level variables in their public use file. The AHS does not provide person-level weights and, while the housing unit weights can be used to weigh occupants, they produce smaller counts than the counts based on person weights in the other surveys. The AHS and ACS ask the questions of the same populations, but the CPS and SIPP ask the questions only of persons 15 years old or older.

Comparisons of both person-level and household-level tabulations from the AHS and the ACS reveal that the percentages of persons and households affected by disabilities are substantially lower in the AHS than in the ACS. Neither the Census Bureau nor independent researchers have systematically examined these differences. The two most plausible explanations available at this point are: (1) the ACS asks the full battery about each person in the household, whereas the AHS asks the full battery about household members only if the respondent answers positively to a question about whether anyone in the household has a disability and (2) the ACS mail questionnaire is more private than the AHS' telephone interview and therefore might elicit fuller answers to sensitive questions. Appendix B compares the AHS, the ACS, and the CPS on counts and incidence for persons 15 years old and older. All the CPS percentages are higher than those of the AHS and lower than those of the ACS. In every case, the CPS percentage is closer to the AHS percentage than to the ACS percentage. The recent HUD report on *Worst Case Housing Needs of People with Disabilities* found that the AHS and the NHIS produced similar estimates for similar disability concepts. The percentage differences between the AHS and the ACS are important and need further analysis.

Because the AHS does not provide person-level weights, the text uses the AHS data to analyze the prevalence of disabilities only at the household level. Appendix A analyzes disabilities at the person level using both AHS and ACS data.

The six questions fall into two groups. Four questions inquire about specific impediments: difficulty walking or climbing stairs, difficulty with memory or general cognition, difficulty hearing, and difficulty seeing. The remaining two questions examine whether a member of the household is restricted in his or her ability to function at home (namely, whether the person is able to bathe or dress without assistance) and to function outside the home (namely, the ability to

**Table ES-1: Summary of Key Characteristics of Surveys Using Standard Questions on Disabilities**

<b>Features</b>	<b>ACS</b>	<b>AHS</b>	<b>CPS</b>	<b>SIPP</b>
Standard questions on disabilities	Hearing, seeing, walking, memory, bathing and dressing, running errands	Hearing, seeing, walking, memory, bathing and dressing, running errands	Hearing, seeing, walking, memory, bathing and dressing, running errands	Hearing, seeing, walking, memory, bathing and dressing, running errands
Additional questions	None	None	Effect of disabilities on labor force participation	Six questions and question on effect of disabilities on labor force participation in one or more common topical modules; additional questions that provide more detail on conditions related to disability are asked in topical modules on an irregular basis
Data collected	Person-level	Person-level	Person-level	Person-level
Public use file variables	Person-level only	Person- and household-level	Person-level only	Person-level only
Weights	Person and housing unit	Housing unit only	Person and housing unit	Person and housing unit
Published tabulations (includes Internet tables)	Person-level—includes labor force participation by disability	Household-level	Person level—labor force participation-related issues only	No regular tables published, special reports available online

run errands, such as go to the doctor or shop). Viewed this way, four questions identify the causes of a disability, and two questions measure its severity.

From the perspective of four questions identifying impediments and two questions measuring severity, the key findings are:

1. The number of households where one or more members has a disability that prevents him or her from performing functions inside or outside of the house is considerably smaller than the number of households where one or more members has one or more disabilities.
  - a. There are 19,182,000 households that have one or more members with a disability. This is 17.3 percent of all households.
  - b. There are 6,206,000 households that have one or more members who have difficulty performing functions outside of the house; that is, running errands, such as visiting a doctor or shopping.
  - c. There are 2,969,000 households that have one or more members who have difficulty performing functions inside the house, such as bathing or dressing.
  - d. Taking into account the overlap between having difficulty performing functions (inside and outside of the house), there are 6,847,000 households where one or more member has a disability that prevents him or her from performing functions inside or outside of the house. This is 6.1 percent of all households.
2. At the household level, difficulty performing inside or outside of the house rarely occurs independently of other disabilities.
  - a. Only 7.3 percent of households that report having a member who experiences difficulty performing functions outside of the house report no other disability among household members.
  - b. Only 2.2 percent of households that report having a member who experiences difficulty performing functions inside the house report no other disability among household members.
3. At the household level, having difficulty performing functions outside of the house is more commonly the result of having other disabilities than of having difficulty with bathing or dressing, and having difficulty with bathing or dressing rarely occurs without having difficulty performing errands.
  - a. Households where one or more members has difficulty performing functions outside of the house total 6,206,000, compared to 2,969,000 households that have members who have difficulty performing functions inside the house.
  - b. Only 64,000 households have members who have difficulty performing functions inside the house but have no members who have difficulty performing functions outside of the house.
4. At the household level, having difficulty walking or climbing stairs is the disability most commonly associated with having difficulty performing functions inside or outside of the house.
  - a. Of the households that have one or more members with difficulty bathing or dressing, 89.1 percent have one or more members with difficulty walking.

- b. Of the households that have one or more members with difficulty running errands, 70.7 percent have one or more members with difficulty walking.
5. At the household level, having difficulty with memory or cognition is the second most common disability associated with having difficulty performing functions inside or outside of the house.
  - a. Of the households that have one or more members who have difficulty with bathing or dressing, 47.5 percent have one or more members who have difficulty with memory.
  - b. Of the households that have one or more members who have difficulty running errands, 42.4 percent have one or more members who have difficulty with memory.
6. At the household level, difficulty with hearing or seeing are infrequently associated with the ability to perform functions inside or outside of the house.
  - a. Among households with one or more members who have difficulty with bathing or dressing, only 27.6 percent have members with difficulty hearing, and only 18.7 percent have members with difficulty seeing.
  - b. Among households with one or more members who have difficulty running errands, only 25.1 percent have members with difficulty hearing, and only 18.7 percent have members with difficulty seeing.

Analysis in Appendix A confirms—with both AHS and ACS data—that these same relationships hold at the person level.

There are clear patterns in the incidence among households; these patterns are very similar for each of the conditions identified by the six questions and for having any of the six conditions. The most important findings are:

1. Among households with one or more members with a disability, 86 percent have only one member with a disability.
2. One-third of all households with disabilities are one-person households.
3. Among units in different structure types, the incidence of disabilities is highest among households living in mobile homes. The age of the occupants and household income probably account for this result.
4. Households in non-metropolitan areas have higher percentages of persons with disabilities than households in metropolitan areas. Generally, households in urban suburbs have the lowest percentages; this is not true for all of the specific disabilities, but these exceptions are statistically insignificant.
5. The incidence of households with members with disabilities is greatest among households living in units built prior to 1970 and is lowest for households living in units built in 1990 or later.

6. The incidence patterns associated with household income are the most revealing. The percentage of households with one or more members with any disability among households who have extremely low incomes (30.6 percent) is more than three times greater than the percentage among households who have extremely high incomes (9.8 percent). The percentages decline monotonically across the income categories. This monotonic pattern is repeated in each of the specific disability categories except for a blip among the percentages for households with one or more members with a seeing disability. The income patterns appear to be related in straightforward ways to other patterns in the data. Having a member with a disability limits the income earning potential of any household but especially one-member households. Appendix A shows that the probability of an individual having a disability increases substantially with age. Households over 59 (and particularly those over 74) have lower earned income and lower income in general.
7. This income pattern is reflected clearly in three of the four categories that involve the quality and affordability of housing.
  - a. The percentage of households with disabilities is much higher among those renter households that live in assisted housing than among those living in market housing.
  - b. The incidence of disability among households also varies systematically with rent burden—the ratio of housing costs to income. The percentages increase monotonically as the severity of rent burden increases. This monotonic pattern is consistent across the various specific disabilities except for a blip in the percentages for difficulty with hearing.
  - c. While the overwhelming majority of housing units are considered adequate using the AHS adequacy measure, units that are moderately or severely inadequate have higher incidence levels.
  - d. Overcrowding, however, is not associated with disability. In fact, the incidence of disabilities declines with the number of persons per room. This is not surprising, since one-third of households with disabilities are one-person households; these households, by definition, cannot be overcrowded (i.e., have more than one person per room).

The paper concludes with recommendations to researchers about which survey to use depending upon how they want to incorporate information on disabilities into their research. These recommendations are tentative because of the unresolved issue about differences between the AHS and the ACS in the incidence of disability at the person and household levels.



# Disability Variables in the American Housing Survey

## ***Introduction***

In October 2009, Econometrica, Inc., entered into a contract with the U.S. Department of Housing and Urban Development (HUD) to support the American Housing Survey (AHS). Task 8 of that contract required the Econometrica team to analyze the information collected in the 2009 national AHS on disability. HUD asked Econometrica to summarize the AHS findings, to compare them with surveys with similar questions, and to provide guidance to AHS data users on how to interpret these variables.

In 2009, HUD and the Census Bureau included questions on disability in the AHS survey for the first time. The AHS asks a battery of six questions, the content and wording of which are based on the questions contained in the American Community Survey (ACS). The questions are asked at the person level, and the answers are tabulated at both the person and housing unit level. The Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP) also report disability status and use questions based on the ACS questions. Researchers studying disability per se would most likely use the much more extensive battery of questions contained in the National Health Interview Survey (NHIS), conducted by the Census Bureau for the Centers for Disease Control and Prevention (CDC).

The remainder of this report consists of seven sections:

- An overview of the disability concept.
- A comparison across surveys of the questions asked about disability status.
- A discussion of how to choose among the various sources of information on disability.
- A comparison of AHS tabulations at the housing unit level with tabulations in other surveys.
- Characteristics of households with members with disabilities from the AHS.
- Patterns in the AHS disability data at the household level.
- A summary comparison of the surveys and recommendations on choice among the surveys.

Appendices contain additional tabulations.

- Appendix A: Comparison of AHS tabulations at the person level with ACS tabulations.
- Appendix B: Comparison of CPS tabulations with AHS and ACS tabulations for persons 15 years old or older.

## ***The Concept of Disability***

A “disability” arises when an “impairment” (such as blindness or Alzheimer’s disease) limits a person’s ability to carry out a function (such as bathing or dressing) or to participate in an activity (such as employment). It is important to distinguish between the impairment and its effects and to remember that the effects of an impairment are dependent upon the environment.

For example, the ability of a near-blind person to work may depend upon the existence of special transportation facilities and the availability of special reading devices.

The World Health Organization (WHO) maintains two internationally accepted classification systems: the International Classification of Diseases (ICD) and the International Classification of Functioning, Disability and Health (ICF). The ICF, which was approved by member states in 2001, is designed to work in consort with the ICD. A useful discussion of the ICF model is contained in a paper on disability statistics in the NHIS.

