BZA15-114
5247 Gender Road

THE CITY OF
COLUMBUS
MICHAEL B. COLEMAN, MAYOR

DEPARTMENT OF BUILDING AND ZONING SERVICES

Board of Zoning Adjustment Application

757 Carolyn Avenue, Columbus, Ohio 43224
Phone: 614-645-7433 ▪ www.bzs.columbus.gov

OFFICE USE ONLY

Application Number: BZA15-114 Date Received: 14 Oct. 2015
Application Accepted by: JF Fee: $1900
Commission/Civic: Greater Southeast Area Commission
Existing Zoning: C-4
Comments: 12/15/15

TYPE(S) OF ACTION REQUESTED (Check all that apply):

☒ Variance ☐ Special Permit

Indicate what the proposal is and list applicable code sections:
Setback variances as allowed under Section 3389 of the City of Columbus Zoning Code to permit a 150' monopole, with a 10' lightning arrestor for a total of 160' located in a C-4 zoning district at 5247 Gender Road. The Variance requested is for the 2:1 set back from a residential district. A variance of 238.7' will be required along the North property boundary.

LOCATION

Certified Address: 5247 Gender Road City: Columbus Zip: 43110

Parcel Number (only one required): 490-18114400

APPLICANT (If different from Owner):

Applicant Name: New Par d/b/a Verizon Wireless, attn: Dan Noble Phone Number: 614-570-8544 Ext.:

Address: 7575 Commerce Court City/State: Lewis Center / OH Zip: 43035

Email Address: Dan.Noble@VerizonWireless.com Fax Number: N/A

PROPERTY OWNER(S) ☐ *Check here if listing additional property owners on a separate page*

Name: J. Johnson Investments, LLC c/o Jim Johnson Phone Number: 614-989-3010 Ext.:

Address: P.O. Box 145 City/State: Carroll / OH Zip: 43112

Email Address: james@jjohnsoninv.com Fax Number: 614-863-7983

ATTORNEY / AGENT (Check one if applicable): ☒ Attorney ☐ Agent

Name: Christopher Slagle, Bricker & Eckler - Attorney Phone Number: 614-227-8826 Ext.:
Spenser Stafford, NTP Wireless - Agent 614.410.6628

Address: 100 South Third Street City/State: Columbus / OH Zip: 43215
470 Olde Worthington Rd. Ste 200 Westerville / OH 43082

Email Address: cslagle@bricker.com Fax Number: N/A
spenser.stafford@ntpwireless.com 773.275.5713

SIGNATURES (All signatures must be provided and signed in **blue** ink)

APPLICANT SIGNATURE DAN A. NOBLE

PROPERTY OWNER SIGNATURE

ATTORNEY / AGENT SIGNATURE Spenser Stafford

PLEASE NOTE: Incomplete information will result in the rejection of this submittal.
Applications must be submitted by appointment. Call 614-645-4522 to schedule.
Please make checks payable to the Columbus City Treasurer

tmt 12/14

NTPWIRELESS
EVERY SITE, EVERY DAY

J John Investments LL
ATTN: James Johnson, Sr.
P.O. Box 145
Carroll, OH 43112

June 10, 2015

City of Columbus- Building and Zoning Dept.
Ashley Newnam
757 Carolyn Ave.
Columbus, OH 43224

RE: Owner Authorization: 5241 Gender Rd, Canal Winchester, Ohio 43232

Dear Ms. Newnam & City of Columbus Board of Zoning Adjustment

Owner of the above reference property, James Johnson, Sr. authorize Verizon Wireless, and its agent NTP Wireless, to file and obtain all necessary zoning and building permits required by the City of Columbus for Verizon Wireless's construction of its telecommunications tower and installation of its associated equipment shelter at the above referenced address.

Sincerely,

James J. Johnson- Manager of J. John Investments LLC

6/22/2015
Date

Janet C. Johnson

6/22/2015
Date

BZA15-114
5247 Gender Road

THE CITY OF
COLUMBUS
MICHAEL B. COLEMAN, MAYOR

DEPARTMENT OF BUILDING AND ZONING SERVICES

Board of Zoning Adjustment Application

757 Carolyn Avenue, Columbus, Ohio 43224
Phone: 614-645-7433 ▪ www.bzs.columbus.gov

AFFIDAVIT

STATE OF OHIO
COUNTY OF FRANKLIN

Being first duly cautioned and sworn **(1)** NAME Tony W. Meacham
of **(1)** MAILING ADDRESS 4169 Marathon Court, Gahanna, OH 43230
deposes and states that (he/she) is the applicant, agent, or duly authorized attorney for same and the following is a list of the name(s) and mailing address(es) of all the owners of record of the property located at
(2) per ADDRESS CARD FOR PROPERTY 5247 Gender Road, Canal Winchester, OH 43110
for which application for a rezoning, variance, special permit or graphics plan was filed with the Department of Building and Zoning Services, on **(3)** _____
(THIS LINE TO BE FILLED OUT BY CITY STAFF)

SUBJECT PROPERTY OWNERS NAME AND MAILING ADDRESS **(4)** J. Johnson Investments, LLC
P.O. Box 145, Carroll, OH 43112

APPLICANT'S NAME AND PHONE # (same as listed on front application) New Par d/b/a Verizon Wireless, attn: Dan Noble
614-570-8544

AREA COMMISSION OR CIVIC GROUP AREA COMMISSION ZONING CHAIR OR CONTACT PERSON AND ADDRESS **(5)** Greater South East Area Commission
Ava Johnson, (614) 805-6213
2500 Park Crescent Drive, Columbus, Ohio 43232

and that the following is a list of the **names** and **complete mailing addresses**, including **zip codes,** as shown on the **County Auditor's Current Tax List or the County Treasurer's Mailing List**, of all the **owners of record of property within 125 feet** of the exterior boundaries of the property for which the application was filed, **and** all of the owners of any property within 125 feet of the applicant's or owner's property in the event the applicant or the property owner owns the property contiguous to the subject property:

(6) PROPERTY OWNER NAME	**(6a)** PROPERTY ADDRESS	**(6b)** PROPERTY OWNER MAILING ADDRESS
See attached		

☒ **(7)** Check here if listing additional property owners on a separate page.

(8) SIGNATURE OF AFFIANT Tony W. Meacham

Sworn to before me and signed in my presence this 11 day of May, in the year 2015

Christopher Brem
(8) SIGNATURE OF NOTARY PUBLIC

5/23/2016
My Commission Expires

Notary Seal

NOTARY SEAL STATE OF OHIO

PLEASE NOTE: Incomplete information will result in the rejection of this submittal.
Applications must be submitted by appointment. Call 614-645-4522 to schedule.
Please make checks payable to the Columbus City Treasurer

tmt 12/14

GEORGES CREEK LP
6300 GENDER RD
CANAL WINCHESTER, OH 43110

COLUMBUS METROPOLITAN HOUSING AUTHORITY
4855 PINTAIL CREEK DR
CANAL WINCHESTER, OH 43110

STORAGE ONE LLC
PO BOX 145
CARROLL OH 43112

CITY OF COLUMBUS OHIO
90 W BROAD ST RM 425
COLUMBUS, OH 43215

SEPP LTD
6063 BRICE PARK DR
CANAL WINCHESTER, OH 43110

WILLIS BENJAMIN C WILLIS SHAWNA R
6055 BRICE PARK DR
CANAL WINCHESTER, OH 43110

CHANNAKHON MINDY
6075 BRICE PARK DR
CANAL WINCHESTER, OH 43110

DIALLO AMADOU
6059 BRICE PARK DR
CANAL WINCHESTER, OH 43110

FITTEN WILLIAM R
6079 BRICE PARK DR
CANAL WINCHESTER, OH 43110

KAPP JESSE D
6071 BRICE PARK DR
CANAL WINCHESTER, OH 43110

JOHNSON ANGEL A & RICHARD L
6083 BRICE PARK DR
CANAL WINCHESTER, OH 43110

PEREZ JOSE F PEREZ JENNIFER L
6067 BRICE PARK DR
CANAL WINCHESTER, OH 43110

Ava Johnson
2500 Park Crescent Dr.
Columbus, OH 43232

CITY OF COLUMBUS

DEPARTMENT OF BUILDING AND ZONING SERVICES

One Stop Shop Zoning Report Date: Wed Oct 21 2015

General Zoning Inquiries: 614-645-8637

SITE INFORMATION

Address: 5273 GENDER RD COLUMBUS, OH
Mailing Address: PO BOX 145
CARROLL OH 43112-0145

