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## Wireless Substitution: State-level Estimates From the National Health Interview Survey, 2010–2011

by Stephen J. Blumberg, Ph.D., Julian V. Luke, National Center for Health Statistics;  
Nadarajasundaram Ganesh, Ph.D., Michael E. Davern, Ph.D., NORC at the University of Chicago;  
and Michel H. Boudreaux, M.S., State Health Access Data Assistance Center, University of Minnesota

### Abstract

**Objectives**—This report updates subnational estimates of the percentage of adults and children living in households without a landline telephone but with at least one wireless telephone (i.e., wireless-only households). State-level estimates for 2011 are presented, as well as estimates for selected U.S. counties and groups of counties, for other household telephone service use categories (e.g., those that had only landlines and those that had landlines yet received all or almost all calls on wireless telephones), and for two earlier 12-month periods (January–December 2010 and July 2010–June 2011).

**Methods**—Small-area statistical modeling techniques were used to estimate the prevalence of adults and children living in households with various household telephone service types for 93 disjoint geographic areas that make up the United States. This modeling was based on 2007–2011 data from the National Health Interview Survey, 2006–2010 data from the American Community Survey, and auxiliary information on the number of listed telephone lines per capita in 2007–2011.

**Results**—The prevalence of wireless-only adults and children varied substantially across states. State-level estimates for 2011 ranged from 15.3% (Rhode Island) to 44.6% (Idaho) of adults and from 15.2% (Rhode Island) to 58.6% (Mississippi) of children.

**Keywords:** cell phones • telephone surveys • small domain estimation

### Introduction

The prevalence and use of wireless telephones (also known as cellular telephones, cell phones, or mobile phones) has changed substantially over the past decade. Today, an ever-increasing number of adults have chosen to use wireless telephones rather than landline telephones to make and receive calls. As of the second half of 2011, one

in three U.S. households (34.0%) had only wireless telephones (1). The prevalence of such “wireless-only” households markedly exceeds the prevalence of households with only landline telephones (10.2%), as it has since 2009, and this difference is expected to grow.

The National Health Interview Survey (NHIS) is the most widely cited

source for data on the ownership and use of wireless telephones. Every 6 months, the Centers for Disease Control and Prevention’s (CDC) National Center for Health Statistics (NCHS) releases a report with the most up-to-date estimates available from the federal government concerning the size and characteristics of the wireless-only population (1). That report, published as part of the NHIS Early Release Program (<http://www.cdc.gov/nchs/nhis/releases.htm>), presents national and regional estimates.

Direct state-level estimates of this prevalence had not been available from NHIS data because the sample size of NHIS was insufficient for direct, reliable annual estimates for most states; however, in April 2011, NCHS released the results of statistically modeled estimates of the prevalence of wireless-only adults and children at the state level, using data from NHIS and the Census Bureau’s American Community Survey (ACS), along with auxiliary information on the number of listed telephone lines per capita (2). Those estimates for 12-month periods from January 2007 through June 2010 were the first multiyear state-level estimates of the size of this population available from the federal government.



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In this report, estimates through December 2011 are updated. Estimates are presented for adults and children living in wireless-only households, wireless-mostly households (defined as households that have landlines yet receive all or almost all calls on wireless telephones), dual-use households (receive significant amounts of calls on both landlines and wireless telephones), landline-mostly households (have wireless telephones yet receive all or almost all calls on landlines), and landline-only households.

## Methods

The methods employed to produce the estimates for this report were identical to the methods used for the estimates published in 2011 (2). Small-area statistical modeling techniques were used to combine NHIS data collected from within specific geographies (states and some counties) with auxiliary data that are representative of those geographies to produce model-based estimates. Specifically, a combination of direct survey estimates from the 2007–2011 NHIS, direct survey estimates from the 2006–2010 ACS, and auxiliary information on the number of listed telephone lines per capita in 2007–2011 were used. The small-area model was used to derive estimates of the proportion of people who lived in households that were wireless-only, wireless-mostly, dual-use, landline-mostly, and landline-only for 10 6-month periods: January–June and July–December in each year from 2007 through 2011.

Estimates were separately derived for adults (aged 18 and over) and children (under age 18) for 93 nonoverlapping areas that comprise the United States. Twenty-six of these areas were states and one was the District of Columbia; other areas consisted of selected counties, groups of counties, or the balance of the state population excluding the selected counties. No areas crossed state lines, and every location in the United States was part of one (and only one) of the 93 areas. Areas considered for inclusion in this

report were urban areas that receive federal Section 317 immunization grants and other substate areas that are strata for CDC's National Immunization Survey (3). Areas were selected for this report on the basis of available survey sample sizes and the stability of the modeled estimates.

For each telephone category, the 6-month estimates for all 93 small areas were modeled jointly. That is, all 6-month periods were modeled together in a single model rather than separately as 10 models (one for each 6-month period). Separate small-area models were fitted for each of the telephone service use categories (e.g., wireless-only, dual-use) and by age group (adults or children). The model-based estimates for each telephone service use category, small area, and 6-month period were derived using a standard small-area modeling and estimation approach known as “empirical best linear unbiased prediction” (4–6). The model-based estimates were a weighted combination of three distinct sets of estimates: (a) the direct estimate from NHIS for the small area during the 6-month period of interest, (b) a synthetic estimate derived from a regression model involving ACS and auxiliary data for the small area during the 6-month period of interest, and (c) adjusted direct estimates from NHIS for the small area during all 6-month periods other than the 6-month period of interest. By using estimates from all 10 6-month periods, the model-based estimate allows for “borrowing strength” across time. When these three distinct sets of estimates were combined, the weights associated with each set reflected the relative precision of each estimate.

Although model-based estimates were produced for every small area and 6-month period, consecutive 6-month period estimates were combined to produce 12-month estimates. The small-area estimates for 12-month periods were obtained by simply averaging the two consecutive 6-month estimates. This helped to reduce the variability of the estimates. Then, the 12-month small-area estimates for each phone category were adjusted so that

they agreed with the national direct estimates from NHIS for the corresponding phone category and year. The 12-month estimates were further adjusted so that they agreed with the 2008, 2009, or 2010 ACS estimate for the population without telephone service (landline or wireless) for each small area. For states with multiple small areas, 12-month state-level estimates were obtained by appropriately weighting the 12-month small-area estimates by population size.

Model-based estimates were produced for 2007–2011. Because the models now included full-year data from 2010 and 2011, the estimates for January 2007–June 2010 differed from the estimates previously reported (5), which were based on models that did not include data from 2011 or the second half of 2010. These differences were generally small (e.g., for the prevalence of wireless-only adults, mean = -0.1, interquartile range = 0.7). Therefore, the updated estimates for 2007–2009 are not presented in this report. Instead, this report only includes estimates for January–December 2010, July 2010–June 2011, and January–December 2011.

## Estimates for Adults and Children Living in Wireless-only Households

Results from the small-area modeling strategy showed great variation in the prevalence of adults living in wireless-only households across states. Estimates for 2011 ranged from a high of 44.6% in Idaho to a low of 15.3% in Rhode Island (Table 1). Other states in which the prevalence of wireless-only adults was relatively high (exceeding 40%) were Arkansas (44.4%), Mississippi (42.3%), and North Dakota (41.6%). Most other states in the northeast region joined Rhode Island with prevalence rates below 25%, including New Jersey (16.5%), Connecticut (18.7%), New York (19.7%), Massachusetts (21.3%), Pennsylvania (23.4%), and New Hampshire (23.6%).

Similarly, results showed great variation in the prevalence of wireless-only children across states, ranging from a high of 58.6% in Mississippi to a low of 15.2% in Rhode Island (Table 1). Other states with a high prevalence of wireless-only children included Arkansas (55.5%), Idaho (54.8%), New Mexico (51.9%), and Texas (49.2%). Other states with a low prevalence of wireless-only children included Connecticut (16.5%), New Jersey (20.1%), New York (20.3%), and Massachusetts (22.6%).

## Estimates for Adults Living in Households With Wireless Telephones

Table 2 presents modeled estimates for 2011 for the prevalence of adults living in households with various telephone service types, including but not limited to wireless-only status. Estimates are presented for adults living in wireless-mostly households, landline-mostly households, dual-use households, and landline-only households. These results can be used to obtain the prevalence of adults living in households with any wireless telephones (regardless of whether the wireless telephones are the only telephones). Estimates ranged from a high of 92.9% in Delaware to a low of 80.4% in West Virginia. Nineteen states exceeded 90%, with Illinois (92.4%), Nebraska (91.8%), Minnesota (91.8%), and Idaho (91.7%) joining Delaware with the highest rates. Along with West Virginia, states with the lowest rates included Vermont (83.7%), New Mexico (84.0%), New York (85.6%), and Indiana (86.2%).

Table 2 can also be used to look at the prevalence of adults living in households that receive all or almost all calls on wireless telephones, regardless of whether the households have landline telephones. Both wireless-only and wireless-mostly adults are in this group. Estimates of the prevalence of adults living in households where wireless telephones are the primary means of receiving calls ranged from 61.1% in Arkansas to 35.0% in Connecticut. One-half of the states (25 total) had rates of primary wireless use exceeding 50%, including Texas (59.1%), Idaho (58.6%), Colorado (57.2%), and

Oklahoma (56.7%) joining Arkansas at the top end. Other states below 40% included Rhode Island (36.1%), New York (37.6%), West Virginia (37.9%), New Hampshire (38.7%), and Vermont (39.4%).

Table 3 presents modeled estimates for 2011 for the prevalence of children living in households with various telephone service types. This table can be used to calculate estimates for children similar to those for adults described above.

## Implications

The increasing prevalence of wireless-only households has implications for random-digit-dial (RDD) telephone surveys. Until recently, such surveys did not include wireless telephone numbers in their samples. Now, despite operational challenges (7), most major RDD telephone surveys do include wireless telephone numbers (8,9). If they did not, the exclusion of households with only wireless telephones (along with the 2.0% of households that have no telephone service) could bias results (10).

Statistical challenges exist when combining samples of wireless-only households with samples of landline households from RDD surveys. To ensure that each sample is appropriately represented in the final data set and appropriately weighted in the final analyses, reliable and current estimates of the prevalence of wireless-only households are needed (7). Moreover, if the persons interviewed on their wireless telephones are not screened to exclude persons who also have landlines, reliable and current estimates of the prevalence of landline and wireless telephone service use may be required to address the probability that an individual could be in both samples (7).

This report presents survey researchers with the most up-to-date estimates available from the federal government concerning the prevalence of landline and wireless telephone service use in each state. Telecommunications companies may also find these estimates useful for understanding changing conditions in state and local markets.