... we adopt ICF concepts to create operational definitions of disability. The concepts used include impairment, activity limitation, participation restriction, and disability (see WHO, 2001). A prerequisite to each of these concepts is the presence of a health condition. Examples of health conditions are listed in the International Classification of Diseases, Tenth Edition (ICD-10) and they encompass diseases, injuries, health disorders, and other health related conditions. An impairment is defined as a significant deviation or loss in body function or structure. For example, the loss of a limb or vision loss may be classified as impairments. In some surveys, impairments are defined as long lasting health conditions that limit a person's ability to see or hear, limit a person's physical activity, or limit a person's mental capabilities. An activity limitation is defined as a difficulty an individual may have in executing activities. For example, a person who experiences difficulty dressing, bathing or performing other activities of daily living due to a health condition may be classified as having an activity limitation. In some surveys, activity limitations are identified based upon a standard set of activities of daily living questions (ADLs) and/or instrumental activities of daily living questions (IADLs). A participation restriction is defined as a problem that an individual may experience in involvement in life situations. For example, a working-age person with a severe health condition may have difficulty participating in employment as a result of the physical environment (e.g., lack of reasonable employer accommodations) and/or the social environment (e.g., discrimination). In some surveys, participation restrictions are identified by questions that ask whether the person has a long lasting health condition that limits his or her ability to work, or whether a health conditions affects his or her ability to go outside his or her home to go shopping, to church or to the doctor's office.

The final ICF concept that we use is a disability. The term disability is used to describe the presence of an impairment, an activity limitation and/or a participation restriction. This concept is similar to the definition used in the Americans with Disabilities Act of 1990 (ADA). The ADA defines a disability as "a physical or mental impairment that substantially limits one or more of the major life activities, a record of such an impairment, or being regarded as having such an impairment."<sup>1</sup>

Cornell University's Rehabilitation Research and Training Center on Disability Demographics and Statistics has prepared a series of papers on disability statistics in major surveys. While this series does not as yet contain an analysis of disability statistics in the AHS, readers will find on

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<sup>1</sup> Benjamin H. Harris, Gerry Hendershot, and David C. Stapleton, *A Guide to Disability Statistics from the National Health Interview Survey*, Rehabilitation Research and Training Center on Disability Demographics and Statistics, Cornell University, October 2005, pages 6-7.

this Web site user guides that evaluate the disability data found in the ACS, CPS, decennial census, NHIS, NHIS disability supplement, Panel Study of Income Dynamics, and SIPP.<sup>2</sup> Readers should also be aware of a study by Mathematica Policy Research, Inc., funded by the Department of Health and Human Services.<sup>3</sup> While not as detailed as the Cornell studies, this report examines a larger number of surveys, including the AHS. It cites supplemental questions within the AHS on disabilities in 1978 and 1995.

## ***Disability and Large-Scale Statistical Surveys***

### **Surveys Focusing on Health and Disability**

Researchers who are interested in studying the causes and consequences of disabilities should rely mainly on the National Health Interview Survey. The NHIS dates back to 1957; it is conducted annually by the Census Bureau for the National Center for Health Statistics (NCHS), which is part of the CDC.<sup>4</sup> Currently, the survey collects data on approximately 87,500 persons from a representative sample of 35,000 households. Since 1997, the NHIS has had four core components: Household, Family, Sample Adult, and Sample Child.<sup>5</sup>

The Household component collects limited demographic information on all of the individuals living in a particular house. The Family component verifies and collects additional demographic information on each member from each family in the house and collects data on topics including health status and limitations, injuries, health care access and utilization, health insurance, and income and assets. The Family Core component allows the NHIS to serve as a sampling frame for additional integrated surveys as needed.

From each family in the NHIS, one sample adult and one sample child (if any children are present) are randomly selected, and information on each is collected with the Sample Adult Core and the Sample Child Core questionnaires. Because some health issues are different for children than they are for adults, these two questionnaires differ in some items, but both collect basic information on health status, health care services, and health behaviors.

The most recent description of the NHIS questionnaire applies to the 2010 NHIS. The Family Core component of the 2010 NHIS produced person-level variables for all household members. A Health Status and Limitation of Activity section focused on disabilities.

For each family member (with some exclusions for children and youth), information is collected on activity limitations, including questions about work limitations; the need for personal assistance with personal care needs, such as eating, bathing, dressing, and getting around inside the home; and the need for personal assistance with handling routine needs, such as everyday household chores, doing necessary business, and shopping or running errands. If any limitations

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<sup>2</sup> <http://www.ilr.cornell.edu/edi/disabilitystatistics/sources-userGuides.cfm#nhis>.

<sup>3</sup> Gina Livermore, Denise Whalen, Sarah Prenovitz, Raina Aggerwal, and Maura Bardos, *Disability Data in National Survey*, Center for Studying Disability Policy, August 22, 2011.

<sup>4</sup> Information on the NHIS was drawn from its Web site: [http://www.cdc.gov/nchs/nhis/about\\_nhis.htm#content](http://www.cdc.gov/nchs/nhis/about_nhis.htm#content).

<sup>5</sup> A special supplement on disability was added to the 1994 and 1995 NHIS surveys; see [http://www.cdc.gov/nchs/nhis/nhis\\_disability.htm](http://www.cdc.gov/nchs/nhis/nhis_disability.htm).

are identified, the respondent is asked to specify the health condition(s) causing the limitation(s) and indicate how long he or she has had each such condition.

More detailed information on disabilities is collected for the Sample Adult and the Sample Child. The following description of the relevant section of the Sample Child questionnaire indicates the extent of information collected.

The Child Conditions, Limitation of Activity, and Health Status Section (CHS) of the 2009 NHIS contains information on conditions, limitations of activity, health status, and mental health. The CHS includes questions on the following health conditions: mental retardation, developmental delays, Attention Deficit Hyperactivity Disorder (ADHD) or Attention Deficit Disorder (ADD), Down's syndrome, cerebral palsy, muscular dystrophy, cystic fibrosis, sickle cell anemia, autism, diabetes, arthritis, congenital and other heart disease, asthma, allergies, colitis, anemia, ear infections, seizures, headaches, stuttering, and stammering. A question about whether the sample child still has asthma is included. This section also contains a question used to determine the number of school-loss days reported during the 12 months prior to the interview. In addition, respondents were asked about hearing and vision loss; if a health problem requires the sample child to use special equipment such as a brace, wheelchair, or hearing aid; whether the sample child's health is better, worse, or the same compared with 12 months ago; and whether the sample child currently has a problem that has required prescription medication for at least 3 months. Lastly, there are questions about the sample child's height and weight.

In 1994 and 1995, the NHIS included a special supplement on disabilities designed to collect more extensive information on the disabilities and their effects.

## **Surveys Reporting Disability Information in a Non-Health Context**

The other surveys discussed in this paper view a disability as an important demographic characteristic that may affect or be related to other information being collected by the survey. For example, disability status may have an effect on the extent and type of remodeling carried out by homeowners (data collected by the AHS) or on participation in the labor force (data collected by the CPS). The collection of information on disabilities is not the primary focus in any of these other surveys.

The long form of the 2000 decennial census contained six questions on disabilities. These questions, with modifications, are included in the American Community Survey. The AHS, CPS, and SIPP adopted these questions with appropriate modifications. Figure 1 contains the relevant questions from the 2011 ACS questionnaire.

In the context of the WHO model, questions 17a and 17b inquire about specific impediments: difficulty in hearing or seeing. These questions are asked of all persons. Questions 18a, 18b, and 18c inquire about the ability to perform specific activities, such as concentrating or decisionmaking, walking up stairs, and bathing and dressing. Questions 18a and 18b involve activities that are mostly one-dimensional (cognition and ambulation), whereas Question 18c involves activities that require both mental and physical abilities (bathing and dressing). These questions are asked of persons 5 years old or older. Question 19 inquires about the ability to

Figure 1: ACS Questions on Disabilities

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**Person 1 (continued)**

**16** Is this person CURRENTLY covered by any of the following types of health insurance or health coverage plans? Mark "Yes" or "No" for EACH type of coverage in items a – h.

a. Insurance through a current or former employer or union (of this person or another family member)	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>
b. Insurance purchased directly from an insurance company (by this person or another family member)	<input type="checkbox"/>	<input type="checkbox"/>
c. Medicare, for people 65 and older, or people with certain disabilities	<input type="checkbox"/>	<input type="checkbox"/>
d. Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low incomes or a disability	<input type="checkbox"/>	<input type="checkbox"/>
e. TRICARE or other military health care	<input type="checkbox"/>	<input type="checkbox"/>
f. VA (including those who have ever used or enrolled for VA health care)	<input type="checkbox"/>	<input type="checkbox"/>
g. Indian Health Service	<input type="checkbox"/>	<input type="checkbox"/>
h. Any other type of health insurance or health coverage plan – Specify	<input type="checkbox"/>	<input type="checkbox"/>

**17** a. Is this person deaf or does he/she have serious difficulty hearing?  
 Yes  
 No

b. Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?  
 Yes  
 No

**18** a. Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions?  
 Yes  
 No

b. Does this person have serious difficulty walking or climbing stairs?  
 Yes  
 No

c. Does this person have difficulty dressing or bathing?  
 Yes  
 No

**19** Answer question 19 if this person is 15 years old or over. Otherwise, SKIP to the questions for Person 2 on page 12.

**19** Because of a physical, mental, or emotional condition, does this person have difficulty doing errands alone such as visiting a doctor's office or shopping?  
 Yes  
 No

**20** What is this person's marital status?  
 Now married  
 Widowed  
 Divorced  
 Separated  
 Never married → SKIP to **21**

**21** In the PAST 12 MONTHS did this person get –

	Yes	No
a. Married?	<input type="checkbox"/>	<input type="checkbox"/>
b. Widowed?	<input type="checkbox"/>	<input type="checkbox"/>
c. Divorced?	<input type="checkbox"/>	<input type="checkbox"/>

**22** How many times has this person been married?  
 Once  
 Two times  
 Three or more times

**23** In what year did this person last get married?  
 Year

**24** Answer question 24 if this person is female and 15 – 50 years old. Otherwise, SKIP to question 25a.

**24** Has this person given birth to any children in the past 12 months?  
 Yes  
 No

**25** a. Does this person have any of his/her own grandchildren under the age of 18 living in this house or apartment?  
 Yes  
 No → SKIP to question 26

b. Is this grandparent currently responsible for most of the basic needs of any grandchildren under the age of 18 who lives in this house or apartment?  
 Yes  
 No → SKIP to question 26

**26** Has this person ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard? Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War.  
 Less than 6 months  
 6 to 11 months  
 1 or 2 years  
 3 or 4 years  
 5 or more years

**26** Has this person ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard? Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War.  
 Yes, now on active duty  
 Yes, on active duty during the last 12 months, but not now  
 Yes, on active duty in the past, but not during the last 12 months  
 No, training for Reserves or National Guard only → SKIP to question 28a  
 No, never served in the military → SKIP to question 29a

**27** When did this person serve on active duty in the U.S. Armed Forces? Mark (X) a box for EACH period in which this person served, even if just for part of the period.