Owner: JOHNSON J INVESTMENTS LLC
Parcel Number: 490181144

ZONING INFORMATION

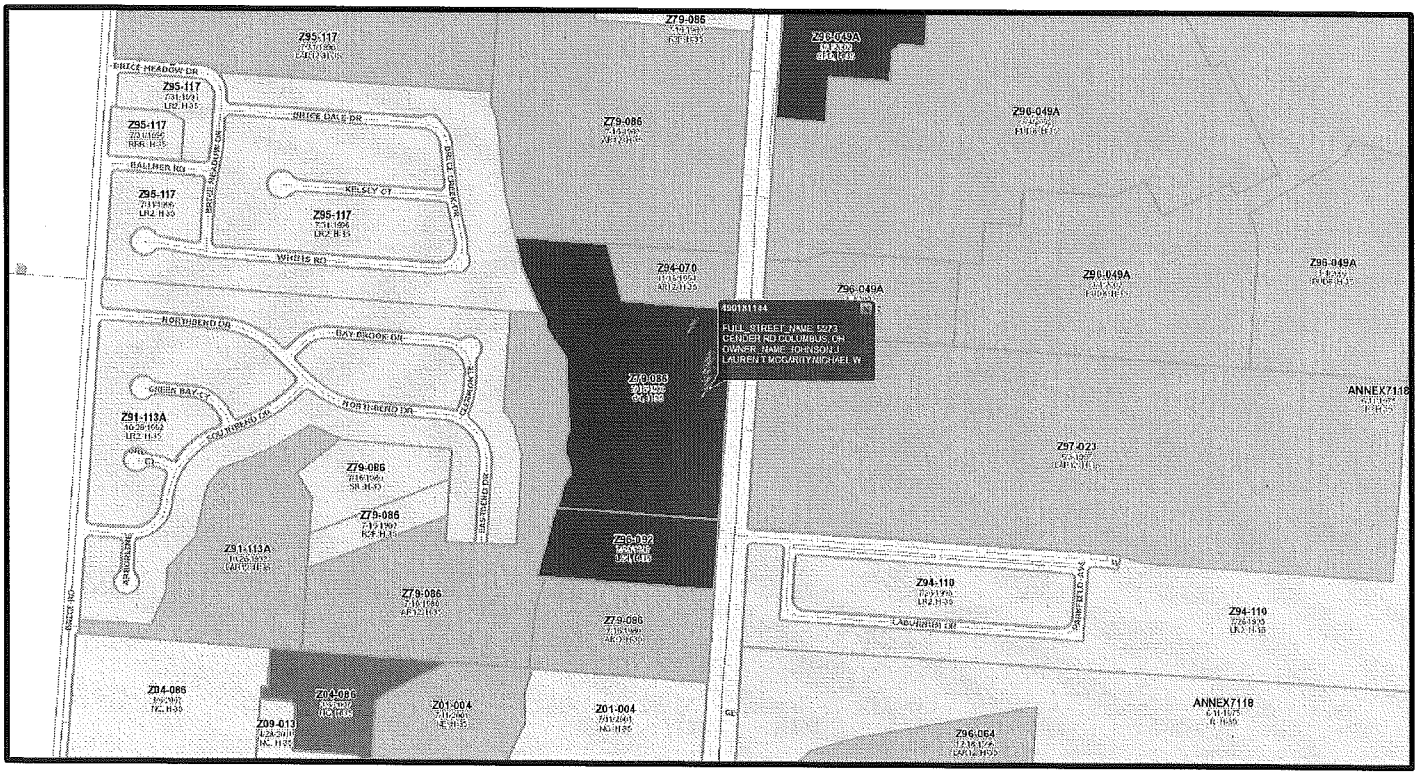
Zoning: Z79-086, Commercial, C4
effective 7/16/1980, Height District H-35
Board of Zoning Adjustment (BZA): N/A
Commercial Overlay: N/A
Graphic Commission: N/A
Area Commission: Greater South East Area Commission
Planning Overlay: N/A

Historic District: N/A
Historic Site: No
Council Variance: N/A
Flood Zone: OUT
Airport Overlay Environs: N/A

PENDING ZONING ACTION

Zoning: N/A
Board of Zoning Adjustment (BZA): N/A

Council Variance: N/A
Graphic Commission: N/A



Statement of Hardship Residential Set Back 2:1 or 320 feet.

The candidate parcel presented for the city's review and consideration substantially meets all requirements for a development permit. The fly in the ointment is that the city's zoning regulations require that a tower be set back from residential districts a distance of twice the tower's height. Close scrutiny of the land use classifications in this part of the city confirm there are no parcels in the search area that have sufficient land space available to comply with the residential district setback requirement as written, that would also allow construction of a tower of a height that would be technically feasible.

Without a measure of relief, the city's ordinance will work a hardship as to applicant, by functionally prohibiting the provision of wireless service in this area.

The facts underscoring this hardship are:

- The land surrounding this site along Gender Road is zoned "Residential" and "Multi-Family" almost exclusively. The zoning ordinance prohibits wireless communications facilities in "R" districts.
- The only parcels in the service area where zoning regulations permit wireless facilities to be built are literally the three commercial parcels west of the intersection of Gender Road and Gender Court.
- Literal application of the *Twice Tower Height* residential district setback, in conjunction with the constraints presented by the limited available land space within this parcel, would operate to prohibit a technically feasible tower structure from being built, and would result in a *de facto* prohibition of service in this area.
- A tower less than 150 feet high in this area would not be technically feasible.
  - It would be too short to hand off calls to other sites in the network;
  - It would be too short to ensure wireless coverage in the service area;
  - It would be too short to eliminate the growing coverage and capacity gaps; and,
  - It would be too short to eliminate call blocking.

Verizon Wireless avers that literal application of *Twice Tower Height* residential district setback requirement would work a hardship by preventing the company from providing service in this area, and further avers that a minimum tower height of 150 feet, (exclusive of lightning rod), is needed to be able to effectively connect with and hand off calls to other network sites.

For these reasons, literal application of the *Twice Tower Height* residential district setback requirement in this case would work a hardship on the applicant. It would in effect operate to prohibit the applicant from providing wireless service in this area. It would guarantee that the existing service and capacity gaps will grow more extensive, increase in size over time, and increasing both the number and frequency of blocked calls. Ultimately, residents and motorists would be prevented from wirelessly connecting to the national telephone system from within these expanding service and capacity gaps.

Applicant's Request for Relief from the Residential Setback Requirement

The setback requirements applicable to the C-4 Commercial zoning district requires wireless communications facilities to be separated from residential districts a distance equal to twice the height of the tower.

The minimum feasible tower height proposed in this application is 150 feet with a 10 foot lightning arrestor for a total of 160 feet. The distance from the monopole tower to the nearest occupied residential district north of this site is 81 feet. This necessitated one setback variance for 239 feet from the property to the north.

Verizon Wireless is seeking discretionary relief from literal application of the residential district setback requirement. We ask that the Board of Zoning Adjustment modify the residential setback requirement to permit a 150 foot tower at the requested location (exclusive of lightning rod). The applicant avers that granting the requested relief would be a reasonable accommodation and balancing of the residential district setback guidelines against the public necessity for maintaining reliable connections with the national telephone network.

Summary of Variances for Verizon Wireless at 5247 Gender Road

Variances Per Section 3389.14:

Setback Variance. The City of Columbus Code requires a 2':1' ratio of height to horizontal separation from the base of the tower structure to any/all residential districts. The monopole tower is 160 feet in overall height including the 10 foot lightning arrestor. Per City Code, the monopole structure should have a horizontal buffer zone to residential districts of 320 feet in all directions (160' x 2' = 320'). The location of the monopole tower meets the required setback to residential districts with the exception of the north side.

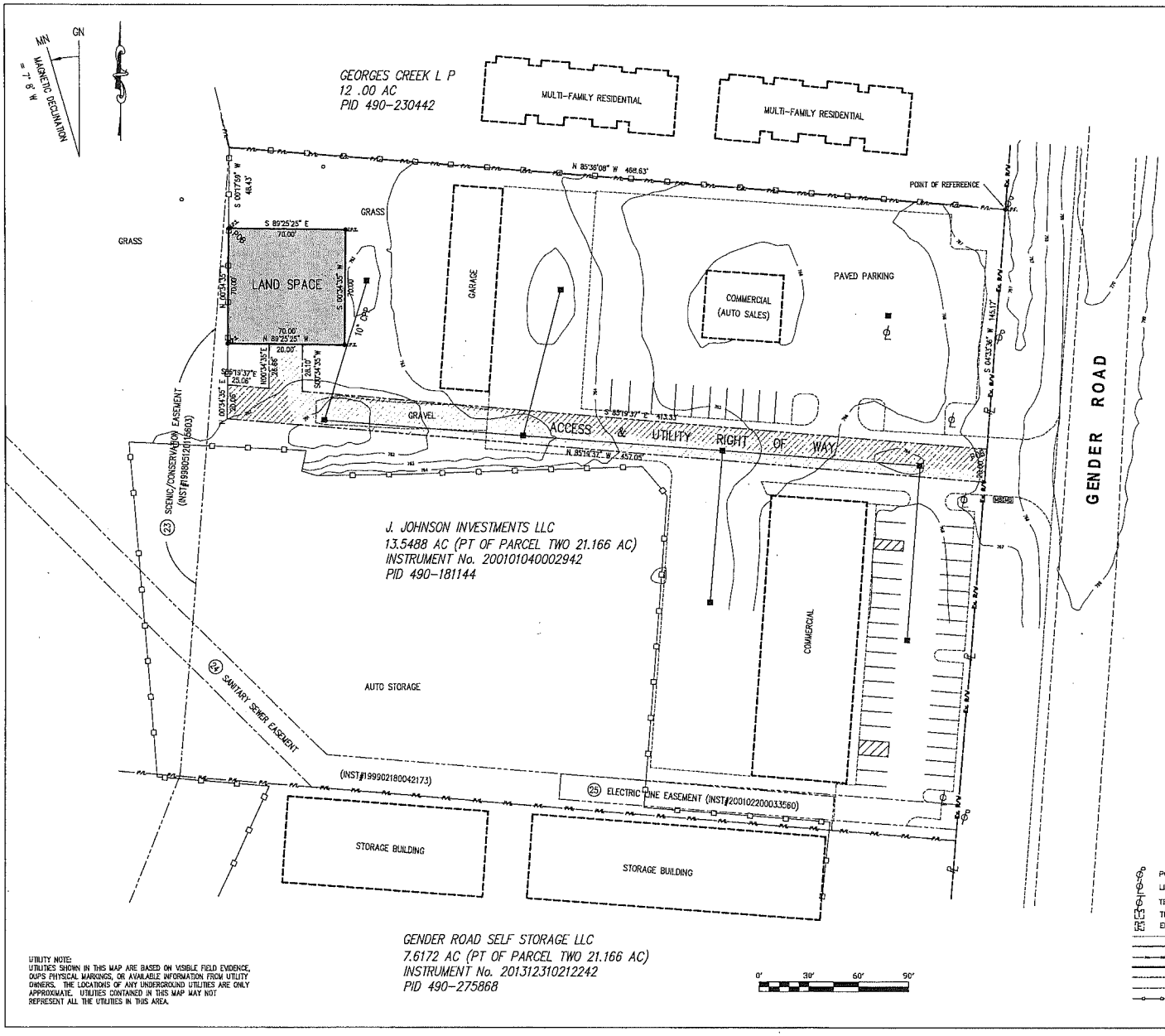
North Setback. The distance from the monopole tower to the nearest occupied residential district north of this site is 81.3 feet. This necessitates a setback variance for 238.7 feet from the property boundary to the north.