## References

1. Blumberg SJ, Luke JV. Wireless substitution: Early release of estimates from the National Health Interview Survey, July–December 2011. National Center for Health Statistics. June 2012. Available from: <http://www.cdc.gov/nchs/nhis.htm>.
2. Blumberg SJ, Luke JV, Ganesh N, et al. Wireless substitution: State-level estimates from the National Health Interview Survey, January 2007–June 2010. National health statistics reports; no 39. Hyattsville, MD: National Center for Health Statistics. 2011. Available from: <http://www.cdc.gov/nchs/data/nhsr/nhsr039.pdf>.
3. CDC. National Immunization Survey: A user's guide for the 2010 public-use data file. 2011. Available from: [ftp://ftp.cdc.gov/pub/Health\\_Statistics/NCHS/Dataset\\_Documentation/NIS/NISPUF10\\_DUG.PDF](ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NIS/NISPUF10_DUG.PDF).
4. Jiang J, Lahiri P. Mixed model prediction and small area estimation (with discussion). *Test* 15(1):1–96. 2006.
5. Rao JNK. Small area estimation. Hoboken, NJ: John Wiley & Sons, Inc. 2003.
6. Rao JNK, Yu M. Small-area estimation by combining time-series and cross-sectional data. *Can J Stat* 22(4):511–28. 1994.
7. AAPOR Cell Phone Task Force. New considerations for survey researchers when planning and conducting RDD telephone surveys in the U.S. with respondents reached via cell phone numbers. American Association for Public Opinion Research. 2010. Available from: [http://aapor.org/cell\\_phone\\_task\\_force.htm](http://aapor.org/cell_phone_task_force.htm).
8. CDC. Methodologic changes in the Behavioral Risk Factor Surveillance System in 2011 and potential effects on prevalence estimates. *MMWR* 61(22):410–3. 2012.
9. CDC. Announcement: Addition of households with only cellular telephone service to the National Immunization Survey, 2011. *MMWR* 61(34):685. 2012.
10. Blumberg SJ, Luke JV. Reevaluating the need for concern regarding noncoverage bias in landline surveys. *Am J Public Health* 99(10):1806–10. 2009.

**Table 1. Modeled estimates (with standard errors) of the percentage of persons living in wireless-only households, by selected geographic areas, age, and period: United States, 2010–2011**

Geographic area	Adults aged 18 and over			Children under age 18		
	January– December 2010	July 2010– June 2011	January– December 2011	January– December 2010	July 2010– June 2011	January– December 2011
	Percent (standard error)					
Alabama . . . . .	29.3 (1.6)	32.2 (1.7)	34.4 (1.8)	38.0 (3.0)	41.5 (3.1)	44.3 (3.2)
Jefferson County . . . . .	30.4 (2.6)	36.6 (2.7)	41.9 (2.9)	39.6 (4.7)	48.0 (4.6)	56.1 (4.8)
Rest of Alabama . . . . .	29.1 (1.8)	31.4 (1.9)	33.2 (2.0)	37.7 (3.4)	40.4 (3.4)	42.5 (3.6)
Alaska . . . . .	22.2 (2.9)	26.9 (3.0)	30.4 (3.2)	20.8 (4.8)	25.4 (4.9)	27.4 (4.9)
Arizona . . . . .	33.2 (1.5)	36.3 (1.6)	38.2 (1.8)	39.2 (2.4)	43.7 (2.4)	44.6 (2.7)
Maricopa County . . . . .	37.4 (2.0)	40.7 (2.1)	42.3 (2.3)	42.2 (3.1)	47.4 (3.2)	47.4 (3.4)
Rest of Arizona . . . . .	27.0 (2.2)	29.7 (2.4)	32.1 (2.7)	34.3 (3.5)	37.8 (3.7)	40.2 (4.2)
Arkansas . . . . .	39.7 (2.1)	42.3 (2.1)	44.4 (2.2)	49.9 (3.7)	53.2 (3.4)	55.5 (3.5)
California . . . . .	21.7 (0.6)	25.2 (0.6)	27.9 (0.7)	23.0 (1.0)	28.0 (1.0)	32.3 (1.2)
Alameda County . . . . .	22.2 (2.2)	25.4 (2.3)	28.0 (2.6)	20.6 (3.3)	25.9 (3.6)	30.5 (4.0)
Fresno County . . . . .	22.9 (2.2)	26.5 (2.3)	30.5 (2.6)	26.4 (3.4)	27.7 (3.2)	30.6 (3.5)
Los Angeles County . . . . .	21.1 (1.1)	25.2 (1.2)	28.3 (1.3)	20.7 (1.7)	26.7 (1.9)	32.4 (2.1)
Northern counties <sup>1</sup> . . . . .	20.1 (2.3)	22.9 (2.5)	25.4 (2.8)	24.2 (3.7)	28.6 (4.1)	32.7 (4.7)
San Bernardino County . . . . .	19.9 (1.8)	23.2 (2.0)	26.8 (2.3)	24.1 (2.9)	28.0 (3.1)	32.6 (3.6)
San Diego County . . . . .	18.6 (1.5)	20.4 (1.7)	22.5 (1.9)	18.3 (2.5)	20.6 (2.7)	22.0 (3.0)
Santa Clara County . . . . .	24.3 (2.0)	28.7 (2.2)	31.9 (2.5)	27.4 (3.2)	32.6 (3.5)	35.1 (3.9)
Rest of California . . . . .	22.6 (1.0)	26.0 (1.1)	28.4 (1.2)	24.3 (1.6)	29.6 (1.7)	33.9 (1.9)
Colorado . . . . .	33.2 (1.7)	36.5 (1.7)	38.7 (1.9)	34.4 (2.6)	39.5 (2.7)	41.9 (2.8)
City of Denver counties <sup>2</sup> . . . . .	28.9 (2.0)	31.5 (2.1)	33.0 (2.3)	31.5 (3.4)	35.9 (3.6)	38.1 (3.8)
Rest of Colorado . . . . .	36.0 (2.4)	39.8 (2.5)	42.4 (2.7)	36.4 (3.7)	42.1 (3.8)	44.5 (4.0)
Connecticut . . . . .	15.3 (1.5)	17.3 (1.6)	18.7 (1.8)	13.9 (2.2)	15.9 (2.3)	16.5 (2.4)
Delaware . . . . .	21.3 (2.7)	24.3 (2.8)	26.9 (3.0)	22.7 (4.6)	26.1 (4.9)	28.4 (5.3)
District of Columbia . . . . .	37.0 (3.5)	41.2 (3.6)	44.2 (3.7)	44.6 (7.1)	48.9 (6.6)	50.9 (6.3)
Florida . . . . .	30.0 (1.0)	32.6 (1.1)	34.4 (1.2)	37.1 (1.7)	41.0 (1.8)	43.0 (1.9)
Miami-Dade County . . . . .	31.8 (2.8)	34.0 (3.0)	35.9 (3.2)	37.4 (4.4)	42.5 (4.9)	45.5 (5.5)
Duval County . . . . .	33.2 (1.8)	37.8 (1.9)	41.3 (2.1)	44.7 (3.4)	50.3 (3.5)	52.4 (3.7)
Orange County . . . . .	36.2 (2.8)	38.1 (3.0)	39.7 (3.2)	44.1 (4.6)	46.7 (4.8)	48.0 (5.3)
Rest of Florida . . . . .	28.8 (1.2)	31.2 (1.3)	32.7 (1.4)	35.1 (2.1)	38.5 (2.2)	40.5 (2.4)
Georgia . . . . .	29.1 (1.3)	31.9 (1.4)	34.3 (1.6)	34.8 (2.2)	36.2 (2.3)	38.6 (2.5)
Fulton/DeKalb counties . . . . .	36.5 (2.6)	40.1 (2.7)	41.9 (2.9)	35.8 (4.1)	42.3 (4.4)	46.6 (4.9)
Rest of Georgia . . . . .	27.6 (1.5)	30.2 (1.6)	32.7 (1.8)	34.6 (2.5)	35.1 (2.6)	37.2 (2.8)
Hawaii . . . . .	23.1 (1.9)	24.8 (1.9)	26.0 (2.0)	29.0 (3.4)	34.2 (3.6)	35.6 (3.9)
Idaho . . . . .	38.8 (2.6)	42.4 (2.6)	44.6 (2.7)	44.7 (4.0)	50.1 (3.9)	54.8 (3.9)
Illinois . . . . .	27.7 (1.2)	30.7 (1.3)	33.0 (1.4)	31.0 (2.0)	34.9 (2.1)	37.5 (2.3)
Cook County . . . . .	32.0 (1.6)	35.1 (1.7)	38.3 (2.0)	34.2 (2.9)	39.0 (3.0)	42.7 (3.3)
Madison/St. Clair counties . . . . .	33.8 (3.2)	34.2 (3.4)	34.6 (3.6)	46.3 (5.6)	47.0 (5.9)	45.3 (6.3)
Rest of Illinois . . . . .	26.0 (1.5)	29.1 (1.6)	31.3 (1.8)	29.2 (2.5)	32.9 (2.6)	35.6 (2.8)
Indiana . . . . .	28.3 (1.5)	31.1 (1.5)	32.8 (1.7)	35.0 (2.5)	40.0 (2.6)	42.9 (2.9)
Lake County . . . . .	22.6 (3.2)	26.5 (3.4)	29.0 (3.5)	38.3 (6.1)	42.3 (6.2)	43.6 (6.2)
Marion County . . . . .	35.4 (3.0)	39.0 (3.3)	42.0 (3.7)	40.7 (5.1)	46.8 (5.6)	52.3 (6.3)
Rest of Indiana . . . . .	27.6 (1.7)	30.1 (1.8)	31.5 (2.0)	33.6 (3.0)	38.6 (3.1)	41.1 (3.4)
Iowa . . . . .	§	§	§	§	§	§
Kansas . . . . .	33.3 (1.8)	36.2 (1.9)	38.0 (2.0)	40.4 (3.1)	43.6 (3.1)	44.8 (3.1)
Johnson/Wyandotte counties . . . . .	24.4 (2.5)	26.9 (2.6)	28.7 (2.8)	27.2 (4.3)	28.9 (4.2)	31.1 (4.4)
Rest of Kansas . . . . .	36.1 (2.2)	39.2 (2.3)	41.1 (2.4)	45.0 (3.8)	48.7 (3.9)	49.6 (3.9)
Kentucky . . . . .	31.1 (2.1)	32.7 (2.1)	33.7 (2.3)	36.8 (3.2)	41.1 (3.4)	41.3 (3.5)
Louisiana . . . . .	30.2 (1.9)	32.3 (1.9)	33.5 (2.1)	38.5 (3.1)	41.8 (3.0)	43.4 (3.2)
Maine . . . . .	25.7 (2.1)	29.1 (2.2)	31.6 (2.4)	27.5 (4.0)	32.1 (4.0)	35.3 (4.2)
Maryland . . . . .	21.4 (1.3)	24.2 (1.4)	26.5 (1.5)	20.5 (2.1)	23.8 (2.2)	27.2 (2.4)
Baltimore City . . . . .	28.9 (3.0)	32.5 (3.2)	34.8 (3.4)	32.8 (4.8)	37.4 (4.9)	39.4 (5.1)
Prince George's County . . . . .	20.1 (2.2)	23.7 (2.5)	26.8 (2.7)	24.9 (4.0)	29.9 (4.4)	33.8 (4.8)
Rest of Maryland . . . . .	20.6 (1.6)	23.0 (1.7)	25.2 (1.9)	18.0 (2.6)	20.8 (2.6)	24.3 (2.9)
Massachusetts . . . . .	17.3 (1.2)	19.3 (1.3)	21.3 (1.4)	15.6 (2.0)	18.2 (2.1)	22.6 (2.5)
Suffolk County . . . . .	28.7 (3.0)	31.8 (3.2)	33.8 (3.4)	30.5 (6.2)	35.6 (6.9)	40.2 (7.5)
Rest of Massachusetts . . . . .	16.0 (1.3)	17.9 (1.4)	19.9 (1.5)	14.5 (2.0)	16.9 (2.2)	21.3 (2.6)
Michigan . . . . .	30.8 (1.4)	33.4 (1.5)	35.8 (1.6)	36.6 (2.4)	39.5 (2.5)	43.1 (2.7)
Wayne County . . . . .	37.4 (2.4)	38.5 (2.5)	39.6 (2.7)	48.1 (4.4)	51.2 (4.4)	52.2 (4.8)
Rest of Michigan . . . . .	30.3 (1.5)	33.0 (1.5)	35.6 (1.7)	35.6 (2.6)	38.4 (2.7)	42.3 (2.9)
Minnesota . . . . .	27.2 (1.3)	30.1 (1.4)	32.3 (1.5)	24.0 (2.2)	27.5 (2.3)	31.6 (2.6)
Twin Cities counties <sup>3</sup> . . . . .	27.9 (1.8)	31.4 (1.9)	33.9 (2.1)	23.3 (3.0)	28.0 (3.2)	31.9 (3.5)
Rest of Minnesota . . . . .	26.4 (1.9)	28.5 (2.0)	30.4 (2.2)	24.7 (3.3)	26.9 (3.3)	31.3 (3.8)