September 2001 or later  
 August 1990 to August 2001 (including Persian Gulf War)  
 September 1980 to July 1990  
 May 1975 to August 1980  
 Vietnam era (August 1964 to April 1975)  
 March 1961 to July 1964  
 February 1955 to February 1961  
 Korean War (July 1950 to January 1955)  
 January 1947 to June 1950  
 World War II (December 1941 to December 1946)  
 November 1941 or earlier

**28** a. Does this person have a VA service-connected disability rating?  
 Yes (such as 0%, 10%, 20%, ... , 100%)  
 No → SKIP to question 29a

b. What is this person's service-connected disability rating?  
 0 percent  
 10 or 20 percent  
 30 or 40 percent  
 50 or 60 percent  
 70 percent or higher



perform functions outside of the home, such as doing errands or visiting a doctor; these functions also require both mental and physical abilities. Question 19 is asked of persons 15 years of age or older. The ACS questions represent an effort to collect information in an efficient manner (only six questions) on specific impediments and their effects on living in the home and outside of the home.

The AHS, CPS, and SIPP adopted versions of the ACS questions for four reasons: the six questions were very carefully designed, reviewed, and tested;<sup>6</sup> they cover the most important disability characteristics; they impose minimal burden on respondents; and the consistency in questionnaire design makes it easier to combine information from multiple sources on how disabilities affect other economic and demographic variables.

Because of its labor market focus, the CPS contains a seventh question that focuses on the relationship between disability and participation in the labor force:

Do you have a disability that prevents you from accepting any kind of work during the next six months?

The long form of the 2000 decennial census included a similar question, but survey design and enumerator issues invalidated this measurement for Census 2000.<sup>7</sup> Similar questions were included in the 2005 and 2006 ACS questionnaires but were omitted after 2006.

SIPP is a panel survey in which the same households are interviewed in successive waves. The SIPP “questionnaire” consists of a set of core questions that are asked in each wave and a series of topical modules that are asked as part of specific waves. The mix of topical modules changes with each SIPP panel, and not all modules are asked of each panel. The six questions are generally included in one of the topical modules. In addition, past SIPPs have had a topical module that explores in greater detail the relationship between disabilities and employment. The module looks at how health conditions limit the ability to work. The module asks about 29 specific health conditions, including hearing and vision problems, AIDS, cancer, and loss of limbs. An “other” category forms the 30th question in this sequence.

All the surveys ask the six questions at the person level. The AHS and ACS follow the same age structure in asking the questions: all persons are queried about problems with hearing and vision; persons 5 years old or older are queried about problems with cognition, walking, and bathing and dressing; and persons 15 years old or older are asked about problems with errands. The CPS and SIPP ask the disability questions only of persons 15 years old or older.

An important distinction is how the surveys report the information. The AHS reports information on disabilities at both the person and the household level. The ACS, CPS, and SIPP report information on disabilities only at the person level.

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<sup>6</sup> See Brault, Matthew W. 2009. *Review of Changes to the Measurement of Disability in the 2008 American Community Survey*. Washington, DC: U.S. Census Bureau.

<sup>7</sup> The long form of the 1990 decennial census included a similar question about the relationship between disability and employment. The only other questions about disability in the 1990 long form dealt with the effects of disabilities on the ability to bathe or dress and the ability to run errands outside the home.

# Choosing Among the Surveys

Two broad guidelines are obvious:

Researchers interested in how various health conditions create impediments that restrict the ability of individuals to perform certain functions or participate in various activities should use the NHIS because this survey contains very detailed information on the causes and consequences of disabilities.

Researchers interested in how disabilities affect specific variables should choose the survey that focuses on those variables. CPS or SIPP are the obvious choices for research into the effects of disabilities on employment, and the AHS is the obvious choice for research into the effects of disabilities on housing needs and choices.

Starting from these simple guidelines, we will now compare using the disability information in the AHS to using that in other surveys under specific conditions.

## AHS and Person-Level Information on Disabilities

Compared to the ACS, the AHS suffers from several disadvantages for person-level analysis. The major disadvantage is the absence of person-level weights. For the AHS, the Census Bureau provides only housing unit weights (PWT, WGT90GEO, or WEIGHT), while the ACS provides both person-level weights (PWGTP) and housing unit weights (WGTP).<sup>8</sup> Table 1 compares population counts using the AHS and the ACS; the counts are for persons not living in group homes. The ACS count in the bottom line of the Table is derived by multiplying the number of persons in a household by the weighted number of households with that number of persons. The AHS and the ACS provide very similar population counts when the ACS uses housing unit weights just like the AHS does. However, when the ACS uses population weights, its estimate of the population is much closer to the official Census estimate.

**Table 1: 2009 Population Counts from the AHS and ACS**

Source	Number of persons in housing units
American Housing Survey	283.1 million
American Community Survey (person weights)	298.7 million
American Community Survey (housing weights)	285.6 million

Another unique advantage of the ACS is the provision of information on disabilities for persons living in group quarters. The ACS disability counts provided by the Census Bureau online through American Fact Finder are based on the civilian non-institutional population, which includes persons living in households and persons living in non-institutional group quarters, a group totaling 301.5 million persons in 2009. One can obtain counts for persons living in

<sup>8</sup> The capitalized expressions are variable names from the AHS and ACS public use files, respectively. The AHS has three weights, a pure weight (PWT), a weight based on 1980 geography (WEIGHT), and a weight based on 1990 geography (WGT90GEO).

households only, for persons living in group quarters, and for all persons by using the ACS public use file (PUF).

Appendix A shows that the AHS and the ACS produce different estimates of the proportion of persons with specific disabilities. The ACS estimates are conceptually better because they use population weights, whereas the AHS estimates use housing weights. The estimates differ for other reasons. The AHS reports refusals and “don’t know” responses, but the Census Bureau imputes answers when ACS encounters refusals or “don’t know” responses. American Fact Finder indicates that 7 to 10 million of the 301 million in the 2009 ACS-tabulated responses were imputed. Finally, there are important data collection differences between the AHS and the ACS. The AHS relies mainly on telephone interviewing, while the ACS relies mainly on mail questionnaires. The length of the questionnaire and the sequences of questions also differ between the two surveys.

## **AHS and Household-Level Information of Disabilities**

The AHS is the only survey among those discussed above that tabulates the person data at the household level and that provides household-level variables in its PUF. Household-level tabulations can be produced from the PUFs of the other surveys; however, most researchers would only consider the ACS as an alternative to the AHS for household-level information because the CPS and SIPP ask the disability question only of persons 15 years old or older. The NHIS can also be used to produce household estimates, but its greater detail on disabilities and health issues makes it more difficult to use.

The choice between the AHS and the ACS depends upon the goals of the research, as each survey has its strengths and weaknesses.

AHS strengths include:

- Household-level variables already exist.
- Survey collects more detailed information on both housing unit and household characteristics.
- Data collection by telephone interviews allows for more probing and interaction with respondents during editing.
- No imputations for refusals or “don’t know” responses – for users who prefer no imputations.

ACS strengths include:

- Much larger sample size allows analysis at the state and metropolitan area levels.
- Imputations for refusals or “don’t know” responses – for users who prefer imputations.

The next section compares household-level tabulations from the AHS and the ACS for 2009.



## ***Disabilities at the Household Level: AHS vs. ACS***

Before comparing the two surveys, a brief discussion is required about the differences between the AHS and the ACS in reporting the basic housing counts. Table 2 compares the counts from the two surveys of the housing stock, occupied housing units, and vacant units for 2009. By definition, the number of occupied housing units equals the number of households. The two key differences between the surveys involve the treatment of seasonal units and how vacancies are estimated. The AHS divides the housing stock into seasonal and year-round units and then divides year-round units into occupied and vacant units. The ACS classifies units occupied less than 2 months as vacant units if all the occupants have other residences. Among the types of vacant units recorded by the ACS are units that are “for seasonal, recreational, or occasional use.” In 2009, this group numbered 4,706,000, which was approximately equal to the number of seasonal units reported by the AHS. If we adjust the AHS count of vacant units to include seasonal units, the AHS counts roughly 2 million more vacant units than the ACS. The ACS has a known bias in estimating vacancy. The ACS provides this guidance on vacancy: “The data on vacancy status were obtained only for a sample of cases in the computer-assisted personal interview (known as “CAPI”) follow-up by field representatives. Data on vacancy status were obtained at the time of the personal visit.” Vacant units had 2 months to become occupied before the ACS conducted a field interview; therefore, ACS vacancy rates should be lower than AHS vacancy rates. Because both surveys use roughly the same count of the housing stock, the underestimation of vacancies by ACS results in an overestimate of occupied housing units or households.<sup>9</sup>

**Table 2: Differences in Housing Counts, AHS vs. ACS<sup>10</sup>**

	<b>AHS</b>	<b>ACS</b>	<b>AHS-ACS</b>
Housing Stock	130,112,000	129,950,000	162,000
Year-round	125,494,000	NA	
Occupied (households)	111,806,000	113,616,000	-1,810,000
Vacant	13,688,000	16,334,000	-2,646,000
Seasonal	4,618,000	NA	
Vacant + seasonal	18,306,000	16,334,000	1,972,000

Table 3 compares the incidence of various disabilities among households in 2009 using data from the PUFs from the 2009 AHS and the 2009 ACS. The Census Bureau collects information on disabilities at the person level; it puts variables that indicated whether a household has a member with a specific disability on the AHS PUF but not on the ACS public use microdata sample (PUMS). To produce the ACS portion of Table 3, we merged the housing and person ACS PUMS files and created variables that reproduce the information found on the AHS PUF.

<sup>9</sup> This issue is discussed in greater detail in *Comparison of Housing Information from the American Housing Survey and the American Community Survey* by Frederick Eggers, a report prepared by Econometrica, Inc., for HUD in 2007. See pages 12-14. Found under technical supplements at <http://www.huduser.org/portal/datasets/ahs/ahsprev.html>.

<sup>10</sup> The counts in Table 2 come from American Housing Survey for the United States: 2009, Table 1-1, and from Tables B25002 and B25004 for the 2009 ACS on American Fact Finder.