Variances Per Section 3309.142:

Height Variance. The City of Columbus Code imposes height districts, and section §3309.142 provides exceptions to those height districts. The applicant's interpretation of §3363.175 is this section provides "Monopole telecommunications antennas shall be exempt from C.C. 3312 and C.C. 3309.14 up to a maximum height of...200 feet if built for three or more providers".

If the Board of Zoning Adjustment applies a different interpretation to this code section, the applicant respectfully requests relief from the height regulation of 35 feet. The monopole tower is 150 feet tall, with an additional 10' lightning attester. The overall structure height is 160'. This necessitates a height variances for 125'.

BZA15-114
5247 Gender Road



UTILITY NOTE:
UTILITIES SHOWN IN THIS MAP ARE BASED ON VISIBLE FIELD EVIDENCE, OUPS PHYSICAL MARKINGS, OR AVAILABLE INFORMATION FROM UTILITY OWNERS. THE LOCATIONS OF ANY UNDERGROUND UTILITIES ARE ONLY APPROXIMATE. UTILITIES CONTAINED IN THIS MAP MAY NOT REPRESENT ALL THE UTILITIES IN THIS AREA.

THE LAND SPACE, AS SHOWN IN THE COORDINATES BELOW, HAVE A HORIZONTAL ACCURACY WITHIN +/- 50 FEET AND A VERTICAL ACCURACY WITHIN +/- 20 FEET.

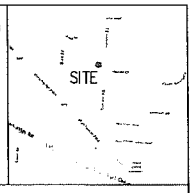
LATITUDE: 39° 52' 35.37" N
LONGITUDE: 82° 49' 40.70" W

GROUND ELEVATION: 762 FT
(NAVD 88)

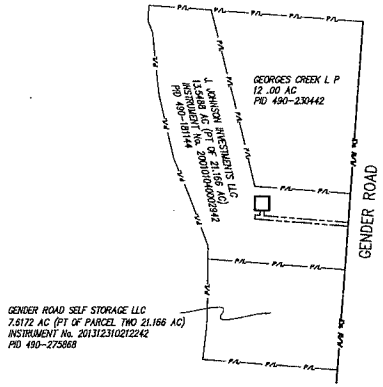
TOWER COORDINATES

From Lewis Center, Ohio, take US-23 S/Columbus Pike and go 4.8 miles. Merge onto I-270 E and go 16.5 miles. Take exit 43B to merge onto I-70 E toward Wheeling and go 1.3 miles. Take exit 110A for Brice Rd-S and merge onto Brice Rd. Continue onto Gender Rd and go 3.4 miles. Arrive site on the right (west) side of road.

DIRECTIONS



LOCATION MAP
(NOT TO SCALE)



OVERALL PROPERTY MAP
(NOT TO SCALE)

LEGEND

POWER POLE	CIP.F.	IRON PIN FOUND
LIGHT POLE	⊙I.P.S.	IRON PIN SET
TELEPHONE POLE	⊙P.K.S.	PK NAIL SET
TELEPHONE BOX	⊙M.N.S.	MAG NAIL SET
ELECTRIC BOX	MONU	– MONUMENT
	IP	– IRON PIN
	POB	– POINT OF BEGINNING
		CENTERLINE
		RIGHT OF WAY LINE
		PROPERTY LINE
		LAND SPACE
		PROPOSED RIGHTS OF WAY
		EXISTING EASEMENT
		FENCE

NO.	DATE	DESCRIPTION
2	7/16/14	PRELIM SURVEY WITH TITLE
1	5/10/14	PRELIM SURVEY

REVISIONS

GENDER-WINCHESTER (CLMB-340)
J. JOHNSON INVESTMENTS LLC

STATE OF OHIO, COUNTY OF FRANKLIN, CITY OF COLUMBUS
GENDER ROAD, CANAL WINCHESTER, OH 43110

PREPARED FOR
NEW PAR dba VERIZON WIRELESS

PS SURVEYING & MAPPING GROUP, LLC
1455 PORTLAND PLACE, COLUMBUS, OH 43235
(614) 531-1122 info@PSsurvey.com

SITE SURVEY

PS PROJECT No.	DRAWN BY	DATE
14-101-27	ALC	5/10/2014

SHEET 1 OF 2

PRELIMINARY SURVEY

BZA15-114
5247 Gender Road

City of Columbus
Address Plat

N

CERTIFIED HOUSE NUMBERS

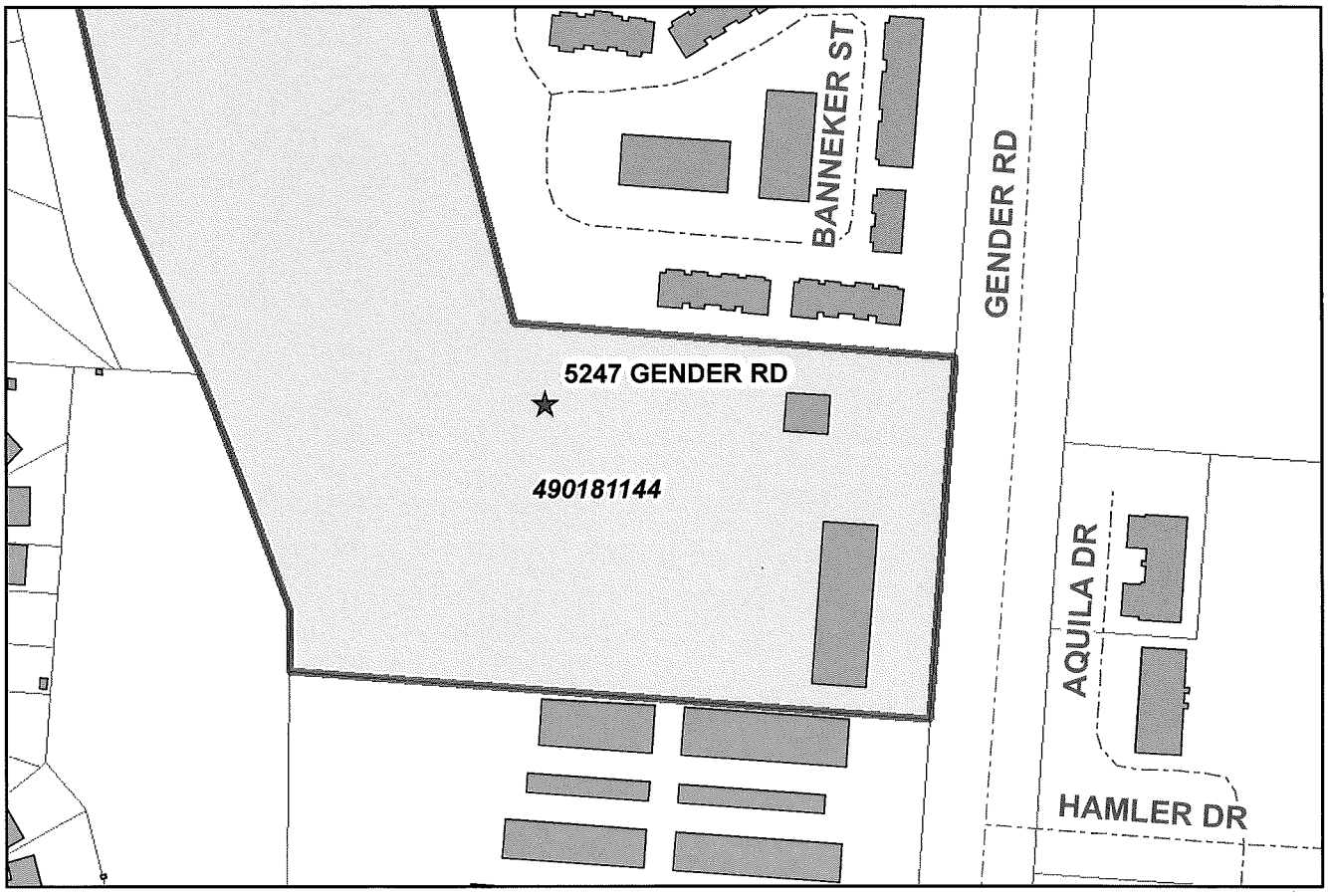
The House Numbers Contained on This Form are Herein Certified for Securing of Building & Utility Permits