See footnotes at end of table.



**Table 1. Modeled estimates (with standard errors) of the percentage of persons living in wireless-only households, by selected geographic areas, age, and period: United States, 2010–2011—Con.**

Geographic area	Adults aged 18 and over			Children under age 18		
	January–December 2010	July 2010–June 2011	January–December 2011	January–December 2010	July 2010–June 2011	January–December 2011
	Percent (standard error)					
Mississippi . . . . .	37.3 (1.9)	39.8 (2.0)	42.3 (2.1)	49.3 (3.4)	55.7 (3.5)	58.6 (3.5)
Missouri . . . . .	25.8 (1.5)	29.5 (1.6)	32.5 (1.7)	30.9 (2.7)	35.9 (2.8)	40.6 (3.0)
St. Louis County/City . . . . .	27.5 (2.4)	29.4 (2.5)	30.6 (2.6)	22.1 (3.7)	24.0 (3.7)	25.6 (4.0)
Rest of Missouri . . . . .	25.3 (1.8)	29.5 (1.9)	33.1 (2.1)	33.3 (3.3)	39.1 (3.4)	44.7 (3.7)
Montana . . . . .	§	§	§	§	§	§
Nebraska . . . . .	32.9 (2.3)	36.0 (2.3)	38.5 (2.6)	31.8 (3.6)	34.5 (3.5)	38.5 (3.9)
Nevada . . . . .	27.9 (1.7)	31.5 (1.8)	34.7 (1.9)	30.9 (3.1)	36.5 (3.2)	40.6 (3.4)
Clark County . . . . .	29.0 (2.1)	32.4 (2.2)	35.2 (2.3)	31.7 (3.8)	37.0 (3.8)	39.9 (4.0)
Rest of Nevada . . . . .	24.9 (2.9)	29.2 (3.0)	33.5 (3.3)	28.4 (5.4)	35.3 (5.8)	42.5 (6.4)
New Hampshire . . . . .	17.3 (1.9)	20.6 (2.0)	23.6 (2.2)	16.6 (3.2)	22.2 (3.5)	26.5 (4.0)
New Jersey . . . . .	14.0 (1.1)	15.3 (1.1)	16.5 (1.2)	13.4 (1.8)	16.6 (1.9)	20.1 (2.3)
Essex County . . . . .	28.7 (3.1)	31.3 (3.2)	33.5 (3.4)	23.5 (4.7)	24.6 (4.6)	25.9 (4.9)
Rest of New Jersey . . . . .	13.6 (1.1)	14.8 (1.1)	16.0 (1.3)	13.0 (1.8)	16.3 (2.0)	19.8 (2.4)
New Mexico . . . . .	29.9 (1.6)	33.2 (1.6)	36.0 (1.7)	44.7 (2.9)	48.9 (2.9)	51.9 (3.1)
Southern counties <sup>4</sup> . . . . .	34.0 (2.8)	37.2 (2.7)	38.3 (2.7)	60.2 (5.4)	62.8 (4.6)	61.6 (4.4)
Rest of New Mexico . . . . .	28.4 (1.9)	31.7 (2.0)	35.2 (2.1)	38.6 (3.4)	43.5 (3.7)	48.1 (4.0)
New York . . . . .	16.7 (0.9)	18.1 (0.9)	19.7 (1.1)	17.2 (1.4)	18.3 (1.5)	20.3 (1.6)
City of New York counties <sup>5</sup> . . . . .	19.8 (1.3)	21.3 (1.3)	22.9 (1.5)	20.8 (2.2)	21.3 (2.1)	23.7 (2.3)
Rest of New York . . . . .	14.3 (1.2)	15.7 (1.3)	17.2 (1.5)	14.7 (1.9)	16.2 (2.0)	18.0 (2.3)
North Carolina . . . . .	27.1 (1.4)	30.0 (1.4)	32.8 (1.6)	36.5 (2.4)	41.3 (2.5)	45.8 (2.6)
North Dakota . . . . .	38.1 (3.2)	40.3 (3.1)	41.6 (3.1)	41.8 (5.4)	42.8 (4.8)	44.1 (4.8)
Ohio . . . . .	28.0 (1.1)	30.7 (1.2)	33.4 (1.3)	33.5 (2.2)	38.5 (2.3)	41.3 (2.4)
Cuyahoga County . . . . .	26.6 (2.3)	29.2 (2.5)	31.2 (2.7)	29.8 (3.9)	31.0 (4.1)	30.2 (4.4)
Franklin County . . . . .	36.1 (2.9)	39.5 (3.1)	41.1 (3.3)	39.4 (4.1)	48.1 (4.3)	50.8 (4.5)
Rest of Ohio . . . . .	27.1 (1.4)	29.8 (1.4)	32.8 (1.6)	33.2 (2.6)	38.2 (2.7)	41.5 (2.9)
Oklahoma . . . . .	29.9 (1.9)	32.4 (1.9)	34.6 (2.0)	35.6 (3.5)	38.0 (3.4)	39.9 (3.4)
Oregon . . . . .	33.0 (2.1)	35.6 (2.1)	38.2 (2.2)	36.6 (3.6)	39.0 (3.6)	40.7 (3.6)
Pennsylvania . . . . .	18.4 (1.0)	21.1 (1.1)	23.4 (1.2)	22.1 (1.8)	26.2 (1.9)	28.9 (2.2)
Allegheny County . . . . .	31.3 (3.2)	34.8 (3.3)	38.0 (3.5)	31.1 (5.5)	36.2 (5.7)	40.6 (5.9)
Philadelphia County . . . . .	21.8 (2.4)	24.8 (2.5)	27.4 (2.7)	28.7 (4.2)	33.3 (4.3)	35.7 (4.5)
Rest of Pennsylvania . . . . .	16.3 (1.1)	18.8 (1.2)	20.9 (1.4)	20.1 (2.0)	24.0 (2.3)	26.6 (2.5)
Rhode Island . . . . .	13.3 (1.7)	14.3 (1.8)	15.3 (1.9)	15.3 (3.2)	16.0 (3.2)	15.2 (3.3)
South Carolina . . . . .	30.2 (1.7)	33.8 (1.8)	36.1 (1.9)	37.7 (3.0)	41.8 (3.0)	43.6 (3.1)
South Dakota . . . . .	§	§	§	§	§	§
Tennessee . . . . .	31.0 (1.5)	33.4 (1.6)	35.7 (1.7)	38.9 (2.5)	41.1 (2.6)	44.4 (2.9)
Davidson County . . . . .	41.6 (3.5)	43.8 (3.6)	45.5 (3.8)	46.4 (5.9)	50.5 (6.1)	51.6 (6.3)
Shelby County . . . . .	35.6 (3.0)	38.0 (3.2)	40.5 (3.5)	40.7 (5.1)	43.9 (5.3)	47.2 (5.7)
Rest of Tennessee . . . . .	28.7 (1.8)	31.1 (1.9)	33.5 (2.1)	37.6 (3.1)	39.3 (3.2)	42.9 (3.6)
Texas . . . . .	35.4 (1.0)	37.6 (1.0)	39.9 (1.1)	40.4 (1.5)	44.3 (1.5)	49.2 (1.6)
Bexar County . . . . .	33.3 (2.2)	37.7 (2.3)	40.7 (2.6)	42.6 (3.5)	47.6 (3.6)	50.7 (3.8)
Dallas County . . . . .	47.4 (2.2)	50.6 (2.3)	53.3 (2.5)	48.2 (3.3)	53.4 (3.5)	59.0 (3.8)
El Paso County . . . . .	§	§	§	§	§	§
Harris County . . . . .	37.1 (1.8)	38.9 (1.8)	39.1 (2.0)	42.5 (2.7)	44.2 (2.7)	44.3 (2.9)
Rest of Texas . . . . .	33.8 (1.3)	35.7 (1.3)	38.0 (1.4)	38.8 (2.0)	42.5 (2.0)	48.0 (2.1)
Utah . . . . .	29.6 (2.4)	33.7 (2.5)	37.0 (2.8)	31.8 (3.5)	37.8 (3.6)	41.3 (3.8)
Vermont . . . . .	20.6 (2.6)	24.6 (2.8)	28.7 (3.2)	16.9 (4.2)	22.6 (4.6)	29.1 (5.3)
Virginia . . . . .	22.6 (1.4)	24.6 (1.5)	26.6 (1.7)	20.0 (2.0)	22.9 (2.2)	27.0 (2.5)
Washington . . . . .	30.2 (1.4)	32.3 (1.5)	33.8 (1.6)	30.8 (2.2)	32.7 (2.2)	35.1 (2.4)
Eastern counties <sup>6</sup> . . . . .	26.1 (2.0)	28.7 (2.1)	31.4 (2.4)	29.1 (3.4)	33.0 (3.6)	38.4 (3.9)
King County . . . . .	36.5 (2.4)	40.3 (2.6)	42.9 (2.8)	28.9 (3.6)	34.3 (3.9)	37.7 (4.4)
Rest of Washington . . . . .	28.2 (2.3)	28.9 (2.4)	29.2 (2.5)	32.7 (3.6)	31.8 (3.5)	32.1 (3.7)
West Virginia . . . . .	21.6 (2.3)	23.8 (2.3)	25.7 (2.5)	27.8 (4.0)	30.8 (4.0)	31.5 (3.9)
Wisconsin . . . . .	29.0 (1.6)	31.7 (1.7)	33.8 (1.8)	29.6 (2.7)	32.0 (2.8)	34.9 (3.1)
Milwaukee County . . . . .	§	§	§	§	§	§
Rest of Wisconsin . . . . .	27.3 (1.8)	30.0 (1.9)	32.0 (2.1)	26.3 (3.1)	28.9 (3.3)	32.4 (3.6)
Wyoming . . . . .	§	§	§	§	§	§

§ Model-based estimates for Iowa, Montana, South Dakota, Texas–El Paso County, Wisconsin–Milwaukee County, and Wyoming are not reported. For at least one telephone service use category, direct estimates from the National Health Interview Survey were more than double or less than one-half the synthetic estimate. These differences between two components of the model-based estimates suggest that the direct estimates for these areas may be biased. Biased estimates violate a key model-based estimation assumption.