**Table 3: Comparison of Household Level Information on Disabilities: 2009 AHS vs. ACS**

Type of disability*	AHS					ACS		
	With disability	All who responded	Refused or Don't Know	Percent	Maximum percent	With disability	All	Percent
Hearing	6,077,000	110,927,000	877,000	5.5%	6.2%	9,124,000	113,620,000	8.0%
Seeing	2,993,000	110,893,000	917,000	2.7%	3.5%	5,502,000	113,620,000	4.8%
Memory & related	5,817,000	110,847,000	956,000	5.2%	6.1%	10,474,000	113,620,000	9.2%
Walking	11,651,000	110,895,000	911,000	10.5%	11.2%	16,137,000	113,620,000	14.2%
Care	2,969,000	110,899,000	907,000	2.7%	3.5%	6,024,000	113,620,000	5.3%
Errands	6,206,000	110,996,000	813,000	5.6%	6.3%	10,642,000	113,620,000	9.4%
Any Disability	19,182,000	110,803,000	1,003,000	17.3%	18.1%	27,678,000	113,620,000	24.4%

\*The AHS and ACS samples are so large (45,000 and 1,275,000, respectively) that all the percentage differences are highly statistically significant.

As explained, the ACS reports a larger number of households, 113.6 million (compared with 110.9 million). The methodological differences discussed in the preceding paragraph should not affect the percentage estimates because, in the case of both surveys, the Census Bureau derives percentage estimates from the survey data and then applies the percentages to the relevant totals to produce the count estimates.

Table 3 shows that the ACS consistently reports a higher percentage of households having one or more members with a disability. According to the AHS, 17.3 percent of households contain a member with some disability; the ACS reports 24.4 percent. The ACS estimates range from one-third larger (14.2 percent vs. 10.5 percent for difficulty with walking) to almost twice as large (5.3 percent vs. 2.7 percent for difficulty with bathing or dressing). Appendix A demonstrates that the ACS also finds a higher percentage of persons with disabilities than does the AHS.

The ACS PUMS data contain no refusals or “don’t know” responses because the Census Bureau imputes answers when the respondent fails to answer the disability question. Perhaps this imputation process contributes to the differences between the two surveys. Under the AHS, the “maximum percent” column is the ratio of the households that report having a member with a specified disability plus the households that refused to answer the question or answered they did not know to the total number of households questioned (including those that did not provide a “yes or no” answer). Even if one assumes all the refusals or “don’t know” responses conceal households with disabled members, the AHS estimates would still be substantially smaller than the ACS estimates.

Teresa Souza discovered this disparity some months before we did.<sup>11</sup> She tried to determine which set of estimates was more believable by looking at a subset of the households that should be receiving public assistance if the household had a member with a disability. For these households, she calculated the following ratio for both the AHS and the ACS:

$$\text{Rate of false positives} = \frac{(B-A)}{B}, \text{ where}$$

A = the number of households that both report receiving a specific type of assistance related to a disability and report having a member with a disability

B = the number of households that report receiving a specific type of assistance related to a disability

Souza concluded that the ACS had a lower incidence of false positives; in other words, the ACS has a smaller share of households that report having an income source proxy associated with disabilities but that do not answer positive to at least one of the six questions about disabilities. This was true for three of the four sources of assistance she studied and for the reception of any of the four forms of assistance. For example, among very low income, nonelderly families without children, the ACS had a 4.5 percent rate of false positives for Supplemental Security Income compared to a 39.3 percent rate for the AHS. However, for the same group, the rate of

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<sup>11</sup> Email from Teresa Souza to David A. Vandenbroucke on December 1, 2010.

false positives for “retirement, survivor, or disability” payments (remember this group is nonelderly) was 63.8 percent for the ACS and 36.5 percent for the AHS.

In her email, Souza suggested two reasons why the AHS might underreport disabilities:

Different survey contexts affect results. For example, respondents are more likely to say yes to disability questions that are within health-related surveys than when those same questions are included in a survey with a different context. Because AHS focus more on housing characteristics than population characteristics, it might lead to more under-reporting in the context of AHS.

Different mode of collection. The personal and telephone interviewing used by AHS might make respondents uncomfortable disclosing information on disabilities.

Mathew Streeter of the Census Bureau has also suggested that telephone interviews may discourage the reporting of disabilities. Streeter put forward another idea that may be an important explanation. He noted that the ACS paper questionnaire asks the battery of six questions for each household member. In the case of the AHS, the interviewer asks the respondent if anyone in the household has a disability. If the answer is no, then no further questions are asked. It is possible that having to answer the six questions for each person in the ACS causes the respondent to think more carefully about the situation of each household member and acknowledge the existence of a disability or disabilities that he or she might overlook in an off-the-cuff response to the general question used in the AHS.<sup>12</sup>

Our uninformed prior is that the AHS estimate that 17.3 percent of households contain one or more members with disabilities is more credible than the ACS estimate of 24.4 percent. The only Census Bureau study of the accuracy of the ACS estimates that the authors are aware of was conducted before the Census Bureau revised the disability questions in 2008. That study suggests that the ACS may underestimate disabilities at the person level.<sup>13</sup>

Appendix B compares the AHS, the ACS, and the CPS on counts and incidence for persons 15 years old and older. All the CPS percentages are higher than those of the AHS and lower than those of the ACS. In every case, the CPS percentage is closer to the AHS percentage than to the ACS percentage. Comparisons of AHS estimates with household-level estimates computed using NHIS can be found in a 2011 HUD study.<sup>14</sup> The following quote from that study compares estimates from the two surveys for nonelderly households where the surveys asked comparable questions:

...concerning questions pertaining to activity limitation that use similar concepts, the NHIS and AHS estimates are, in fact, very similar. For example, in 2009, in questions

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<sup>12</sup> Email from Mathew Streeter to Tamara Cole, August 10, 2011.

<sup>13</sup> For a discussion of that study, see Robert R. Weathers II, *A Guide to Disability Statistics from the American Community Survey*, Employment and Disability Institute, Cornell University, May 2005, page 32.

<sup>14</sup> Maria Teresa Souza, *2009 Worst Case Housing Needs of People with Disabilities*, U.S. Department of Housing and Urban Development, March 2011, on pages 14-15.

[http://www.huduser.org/portal/publications/affhsg/wcn\\_disability.html](http://www.huduser.org/portal/publications/affhsg/wcn_disability.html)

related to ADL, the AHS estimates that 1.2 million households have a nonelderly individual who has *serious difficulty dressing or bathing*, and the NHIS estimates 1.1 million households have a nonelderly individual *who needs help with bathing and dressing*. In questions related to IADL, the AHS estimates that 2.5 million households have a nonelderly individual who has difficulty *doing errands alone (visiting a doctor's office or shopping)*, and the NHIS estimates the same number of households have a nonelderly individual who *has difficulty handling routine needs (household chores, doing necessary business, shopping, or getting around for other purposes)*. Despite slight differences in wording, these surveys arrive at very similar estimates in the number of households that include nonelderly people with these self-care and independent living limitations....{italics in original}

The magnitude of the differences between the household estimates derived from the AHS and the ACS deserve further research.

### ***Housing Characteristics of Households with Persons with Disabilities***

This section uses the information in the AHS to examine the housing and economic characteristics of households who have members with disabilities. Because this analysis is at the household level, we do not report demographic characteristics, such as age, sex, or race, as these characteristics would apply to the householder but not necessarily to the household member or members with a disability. Appendix A, which focuses on person-level analysis, contains these results using AHS data. Tables 4, 5, and 6 provide a general overview of the disability situation at the household level. Table 7 provides information on the housing type and condition and household income by type of disability.

**Table 4: Incidence of Disability by Household Size**

<b>Number of persons in household</b>	<b>Household has a member with a disability</b>	<b>Percent of answering households with <i>n</i> persons</b>
1	6,178,000	20.8%
2	7,078,000	19.3%
3	2,704,000	15.5%
4	1,661,000	10.6%
5	892,000	12.6%
6	392,000	15.2%
7 or more	278,000	18.1%
All households	19,182,000	17.3%

Table 4 records the incidence of having a member with a disability by household size. One-person and two-person households have the highest incidence of disability; roughly one out of five of the one-person and two-person households have a member with a disability. Of course, in a one-person household, the only member is the member with the disability. Four- and five-

person households have the lowest incidence of disability. All of the percentages are statistically different from the overall incidence level of 17.3 percent.<sup>15</sup>

The incidence levels reported in Table 4 seem counterintuitive, as households with more members would appear to be more likely to have a member with a disability. As Appendix A shows, the likelihood of a person having a disability depends upon such factors as the age of the person. Larger households tend to have younger members and therefore members less likely to have a disability.

Table 5 examines the extent to which households have multiple members with disabilities. Among households with disabilities, 86 percent have only one member with a disability; only 1.3 percent of households with disabilities have three or more members with a disability.

**Table 5: Households with Disabilities, by Number of Members with a Disability**

Households with disabilities	19,182,000	Percent of households with disabilities	Percent of all households
1 person with 1 or more disabilities	16,504,000	86.0%	14.8%
2 persons with 1 or more disabilities	2,429,000	12.7%	2.2%
3 persons with 1 or more disabilities	199,000	1.0%	0.2%
4 persons with 1 or more disabilities	32,000	0.2%	0.0%
5 persons with 1 or more disabilities	15,000	0.1%	0.0%
7 persons with 1 or more disabilities	3,000	0.0%	0.0%

Table 6 breaks down households with disabilities by type of disability. Because a household member may have more than one disability or a household may have two or more members with different disabilities, the percentages do not add up to 100 percent. The most common disability involves problems walking or climbing stairs; 60.7 percent of the households with disabilities report having a member with this disability. Roughly one-third of households with disabilities report one or more members with difficulty running errands, difficulty hearing, or difficulty with memory or other cognitive functions. Approximately 16 percent of households have a member who experiences difficulty seeing or difficulty bathing or dressing.

The rest of this section looks at the characteristics of the housing occupied by households who have members with disabilities and at the income of these households. We report the characteristics for households who have members with any disability and for households who have members with specific disabilities where appropriate.

<sup>15</sup> The t-statistics are all larger than 3.0.

**Table 6: Households with Disabilities, by Disability Type**

Households by disability types		Percent of households with disabilities	Percent of all households
Any	19,182,000		17.3%
Difficult walking	11,650,675	60.7%	10.4%
Difficulty running errands	6,205,694	32.4%	5.6%
Difficulty hearing	6,076,516	31.7%	5.4%
Memory or cognitive difficulties	5,817,112	30.3%	5.2%
Difficulty seeing	2,993,244	15.6%	2.7%
Difficult with bathing or dressing	2,968,650	15.5%	2.7%

Table 7 contains counts of households with various types of disabilities and translates the counts into percentages by dividing the counts by the number of households who responded to the specific question.<sup>16</sup> The first two columns report households with one or more members with any disability; we will discuss the results for these two columns only because the patterns revealed in these columns apply with only a few exceptions to the other six pairs of columns. We will note the exceptions.