Parcel ID: 490-181144
Project Name: VZW CELL TOWER
House Number: 5247
Street Name: GENDER RD
Lot Number: N/A
Subdivision: N/A
Work Done: NEW
Complex: N/A

Owner: VERIZON WIRELESS

Requested By: TERRA ENGINEERING

Printed By: Alfred Carmon **Date:** 11/19/2014



JAMES D. YOUNG, P.E., ADMINISTRATOR
DIVISION OF INFRASTRUCTURE MANAGEMENT
COLUMBUS, OHIO

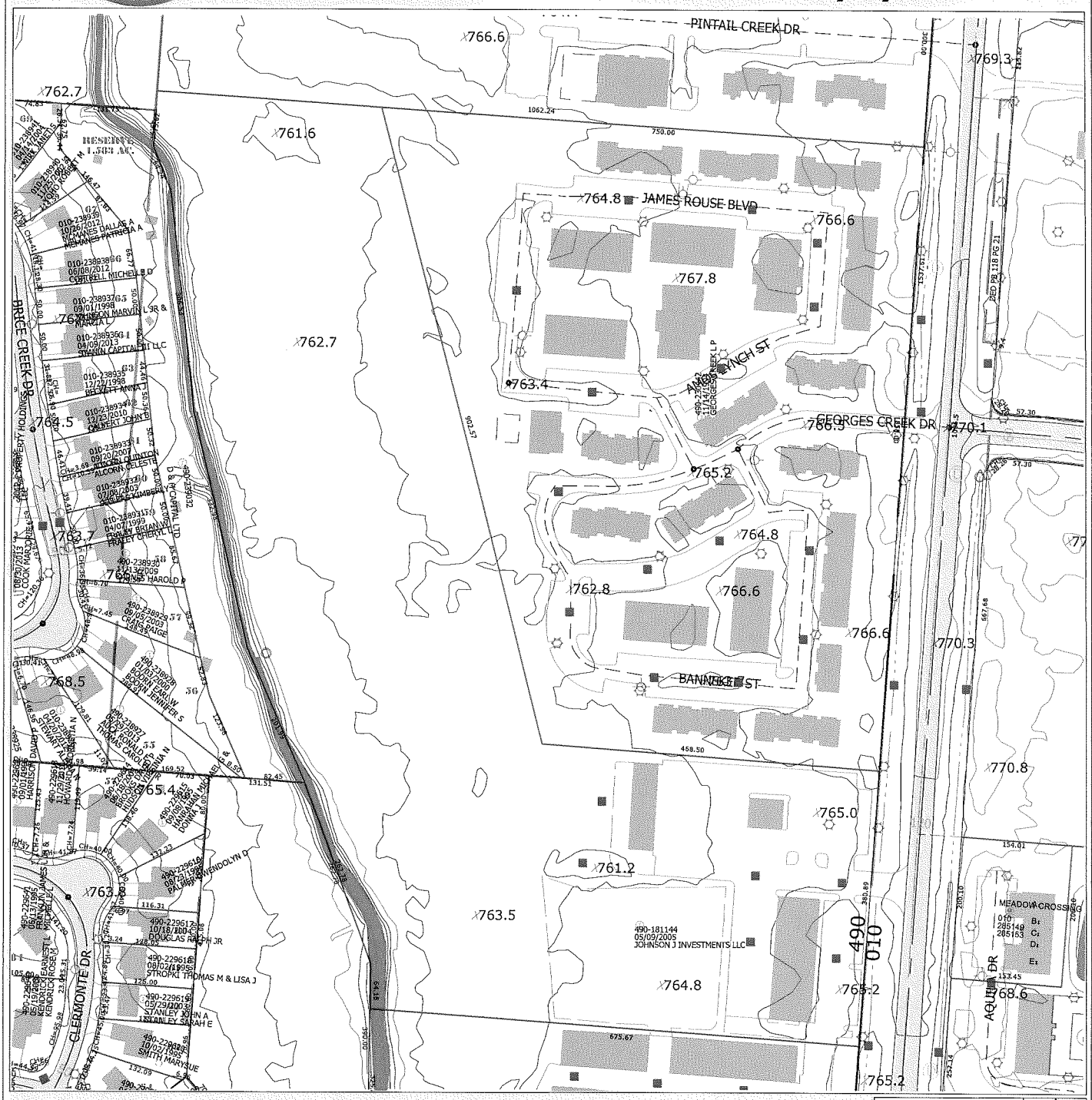
SCALE: 1 inch = 200 feet
GIS FILE NUMBER: 1627694

Printed: 11/19/2014 1:59:52 PM

BZA15-114
5247 Gender Road

CLARENCE E MINGO II
FRANKLIN COUNTY AUDITOR

MAP ID: S **DATE: 6/2/15**



Scale = 200

Grid North

Disclaimer

This map is prepared for the real property inventory within this county. It is compiled from recorded deeds, survey plats, and other public records and data. Users of this map are notified that the public primary information sources should be consulted for verification of the information contained on this map. The county and the mapping companies assume no legal responsibilities for the information contained on this map. Please notify the Franklin County GIS Division of any discrepancies.

Real Estate / GIS Department

verizonwireless

TO: City of Columbus Planning Office

Attn: Shannon Pine

RE: Proposed Wireless Telecommunications Facility at:

Gender Road Storage

5241 Gender Road, Canal Winchester, OH 43110

Executive Summary

Within the eastern municipal boundaries of the City of Columbus, Verizon Wireless is experiencing a condition known as "call blocking". During peak wireless telephone use periods, this condition prevents a growing percentage of calls placed from and sent to this area of Columbus, Ohio from connecting to the national telephone system. The trend in our data shows the number of blocked calls is growing.

These blocked calls are evidence of a service capacity gap in the applicant's existing wireless network.

Because of significant increases in customer demand for services, the Verizon Wireless Company's existing coverage and call carrying capacity in this area of Columbus has been exceeded, and its existing sites are no longer able to provide uninterrupted service within this area. In order to close this service capacity gap, Verizon Wireless first identified existing possible cell sites. Upon determining these sites would not close the service capacity gap, Verizon identified the optimum location for a new telecommunications facility.

Verizon Wireless is seeking approval to develop a new wireless communications facility to close this service capacity gap on a parcel of land in the area where a wireless communication facility has sufficient land space to host the proposed facility and where the site is technically feasible.

The host parcel is zoned C4 Commercial, and is currently developed with the Gender Road Storage Facility. A monopole tower of 150 feet with a 10 foot lightning arrestor is proposed on this site. This is the minimum height necessary to connect to and hand off calls to adjacent antenna sites.

The proposed facility will allow the applicant to close the service and capacity gaps in this southeastern portion of its wireless network in Columbus and will operate to restore reliable connections to the national telephone network in this part of the city.

In conjunction with this application, Verizon Wireless has applied for a setback variance, requesting relief from the 2:1 foot setback requirement from a residential district to allow for the proposed height of the communications tower. The relief requested is for 239 feet from the residential property to the north.

Verizon Wireless presents evidence in its application and exhibits that show that this proposed 160 foot wireless communications facility can be established at the site without compromising public safety and that these practical adjustments are a necessary accommodation under the provisions of the *Federal Telecommunications Act of 1996* (47 USC §332).

The proposed facility will allow the applicant to close the service and capacity gaps in this portion of its wireless network and will operate to restore reliable connections to the national telephone network in this part of Columbus, Ohio.

Sincerely,

Dan Noble
Verizon Wireless / Real Estate Project Manager
614-570-8544

dan.noble@verizonwireless.com

March 23, 2015

Development and Zoning Manager

Re: Radio Frequency Need Report for New Communications Facility
Applicant: New Par, d/b/a Verizon Wireless
Wireless Telecommunications Facility Application
Verizon Wireless Site Name: Gender Winchester

To City of Columbus Board of Adjustment:

Verizon Wireless appreciates this opportunity to elaborate on the need for a wireless communications facility in City of Columbus and explain why the proposed site was chosen to remedy a significant service capacity gap in this area. The Verizon Wireless name given to this project is Gender Winchester.

Verizon Wireless was issued a Certificate of Public Convenience and Necessity from the Public Utilities Commission of Ohio on December 31, 1996. As a public utility, Verizon Wireless provides an essential service to individuals and businesses within City of Columbus, subject to the jurisdiction of the Federal Communications Commission (FCC). Verizon Wireless is licensed by the FCC to build and operate a wireless communications network in City of Columbus. Our licenses include, among others, the 700 MHz band, and the 2100 MHz or AWS band. The different performance characteristics of these two frequency bands are important to an understanding of what it is that Verizon Wireless is seeking to accomplish with this site, and are discussed below.

National statistics compiled by the FCC indicate that more than 70% of E-911 calls to police and fire departments are now made using wireless phones. That percentage grows each year. For many Americans, the ability to call E-911 for help in an emergency is one of the main reasons they own a wireless phone. Other wireless E-911 calls come from "Good Samaritans" reporting traffic accidents, crimes or other emergencies. The prompt delivery of wireless E-911 calls to public safety organizations benefits the public by promoting safety of life and property. The public relies on wireless communications for emergency access to law enforcement and public safety services. Many police departments also rely on wireless data services between patrol cars and law enforcement databases. Wireless data services helps police departments utilize their limited resources more effectively to better protect the public. It is in public's interest to

ensure that robust and reliable emergency voice and data services remain available to everyone in our service areas. 700 and 2100 MHz frequencies carry both data and voice. 850/1900 MHz is our current E911 voice service.