<sup>1</sup>Includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity.

<sup>2</sup>Includes Adams, Arapahoe, Denver, and Douglas. Previously published estimates for City of Denver counties (2) did not include Adams, Arapahoe, or Douglas.

<sup>3</sup>Includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.

<sup>4</sup>Includes Catron, Chaves, Curry, De Baca, Dona Ana, Eddy, Grant, Hidalgo, Lea, Lincoln, Luna, Otero, Roosevelt, Sierra, and Socorro.

<sup>5</sup>Includes Bronx, Kings, New York, Queens, and Richmond.

<sup>6</sup>Includes Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima. Previously published estimates for Eastern Washington counties (2) did not include Spokane or Yakima.

NOTE: Estimates were calculated by NORC at the University of Chicago.

SOURCES: CDC/NCHS, National Health Interview Survey, 2007–2011; U.S. Census Bureau, American Community Survey, 2006–2010; and infoUSA.com, Inc. consumer database, 2007–2011.

**Table 2. Modeled estimates (with standard errors) of the percent distribution of household telephone status for adults aged 18 and over, by selected geographic areas: United States, 2011**

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service <sup>1</sup>	Total
	Percent (standard error)						
Alabama . . . . .	34.4 (1.8)	14.4 (1.4)	25.3 (1.8)	15.6 (1.4)	8.3 (1.2)	1.9	100.0
Jefferson County . . . . .	41.9 (2.9)	14.0 (2.0)	23.4 (2.7)	12.3 (1.9)	6.9 (1.7)	1.5	100.0
Rest of Alabama . . . . .	33.2 (2.0)	14.5 (1.5)	25.6 (2.1)	16.2 (1.6)	8.6 (1.3)	1.9	100.0
Alaska . . . . .	30.4 (3.2)	23.4 (2.9)	17.1 (2.9)	16.5 (2.5)	11.6 (2.5)	1.0	100.0
Arizona . . . . .	38.2 (1.8)	16.5 (1.3)	20.1 (1.6)	12.1 (1.2)	10.9 (1.3)	2.2	100.0
Maricopa County . . . . .	42.3 (2.3)	18.1 (1.8)	20.7 (2.0)	8.5 (1.3)	8.3 (1.4)	2.2	100.0
Rest of Arizona . . . . .	32.1 (2.7)	14.3 (2.0)	19.3 (2.5)	17.3 (2.2)	14.7 (2.3)	2.3	100.0
Arkansas . . . . .	44.4 (2.2)	16.7 (1.7)	16.9 (1.8)	10.7 (1.4)	8.9 (1.4)	2.4	100.0
California . . . . .	27.9 (0.7)	20.1 (0.7)	29.6 (0.8)	13.1 (0.6)	7.8 (0.4)	1.5	100.0
Alameda County . . . . .	28.0 (2.6)	16.6 (2.1)	38.7 (3.1)	9.5 (1.7)	6.1 (1.6)	1.1	100.0
Fresno County . . . . .	30.5 (2.6)	9.1 (1.6)	28.0 (2.8)	15.2 (2.0)	15.3 (2.2)	1.9	100.0
Los Angeles County . . . . .	28.3 (1.3)	19.2 (1.2)	31.0 (1.5)	11.8 (1.0)	8.2 (0.9)	1.6	100.0
Northern counties <sup>2</sup> . . . . .	25.4 (2.8)	16.6 (2.4)	22.1 (3.0)	20.7 (2.6)	13.3 (2.5)	1.8	100.0
San Bernardino County . . . . .	26.8 (2.3)	19.2 (2.1)	34.3 (2.8)	11.4 (1.7)	6.7 (1.5)	1.5	100.0
San Diego County . . . . .	22.5 (1.9)	23.4 (1.9)	33.3 (2.3)	10.7 (1.4)	8.6 (1.4)	1.4	100.0
Santa Clara County . . . . .	31.9 (2.5)	20.3 (2.2)	26.6 (2.6)	10.1 (1.6)	10.0 (1.8)	1.0	100.0
Rest of California . . . . .	28.4 (1.2)	21.3 (1.1)	27.7 (1.2)	14.5 (0.9)	6.6 (0.7)	1.5	100.0
Colorado . . . . .	38.7 (1.9)	18.5 (1.5)	21.6 (1.7)	12.0 (1.3)	7.5 (1.1)	1.6	100.0
City of Denver counties <sup>3</sup> . . . . .	33.0 (2.3)	21.5 (2.0)	24.7 (2.3)	12.3 (1.6)	6.8 (1.4)	1.6	100.0
Rest of Colorado . . . . .	42.4 (2.7)	16.6 (2.0)	19.7 (2.4)	11.8 (1.8)	8.0 (1.6)	1.6	100.0
Connecticut . . . . .	18.7 (1.8)	16.3 (1.7)	34.8 (2.3)	18.6 (1.8)	10.5 (1.5)	1.1	100.0
Delaware . . . . .	26.9 (3.0)	19.0 (2.6)	26.5 (3.3)	20.5 (2.7)	6.1 (1.8)	1.0	100.0
District of Columbia . . . . .	44.2 (3.7)	15.7 (2.8)	20.8 (3.2)	13.6 (2.5)	*3.3 (1.5)	2.4	100.0
Florida . . . . .	34.4 (1.2)	17.3 (0.9)	25.7 (1.1)	11.8 (0.8)	8.8 (0.7)	2.1	100.0
Miami-Dade County . . . . .	35.9 (3.2)	13.8 (2.3)	26.5 (3.4)	13.0 (2.3)	8.7 (2.2)	2.0	100.0
Duval County . . . . .	41.3 (2.1)	17.7 (1.7)	22.2 (2.0)	7.0 (1.1)	8.7 (1.3)	3.2	100.0
Orange County . . . . .	39.7 (3.2)	20.4 (2.6)	22.3 (3.1)	10.6 (2.0)	*5.1 (1.7)	1.9	100.0
Rest of Florida . . . . .	32.7 (1.4)	17.2 (1.2)	26.5 (1.4)	12.7 (1.0)	9.1 (0.9)	1.9	100.0
Georgia . . . . .	34.3 (1.6)	21.6 (1.4)	23.7 (1.6)	11.4 (1.1)	6.7 (0.9)	2.3	100.0
Fulton/DeKalb counties . . . . .	41.9 (2.9)	20.4 (2.4)	23.3 (2.8)	7.8 (1.6)	*4.7 (1.4)	1.9	100.0
Rest of Georgia . . . . .	32.7 (1.8)	21.8 (1.6)	23.8 (1.8)	12.2 (1.3)	7.2 (1.1)	2.3	100.0
Hawaii . . . . .	26.0 (2.0)	15.6 (1.7)	36.5 (2.4)	10.1 (1.4)	9.9 (1.5)	1.9	100.0
Idaho . . . . .	44.6 (2.7)	14.0 (1.8)	19.1 (2.3)	14.0 (1.9)	6.4 (1.4)	1.9	100.0
Illinois . . . . .	33.0 (1.4)	18.1 (1.2)	28.1 (1.5)	13.2 (1.1)	6.0 (0.8)	1.6	100.0
Cook County . . . . .	38.3 (2.0)	17.4 (1.6)	27.1 (2.0)	9.4 (1.2)	6.0 (1.1)	1.8	100.0
Madison/St. Clair counties . . . . .	34.6 (3.6)	15.3 (2.6)	29.5 (3.8)	13.2 (2.5)	*5.4 (2.0)	2.0	100.0
Rest of Illinois . . . . .	31.3 (1.8)	18.5 (1.5)	28.3 (1.9)	14.3 (1.4)	6.0 (1.0)	1.5	100.0
Indiana . . . . .	32.8 (1.7)	16.0 (1.4)	22.2 (1.7)	15.2 (1.3)	11.7 (1.3)	2.1	100.0
Lake County . . . . .	29.0 (3.5)	18.2 (2.9)	21.7 (3.5)	18.7 (3.0)	10.4 (2.7)	2.0	100.0
Marion County . . . . .	42.0 (3.7)	13.2 (2.4)	20.7 (3.4)	15.6 (2.6)	*7.2 (2.2)	1.2	100.0
Rest of Indiana . . . . .	31.5 (2.0)	16.3 (1.6)	22.5 (2.0)	14.8 (1.6)	12.6 (1.6)	2.3	100.0
Iowa . . . . .	§	§	§	§	§	§	§
Kansas . . . . .	38.0 (2.0)	15.4 (1.4)	23.6 (1.8)	12.0 (1.3)	9.4 (1.3)	1.6	100.0
Johnson/Wyandotte counties . . . . .	28.7 (2.8)	17.2 (2.3)	37.7 (3.2)	8.7 (1.7)	6.3 (1.7)	1.4	100.0
Rest of Kansas . . . . .	41.1 (2.4)	14.8 (1.8)	19.1 (2.1)	13.0 (1.7)	10.4 (1.7)	1.7	100.0
Kentucky . . . . .	33.7 (2.3)	16.9 (1.8)	18.5 (2.1)	17.7 (1.9)	11.0 (1.7)	2.2	100.0
Louisiana . . . . .	33.5 (2.1)	16.1 (1.6)	28.5 (2.1)	11.3 (1.4)	8.1 (1.3)	2.5	100.0
Maine . . . . .	31.6 (2.4)	12.1 (1.7)	18.1 (2.1)	25.8 (2.3)	10.9 (1.8)	1.4	100.0
Maryland . . . . .	26.5 (1.5)	19.9 (1.4)	26.9 (1.7)	17.4 (1.4)	7.6 (1.0)	1.7	100.0
Baltimore City . . . . .	34.8 (3.4)	13.5 (2.3)	24.7 (3.4)	12.7 (2.3)	10.4 (2.5)	4.0	100.0
Prince George's County . . . . .	26.8 (2.7)	23.8 (2.7)	25.7 (3.1)	13.4 (2.1)	9.6 (2.1)	0.7	100.0
Rest of Maryland . . . . .	25.2 (1.9)	20.1 (1.8)	27.5 (2.2)	18.9 (1.8)	6.8 (1.2)	1.6	100.0
Massachusetts . . . . .	21.3 (1.4)	18.9 (1.4)	31.7 (1.8)	17.0 (1.4)	10.1 (1.2)	1.1	100.0
Suffolk County . . . . .	33.8 (3.4)	15.9 (2.7)	23.8 (3.5)	13.0 (2.6)	11.8 (2.8)	1.7	100.0
Rest of Massachusetts . . . . .	19.9 (1.5)	19.2 (1.5)	32.6 (2.0)	17.4 (1.5)	9.9 (1.3)	1.0	100.0
Michigan . . . . .	35.8 (1.6)	15.6 (1.3)	23.8 (1.6)	15.7 (1.3)	7.1 (1.0)	2.0	100.0
Wayne County . . . . .	39.6 (2.7)	17.1 (2.2)	21.3 (2.6)	13.3 (1.9)	5.8 (1.5)	2.9	100.0
Rest of Michigan . . . . .	35.6 (1.7)	15.5 (1.3)	24.0 (1.7)	15.9 (1.4)	7.2 (1.0)	1.9	100.0
Minnesota . . . . .	32.3 (1.5)	19.0 (1.3)	27.5 (1.6)	13.0 (1.1)	6.8 (0.9)	1.4	100.0
Twin Cities counties <sup>4</sup> . . . . .	33.9 (2.1)	19.8 (1.8)	27.6 (2.1)	12.1 (1.5)	5.2 (1.1)	1.5	100.0
Rest of Minnesota . . . . .	30.4 (2.2)	18.1 (1.8)	27.4 (2.3)	14.0 (1.7)	8.8 (1.5)	1.3	100.0