A higher percentage of renter-occupied households have members with disabilities than owner-occupied households, although the difference is small. Among units in different structure types, the percentage of households with one or more members with a disability is highest among households living in mobile homes. The age of the occupants and household income probably account for this result. Households in single-family attached units have the lowest percentage of households with disabilities.<sup>17</sup>

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<sup>16</sup> The total number of households is used as the denominator in calculating the percentage of households that contain one or more members with any disability.

<sup>17</sup> The differences between the percentage for mobile homes and all households and between households in single-family attached units and all households are both strongly statistically significant for the any disability column. David A. Vandenbroucke pointed out to us that households that have a member with a disability, particularly difficulty walking, might avoid units with multiple floors and narrow hallways.

**Table 7: Housing Characteristics and Household Income for Households with Members with Disabilities**

All counts in thousands	All households	Tenure		Structure type			
		Owner-occupied	Renter-occupied	Single-family, detached	Single-family, attached	Multi-unit structure	Mobile home
<b>Any disability</b>							
Households	19,182	12,950	6,234	12,240	750	4,441	1,754
Percent of respondents	17.3	17.1	17.8	16.9	12.7	17.3	25.8
<b>Difficulty walking</b>							
Households	11,651	7,880	3,771	7,298	447	2,791	1,115
Percent of respondents	10.4	10.4	10.7	10.1	7.6	10.9	16.4
<b>Difficulty running errands</b>							
Households	6,206	4,140	2,065	3,898	256	1,502	550
Percent of respondents	5.6	5.5	5.9	5.4	4.3	5.8	8.1
<b>Difficulty with hearing</b>							
Households	6,077	4,498	1,578	4,168	218	1,130	561
Percent of respondents	5.4	5.9	4.5	5.7	3.7	4.4	8.2
<b>Difficulty with memory</b>							
Households	5,817	3,498	2,320	3,524	253	1,441	600
Percent of respondents	5.2	4.6	6.6	4.9	4.3	5.6	8.8
<b>Difficulty with seeing</b>							
Households	2,993	1,940	1,053	1,860	128	698	306
Percent of respondents	2.7	2.6	3.0	2.6	2.2	2.7	4.5
<b>Difficulty with care</b>							
Households	2,969	2,038	931	1,949	134	648	238
Percent of respondents	2.7	2.7	2.7	2.7	2.3	2.5	3.5
All counts in thousands	All households	Location					
		Central city	Suburbs, urban	Suburbs, rural	Non-metro, urban	Non-metro, rural	
<b>Any disability</b>							
Households	19,182	5,273	5,857	2,607	1,843	3,602	
Percent of respondents	17.3	16.4	15.3	16.9	21.9	21.7	
<b>Difficulty walking</b>							
Households	11,651	3,275	3,493	1,574	1,119	2,190	
Percent of respondents	10.4	10.2	9.1	10.2	13.3	13.2	
<b>Difficulty running errands</b>							
Households	6,206	1,795	1,921	755	586	1,148	
Percent of respondents	5.6	5.6	5.0	4.9	7.0	6.9	
<b>Difficulty with hearing</b>							
Households	6,077	1,429	1,845	871	592	1,340	
Percent of respondents	5.4	4.4	4.8	5.6	7.0	8.1	
<b>Difficulty with memory</b>							
Households	5,817	1,741	1,759	736	534	1,047	
Percent of respondents	5.2	5.4	4.6	4.8	6.3	6.3	
<b>Difficulty with seeing</b>							
Households	2,993	860	898	305	331	599	
Percent of respondents	2.7	2.7	2.3	2.0	3.9	3.6	
<b>Difficulty with care</b>							
Households	2,969	919	895	389	230	537	
Percent of respondents	2.7	2.9	2.3	2.5	2.7	3.2	



**Table 7: Housing Characteristics and Household Income for Households with Members with Disabilities (continued)**

All counts in thousands	All households	Year structure built				
		Before 1950	1950-1969	1970-1989	1990 or later	
<b>Any disability</b>						
Households	19,182	4,389	4,951	6,068	3,775	
Percent of respondents	17.3	18.8	19.9	17.3	13.7	
<b>Difficulty walking</b>						
Households	11,651	2,644	3,188	3,703	2,115	
Percent of respondents	10.4	11.3	12.8	10.6	7.7	
<b>Difficulty running errands</b>						
Households	6,206	1,426	1,704	1,930	1,146	
Percent of respondents	5.6	6.1	6.8	5.5	4.1	
<b>Difficulty with hearing</b>						
Households	6,077	1,293	1,597	1,880	1,306	
Percent of respondents	5.4	5.5	6.4	5.4	4.7	
<b>Difficulty with memory</b>						
Households	5,817	1,361	1,438	1,821	1,197	
Percent of respondents	5.2	5.8	5.8	6.6	4.3	
<b>Difficulty with seeing</b>						
Households	2,993	709	812	914	557	
Percent of respondents	2.7	3.0	3.3	2.6	2.0	
<b>Difficulty with care</b>						
Households	2,969	650	842	941	535	
Percent of respondents	2.7	2.8	3.4	2.7	1.9	
All counts in thousands	All households	Assistance status (rentals)		Persons per room		
		Assisted	Unassisted	1.0 ≤ persons per room	1.0 < persons per room ≤ 1.5	1.5 < persons per room
<b>Any disability</b>						
Households	19,182	1,840	4,394	18,810	324	43
Percent of respondents	17.3	38.1	14.5	17.4	15.2	11.8
<b>Difficulty walking</b>						
Households	11,651	1,224	2,547	11,500	128	24
Percent of respondents	10.4	25.3	8.4	10.6	6.0	6.5
<b>Difficulty running errands</b>						
Households	6,206	688	1,378	6,114	89	2
Percent of respondents	5.6	14.2	4.5	5.6	4.2	0.7
<b>Difficulty with hearing</b>						
Households	6,077	389	1,189	5,988	80	8
Percent of respondents	5.4	8.0	3.9	5.5	3.8	2.2
<b>Difficulty with memory</b>						
Households	5,817	703	1,617	5,656	143	18
Percent of respondents	5.2	14.6	5.3	5.2	6.7	5.1
<b>Difficulty with seeing</b>						
Households	2,993	315	739	2,871	118	4
Percent of respondents	2.7	6.5	2.4	2.6	5.5	1.2
<b>Difficulty with care</b>						
Households	2,969	320	610	2,912	52	4
Percent of respondents	2.7	6.6	2.0	2.7	2.5	1.2

**Table 7: Housing Characteristics and Household Income for Households with Members with Disabilities (continued)**

All counts in thousands	All households	Relative household income						
		Extremely low income	Very low income	Low income	Moderate Income	High income	Very high income	Extremely high income
<b>Any disability</b>								
Households	19,182	5,143	3,834	1,390	2,106	1,567	1,321	3,821
Percent of respondents	17.3	30.6	25.3	19.4	17.3	15.0	13.0	9.8
<b>Difficulty walking</b>								
Households	11,651	3,363	2,606	817	1,245	886	705	2,030
Percent of respondents	10.4	20.0	17.2	11.4	10.2	8.5	6.9	5.2
<b>Difficulty running errands</b>								
Households	6,206	1,882	1,342	444	691	474	356	1,016
Percent of respondents	5.6	11.2	8.8	6.2	5.7	4.5	3.5	2.6
<b>Difficulty with hearing</b>								
Households	6,077	1,333	1,174	516	717	560	403	1,373
Percent of respondents	5.4	7.9	7.7	7.2	5.9	5.4	4.0	3.5
<b>Difficulty with memory</b>								
Households	5,817	1,743	1,131	415	646	464	387	1,032
Percent of respondents	5.2	10.4	7.4	5.8	5.3	4.4	3.8	2.7
<b>Difficulty with seeing</b>								
Households	2,993	883	657	251	260	249	192	501
Percent of respondents	2.7	5.2	4.3	3.5	2.1	2.4	1.9	1.3
<b>Difficulty with care</b>								
Households	2,969	877	599	195	312	244	158	584
Percent of respondents	2.7	5.2	3.9	2.7	2.6	2.3	1.6	1.5
All counts in thousands	All households	Rent burden						
		Gross rent < 20% income	20% < gross rent ≤ 30%	30% < gross rent ≤ 40%	40% < gross rent ≤ 50%	50% < gross rent ≤ 70%	70% < gross rent ≤ 100%	100% < gross rent
<b>Any disability</b>								
Households	19,182	6,567	3,960	2,427	1,450	1,559	1,047	1,941
Percent of respondents	17.3	15.0	15.9	17.3	19.2	20.9	23.2	27.0
<b>Difficulty walking</b>								
Households	11,651	3,790	2,411	1,496	919	1,004	652	1,247
Percent of respondents	10.4	8.7	9.7	10.6	12.1	13.4	14.4	17.3
<b>Difficulty running errands</b>								
Households	6,206	1,910	1,252	817	449	544	420	747
Percent of respondents	5.6	4.4	5.0	5.8	5.9	7.3	9.3	10.4
<b>Difficulty with hearing</b>								
Households	6,077	2,446	1,150	702	450	417	257	604
Percent of respondents	5.4	5.6	4.6	5.0	5.9	5.6	5.7	8.4
<b>Difficulty with memory</b>								
Households	5,817	1,774	1,192	793	466	505	349	636
Percent of respondents	5.2	4.1	4.8	5.6	6.2	6.8	7.7	8.8
<b>Difficulty with seeing</b>								
Households	2,993	914	650	407	219	257	177	335
Percent of respondents	2.7	2.1	2.6	2.9	2.9	3.4	3.9	4.7
<b>Difficulty with care</b>								
Households	2,969	988	569	359	209	241	194	368
Percent of respondents	2.7	2.3	2.3	2.5	2.8	3.2	4.3	5.1

Households in non-metropolitan areas have higher percentages of persons with disabilities than households in metropolitan areas.<sup>18</sup> Generally, households in urban suburbs have the lowest percentages, but this is not true for all of the specific disabilities, although these exceptions are statistically insignificant. The incidence of households with members with disabilities is greatest among households living in units built prior to 1970 and is lowest for households living in units built in 1990 or later.

The incidence patterns associated with household income are the most revealing. The eighth panel in Table 7 uses data from HUD's Housing Affordability Data System (HADS) on the ratio of household income to local area median income.<sup>19</sup> The percentage of households with one or more members with any disability among households with extremely low incomes (30.6 percent) is more than three times greater than the percentage among households with extremely high incomes (9.8 percent). The percentages decline monotonically across the income categories. This monotonic pattern is repeated in each of the specific disability categories, except for a blip among the percentages for households with one or more members with a seeing disability.

The income patterns appear to be related in straightforward ways to other patterns in the data. The household counts in Table 4 indicate that one-third of all households with disabilities are single-person households. Having a member with a disability limits the income earning potential of any household but especially of one-member households. Appendix Table A-2 shows that the probability of an individual having a disability increases substantially with age. Households over the age of 59 (and particularly those over the age of 74) have lower earned income and lower income in general.