A U.S. Government Semi-Annual Report on Wireless Substitution shows that as of December 2012, at least 38.2% of all American homes have abandoned the older wireline service entirely, and instead rely exclusively on wireless phones to make emergency 911 and other calls. This empirically demonstrates that the Applicant provides essential services to individuals and businesses within Columbus. The public requires reliable and state-of-the-art communications infrastructure to deliver expected service. Empirical data demonstrates that large numbers of people have "cut the cord" on traditional wireline service and now rely exclusively on wireless services to connect to the national telephone system. The U.S. Government report confirms that wireless communication is the primary communications channel for more than one third of the general population. This dependence upon the availability of wireless service by a significant proportion of the population clearly demonstrates a public need for ensuring the availability of reliable wireless communications services, including travelers and residential areas of Columbus.

Background: The Verizon Wireless' communication system and indeed all carriers' wireless communications systems rely on an overlapping and interconnected network of individual antenna sites. Individual sites, like the one under consideration here, consist of antennas mounted on a support structure. The radios and other electronic equipment that are needed to make wireless communications work are typically located at the base of the antenna support structure. These antenna sites transmit and receive wireless communications signals to and from mobile wireless handsets or similar devices.

Individually, these communications facilities have a limited coverage area. The extent of the coverage depends on several factors, including antenna height, local topography, proximity and height of other adjacent antenna installations, and localized customer usage demands. When linked electronically to form a network however, individual antenna sites operate to deliver a seamless wireless communications service to individuals, businesses, and government. The "seamless" part is important, even crucial, to understanding the need for this site. Without overlapping coverage, calls can't get through, or be completed. The locations of antenna sites are therefore carefully thought out, and selected to be located as far apart as is consistent with the number of customers in the service area, while still being close enough to "hand off" a motorist's call from one tower to the next, without dropping the call.

To be effective, any new antenna facility must first be integrated into the existing network, so that it can transmit, receive, and offload calls to and from its siblings without interference. The requirement that any new site must be able to perform a call "handoff", as when a motorist drives from one coverage area into another,

is absolutely essential. If a call cannot be handed off, the site is useless as a network component.

This brings us to consideration of the proposed Gender Winchester site. This facility is intended to address two pressing service problems, problems that cannot be solved merely by re-engineering our existing antenna sites: the 700 capacity problem and the 2100 AWS coverage problem. This site is also a capacity off-load for CDMA voice and data.

AWS

700 MHz Capacity Problem: The first problem is one of capacity. Briefly put, although other existing antenna sites were in the past able to serve this area, they can no longer do so efficiently because the number of customers has grown enormously over the past few years. As problems go, a large and growing customer base is a good one to have, but it also means that local demand for wireless services is starting to exceed the capacity of our existing sites in this area to handle. Customers from this area are now reporting that during peak use times they can't connect to the network, or reflexively that calls to customers within this service area are not getting through. This means that this geographic area is no longer being served effectively.

Call Blocking: When a wireless network reaches the maximum number of connections it can handle at one time, the service area is saturated, and new calls can't get through. This is known as "Call Blocking". Call blocking most often occurs during high demand periods, such as emergencies and social events, but as the customer base in a given area grows, call blocking starts to occur more often, even daily, especially during high-demand periods. The logical solution to cure call blocking is to add capacity by adding more carriers or call channels. In this case, the existing cells surrounding this area have already had the maximum number of radios added; however this has not kept up with demand. The demand for wireless service continues to increase, and adding more radios is no longer possible. Simply put, the cell sites surrounding this area have become saturated. Adding capacity to relieve call blocking in areas where the existing sell sites are at their maximum capacity requires more extensive measures, such as cell splitting, or band hopping.

Cell Split: A cell split does exactly what the phrase implies: it splits an existing coverage area in half, so that the network can redirect calls away from existing, overloaded sites, to the new cell site instead. By dividing the call volume among a larger number of sites, the call volume processed by each individual antenna site is reduced to a level that the equipment can effectively manage during peak call periods, thereby enabling everyone's calls to be completed, without blocking or interruption.

Band Hopping: The second capacity enhancement measure is band hopping. When a site reaches its capacity limit on an existing band (in this case 700MHz), it may be possible to redirect new calls to a different band, provided an alternate frequency band is available, and provided sufficient reserve capacity exists in that alternate frequency band. In this case, Verizon Wireless has another licensed frequency band available (this is the AWS band centered at 2100 MHz). Although this band is available in this area, the reserve capacity of this 2100 MHz band is limited, making "frequency hopping" of limited use to relieve the call blocking. (The 2100 MHz band is particularly limited in its ability to provide in-building penetration, and its effective range at any given power level is half that of the 700 MHz frequencies.)

2100 MHz AWS Coverage Problem: The huge increase in demand for wireless services, in particular the exponential increase in demand for mobile data services, requires the use of all of the applicant's licensed frequencies in this area, which in this instance means both the 700 MHz and 2100 MHz frequency bands. The problem is that the 2100 MHz or "AWS" band has less "propagation power" compared to the 700 MHz band. The 2100 MHz wavelength is physically shorter than the 700 MHz wavelength. In practice, shorter wavelength frequencies provide much less coverage (about 40%) than the older 700 MHz bands. In many cases, the 2100 MHz band is so limited in terms of propagation power; that only persons who are in a direct line-of-site to the antennas will be able to connect to the national telephone system. In order to create a network using the 2100 MHz frequency band, the antenna sites must therefore be physically closer to each other than sites in the 700 MHz network in order to perform call handoffs between cells. Because this frequency band has to be able to "see" its service area, the coverage area for each 2100 MHz cell must be physically smaller for the network to interconnect, and to provide the same level of reliability that lower frequency bands provide.

The 2100 MHz frequencies can have a performance disadvantage, in that these frequencies could have a limited ability to provide in-building penetration. Depending on building construction (whether wood, or brick, or steel), 2100 MHz frequencies typically experience more signal degradation compared to in-building penetration by 700 MHz frequencies. The in-building penetration problem is a critical design and performance issue.

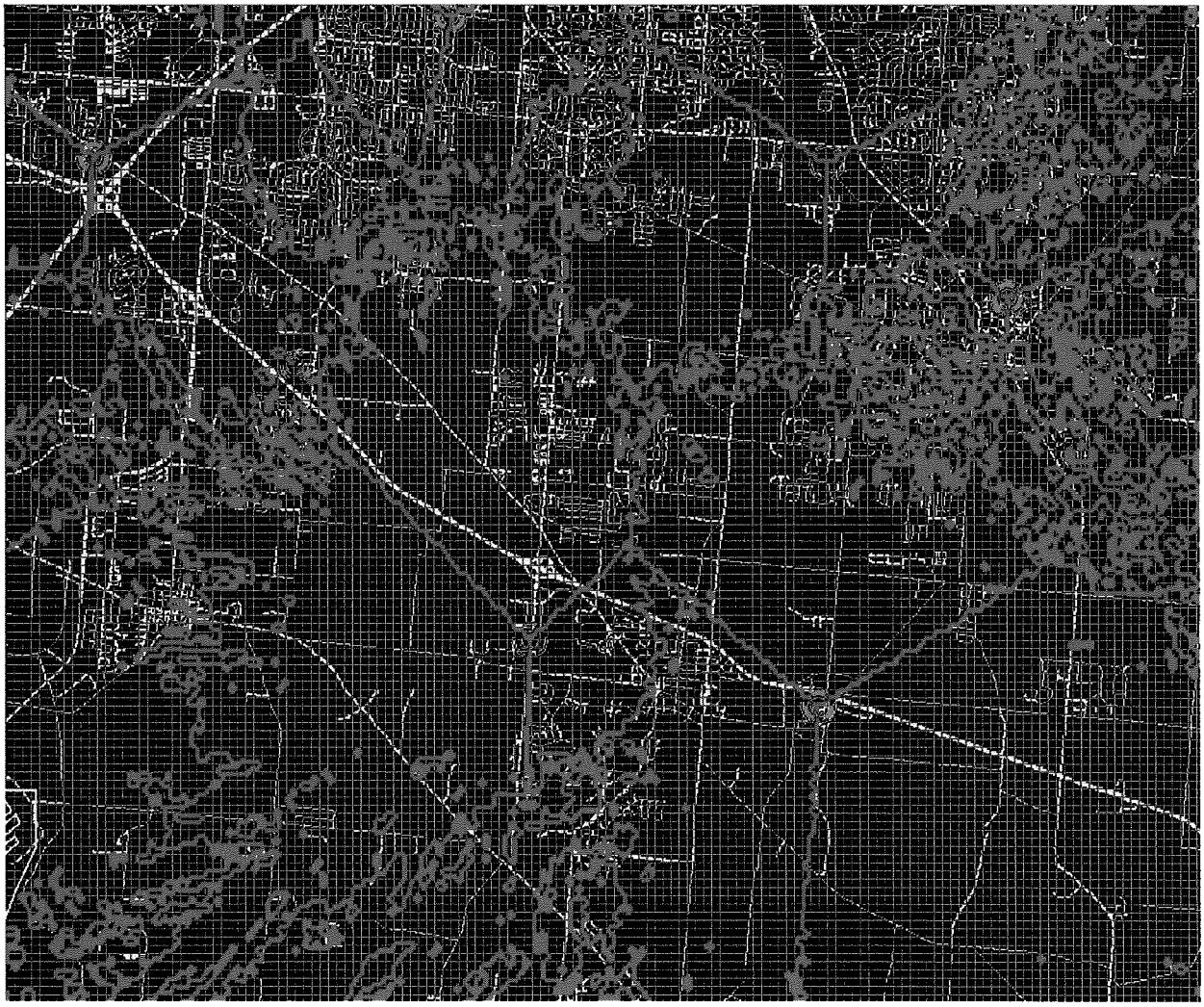
In the case of Gender Winchester the existing Verizon Wireless network was originally designed for 700 MHZ, and the cell sites in this area are therefore too far away from one another to implement an effective 2100 MHz network by just adding 2100 MHz antennas to these sites. In this case, overlaying 2100 MHz antennas to allow "band hopping" simply won't work.