See footnotes at end of table.

**Table 2. Modeled estimates (with standard errors) of the percent distribution of household telephone status for adults aged 18 and over, by selected geographic areas: United States, 2011—Con.**

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service <sup>1</sup>	Total
	Percent (standard error)						
Mississippi . . . . .	42.3 (2.1)	13.2 (1.5)	19.0 (1.8)	15.4 (1.6)	8.0 (1.3)	2.2	100.0
Missouri . . . . .	32.5 (1.7)	17.4 (1.4)	25.2 (1.7)	15.1 (1.3)	7.8 (1.1)	2.0	100.0
St. Louis County/City . . . . .	30.6 (2.6)	16.3 (2.1)	28.7 (2.9)	14.5 (2.0)	8.6 (1.8)	1.3	100.0
Rest of Missouri . . . . .	33.1 (2.1)	17.7 (1.7)	24.2 (2.1)	15.2 (1.6)	7.6 (1.3)	2.2	100.0
Montana . . . . .	§	§	§	§	§	§	§
Nebraska . . . . .	38.5 (2.6)	15.5 (1.9)	24.7 (2.5)	13.1 (1.8)	6.7 (1.5)	1.5	100.0
Nevada . . . . .	34.7 (1.9)	20.4 (1.6)	23.7 (1.8)	9.4 (1.2)	10.0 (1.3)	1.8	100.0
Clark County . . . . .	35.2 (2.3)	19.7 (1.9)	24.4 (2.2)	7.7 (1.3)	11.2 (1.7)	1.9	100.0
Rest of Nevada . . . . .	33.5 (3.3)	22.2 (2.8)	21.9 (3.1)	13.8 (2.4)	7.1 (2.0)	1.5	100.0
New Hampshire . . . . .	23.6 (2.2)	15.1 (1.9)	31.2 (2.6)	21.4 (2.1)	7.4 (1.5)	1.3	100.0
New Jersey . . . . .	16.5 (1.2)	24.7 (1.5)	31.8 (1.7)	16.0 (1.3)	9.4 (1.1)	1.5	100.0
Essex County . . . . .	33.5 (3.4)	11.7 (2.4)	36.2 (4.0)	*2.3 (1.1)	13.7 (3.0)	2.7	100.0
Rest of New Jersey . . . . .	16.0 (1.3)	25.1 (1.5)	31.7 (1.7)	16.5 (1.3)	9.3 (1.1)	1.5	100.0
New Mexico . . . . .	36.0 (1.7)	14.8 (1.3)	22.9 (1.6)	10.2 (1.1)	12.2 (1.3)	3.8	100.0
Southern counties <sup>5</sup> . . . . .	38.3 (2.7)	11.3 (1.7)	24.1 (2.5)	9.8 (1.6)	14.3 (2.1)	2.0	100.0
Rest of New Mexico . . . . .	35.2 (2.1)	16.1 (1.7)	22.5 (2.0)	10.3 (1.4)	11.5 (1.6)	4.5	100.0
New York . . . . .	19.7 (1.1)	17.9 (1.0)	33.0 (1.4)	15.0 (1.0)	12.3 (1.0)	2.1	100.0
City of New York counties <sup>6</sup> . . . . .	22.9 (1.5)	19.3 (1.4)	31.8 (1.8)	10.4 (1.1)	12.7 (1.3)	2.9	100.0
Rest of New York . . . . .	17.2 (1.5)	16.9 (1.5)	33.9 (2.0)	18.4 (1.6)	11.9 (1.4)	1.6	100.0
North Carolina . . . . .	32.8 (1.6)	13.2 (1.2)	26.5 (1.6)	18.0 (1.4)	7.8 (1.0)	1.7	100.0
North Dakota . . . . .	41.6 (3.1)	9.4 (1.8)	26.6 (3.0)	9.2 (1.8)	12.1 (2.3)	1.0	100.0
Ohio . . . . .	33.4 (1.3)	18.1 (1.1)	22.3 (1.3)	17.5 (1.1)	6.3 (0.8)	2.2	100.0
Cuyahoga County . . . . .	31.2 (2.7)	20.3 (2.4)	21.0 (2.7)	19.0 (2.3)	7.0 (1.7)	1.5	100.0
Franklin County . . . . .	41.1 (3.3)	17.6 (2.5)	25.4 (3.3)	10.8 (2.1)	*2.9 (1.3)	2.2	100.0
Rest of Ohio . . . . .	32.8 (1.6)	17.9 (1.3)	22.1 (1.5)	18.2 (1.4)	6.7 (0.9)	2.3	100.0
Oklahoma . . . . .	34.6 (2.0)	22.1 (1.8)	22.5 (1.9)	11.5 (1.4)	7.7 (1.2)	1.7	100.0
Oregon . . . . .	38.2 (2.2)	14.5 (1.6)	15.5 (1.8)	18.9 (1.8)	11.2 (1.6)	1.7	100.0
Pennsylvania . . . . .	23.4 (1.2)	17.1 (1.1)	30.7 (1.5)	17.4 (1.1)	9.9 (0.9)	1.5	100.0
Allegheny County . . . . .	38.0 (3.5)	15.2 (2.6)	21.5 (3.3)	17.6 (2.7)	*6.6 (2.1)	1.1	100.0
Philadelphia County . . . . .	27.4 (2.7)	20.1 (2.4)	26.8 (2.9)	12.2 (2.0)	10.1 (2.0)	3.4	100.0
Rest of Pennsylvania . . . . .	20.9 (1.4)	16.8 (1.3)	32.5 (1.8)	18.2 (1.4)	10.3 (1.1)	1.3	100.0
Rhode Island . . . . .	15.3 (1.9)	20.8 (2.1)	33.3 (2.6)	17.8 (2.0)	10.6 (1.8)	2.2	100.0
South Carolina . . . . .	36.1 (1.9)	15.8 (1.4)	21.2 (1.7)	15.2 (1.4)	9.5 (1.2)	2.3	100.0
South Dakota . . . . .	§	§	§	§	§	§	§
Tennessee . . . . .	35.7 (1.7)	17.7 (1.4)	26.4 (1.8)	11.6 (1.2)	6.5 (1.0)	2.1	100.0
Davidson County . . . . .	45.5 (3.8)	17.5 (2.8)	19.6 (3.4)	10.5 (2.3)	*5.7 (2.0)	1.2	100.0
Shelby County . . . . .	40.5 (3.5)	16.4 (2.6)	26.0 (3.5)	6.6 (1.7)	8.4 (2.3)	2.2	100.0
Rest of Tennessee . . . . .	33.5 (2.1)	17.9 (1.7)	27.4 (2.2)	12.7 (1.5)	6.3 (1.2)	2.2	100.0
Texas . . . . .	39.9 (1.1)	19.2 (0.9)	22.7 (1.0)	9.8 (0.7)	6.6 (0.6)	1.8	100.0
Bexar County . . . . .	40.7 (2.6)	19.3 (2.1)	22.7 (2.4)	8.1 (1.5)	7.2 (1.5)	1.9	100.0
Dallas County . . . . .	53.3 (2.5)	17.0 (1.9)	14.0 (1.9)	7.3 (1.3)	6.9 (1.4)	1.6	100.0
El Paso County . . . . .	§	§	§	§	§	§	§
Harris County . . . . .	39.1 (2.0)	22.4 (1.7)	20.2 (1.8)	12.2 (1.4)	4.0 (0.9)	2.1	100.0
Rest of Texas . . . . .	38.0 (1.4)	19.4 (1.2)	24.7 (1.3)	10.3 (0.9)	5.8 (0.7)	1.8	100.0
Utah . . . . .	37.0 (2.8)	14.8 (2.0)	27.2 (2.8)	10.8 (1.8)	8.6 (1.8)	1.7	100.0
Vermont . . . . .	28.7 (3.2)	10.7 (2.1)	20.4 (3.1)	23.9 (3.0)	14.9 (2.9)	1.4	100.0
Virginia . . . . .	26.6 (1.7)	22.7 (1.6)	25.5 (1.8)	15.5 (1.4)	7.7 (1.1)	2.0	100.0
Washington . . . . .	33.8 (1.6)	20.9 (1.4)	21.1 (1.5)	15.0 (1.3)	7.5 (1.0)	1.7	100.0
Eastern counties <sup>7</sup> . . . . .	31.4 (2.4)	20.9 (2.1)	24.2 (2.4)	15.4 (1.9)	6.3 (1.4)	1.8	100.0
King County . . . . .	42.9 (2.8)	15.8 (2.1)	23.8 (2.7)	11.0 (1.8)	4.9 (1.4)	1.5	100.0
Rest of Washington . . . . .	29.2 (2.5)	24.1 (2.4)	18.1 (2.4)	17.3 (2.1)	9.6 (1.9)	1.7	100.0
West Virginia . . . . .	25.7 (2.5)	12.2 (1.9)	14.9 (2.2)	27.6 (2.6)	17.1 (2.4)	2.5	100.0
Wisconsin . . . . .	33.8 (1.8)	12.5 (1.3)	22.5 (1.8)	18.6 (1.6)	11.2 (1.4)	1.4	100.0
Milwaukee County . . . . .	§	§	§	§	§	§	§
Rest of Wisconsin . . . . .	32.0 (2.1)	13.2 (1.6)	22.4 (2.1)	20.2 (1.9)	10.8 (1.6)	1.4	100.0
Wyoming . . . . .	§	§	§	§	§	§	§

\* Estimate has a relative standard error greater than 30% and less than or equal to 50%. Such estimates are considered unreliable.