This income pattern is reflected clearly in three of the four categories that involve the quality and affordability of housing. The percentage of households with disabilities is much higher among those renter households that live in assisted housing than among those living in market housing. The incidence of disability among households also varies systematically with rent burden—the ratio of housing costs to income. The percentage increases monotonically as the severity of rent burden increases.<sup>20</sup> This monotonic pattern is consistent across the various specific disabilities, except for a blip in the percentages for difficulty with hearing. While the overwhelming majority

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<sup>18</sup> When metropolitan areas are compared with non-metropolitan areas, the differences for the any disability column are strongly statistically significant.

<sup>19</sup> The categories in this panel are defined as follows:

- Extremely low income: less than or equal to 30 percent of local area median income.
- Very low income: incomes greater than 30 percent but less than or equal to 50 percent of local area median income.
- Low income: incomes greater than 50 percent but less than or equal to 60 percent of local area median income.
- Moderate income: incomes greater than 60 percent but less than or equal to 80 percent of local area median income.
- High income: incomes greater than 80 percent but less than or equal to 100 percent of local area median income.
- Very high income: incomes greater than 100 percent but less than or equal to 120 percent of local area median income.
- Extremely high income: incomes greater than 120 percent of local area median income.

<sup>20</sup> This analysis is based on the HADS variable BURDEN. The unusual high percentage of households with rent burdens greater than 50 percent is examined in *Investigating Very High Rent Burdens Among Renters* by the authors, prepared for HUD by Econometrica, which can be found at [http://www.huduser.org/portal/datasets/ahs/2010\\_high\\_rent\\_burdens\\_v2.pdf](http://www.huduser.org/portal/datasets/ahs/2010_high_rent_burdens_v2.pdf).

of housing units are considered adequate using the AHS adequacy measure, units that are moderately or severely inadequate have higher incidence levels.<sup>21</sup> Overcrowding, however, is not associated with disability. In fact, the incidence of disabilities declines with the number of persons per room. This is not surprising, since one-third of households with disabilities are one-person households, and these households, by definition, cannot be overcrowded (that is, have more than one person per room).

## **Relationship among AHS Household-Level Disability Variables**

As part of this project, HUD requested us to look at the relationship among the AHS variables. The specific request was:

Investigate the clustering of disability types: Which types are typically found together? Which types are notable in not being found together? Are there certain kinds of disabilities which contribute more to the AHS summary variable (HDSB)?

We implemented this task in two ways. First, we used statistical techniques to examine how the variables interact. Then, we used the conceptual logic that underlies the six questions to understand how the variables are connected. While the statistical analysis provides some helpful insights, we believe that the conceptual analysis furnishes AHS users with the most useful guidance.

## **Statistical Analysis**

Table 8 presents the correlations among the six AHS household-level disability variables that identify specific types of disabilities. Table 8 does not include the “any disability” variable (HDSB) because, at this stage, we are looking at how types of disabilities occur together.

**Table 8: Correlations among the AHS Household-Level Disability Variables**

<b>AHS Weighted correlations</b>	<b>Errands</b>	<b>Care</b>	<b>Walking</b>	<b>Memory</b>	<b>Hearing</b>	<b>Seeing</b>
Difficulty with running errands	1.00					
Difficulty with personal care	0.53	1.00				
Difficulty walking	0.52	0.43	1.00			
Difficulty with memory	0.41	0.31	0.29	1.00		
Difficulty hearing	0.21	0.16	0.26	0.18	1.00	
Difficulty seeing	0.24	0.16	0.22	0.18	0.22	1.00

Of the 15 pairwise correlations, only four exceed 0.4, and none exceed 0.6. Difficulty with running errands has moderate correlations with difficulty with personal care (0.53), difficulty walking (0.52), and difficulty with memory (0.41). The only other noteworthy correlation is between difficulty with personal care and difficulty with walking (0.43). What is remarkable is how uncorrelated difficulty with hearing and difficulty with seeing are with each other and with

<sup>21</sup> The AHS definition of adequacy is discussed in the latest AHS Codebook on pages 281 and 282. The codebook can be found at [http://www.huduser.org/portal/datasets/ahs/AHS\\_Codebook.pdf](http://www.huduser.org/portal/datasets/ahs/AHS_Codebook.pdf).

the other disability variables.<sup>22</sup> Moreover, except for its modest correlation with difficulty running errands, difficulty with memory is also uncorrelated with the other variables.

To see if one could capture most of the variation among households with respect to disabilities with just two or three constructed variables, we ran a principal components analysis over the six variables. Table 9 presents the results.

**Table 9: Principal Components for the Six Household-Level Disability Variables**

	Principal components variable weights					
	One	Two	Three	Four	Five	Six
Difficulty with personal care	0.4520	-0.3443	-0.0290	-0.2475	0.6897	0.3734
Difficulty with running errands	0.5083	-0.2318	0.0346	-0.0984	-0.0377	-0.8220
Difficulty hearing	0.2874	0.6474	-0.6699	0.1190	0.1795	-0.0556
Difficulty with memory	0.3900	-0.1289	0.1560	0.8736	-0.0995	0.1840
Difficulty seeing	0.2881	0.6199	0.7060	-0.1664	0.0636	0.0500
Difficulty walking	0.4688	-0.0873	-0.1624	-0.3521	-0.6905	0.3815
Percent of variation explained	41.9%	16.3%	13.1%	12.3%	9.3%	7.2%
Eigenvalue	2.5113	0.9773	0.7870	0.7372	0.5582	0.4290

Statistically, the results were not very encouraging. Only one principal component has an eigenvalue greater than 1—a standard test for retaining components—and that component explained only 41.9 percent of the variation in the data. However, the pattern of coefficients used to calculate the components is instructive.

- The first component gives the most weight to personal care, running errands, and walking.
- The second component emphasizes hearing and seeing.
- The third component gives weight to those cases where seeing and hearing problems do not occur in the same household.
- The fourth component focuses on cases where memory problems occur in the absence of other problems.
- The fifth component gives weight to those cases where difficulty with personal care is not associated with difficulty walking.
- The sixth component gives weight to those cases where difficulty with personal care or difficulty walking is not associated with difficulty running errands.

The conceptual analysis will show that these components are constructed in a manner that picks out the combinations in the data that occur most frequently and that are not overlapping.

Table 10 looks at the relationship between the “any disability” variable and the six variables identifying specific disabilities; it incorporates information from Table 6. This table acts as a bridge between the statistical and the conceptual analyses.

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<sup>22</sup> Here, “uncorrelated” means the lack of a meaningful relationship, not statistical insignificance.

**Table 10: Relationship between Any Disability and the Specific Disabilities**

Households by disability types		Percent of households with disabilities	Correlation with the “any disability” variable
Any	19,182,000		1.00
Difficult walking	11,650,675	60.7%	0.75
Difficulty running errands	6,205,694	32.4%	0.53
Difficulty hearing	6,076,516	31.7%	0.53
Memory or cognitive difficulties	5,817,112	30.3%	0.52
Difficulty seeing	2,993,244	15.6%	0.36
Difficult with bathing or dressing	2,968,650	15.5%	0.36

At the household level, difficulty walking is the most frequently reported; 60.7 percent of all households reporting disabilities report this disability, and this variable has a 0.75 correlation with the “any disability” variable. Almost twice as many households report problems with walking as report problems with running errands or with hearing. The least reported disability is difficulty with bathing or dressing. Four disabilities have correlations greater than 0.5 with the “any disability” variable.

## Conceptual Analysis

The six questions used in the AHS, ACS, and other surveys incorporate the experience gained from a long history of collecting information on disabilities and have an internal logic and structure. Users of these variables need to understand this logic and structure. The last Census Bureau review of these questions took place in 2006 as part of a general review of the ACS questionnaire. The report on these questions from that review contains a useful summary of the history of disability questions and the logic and structure underlying the six questions. In the following extract from that report, emphasis has been added.

Concepts of disability have been included in decennial censuses as early as 1830, which asked whether persons were blind, deaf, or mute. While the term “disability” was first used in the 1880 census, its definition was not the same as ones used today. *Early concepts of disability focused mainly around health conditions like sensory conditions, mental conditions, and deformities of limbs and not on the relationship between health, functioning, participating in societal activities, and fulfilling appropriate societal roles.* After the 1910 census, items on health or disability were dropped from the census form, not to be seen again for many decades.

Returning in 1970, disability content focused on limitations to working at a job....

In response to concerns from local data users following the 1970 census and the passage of the Rehabilitation Act of 1973, the Committee on Disability and Health of the Federal Agency Council stated that there was a need to broaden the disability spectrum for the 1980 census. This expansion led to the testing of questions on limitations to using various

forms of transportation and performing regular housework, schoolwork, and personal self-care. These questions were tested in the 1976 National Content Test (NCT)....

Despite the low reliability of the items tested in the 1976 NCT, the 1980 decennial census included work disability and limitations to using public transportation.

In preparation for the 1990 census, the Census Bureau again included disability items in a national content test. The 1986 NCT included questions on the disability status of children, work disability status, ability to drive a car, the need for assistance inside and outside the home, the prevalence of certain conditions, and the reason for limitation.... [these] disability questions continued to exhibit issues with reliability. For the 1990 census, the decision was made to ask the same work disability question that was asked in the 1970 and 1980 censuses; in addition, two questions addressing difficulty going outside alone and difficulty taking care of personal needs were also asked.

By reviewing the results of previous censuses and tests and consulting with other federal agencies, the Census Bureau identified several disability measures for the 1996 National Content Survey (NCS). Led, in part, by an interest in assessing the impact of the 1990 Americans with Disabilities Act (ADA), the 1996 NCS investigated questions for measuring disability in the following areas: child disability, limitations in schoolwork, vision impairment, hearing impairment, limitations in walking, limitations in cognitive functions, difficulty going outside for errands, use of personal assistance for self-care tasks, and work disability. Questions meant to capture these different aspects of disability were asked using multiple approaches in four different panels of the survey.

After reviewing the results of the 1996 NCS in terms of reliability and validity and presenting the information to a group of experts, including the Interagency Subcommittee on Disability Statistics, the Census Bureau found that still more questions remained and the choice was not clear. Hence, another federal interagency work group was convened in June 1997 by the Office of Management and Budget and charged with the development of a short set of disability questions. The interagency work group faced three tasks in a short period of time: (1) measuring disability using a definition in keeping with the ADA, (2) meeting the needs of various agencies requiring specific information, and (3) having a maximum of six questions. *The work group agreed that three domains (sensory, physical, and mental/emotional/cognitive) sufficiently represented the broad classification of impairments and health conditions that generally resulted in disability. Additionally, the work group concluded that it could meet an array of other policy and programmatic requirements with three questions on difficulty with specific types of functional activities. Their questions intended to address people with limitations in performing the following: Activities of Daily Living, which generally include self-care type activities such as bathing or dressing; Instrumental Activities of Daily Living, which are activities often associated with independent living such as going out alone to shop or visit a doctor's office; and, finally, working at a job or business.* The work group's consensus set of questions was put on the Census 2000 long form and on the ACS....