Finally, one final – indeed critical – system performance limitation must be kept clearly in mind in any discussion of cell site location. The relative coverage limits of signals sent by the cell sites in different frequency bands are important design

criteria. These signals however are only one-half of the communications link. The thing that must be kept in mind is the extremely weak signals from cell phones and other mobile data devices, which provide the return link in the signal path. The power levels of these return signals are limited by federal law to a maximum of 0.6 watts for the older "feature" phones (i.e. – dumb phones), and to 0.25 watts of power for today's LTE smart phones. These weak return signals must also penetrate whatever materials a vehicle or buildings are made of, in order to communicate with the network. This as much as any other reason is why cell sites must be located within the area proposed to be served.

The inherent limitations in the physics of electromagnetic signal propagation and absorption in these frequency bands are unalterable facts. In the case of Gender Winchester these limitations and the implementation of the technical solutions discussed above will require construction of a new antenna site. To accomplish this, the Applicant is proposing the Gender Winchester site. This new site is critical to our efforts to relieve call blocking by closing the growing service capacity gap in this area, and to restoring reliable wireless communication service to the people living, working, and traveling through this area.

The Proposed Gender Winchester Site: A significant wireless network service gap exists in North of Canal Winchester which negatively affects substantial numbers of wireless users throughout the area. Shown below is a coverage plot demonstrating the current gap in coverage (Red is existing coverage):

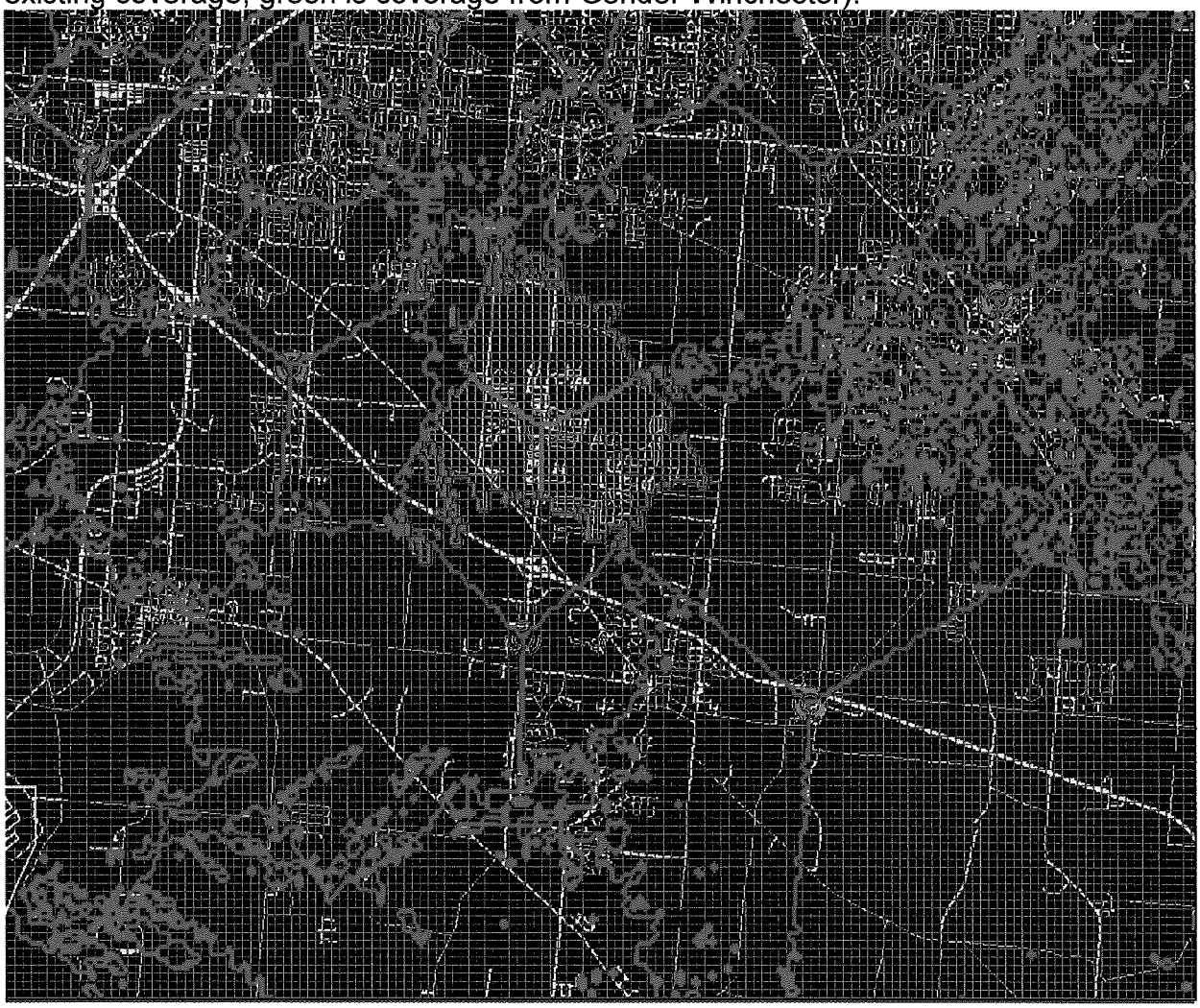


Verizon Wireless radio frequency engineers have worked to identify the optimum location and height at which antennas should be placed to connect with the existing network in order to accommodate growing customer demand, to avoid interference with other wireless communications sites, and to close this growing service capacity gap.

The Search for Existing Tall Structures: Before proposing this new tower site, Verizon Wireless first evaluated whether any existing towers or other tall structures might be technically feasible for coverage purposes, and suitable for collocation. Verizon Wireless is committed to collocation and regularly locates its equipment on existing towers and buildings. Collocation on existing tall structures saves time and money compared to building a new tower. Reciprocally, Verizon Wireless encourages in-bound collocation on its towers by third-party applicants, offering tower space on a first come, first served basis, at competitive, non-discriminatory rents, so long as such shared use does not interfere with any other tower tenant's equipment or operations, and provided the applicant's equipment is installed in accordance with the requirements of the Ohio Building Code, and

maintained in accordance with the requirements of the Federal Communications Commission.

The coverage plot shown below depicts the improvement in coverage that will result from a new communications facility at the proposed location (Red is existing coverage; green is coverage from Gender Winchester):



Optimum Location: The proposed tower will allow the applicant to close the service gap in Columbus. The proposed height is the minimum height required and will provide the best solution to serve the requirements of the area. Without the proposed site, people in this area of Columbus will continue to experience call blocking and poor signal coverage, preventing them from wirelessly connecting to the national telephone system.

Confirmation of Continued Regulatory Compliance: The applicant affirms that the wireless communications facility proposed at this site has been designed and

will be constructed and operated in accordance with all federal, state and local regulations applicable to such facilities. Verizon Wireless affirms it and its licensed operating units will operate exclusively within the frequencies and service areas licensed to it by the Federal Communications Commission. Verizon Wireless further affirms that it will operate its facility in conformance with all applicable federal requirements for controlling public and worker exposure to radiofrequency energy.

The proposed facility is needed to provide an essential public service to wireless communication users in Columbus, Ohio that cannot be established in any other manner. The construction and integration of this site into Verizon Wireless' existing network will provide or improve access to mobile voice and wireless data services previously degraded or unavailable, and support Homeland Security through enhanced 911 services. Finally, it will allow the service gap in this area to be closed.

Sincerely,

Patrick Chanea
Radio Frequency Engineer
Verizon Wireless

ENGINEERED ENDEAVORS

March 18, 2015

Verizon Wireless
7575 Commerce Court
Lewis Center, OH 43035

Subject:	Design and Reliability of a 100 *ft* (2) Carrier Monopole
Location:	Franklin County, OH
Site Name:	Canal Winchester Downtown/CLMB-334
Site Address:	120 West Waterloo St, Canal Winchester, OH
EEI Job #:	17347

In response to your inquiry regarding the design and anticipated reliability of a 100 *ft* (2) carrier monopole under the required design criteria, EEI offers the following comments:

1. The monopole structure is designed to meet the requirements of the ANSI TIA 222-G (*Structural Standard for Antenna Supporting Structures and Antennas*). It also meets or exceeds the requirements of the *2009 International Building Code,* the latest editions of the *Ohio Building Code* and the *Manual of Steel Construction* by the American Institute of Steel Construction. Furthermore, the foundation and anchor bolts meet the requirements of the American Concrete Institute's *Building Code Requirements for Structural Concrete* (ACI 318-05). The pole itself is also designed to meet the provisions of the American Society of Civil Engineers (A.S.C.E.) *Design of Steel Transmission Pole Structures, (ASCE/SEI 48-11)* published in 2011.