§ Model-based estimates for Iowa, Montana, South Dakota, Texas-El Paso County, Wisconsin-Milwaukee County, and Wyoming are not reported. For at least one telephone service use category, direct estimates from the National Health Interview Survey were more than double or less than one-half the synthetic estimate. These differences between two components of the model-based estimates suggest that the direct estimates for these areas may be biased. Biased estimates violate a key model-based estimation assumption.



<sup>1</sup>The proportion of adults living in households with no telephone service was not modeled. Other proportions were adjusted so that this estimate agreed with the 2010 American Community Survey estimate for this proportion.

<sup>2</sup>Includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity.

<sup>3</sup>Includes Adams, Arapahoe, Denver, and Douglas. Previously published estimates for City of Denver counties (2) did not include Adams, Arapahoe, or Douglas.

<sup>4</sup>Includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.

<sup>5</sup>Includes Catron, Chaves, Curry, De Baca, Dona Ana, Eddy, Grant, Hidalgo, Lea, Lincoln, Luna, Otero, Roosevelt, Sierra, and Socorro.

<sup>6</sup>Includes Bronx, Kings, New York, Queens, and Richmond.

<sup>7</sup>Includes Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima. Previously published estimates for Eastern Washington counties (2) did not include Spokane or Yakima.

NOTE: Estimates were calculated by NORC at the University of Chicago.

SOURCES: CDC/NCHS, National Health Interview Survey, 2007–2011; U.S. Census Bureau, American Community Survey, 2006–2010; and infoUSA.com, Inc. consumer database, 2007–2011.

**Table 3. Modeled estimates (with standard errors) of the percent distribution of household telephone status for children under age 18, by selected geographic areas: United States, 2011**

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service <sup>1</sup>	Total
	Percent (standard error)						
Alabama . . . . .	44.3 (3.2)	22.1 (2.6)	22.1 (2.8)	6.0 (1.6)	*3.8 (1.4)	1.6	100.0
Jefferson County . . . . .	56.1 (4.8)	14.6 (3.1)	21.4 (4.1)	†	†	1.0	100.0
Rest of Alabama . . . . .	42.5 (3.6)	23.3 (3.0)	22.2 (3.2)	6.5 (1.8)	*3.8 (1.6)	1.7	100.0
Alaska . . . . .	27.4 (4.9)	27.4 (4.5)	13.0 (3.8)	19.2 (4.3)	*12.8 (4.1)	0.3	100.0
Arizona . . . . .	44.6 (2.7)	20.8 (2.1)	19.8 (2.2)	6.1 (1.3)	6.5 (1.5)	2.2	100.0
Maricopa County . . . . .	47.4 (3.4)	21.5 (2.7)	18.0 (2.7)	*3.0 (1.2)	8.0 (2.0)	2.1	100.0
Rest of Arizona . . . . .	40.2 (4.2)	19.5 (3.2)	22.8 (3.8)	11.1 (2.7)	*4.1 (1.9)	2.3	100.0
Arkansas . . . . .	55.5 (3.5)	19.3 (2.7)	16.3 (2.7)	*3.6 (1.3)	†	3.0	100.0
California . . . . .	32.3 (1.2)	21.3 (1.0)	29.6 (1.1)	9.3 (0.7)	6.0 (0.6)	1.5	100.0
Alameda County . . . . .	30.5 (4.0)	19.5 (3.3)	40.3 (4.5)	*6.4 (2.1)	†	0.8	100.0
Fresno County . . . . .	30.6 (3.5)	10.1 (2.2)	23.5 (3.4)	12.8 (2.6)	20.5 (3.4)	2.4	100.0
Los Angeles County . . . . .	32.4 (2.1)	20.5 (1.8)	30.7 (2.1)	8.1 (1.3)	6.9 (1.2)	1.5	100.0
Northern counties <sup>2</sup> . . . . .	32.7 (4.7)	20.6 (3.7)	24.0 (4.5)	11.1 (3.1)	*10.2 (3.5)	1.5	100.0
San Bernardino County . . . . .	32.6 (3.6)	22.0 (3.1)	28.0 (3.6)	10.9 (2.4)	*4.5 (1.8)	1.9	100.0
San Diego County . . . . .	22.0 (.03)	23.7 (3.0)	35.8 (3.7)	9.2 (2.1)	8.3 (2.2)	1.0	100.0
Santa Clara County . . . . .	35.1 (3.9)	19.2 (3.1)	33.2 (4.1)	*5.3 (1.8)	*6.0 (2.2)	1.3	100.0
Rest of California . . . . .	33.9 (1.9)	22.5 (1.7)	27.7 (1.9)	10.0 (1.3)	4.4 (0.9)	1.5	100.0
Colorado . . . . .	41.9 (2.8)	20.7 (2.2)	25.5 (2.6)	6.9 (1.5)	*3.7 (1.1)	1.2	100.0
City of Denver counties <sup>3</sup> . . . . .	38.1 (3.8)	22.7 (3.1)	27.1 (3.6)	*5.4 (1.8)	*5.4 (2.0)	1.2	100.0
Rest of Colorado . . . . .	44.5 (4.0)	19.3 (3.0)	24.5 (3.5)	8.0 (2.2)	†	1.2	100.0
Connecticut . . . . .	16.5 (2.4)	21.4 (2.6)	35.2 (3.2)	15.7 (2.4)	10.4 (2.1)	0.8	100.0
Delaware . . . . .	28.4 (5.3)	23.9 (4.5)	30.5 (5.5)	*7.7 (3.1)	*8.1 (3.6)	1.5	100.0
District of Columbia . . . . .	50.9 (6.3)	18.9 (4.7)	25.7 (5.3)	†	†	1.7	100.0
Florida . . . . .	43.0 (1.9)	19.9 (1.5)	26.1 (1.7)	3.1 (0.7)	5.5 (1.0)	2.3	100.0
Miami-Dade County . . . . .	45.5 (5.5)	21.2 (4.0)	21.0 (4.7)	†	*7.6 (3.3)	1.9	100.0
Duval County . . . . .	52.4 (3.7)	19.2 (2.8)	21.8 (3.3)	†	†	3.5	100.0
Orange County . . . . .	48.0 (5.3)	23.5 (4.0)	24.6 (4.7)	†	†	1.5	100.0
Rest of Florida . . . . .	40.5 (2.4)	19.6 (1.9)	27.4 (2.2)	3.7 (0.9)	6.5 (1.3)	2.2	100.0
Georgia . . . . .	38.6 (2.5)	25.8 (2.2)	25.4 (2.3)	5.0 (1.2)	*2.7 (0.9)	2.5	100.0
Fulton/DeKalb counties . . . . .	46.6 (4.9)	20.8 (3.7)	27.8 (4.6)	†	†	1.6	100.0
Rest of Georgia . . . . .	37.2 (2.8)	26.7 (2.6)	24.9 (2.6)	5.8 (1.4)	*2.7 (1.0)	2.6	100.0
Hawaii . . . . .	35.6 (3.9)	21.6 (3.2)	33.0 (4.0)	*4.2 (1.6)	†	2.5	100.0
Idaho . . . . .	54.8 (3.9)	18.1 (2.9)	13.1 (2.7)	7.7 (2.1)	*4.7 (1.8)	1.6	100.0
Illinois . . . . .	37.5 (2.3)	20.6 (1.9)	29.2 (2.2)	8.3 (1.4)	*2.7 (0.8)	1.7	100.0
Cook County . . . . .	42.7 (3.3)	20.1 (2.6)	27.5 (3.1)	*4.9 (1.5)	*3.4 (1.3)	1.4	100.0
Madison/St. Clair counties . . . . .	45.3 (6.3)	17.0 (4.1)	26.8 (5.7)	*8.4 (3.4)	†	2.0	100.0
Rest of Illinois . . . . .	35.6 (2.8)	20.9 (2.4)	29.8 (2.8)	9.3 (1.8)	*2.6 (1.0)	1.7	100.0
Indiana . . . . .	42.9 (2.9)	19.6 (2.2)	21.2 (2.5)	8.4 (1.6)	5.1 (1.5)	2.9	100.0
Lake County . . . . .	43.6 (6.2)	21.3 (4.4)	17.4 (4.7)	*12.5 (4.1)	†	2.2	100.0
Marion County . . . . .	52.3 (6.3)	18.0 (4.2)	19.1 (5.0)	*7.9 (3.2)	†	1.2	100.0
Rest of Indiana . . . . .	41.1 (3.4)	19.7 (2.7)	21.9 (3.0)	8.0 (1.9)	*6.0 (1.8)	3.3	100.0
Iowa . . . . .	§	§	§	§	§	§	§
Kansas . . . . .	44.8 (3.1)	18.1 (2.3)	24.1 (2.6)	5.6 (1.5)	*5.4 (1.6)	2.0	100.0
Johnson/Wyandotte counties . . . . .	31.1 (4.4)	18.3 (3.4)	43.2 (4.9)	*3.8 (1.8)	†	1.9	100.0
Rest of Kansas . . . . .	49.6 (3.9)	18.1 (2.8)	17.4 (3.0)	*6.2 (1.9)	*6.7 (2.1)	2.0	100.0
Kentucky . . . . .	41.3 (3.5)	20.9 (2.8)	17.8 (2.8)	12.0 (2.3)	*5.8 (1.9)	2.2	100.0
Louisiana . . . . .	43.4 (3.2)	21.7 (2.6)	23.9 (2.8)	6.6 (1.6)	†	2.8	100.0
Maine . . . . .	35.3 (4.2)	15.3 (2.9)	26.2 (3.9)	16.8 (3.2)	*4.8 (2.0)	1.6	100.0
Maryland . . . . .	27.2 (2.4)	22.0 (2.2)	30.3 (2.7)	13.3 (1.9)	5.2 (1.3)	2.0	100.0
Baltimore City . . . . .	39.4 (5.1)	15.5 (3.5)	21.7 (4.4)	*10.4 (3.2)	*7.8 (3.2)	5.1	100.0
Prince George's County . . . . .	33.8 (4.8)	24.2 (4.1)	31.1 (5.1)	*5.7 (2.4)	†	1.2	100.0
Rest of Maryland . . . . .	24.3 (2.9)	22.4 (2.8)	31.3 (3.3)	15.2 (2.5)	*5.0 (1.7)	1.8	100.0
Massachusetts . . . . .	22.6 (2.5)	21.1 (2.4)	39.0 (3.1)	11.2 (2.0)	5.1 (1.5)	1.1	100.0
Suffolk County . . . . .	40.2 (7.5)	23.6 (6.2)	29.0 (7.4)	†	†	1.5	100.0
Rest of Massachusetts . . . . .	21.3 (2.6)	20.9 (2.5)	39.7 (3.3)	11.7 (2.1)	5.3 (1.6)	1.0	100.0
Michigan . . . . .	43.1 (2.7)	19.5 (2.1)	22.8 (2.4)	8.3 (1.6)	4.4 (1.2)	1.9	100.0
Wayne County . . . . .	52.2 (4.8)	19.6 (3.6)	19.5 (4.0)	*4.0 (1.9)	†	3.4	100.0
Rest of Michigan . . . . .	42.3 (2.9)	19.5 (2.3)	23.1 (2.5)	8.7 (1.7)	4.7 (1.3)	1.7	100.0
Minnesota . . . . .	31.6 (2.6)	24.2 (2.3)	31.8 (2.7)	8.0 (1.5)	*3.1 (1.1)	1.3	100.0
Twin Cities counties <sup>4</sup> . . . . .	31.9 (3.5)	21.9 (3.0)	34.6 (3.8)	8.2 (2.1)	†	1.1	100.0
Rest of Minnesota . . . . .	31.3 (3.8)	26.9 (3.5)	28.4 (3.9)	7.7 (2.2)	*4.1 (1.8)	1.6	100.0
Mississippi . . . . .	58.6 (3.5)	15.4 (2.5)	14.3 (2.6)	8.7 (2.1)	†	2.4	100.0

See footnotes at end of table.