As noted previously, the question dealing with the effects of disabilities on ability to work did not prove to be useful and was subsequently dropped.

In advance of the [2006] ACS Content Test, as part of the overall OMB interagency efforts, a working group representing several government agencies convened to consider disability content in the ACS. The work group established that in past practice agencies focused on functional limitations that might result in a person experiencing a limitation in participation in normal societal activities. The two primary purposes of the disability data are the provision of services (such as VA health benefits) and the provision of opportunities in housing, education, and other areas captured in the ACS. Using the Institute of Medicine (IOM) Model of Disability and the International Classification of Functioning (ICF) Model of Disability, *the work group defined disability as the restriction in participation that results from a lack of fit between the individual's functional limitations and the characteristics of the physical and social environment. So while the disability is not seen as intrinsic to the individual, the way to capture it in a survey is to measure components that make up the process.*

In the case of the ACS, the work group attempted to use the small space available to meet distinct goals. *The group first identified four basic areas of functioning (vision, hearing, mobility, and cognitive functioning) that identified the largest component of the population of people with disabilities. These domains could be used individually or combined in order to assess the equalization of opportunity for people with disabilities. Second, the group identified two key elements that could be used for monitoring independent living and the need for services. Ability to take care of oneself, specifically the ability to bath and dress oneself, and the ability to move around the community without assistance were considered appropriate measures.*<sup>23</sup>

The six questions fall into two groups. Four questions inquire about specific impediments: difficulty walking or climbing stairs, difficulty with memory or general cognition, difficulty hearing, and difficulty seeing. The remaining two questions examine whether a member of the household is restricted in his or her ability to function at home (namely, whether the person is able to bathe or dress without assistance) and to function outside of the home (namely, the ability to run errands, such as go to the doctor or shop).

Table 11 looks at how the two function variables are related to the other four variables and to each other at the household level. The relationship is more appropriately assessed at the level of the individual because a member of a household could have trouble dressing, while another member might be blind, and household-level analysis would suggest that these two conditions are related. Table A-3 in Appendix A performs this analysis at the person level using both AHS and ACS data. Table 11 uses household-level data because the purpose of this section is to interpret the relationship among the AHS' household-level disability variables. The percentages in Table 11 add to more than 100 because the categories can overlap.

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<sup>23</sup> Matthew Brault and Sharon Stern, *Evaluation Report Covering Disability*, 2006 American Community Survey Content Test Report P.4, Bureau of the Census, January 3, 2007, pages 2-4.



**Table 11: Relationship among Disabilities at the Household Level**

	Households	Percent of households with a functional disability
<b>Person with errands disability</b>	6,206,000	
Errands disability only	454,000	7.3%
Errands + walking disabilities	4,387,000	70.7%
Errands + memory disabilities	2,628,000	42.4%
Errands + care disabilities	2,327,000	37.5%
Errands + hearing disabilities	1,555,000	25.1%
Errands + seeing disabilities	1,158,000	18.7%
<b>Person with care disability</b>	2,969,000	
Care disability only	64,000	2.2%
Care + walking disabilities	2,644,000	89.1%
Care + errand disabilities	2,327,000	78.4%
Care + memory disabilities	1,409,000	47.5%
Care + hearing disabilities	820,000	27.6%
Care + seeing disabilities	556,000	18.7%

When viewed in conjunction with earlier tables, Table 11 provides several clear and important insights into disabilities at the household level.

1. The number of households where one or more members has a disability that prevents him or her from performing functions inside or outside of the house is considerably smaller than the number of households where one or more members has one or more disabilities.
  - a. There are 19,182,000 households that have one or more members with a disability (Table 6). This is 17.3 percent of all households.
  - b. There are 6,206,000 households that have one or more members who have difficulty performing functions outside of the house (running errands, such as visiting a doctor or shopping).
  - c. There are 2,969,000 households that have one or more members who have difficulty performing functions inside the house (bathing or dressing).
  - d. Taking into account the overlap between having difficulty performing functions inside and outside of the house, there are 6,847,000 households where one or more members has a disability that prevents him or her from performing functions inside or outside of the house.<sup>24</sup> This is 6.1 percent of all households.

<sup>24</sup> 6,206,000 - 2,327,000 + 2,969,000 (rounded after the calculation).

2. At the household level, difficulty performing inside or outside of the house rarely occurs independently of other disabilities.
  - a. Only 7.3 percent of households that report having a member who experiences difficulty performing functions outside of the house report no other disability among household members.
  - b. Only 2.2 percent of households that report having a member who experiences difficulty performing functions inside the house report no other disability among household members.
3. At the household level, having difficulty performing functions outside of the house is more commonly the result of having other disabilities than of having difficulty with bathing or dressing, and having difficulty with bathing or dressing rarely occurs without having difficulty performing errands.
  - a. Households where one or more members has difficulty performing functions outside of the house total 6,206,000, compared to 2,969,000 households with members who have difficulty performing functions inside the house.
  - b. Only 64,000 households have members who have difficulty performing functions inside the house but have no members who have difficulty performing functions outside of the house.<sup>25</sup>
4. At the household level, having difficulty walking or climbing stairs is the disability most commonly associated with having difficulty performing functions inside or outside of the house.
  - a. Of the households with one or more members who have difficulty bathing or dressing, 89.1 percent have one or more members with difficulty walking.
  - b. Of the households with one or more members who have difficulty running errands, 70.7 percent have one or more members with difficulty walking.
5. At the household level, having difficulty with memory or cognition is the second most common disability associated with having difficulty performing functions inside or outside of the house.
  - a. Of the households with one or more members who have difficulty bathing or dressing, 47.5 percent have one or more members with difficulty with memory.
  - b. Of the households with one or more members who have difficulty running errands, 42.4 percent have one or more members with difficulty with memory.
6. At the household level, difficulty with hearing or seeing are infrequently associated with the ability to perform functions inside or outside of the house.
  - a. Among households with one or more members who have difficulty bathing or dressing, only 27.6 percent have members with difficulty hearing, and only 18.7 percent have members with difficulty seeing.
  - b. Among households with one or more members who have difficulty running errands, only 25.1 percent have members with difficulty hearing, and only 18.7 percent have members with difficulty seeing.

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<sup>25</sup> 2,969,000 - 2,327,000 (rounded after the subtraction).

Table A-3 in Appendix A confirms—with both AHS and ACS data—that these same relationships hold at the person level.

## ***Summary of Surveys' Characteristics and Guidance on Their Use***

Table 12 provides a summary of the key features of the four surveys that use the six ACS questions: the American Community Survey, the American Housing Survey, the Current Population Survey, and the Survey of Income and Program Participation.

Multiple data sets are available to researchers who are interested in the prevalence of disabilities and how they affect people and households. The following suggestions are designed to help researchers choose between data sets.

1. Researchers interested primarily in the prevalence and causes of disabilities should use the National Health Interview Survey because of the extensive detail it collects on health conditions and disabilities.
2. Researchers interested in how disabilities affect labor force participation should use the Current Population Survey or SIPP. If the emphasis is on labor force participation, then the CPS is the better choice because of its larger sample and simpler structure. If the emphasis is on the conditions that create difficulty in finding or keeping a job, then one of the special SIPP topical modules is the better choice because of the SIPP's more detailed information on health conditions.
3. Researchers interested in how disabilities affect earnings and poverty at the person level should use the SIPP because of the detailed information on income; one of the special topical modules should be used if more information on the conditions causing a disability is required.
4. Researchers interested in the general characteristics of persons with disabilities should use the ACS because of its large sample, person-level weights, and imputation of missing information.
5. Researchers interested in the general characteristics of households with disabilities can use either the ACS or the AHS. The AHS is easier to use because its public use file contains household-level variables and does not overestimate the number of occupied housing units. The ACS has a larger sample and is available annually, while the AHS is available biennially.
6. Researchers interested in how disabilities interact with housing should use the AHS because of its extensive details on housing and households.

With respect to situations number 5 and 6, researchers should be aware that the AHS finds a substantially lower percentage of households affected by disabilities than the ACS does. The causes of these percentage differences need to be better understood.

**Table 12: Summary of Key Characteristics of Surveys Using Standard Questions on Disabilities**

<b>Features</b>	<b>ACS</b>	<b>AHS</b>	<b>CPS</b>	<b>SIPP</b>
Standard questions on disabilities	Hearing, seeing, walking, memory, bathing and dressing, running errands	Hearing, seeing, walking, memory, bathing and dressing, running errands	Hearing, seeing, walking, memory, bathing and dressing, running errands	Hearing, seeing, walking, memory, bathing and dressing, running errands
Additional questions	None	None	Effect of disabilities on labor force participation	Six questions and question on effect of disabilities on labor force participation in one or more common topical modules; additional questions that provide more detail on conditions related to disability are asked in topical modules on an irregular basis
Data collected	Person-level	Person-level	Person-level	Person-level
Public use file variables	Person-level only	Person- and household-level	Person-level only	Person-level only
Weights	Person and housing unit	Housing unit only	Person and housing unit	Person and housing unit
Published tabulations (includes internet tables)	Person-level—includes labor force participation by disability	Household-level	Person-level—labor force participation related issues only	No regular tables published, special reports available online.

## **Appendix A**

We did not report person-level statistics on disability in the text because this paper focuses on the disability information in the AHS, and we believe that the ACS is superior to the AHS as a source of information on disabilities at the person level. The ACS' superiority rests on its provision of person-level weights, whereas the AHS provides only household-level weights.

This section compares the disability information from the ACS and the AHS at the person level. We emphasize percentages rather than counts because the AHS undercounts persons. Table A-1 is the counterpart to Table 3 in the text. Table A-1 shows that the ACS consistently reports a higher percentage of persons having one or more members with a disability. According to the AHS, 7.8 percent of persons have some disability; the ACS reports 11.8 percent. The ACS estimates range from 40 percent larger (6.9 percent vs. 4.7 percent for difficult with walking) to over twice as large (2.5 percent vs. 1.2 percent for difficulty with bathing or dressing). These person-level differences carry over to the household level in Table 3.

Compared to the ACS, the AHS produces both a lower count of the number of persons and lower estimates of the percentage of persons with different disabilities. The difference in counts results from the AHS using household weights and the ACS using person weights. The difference in percentages most likely results from differences in questionnaire design and in data collection procedures. These differences are discussed in the text in the section on "AHS and Household-Level Information of Disabilities," but, as of yet, what the most important differences are and how they create the discrepancies in percentage estimates are not understood.