2. Based on the location of this structure, the maximum TIA-222-G basic design wind speed required is 90 *MPH* 3-second gust wind. The wind speed exceeds the 50-year maximum anticipated wind velocity at 33 *ft* above ground level. Additional factors are applied to increase the wind loading, *e.g.*, a gust response factor is imposed in order to account for sudden changes in wind speed, a height coefficient to account for increasing wind speed with height, and an exposure coefficient. Based on these conservative coefficients, the structure could in fact survive even greater wind loads than the basic design wind speed without any failures.

3. The monopole structure design is controlled by wind induced loads, however, earthquake induced loads are also evaluated with all building code requirements being satisfied. Vertical loads (*i.e.*, gravity loads) are minimal on these types of structures, approximately 20% of the maximum capacity.

4. The design and loading assumptions which are used for the analysis of these structures are very conservative in nature when compared to other building

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codes; as a result, **structural failure is highly improbable.**

5. Failure of a **steel monopole structure** is defined as being that point at which the induced stresses exceed the yield strength of the material. At this point, deflections will be induced in the structure, which will no longer be recoverable once the load has been removed. Hence, a permanent deflection in the monopole would exist.

6. The induced loads must be sustained for a long enough periods in order that the structure has time to respond to the load without its removal. Monopoles are flexible, forgiving structures, which are not generally susceptible to damage by impact loads such as wind gust or earthquake shocks.

7. As the structure leans over from the induced loads, it presents a markedly reduced exposure area for the development of wind-induced forces. This would result in the lowering of the applied forces and, therefore, the reduction of stresses and a halting of the structural deflection.

8. Hypothetically, let's assume that a pole becomes overloaded. The typical consequence of this overloading is "local buckling" where a relatively small portion of the shaft distorts and "kinks" the steel. Upon the removal of the applied load, the structure will not return to a plumb position. This does not cause a free falling pole. Even though the buckle exists, the cross section of the pole is capable of carrying the entire vertical load. **As a result, wind induced loads could not conceivably bring this type of structure to the ground due to the excellent ductile properties, design criteria, and failure mode.**

9. Further proof to the integrity of these structure-types is the fact that all EEI monopole structures in the Florida region withstood the direct impact of Hurricane Andrew with absolutely no structural damage reported. Wind loading was reported to be in the range of 100-120 MPH. Most recently, all EEI monopoles in the Wilmington, NC region withstood the force of Hurricanes Bertha and Fran, which had wind speeds of 105 MPH and wind gusts of 115 MPH.

10. EEI has never experienced a structural failure due to weather induced overloading. EEI personnel have over 30 years combined experience in design and fabrication of these types of structures.

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In response to your inquiry regarding the quality of steel and fabrication of a monopole structure:

1) The monopole is fabricated from ASTM A572 material with a controlled silicon content of 0.06% maximum to promote a uniform galvanized coating. The base plate material is also fabricated from ASTM A572 material. All plate material meets a Charpy V-Notch toughness requirement of 15 *ft-lbs* @ -20° Fahrenheit. By meeting the strict toughness requirement, the monopole is best suited to resist the cyclic/fatigue type loading (*i.e.*, wind induced loading) these structures exhibit. The toughness specification is based on 35 years of taper tubular poles being designed and manufactured for the electrical transmission and communication industries.

2) Anchor bolts are fabricated from A615 Grade 75 material. The bolts are 2 ¼ *in* diameter, made from #18J bar stock. All threads are rolled. Anchor bolts come complete with two (2) A194 Grade 2H hex nuts. The anchor bolt material must also meet a Charpy V-Notch toughness of 15 *ft-lbs* @ -20° Fahrenheit, to resist the cyclic/fatigue type loading (*i.e.*, wind induced loading) these structures exhibit.

EEI guarantees the quality of steel used on the entire monopole. Material Certifications (Mill Test Reports) are available on all material at the time of fabrication. Fabrication of the monopole is performed in accordance with the provisions of the AISC *Manual of Steel Construction* and ASCE's *Design of Steel Transmission Pole Structures*. All welding and inspection is in accordance with the American Welding Society's Specification D1.1 - latest revision. Testing and inspection reports are available upon request at the time of fabrication.

In conclusion, due to the aforementioned items, EEI's monopole structures have never experienced a "free fall" type failure due to wind or seismic induced loads. I hope that these comments address the issues, which you might encounter relative to the anticipated performance of monopole structures and quality of steel and fabrication. However, I will be most happy to answer any specific questions, which you might have.

Sincerely,

Engineered Endeavors

STATE OF OHIO
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REGISTERED PROFESSIONAL ENGINEER

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National Health Statistics Reports

Number 70 ■ December 18, 2013

Wireless Substitution: State-level Estimates From the National Health Interview Survey, 2012

by Stephen J. Blumberg, Ph.D., National Center for Health Statistics;
Nadarajasundaram Ganesh, Ph.D., NORC at the University of Chicago;
Julian V. Luke, National Center for Health Statistics; and
Gilbert Gonzales, M.H.A., 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 that do not have a landline telephone but have at least one wireless telephone (i.e., wireless-only households). State-level estimates for 2012 are presented, along with 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 one earlier 12-month period (July 2011–June 2012).

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 2007–2012 data from the National Health Interview Survey, 2006–2011 data from the American Community Survey, and auxiliary information on the number of listed telephone lines per capita in 2007–2012.

Results—The prevalence of wireless-only adults and children varied substantially across states. State-level estimates for 2012 ranged from 19.4% (New Jersey) to 52.3% (Idaho) of adults and from 20.6% (New Jersey) to 63.4% (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 2012, nearly two in every five American households (38.2%) had only wireless telephones (1). The prevalence of such "wireless-only" households markedly exceeds the prevalence of households with only landline telephones (8.6%), 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 both national and regional estimates.

Direct state-level estimates of this prevalence were not available previously from NHIS data because the NHIS sample size 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 U.S. 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

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available from the federal government. In October 2012, those estimates were updated through December 2011 (3).

In this report, the estimates are further updated through December 2012. 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 (which receive significant numbers of calls on both landlines and wireless telephones), landline-mostly households (which 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 those used for the estimates published in 2011 and 2012 (2,3). Small-area statistical modeling techniques were used to combine NHIS data collected 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 2007–2012 NHIS and the 2006–2011 ACS, and auxiliary information on the number of listed telephone lines per capita in 2007–2012, 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 twelve 6-month periods: January–June and July–December in each year from 2007 through 2012.

Selection of small areas

Estimates were derived separately for adults (aged 18 and over) and children (under age 18) for 93 nonoverlapping areas that make up 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 (4). Areas were selected based on the available survey sample sizes and the stability of the modeled estimates.

Production of model-based 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 12 models (one for each 6-month period). Separate small-area models were fitted for each telephone service use category (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" (5–7). 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 twelve 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.

Model-based estimates were produced for every small area and 6-month period, and consecutive 6-month estimates were combined to produce 12-month estimates. The small-area estimates for 12-month periods were obtained by averaging the two consecutive 6-month estimates. This helped to reduce the variability of the estimates. The 12-month small-area estimates for each telephone category were then adjusted to agree with the national direct estimates from NHIS for the corresponding telephone category and year. The 12-month estimates were further adjusted to agree with annual ACS estimates 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 2007–2012. Because the models now included full-year data from 2012, the estimates for 2007–2011 differed from the estimates previously reported (3) that were based on models that did not include data from 2012. The differences in the estimates for 2007–2011 were generally small (e.g., for the prevalence of wireless-only adults, mean = –0.01, interquartile range = 0.5). Therefore, the updated estimates for 2007–2011 are not presented here. Instead, this report includes estimates for July 2011–June 2012 and January–December 2012 only.

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 2012 ranged from a high of 52.3% in Idaho to a low of 19.4% in New Jersey (Table 1). Other states in which the prevalence of wireless-only adults was relatively high (exceeding 45%) were Mississippi (49.4%), Arkansas (49.0%), and Utah (46.6%). Several other states in the northeast joined New Jersey with prevalence rates below 25%, including

Connecticut (20.6%), Delaware (23.3%), New York (23.5%), Massachusetts (24.1%), and Rhode Island (24.9%).

Similarly, results showed great variation in the prevalence of wireless-only children across states, ranging from a high of 63.4% in Mississippi to a low of 20.6% in New Jersey (Table 1). Other states with a high prevalence of wireless-only children included Idaho (62.2%), Arkansas (59.8%), Missouri (55.2%), and South Carolina (54.5%). Other states with a low prevalence of wireless-only children included Vermont (24.5%), Connecticut (25.4%), Alaska (25.7%), and Massachusetts (26.7%).

Estimates for Adults and Children Living in Households With Wireless Telephones

Table 2 presents modeled estimates for 2012 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 94.1% in Utah to a low of 80.8% in West Virginia. Two-thirds of the states (33 total) exceeded 90%, with Maryland (93.8%), New Hampshire (93.6%), Minnesota (93.6%), and Illinois (93.0%) joining Utah with the highest rates. Along with West Virginia, states with the lowest rates included New Mexico (81.1%) and North Dakota (82.6%).

Table 2 can also be used to examine 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 64.1% in Arkansas to 39.4% in Connecticut. Thirty-two states had rates of primary wireless use exceeding 50%, with Texas (63.0%), Idaho (62.7%), and Mississippi (62.0%) joining Arkansas at the top end. Other states at the low end included Massachusetts (41.1%), New York (41.2%), West Virginia (41.3%), and Vermont (41.3%).