**Table 3. Modeled estimates (with standard errors) of the percent distribution of household telephone status for children under age 18, by selected geographic areas: United States, 2011—Con.**

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service <sup>1</sup>	Total
	Percent (standard error)						
Missouri . . . . .	40.6 (3.0)	19.7 (2.3)	22.8 (2.6)	9.5 (1.8)	*4.7 (1.4)	2.7	100.0
St. Louis County/City . . . . .	25.6 (4.0)	22.6 (3.6)	35.9 (4.6)	9.8 (2.7)	*4.4 (2.1)	1.8	100.0
Rest of Missouri . . . . .	44.7 (3.7)	18.9 (2.8)	19.3 (3.0)	9.4 (2.2)	*4.7 (1.7)	2.9	100.0
Montana . . . . .	§	§	§	§	§	§	§
Nebraska . . . . .	38.5 (3.9)	20.6 (3.0)	29.0 (3.7)	*5.9 (1.9)	*4.4 (1.8)	1.6	100.0
Nevada . . . . .	40.6 (3.4)	25.1 (2.8)	19.1 (2.7)	*2.9 (1.1)	10.6 (2.3)	1.6	100.0
Clark County . . . . .	39.9 (4.0)	23.5 (3.2)	19.2 (3.2)	*2.7 (1.3)	12.9 (3.0)	1.8	100.0
Rest of Nevada . . . . .	42.5 (6.4)	29.7 (5.2)	18.8 (5.0)	†	†	1.1	100.0
New Hampshire . . . . .	26.5 (4.0)	18.7 (3.3)	39.1 (4.6)	13 (3.0)	†	1.1	100.0
New Jersey . . . . .	20.1 (2.3)	27.7 (2.6)	33.8 (2.8)	9.7 (1.8)	7.3 (1.6)	1.5	100.0
Essex County . . . . .	25.9 (4.9)	*10.1 (3.2)	49.3 (6.1)	†	*10.7 (4.0)	3.8	100.0
Rest of New Jersey . . . . .	19.8 (2.4)	28.3 (2.7)	33.3 (2.9)	10.0 (1.8)	7.2 (1.7)	1.4	100.0
New Mexico . . . . .	51.9 (3.1)	13.2 (2.0)	19.6 (2.6)	*2.6 (1.0)	7.8 (1.9)	4.9	100.0
Southern counties <sup>5</sup> . . . . .	61.6 (4.4)	12.3 (2.7)	15.1 (3.2)	†	*7.0 (2.5)	1.3	100.0
Rest of New Mexico . . . . .	48.1 (4.0)	13.6 (2.6)	21.4 (3.4)	*2.6 (1.3)	8.1 (2.4)	6.3	100.0
New York . . . . .	20.3 (1.6)	19.6 (1.6)	38.4 (2.1)	12.2 (1.4)	7.4 (1.2)	2.1	100.0
City of New York counties <sup>6</sup> . . . . .	23.7 (2.3)	22.2 (2.2)	35.4 (2.7)	8.2 (1.5)	8.1 (1.6)	2.4	100.0
Rest of New York . . . . .	18.0 (2.3)	17.7 (2.2)	40.5 (3.0)	15.0 (2.2)	6.9 (1.6)	1.9	100.0
North Carolina . . . . .	45.8 (2.6)	15.2 (1.9)	25.1 (2.4)	8.4 (1.5)	*3.5 (1.1)	2.0	100.0
North Dakota . . . . .	44.1 (4.8)	17.1 (3.3)	32.6 (4.6)	†	*5.3 (2.4)	0.3	100.0
Ohio . . . . .	41.3 (2.4)	20.8 (2.0)	20.9 (2.1)	10.6 (1.5)	*3.4 (1.0)	3.0	100.0
Cuyahoga County . . . . .	30.2 (4.4)	20.3 (3.6)	28.1 (4.5)	18.7 (3.7)	†	1.5	100.0
Franklin County . . . . .	50.8 (4.5)	21.6 (3.4)	21.0 (3.8)	*3.7 (1.7)	†	1.9	100.0
Rest of Ohio . . . . .	41.5 (2.9)	20.8 (2.4)	19.9 (2.5)	10.4 (1.9)	*4.0 (1.3)	3.3	100.0
Oklahoma . . . . .	39.9 (3.4)	27.5 (3.0)	19.9 (2.8)	5.7 (1.6)	*5.5 (1.7)	1.7	100.0
Oregon . . . . .	40.7 (3.6)	17.5 (2.7)	18.4 (3.0)	13.8 (2.6)	8.0 (2.2)	1.6	100.0
Pennsylvania . . . . .	28.9 (2.2)	20.6 (1.9)	34.0 (2.4)	9.7 (1.5)	4.4 (1.1)	2.4	100.0
Allegheny County . . . . .	40.6 (5.9)	23.9 (4.6)	26.8 (5.4)	*7.3 (3.0)	†	1.4	100.0
Philadelphia County . . . . .	35.7 (4.5)	23.7 (3.7)	26.8 (4.3)	*5.2 (2.1)	†	4.5	100.0
Rest of Pennsylvania . . . . .	26.6 (2.5)	19.7 (2.3)	35.9 (2.9)	10.6 (1.8)	4.9 (1.4)	2.2	100.0
Rhode Island . . . . .	15.2 (3.3)	33.2 (4.1)	34.7 (4.6)	*7.9 (2.5)	*6.6 (2.6)	2.4	100.0
South Carolina . . . . .	43.6 (3.1)	21.9 (2.5)	19.9 (2.6)	8.4 (1.7)	*3.9 (1.3)	2.3	100.0
South Dakota . . . . .	§	§	§	§	§	§	§
Tennessee . . . . .	44.4 (2.9)	22.1 (2.3)	25.5 (2.7)	4.4 (1.3)	†	2.2	100.0
Davidson County . . . . .	51.6 (6.3)	20.6 (4.4)	23.1 (5.3)	†	†	1.3	100.0
Shelby County . . . . .	47.2 (5.7)	20.1 (4.0)	26.0 (5.1)	†	†	1.9	100.0
Rest of Tennessee . . . . .	42.9 (3.6)	22.8 (2.9)	25.7 (3.3)	*5.4 (1.6)	†	2.4	100.0
Texas . . . . .	49.2 (1.6)	21.2 (1.3)	18.8 (1.3)	5.2 (0.8)	3.7 (0.6)	1.8	100.0
Bexar County . . . . .	50.7 (3.8)	19.5 (2.9)	20.6 (3.2)	*4.2 (1.5)	†	2.5	100.0
Dallas County . . . . .	59.0 (3.8)	20.0 (2.9)	12.6 (2.6)	*4.8 (1.7)	†	1.8	100.0
El Paso County . . . . .	§	§	§	§	§	§	§
Harris County . . . . .	44.3 (2.9)	25.5 (2.5)	17.7 (2.3)	6.3 (1.5)	*4.1 (1.3)	2.2	100.0
Rest of Texas . . . . .	48.0 (2.1)	21.5 (1.8)	20.1 (1.8)	5.4 (1.0)	3.4 (0.8)	1.7	100.0
Utah . . . . .	41.3 (3.8)	15.9 (2.8)	30.3 (3.7)	*5.2 (1.7)	*6.0 (2.0)	1.2	100.0
Vermont . . . . .	29.1 (5.3)	13.3 (3.6)	22.7 (4.9)	26.6 (5.2)	*7.3 (3.4)	1.0	100.0
Virginia . . . . .	27.0 (2.5)	25.0 (2.4)	28.7 (2.6)	11.6 (1.8)	5.5 (1.4)	2.2	100.0
Washington . . . . .	35.1 (2.4)	26.7 (2.2)	22.9 (2.1)	7.2 (1.3)	6.7 (1.5)	1.5	100.0
Eastern counties <sup>7</sup> . . . . .	38.4 (3.9)	22.6 (3.2)	25.6 (3.7)	9.6 (2.4)	†	1.3	100.0
King County . . . . .	37.7 (4.4)	22.5 (3.6)	33.4 (4.5)	*4.0 (1.8)	†	0.9	100.0
Rest of Washington . . . . .	32.1 (3.7)	31.0 (3.5)	16.0 (3.0)	7.7 (2.1)	11.4 (2.8)	1.9	100.0
West Virginia . . . . .	31.5 (3.9)	18.2 (3.1)	12.5 (2.9)	24.9 (3.7)	10.6 (2.9)	2.3	100.0
Wisconsin . . . . .	34.9 (3.1)	19.3 (2.5)	29.4 (3.1)	12.3 (2.2)	*2.7 (0.9)	1.4	100.0
Milwaukee County . . . . .	§	§	§	§	§	§	§
Rest of Wisconsin . . . . .	32.4 (3.6)	21.2 (3.0)	30.5 (3.7)	13.4 (2.6)	§	1.5	100.0
Wyoming . . . . .	§	§	§	§	§	§	§

\* Estimate has relative standard error greater than 30% and less than or equal to 50% and is considered unreliable.

† Estimate has relative standard error greater than 50% and is not shown.

§ Model-based estimates for Iowa, Montana, South Dakota, Texas-El Paso County, Wisconsin-Milwaukee County, and Wyoming are not reported. For at least one telephone service use category, direct estimates from the National Health Interview Survey were more than double or less than one-half the synthetic estimate. These differences between two components of the model-based estimates suggest that the direct estimates for these areas may be biased. Biased estimates violate a key model-based estimation assumption.