Next, we examined whether the AHS and ACS person-level variables relate to one another in similar ways. Table A-2 compares data from the AHS and ACS with respect to the demographic characteristics of those with disabilities. The first two columns with numerical data are the percentages of persons in a particular category who have any disability. The first row contains percentages with disabilities among all persons, 7.8 percent from the AHS and 11.8 percent from the ACS. This row repeats the percentages in the bottom row of Table A-1. Throughout Table A-2, the ACS percentages are higher than the AHS percentages. To make the information in Table A-2 more meaningful, the last two columns divide the relevant percentage for each row by the corresponding percentage in the first row. For example, the first two columns show that the percentages of persons 5 to 14 years old who have disabilities are 2.8 percent in the AHS and 5.1 percent in the ACS, while the second two columns show that the incidence of disabilities among this age group is roughly one-third to two-fifths of the overall incidence. The last row in this group shows that persons over the age of 75 are more than four and a half times more likely to have a disability than the general population.

Both surveys show that the probability of having a disability increases sharply with age. The increase in relative incidence (the last two columns) is similar for both surveys. Both surveys report that females are more likely than males to develop disabilities, most likely because the female population has a greater number of older persons. Both surveys report that the relative incidence of disabilities is lowest among Asians and Hawaiians and Pacific Islanders and highest among American Indians and Native Alaskans. Again, the patterns of relative incidence are similar in the two surveys.

**Table A-1: Comparison of Person-Level Information on Disabilities: 2009 AHS vs. ACS**

Type of disability*	AHS					ACS		
	With disability	All who responded	Refused or Don't Know	Percent	Maximum percent	With disability	All	Percent
Hearing	6,396,000	281,126,000	1,964,000	2.3%	3.0%	10,069,000	298,729,000	3.4%
Seeing	3,227,000	281,057,000	2,028,000	1.1%	1.9%	6,302,000	298,732,000	2.1%
Memory & related	6,397,000	261,767,000	2,151,000	2.4%	3.2%	12,962,000	277,572,000	4.7%
Walking	12,438,000	261,898,000	2,027,000	4.7%	5.5%	19,032,000	277,572,000	6.9%
Care	3,058,000	261,898,000	2,022,000	1.2%	1.9%	6,866,000	277,576,000	2.5%
Errands	6,594,000	222,564,000	1,827,000	3.0%	3.8%	12,524,000	236,934,000	5.3%
Any Disability**	22,183,000	283,092,000	NA	7.8%	NA	35,374,000	298,730,000	11.8%

\*Neither the AHS nor the ACS provides a person-level variable that indicates “any disability;” we created this variable for both surveys using only positive answers to the individual disability questions. In this row, the “all who responded” column for the AHS is the count of all persons.

**Table A-2: Demographic Characteristics of Individuals with Disabilities, AHS vs. ACS**

	Percent of persons with any disability		Relative incidence	
	AHS	ACS	AHS	ACS
<b>All persons</b>	7.8%	11.8%	1.00	1.00
<b>By age</b>				
5 to 14	2.8%	5.1%	0.36	0.43
15 to 39 years old	3.0%	5.7%	0.38	0.48
40 to 59 years old	7.3%	12.3%	0.94	1.04
60-74 years old	16.7%	23.5%	2.13	1.98
75 years old and older	37.7%	50.4%	4.81	4.26
<b>By sex</b>				
Male	7.3%	11.4%	0.93	0.96
Female	8.4%	12.2%	1.07	1.03
<b>By race</b>				
White only	8.0%	12.1%	1.02	1.03
Black only	8.2%	13.4%	1.05	1.13
American Indian, Alaskan Native only	12.0%	16.0%	1.54	1.35
Asian only	2.8%	6.5%	0.36	0.55
Hawaiian, Pacific Islander only	5.5%	9.3%	0.70	0.78
Two or more races	8.7%	11.2%	1.11	0.95
<b>By ethnicity</b>				
Hispanic	5.0%	8.2%	0.64	0.70
Non-Hispanic	8.4%	12.5%	1.07	1.06
<b>By education</b>				
Less than a high school diploma	13.2%	12.5%	1.69	1.05
High school diploma	11.4%	17.3%	1.45	1.46
Some college or vocation education	8.5%	12.4%	1.09	1.05
Associates degree	6.8%	10.4%	0.87	0.88
Bachelors degree	5.1%	7.0%	0.64	0.59
Professional, MA, or PhD degree	5.2%	7.2%	0.66	0.61

Both surveys report low relative incidence of disabilities among Hispanics, a result that once again most likely reflects a difference in the age distribution between these two segments of the population. Finally, both surveys find that the relative incidence of disability is highest among the least educated.<sup>26</sup> One could interpret this result as either an effect or a cause of disabilities. Having a disability may make it more difficult to finish high school or pursue education beyond high school. Alternatively, persons who fail to finish high school and high school graduates have substantially lower lifetime income than those who complete college; lower income can lead to a greater probability of having a disability due to inadequate health care or the inability to

<sup>26</sup> Both surveys collect information only for persons over the age of 14.

purchase devices that allow one to function better with a disability or simply because lower income jobs are more dangerous.

In the analysis of the relationship among disabilities at the household level, we pointed out that difficulty running errands and difficulty with bathing and dressing rarely occur alone at the household level. These difficulties generally result from other problems, such as difficulty walking or using stairs. As explained, the variables were created with this relationship in mind; the logic of the relationship applies more directly at the person level than at the household level. Table A-3 clearly shows that, at the person level, difficulty running errands and difficulty bathing and dressing rarely occur alone. In fact, among persons reporting difficulty with running errands, fewer than 10 percent report no other disabilities, and among persons reporting difficulty with bathing and dressing, fewer than 3 percent report no other disabilities.

**Table A-3: Relationship among Disabilities at the Person Level, AHS vs. ACS**

	AHS	Percent of total	ACS	Percent of total
<b>Person with errands disability</b>	6,594,000		12,524,000	
Errands disability only	601,000	9.1%	1,088,000	8.7%
Errands + walking disabilities	4,729,000	71.7%	8,712,000	69.6%
Errands + memory disabilities	2,551,000	38.7%	6,124,000	48.9%
Errands + care disabilities	2,336,000	35.4%	5,220,000	41.7%
Errands + hearing disabilities	1,361,000	20.6%	2,680,000	21.4%
Errands + seeing disabilities	1,093,000	16.6%	2,541,000	20.3%
<b>Person with care disability</b>	3,058,000		6,866,000	
Care disability only	86,000	2.8%	196,000	2.9%
Care + walking disabilities	2,653,000	86.8%	5,941,000	86.5%
Care + errand disabilities	2,336,000	76.4%	5,220,000	76.0%
Care + memory disabilities	1,338,000	43.8%	3,502,000	51.0%
Care + hearing disabilities	652,000	21.3%	1,599,000	23.3%
Care + seeing disabilities	493,000	16.1%	1,463,000	21.3%

The two panels of Table A-3 show the extent to which persons report difficulty with running errands and difficulty with bathing and dressing jointly with other disabilities. Difficulty with walking or using stairs appears to be the most important determinant of whether a person can perform functions inside and outside of the home. The inability to perform activities outside of the house, such as visiting a doctor or shopping, appears to affect more persons than the inability to bathe and dress oneself. Moreover, a much larger percentage of those who are unable to bathe and dress themselves are unable to run errands than the other way around, suggesting that the inability to perform functions inside the home involves limitations that carry over to performing functions outside of the home.

Table A-4 carries our analysis of relationships among the various disabilities to its logical conclusion by examining the correlations among the six variables. The correlation matrix from the AHS in the top panel is very similar to the correlation matrix from the ACS in the bottom



panel. The correlations between difficulty with errands and difficulty with personal care are the highest. Otherwise, only the correlations between difficulty with walking and two performing function variables and difficulty with memory exceed 0.4.

**Table A-4: Correlation Matrices among the Disability Variables, AHS vs. ACS**

<b>AHS Weighted correlations</b>	<b>Errands</b>	<b>Care</b>	<b>Walking</b>	<b>Memory</b>	<b>Hearing</b>	<b>Seeing</b>
Difficulty with running errands	1.00					
Difficulty with personal care	0.52	1.00				
Difficulty walking	0.51	0.42	1.00			
Difficulty with memory	0.41	0.29	0.26	1.00		
Difficulty hearing	0.19	0.13	0.22	0.15	1.00	
Difficulty seeing	0.23	0.15	0.19	0.16	0.19	1.00
<b>ACS Weighted correlations</b>	<b>Errands</b>	<b>Care</b>	<b>Walking</b>	<b>Memory</b>	<b>Hearing</b>	<b>Seeing</b>
Difficulty with running errands	1.00					
Difficulty with personal care	0.56	1.00				
Difficulty walking	0.53	0.49	1.00			
Difficulty with memory	0.48	0.35	0.32	1.00		
Difficulty hearing	0.20	0.16	0.24	0.17	1.00	
Difficulty seeing	0.27	0.20	0.24	0.20	0.22	1.00

While it is interesting to examine the demographic characteristics of those with disabilities and the relationship among disabilities, the most important finding is that, despite the substantial differences in the detection of disabilities by the AHS and the ACS, the two surveys reveal very similar characteristics and patterns.

## Appendix B

We tabulated the CPS counts for persons with disabilities and compared them to AHS and ACS counts for persons 15 years old or older to see whether the CPS counts and *percentages* are closer to the AHS or the ACS. Table B-1 presents the result of these tabulations.

**Table B-1: Counts of Persons with Disabilities 15 Years Old or Older – CPS, AHS, and ACS**

	CPS		ACS		AHS	
	Count	Percent of population	Count	Percent of population	Count	Percent of respondents
Population -- 15 and older	233,612,000		236,939,000		224,409,000	
Any disability**	26,452,000	11.3%	33,144,000	14.0%	20,982,000	9.3%
Walking disability	15,618,000	6.7%	18,772,000	7.9%	12,348,000	5.5%
Errands disability	9,336,000	4.0%	12,524,000	5.3%	6,594,000	3.0%
Memory disability	8,126,000	3.5%	11,365,000	4.8%	5,522,000	2.5%
Hearing disability	6,914,000	3.0%	9,704,000	4.1%	6,222,000	2.8%
Seeing disability	3,448,000	1.5%	5,915,000	2.5%	3,045,000	1.4%
Care disability	4,418,000	1.9%	6,490,000	2.7%	2,942,000	1.3%

As expected, the CPS comes much closer to the ACS in its count of persons 15 years old and older because the CPS has separate population weights. All of the CPS percentages are higher than those of the AHS and lower than those of the ACS. In every case, the CPS percentage is closer to the AHS percentage than to the ACS percentage.