<sup>1</sup>The proportion of children living in households with no telephone service was not modeled. Other proportions were adjusted so that this estimate agreed with the 2010 American Community Survey estimate for this proportion.

<sup>2</sup>Includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity.

<sup>3</sup>Includes Adams, Arapahoe, Denver, and Douglas. Previously published estimates for City of Denver counties (2) did not include Adams, Arapahoe, or Douglas.

<sup>4</sup>Includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.

<sup>5</sup>Includes Catron, Chaves, Curry, De Baca, Dona Ana, Eddy, Grant, Hidalgo, Lea, Lincoln, Luna, Otero, Roosevelt, Sierra, and Socorro.

<sup>6</sup>Includes Bronx, Kings, New York, Queens, and Richmond.

<sup>7</sup>Includes Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima. Previously published estimates for Eastern Washington counties (2) did not include Spokane or Yakima.

NOTE: Estimates were calculated by NORC at the University of Chicago.

SOURCES: CDC/NCHS, National Health Interview Survey, 2007–2011; U.S. Census Bureau, American Community Survey, 2006–2010; and infoUSA.com, Inc. consumer database, 2007–2011.

## Technical Notes

### Survey data sources

The estimates presented in this report are based on National Health Interview Survey (NHIS) data collected from January 2007 through December 2011 and on American Community Survey (ACS) data collected from 2006 through 2010. NHIS is a multipurpose health survey conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS). ACS is a multipurpose survey conducted by the U.S. Census Bureau to produce estimates of demographic, social, economic, and housing characteristics.

NHIS is a multistage probability household survey of a large sample of households drawn from the civilian noninstitutionalized household population of the United States. This face-to-face survey interview is administered by trained field representatives from the U.S. Census Bureau, under contract to NCHS. NHIS interviews are conducted continuously throughout the year to collect information that is used to assess progress toward meeting national health objectives. The content includes health status, health risk factors, health-related behaviors, health care access, and health care utilization. NHIS also includes questions about demographic and socioeconomic characteristics, household telephones, and whether anyone in the household has a wireless telephone.

The sample for NHIS is stratified by state, which allows use of NHIS data in statistical models that produce state-level estimates; however, for most states, the limited number of sampling strata and small sample sizes preclude reliable direct state-level estimates. Household telephone status information was obtained for 75,150 persons in 2007, for 73,749 persons in 2008, for 88,053 persons in 2009, for 89,620 persons in 2010, and for 101,449 persons in 2011. Fewer than 0.5% of persons with completed NHIS family-level interviews had missing data for household telephone status.

NHIS was used to derive the direct estimates for each telephone service use category by age group (adults aged 18 and over or children under age 18), small area, and 6-month period. These estimates were the dependent variables in the statistical models. Also, NHIS was the source for the national estimates used for raking the model-based estimates for each telephone service use category by age group and year.

ACS is a multistage probability survey that provides data on households and group quarters. Here a subset of the full ACS sample—the civilian noninstitutionalized population—was used to represent a population similar to that sampled for NHIS. Data were collected continuously through a combination of mailed, telephone, and face-to-face interviews. ACS is both nationally and state representative and has included approximately 2 million housing units per year since 2006.

ACS data are released for calendar years rather than for 6-month periods. Moreover, 2011 ACS data were not released until September 20, 2012. Therefore, ACS data for 2006 were used in models for both 6-month periods of 2007 (i.e., January–June 2007 and July–December 2007). Similarly, ACS data for 2007 were used in models for both 6-month periods of 2008; data for 2008 were used in models for both 6-month periods of 2009; data for 2009 were used in models for both 6-month periods of 2010; and data for 2010 were used in models for both 6-month periods of 2011. Moreover, the 2008, 2009, and 2010 ACS were the sources for the proportion of adults or children living in households with any telephone service (landline or wireless). These ACS estimates were used as benchmarking totals when raking the model-based estimates.

NHIS and ACS sampling weights adjust for the probability of selection of each household, and they are adjusted for nonresponse. The results in this report are based on weighted estimates. *R* software (<http://www.r-project.org>) was used to derive the model-based estimates and standard errors. Design effects were included in the models to account for the complex survey designs.

### Auxiliary data sources

The numbers of listed telephone lines within each state for 2007–2011 were obtained from a consumer database compiled by infoUSA.com, Inc. This database is updated bimonthly with information from 37 sources, including postal delivery sequence files, National Change of Address lists, utility company records, and more than 4,000 white page directories. These data were available for each calendar year rather than each 6-month period. Therefore, annual data on listed telephone lines were used in models for both 6-month periods of that calendar year. The count of listed telephone lines was divided by the number of civilian noninstitutionalized persons, and because these proportions were available at the state level only, the same state-specific proportion was used in the model for each small area in the state.

### Definitions

For each family contacted by NHIS, one adult family member is asked whether “you or anyone in your family has a working cellular telephone.” An NHIS family can be an individual or a group of two or more related persons living together in the same housing unit (a “household”). Thus, a family can consist of only one person, and more than one family can live in a household (including, for example, a household where there are multiple single-person families, as when unrelated roommates are living together).

To produce the statistics for this report, families are identified as “wireless families” if anyone in the family had a working cellular telephone at the time of interview. This person (or persons) could be a civilian adult, a member of the military, or a child. Households are identified as “wireless-only” if they include at least one wireless family and if there are no working landline telephones inside the household. To determine whether there was a working landline telephone inside the household, survey respondents were asked if there was “at least one phone



inside your home that is currently working and is not a cell phone.”

Household telephone status (rather than family telephone status) is used because most telephone surveys draw samples of households rather than families. Adults and children are identified as wireless-only if they live in a wireless-only household. Individual ownership or use of wireless telephones is not determined. A similar approach is used to identify adults and children living in landline-only households and in households with both landline and wireless telephones.

NHIS includes an additional question for persons living in families with both landline and wireless telephones. The respondent for the family is asked to consider all of the telephone calls his or her family receives and to report whether “all or almost all calls are received on cell phones, some are received on cell phones and some on regular phones, or very few or none are received on cell phones.” This question permits the identification of persons living in “wireless-mostly” households (defined as households with both landline and cellular telephones in which all families receive all or almost all calls on cell phones) and “landline-mostly” households (defined as households with both landline and cellular telephones in which all families receive all or almost all calls on landline telephones). “Dual-use” households are those with both landline and cellular telephones that are neither wireless-mostly or landline-mostly. That is, they receive some calls on cell phones and some on landline telephones.

## Small-area model

Detailed descriptions of the small-area model and the derivation of the model-based estimates and standard errors are provided in an earlier report (2). As noted above, the model-based estimates were a weighted combination of three distinct sets of estimates: (a) the direct estimate from NHIS for the small area during the 6-month period of interest, (b) a synthetic estimate derived from a regression model involving ACS

and auxiliary data for the small area during the 6-month period of interest, and (c) adjusted direct estimates from NHIS for the small area during all 6-month periods other than the 6-month period of interest.

The approach used to create the model-based estimates can produce substantially biased prevalence estimates and unstable variance estimates when the direct estimate from NHIS is based on small sample sizes, when that sample is drawn from only a few geographic areas, and when those few geographic areas are not very representative of the state or county of interest. To identify potentially problematic model-based estimates, the person-level prevalence ratio of the direct survey estimate to the synthetic regression-based estimate was examined for each of the telephone service use categories and for each small area. Ratios were computed across all 6-month periods and for 2011 only. If the ratios for any telephone service use category were greater than two or less than one-half, then all model-based estimates for that reporting area were suppressed from [Tables 1–3](#) in this report. This occurred for six small areas: Iowa, Montana, South Dakota, Texas-El Paso County, Wisconsin-Milwaukee County, and Wyoming. For these areas, the synthetic estimates derived from the regression model are presented in the Technical Notes [Table](#).

**Table. Synthetic regression-based estimates (with standard errors) of the percent distribution of household telephone status, by age, for selected geographic areas where model-based estimates are not reported: United States, 2011**

Age and geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service <sup>1</sup>	Total
Adults aged 18 and over							
	Percent (standard error)						
Iowa . . . . .	31.9 (5.9)	15.8 (3.8)	24.4 (5.4)	14.9 (3.8)	*11.0 (5.2)	1.9	100.0
Montana . . . . .	32.6 (6.2)	18.0 (4.1)	21.7 (5.4)	15.8 (4.1)	†	2.0	100.0
South Dakota . . . . .	33.0 (6.1)	16.8 (3.9)	24.4 (5.5)	15.3 (4.0)	†	1.6	100.0
Texas-El Paso County . . . . .	41.2 (6.7)	16.0 (4.3)	25.6 (5.9)	†	†	2.4	100.0
Wisconsin-Milwaukee County . . . . .	34.2 (6.2)	17.3 (4.1)	25.2 (5.6)	*11.4 (3.5)	*10.6 (5.2)	1.3	100.0
Wyoming . . . . .	33.8 (6.3)	18.2 (4.1)	21.2 (5.4)	12.9 (3.8)	*12.4 (5.6)	1.5	100.0
Children under age 18							
Iowa . . . . .	38.1 (8.1)	20.3 (5.4)	27.3 (7.2)	†	†	1.8	100.0
Montana . . . . .	39.8 (8.6)	23.8 (5.9)	*21.6 (6.8)	†	†	2.4	100.0
South Dakota . . . . .	39.7 (8.6)	21.5 (5.6)	25.2 (7.2)	†	†	1.2	100.0
Texas-El Paso County . . . . .	54.5 (8.6)	*17.0 (5.4)	*20.1 (6.6)	†	†	2.2	100.0
Wisconsin-Milwaukee County . . . . .	40.5 (8.9)	21.2 (5.9)	27.2 (7.7)	†	†	1.0	100.0
Wyoming . . . . .	40.8 (9.0)	22.2 (5.9)	*21.1 (7.1)	†	†	1.8	100.0

\* Estimate has relative standard error greater than 30% and less than or equal to 50% and is considered unreliable.

† Estimate has relative standard error greater than 50% and is not shown.

<sup>1</sup>The proportion of persons living in households with no telephone service was not modeled. Other proportions were adjusted so that this estimate agreed with the 2010 American Community Survey estimate for this proportion.

NOTES: Model-based estimates for these six areas are not reported in the text tables because the direct National Health Interview Survey estimates (a component of the model-based estimates) may be biased. This table presents synthetic estimates (another component of the model-based estimates) for these areas. These synthetic estimates are the best available estimates for these areas, but they should be used with caution as they are generally less reliable than the model-based estimates reported for other geographic areas. Estimates were calculated by NORC at the University of Chicago.

SOURCES: U.S. Census Bureau, American Community Survey, 2006–2010 and infoUSA.com, Inc. consumer database, 2007–2011.

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**National Center for Health Statistics**

Edward J. Sondik, Ph.D., *Director*  
Jennifer H. Madans, Ph.D., *Associate Director  
for Science*

**Division of Health Interview Statistics**

Jane F. Gentleman, Ph.D., *Director*

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