Table 3 presents modeled estimates for 2012 for the prevalence of children living in households with various telephone service types. The table can be used to calculate estimates for children similar to those for adults as described above.

Implications of Findings

The increasing prevalence of wireless-only households has implications for random-digit-dial (RDD) telephone surveys. Historically, such surveys did not include wireless telephone numbers in their samples. Now, despite operational challenges (8), most major RDD telephone surveys include wireless telephone numbers (9,10). If they did not, the exclusion of households with only wireless telephones (along with the 2.1% of households that have no telephone service) could bias results (11).

Statistical challenges exist when samples of wireless-only households are combined 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 (8). Moreover, if the persons interviewed on their wireless telephones are not screened to exclude those who also have landlines, reliable and current estimates of the prevalence of landline and wireless telephone service use may be required in order to address the probability that an individual could be in both samples (8).

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.

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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, 2011–2012

Geographic area	Adults aged 18 and over		Children under age 18	
	July 2011–June 2012	January–December 2012	July 2011–June 2012	January–December 2012
	Percent (standard error)			
Alabama	34.4 (1.9)	36.4 (2.0)	46.8 (3.1)	49.6 (3.2)
Jefferson County	40.8 (2.7)	41.7 (2.8)	55.7 (4.4)	55.2 (4.4)
Rest of Alabama	33.4 (2.1)	35.5 (2.3)	45.4 (3.5)	48.7 (3.7)
Alaska	30.2 (2.8)	31.6 (2.7)	22.8 (3.8)	25.7 (3.7)
Arizona	39.4 (1.8)	41.2 (1.9)	45.8 (2.6)	49.9 (2.7)
Maricopa County	42.7 (2.4)	44.6 (2.6)	48.1 (3.5)	52.0 (3.7)
Rest of Arizona	34.6 (2.6)	36.1 (2.7)	42.1 (3.8)	46.3 (3.9)
Arkansas	45.7 (2.1)	49.0 (2.1)	56.6 (3.3)	59.8 (3.1)
California	30.1 (0.7)	32.6 (0.8)	33.8 (1.1)	38.2 (1.2)
Alameda County	31.4 (2.6)	34.2 (2.9)	34.3 (4.1)	37.0 (4.3)
Fresno County	31.8 (2.8)	33.8 (2.9)	31.6 (3.7)	36.1 (3.6)
Los Angeles County	30.2 (1.5)	31.7 (1.6)	33.7 (2.1)	36.7 (2.2)
Northern counties[1]	27.0 (2.7)	30.5 (3.0)	32.0 (4.1)	38.2 (4.4)
San Bernardino County	33.7 (2.5)	38.9 (2.7)	38.0 (3.5)	45.8 (3.9)
San Diego County	23.5 (1.8)	26.6 (2.0)	23.1 (2.7)	29.5 (3.0)
Santa Clara County	30.9 (2.4)	31.4 (2.5)	32.8 (3.6)	34.9 (3.7)
Rest of California	30.8 (1.2)	33.6 (1.3)	35.4 (1.9)	40.0 (2.0)
Colorado	39.9 (1.9)	41.7 (2.0)	42.2 (2.7)	45.1 (2.8)
City of Denver counties[2]	35.2 (2.4)	37.8 (2.7)	41.7 (3.6)	46.3 (3.9)
Rest of Colorado	42.9 (2.6)	44.3 (2.7)	42.6 (3.8)	44.2 (3.8)
Connecticut	19.1 (1.7)	20.6 (1.7)	21.2 (2.4)	25.4 (2.6)
Delaware	23.0 (2.1)	23.3 (1.9)	24.5 (3.5)	26.8 (3.3)
District of Columbia	44.4 (2.9)	46.0 (2.6)	43.7 (4.9)	42.2 (4.4)
Florida	37.1 (1.2)	39.7 (1.2)	45.6 (1.8)	49.2 (1.8)
Miami-Dade County	36.6 (3.0)	37.6 (3.1)	48.8 (4.6)	53.2 (4.6)
Duval County	43.5 (2.2)	44.4 (2.3)	52.8 (3.2)	54.2 (3.3)
Orange County	43.9 (3.2)	46.5 (3.2)	49.1 (4.8)	51.4 (4.6)
Rest of Florida	35.4 (1.5)	38.4 (1.5)	43.7 (2.3)	47.7 (2.3)
Georgia	34.3 (1.6)	37.0 (1.7)	41.3 (2.4)	45.9 (2.4)
Fulton/DeKalb counties	40.7 (2.9)	41.8 (3.0)	46.8 (4.5)	48.8 (4.4)
Rest of Georgia	33.0 (1.8)	36.0 (1.9)	40.3 (2.7)	45.4 (2.7)
Hawaii	29.2 (2.1)	31.6 (2.2)	38.8 (3.9)	43.8 (3.9)
Idaho	49.7 (2.0)	52.3 (1.9)	58.3 (2.9)	62.2 (2.6)
Illinois	35.2 (1.4)	38.0 (1.5)	39.7 (2.2)	42.4 (2.3)
Cook County	39.7 (2.0)	42.2 (2.1)	41.1 (3.1)	42.3 (3.2)
Madison/St. Clair counties	35.1 (3.5)	36.5 (3.6)	43.8 (5.7)	45.6 (5.5)
Rest of Illinois	33.9 (1.8)	36.8 (2.0)	39.1 (2.7)	42.2 (2.9)
Indiana	33.4 (1.6)	36.1 (1.8)	43.3 (2.7)	46.3 (2.9)
Lake County	30.3 (2.8)	33.1 (3.0)	41.3 (5.0)	44.5 (5.2)
Marion County	41.5 (3.3)	44.9 (3.3)	51.0 (5.1)	52.8 (4.7)
Rest of Indiana	32.3 (2.0)	34.8 (2.2)	42.0 (3.2)	45.3 (3.5)
Iowa	40.1 (2.0)	42.2 (2.1)	41.3 (3.2)	45.4 (3.2)
Kansas	40.0 (1.8)	42.3 (1.9)	48.6 (2.8)	52.5 (2.7)
Johnson/Wyandotte counties	31.1 (3.1)	35.0 (3.3)	33.7 (4.4)	41.5 (4.8)
Rest of Kansas	42.9 (2.2)	44.8 (2.2)	53.8 (3.4)	56.4 (3.2)
Kentucky	35.3 (2.2)	37.0 (2.2)	47.1 (3.2)	52.5 (3.2)
Louisiana	34.0 (2.1)	36.2 (2.2)	42.8 (3.1)	45.1 (3.1)
Maine	33.0 (2.4)	35.0 (2.3)	38.6 (3.6)	41.6 (3.3)
Maryland	27.9 (1.5)	29.4 (1.6)	31.1 (2.3)	33.6 (2.4)
Baltimore City	37.2 (3.1)	39.6 (3.2)	46.7 (5.0)	51.8 (5.3)
Prince George's County	§	§	§	§
Rest of Maryland	26.2 (1.9)	27.6 (2.0)	28.0 (2.8)	30.0 (3.0)
Massachusetts	22.3 (1.5)	24.1 (1.6)	23.7 (2.4)	26.7 (2.7)
Suffolk County	35.1 (3.4)	37.5 (3.6)	41.9 (6.4)	48.9 (6.8)
Rest of Massachusetts	20.9 (1.6)	22.6 (1.7)	22.2 (2.6)	24.9 (2.8)
Michigan	37.5 (1.6)	39.5 (1.7)	42.7 (2.5)	44.2 (2.6)
Wayne County	43.5 (2.6)	46.6 (2.8)	54.5 (4.2)	59.6 (4.1)
Rest of Michigan	37.0 (1.8)	39.0 (1.9)	41.7 (2.7)	42.9 (2.8)

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, 2011–2012—Con.

Geographic area	Adults aged 18 and over		Children under age 18	
	July 2011–June 2012	January–December 2012	July 2011–June 2012	January–December 2012
	Percent (standard error)			
Minnesota	34.4 (1.6)	35.7 (1.7)	33.0 (2.5)	36.7 (2.6)
Twin Cities counties[3]	35.6 (2.1)	36.7 (2.3)	33.7 (3.5)	37.0 (3.7)
Rest of Minnesota	33.1 (2.3)	34.6 (2.5)	32.2 (3.4)	36.3 (3.7)
Mississippi	45.6 (2.0)	49.4 (1.9)	59.0 (3.2)	63.4 (3.0)
Missouri	38.1 (1.8)	41.4 (2.0)	49.8 (2.8)	55.2 (3.0)
St. Louis County/City	34.2 (2.9)	38.1 (3.2)	32.4 (4.3)	39.2 (4.8)
Rest of Missouri	39.3 (2.1)	42.4 (2.4)	54.5 (3.4)	59.4 (3.5)
Montana	§	§	§	§
Nebraska	37.4 (2.0)	37.5 (2.0)	40.5 (3.3)	43.7 (3.2)
Nevada	36.0 (1.8)	38.9 (1.8)	37.9 (2.8)	41.7 (2.8)
Clark County	37.2 (2.2)	40.7 (2.2)	36.3 (3.3)	40.6 (3.4)
Rest of Nevada	33.1 (2.9)	34.4 (2.9)	42.2 (5.0)	44.6 (5.0)
New Hampshire	25.4 (2.0)	26.7 (1.9)	29.3 (3.6)	30.3 (3.2)
New Jersey	17.8 (1.3)	19.4 (1.4)	19.8 (2.1)	20.6 (2.2)
Essex County	35.9 (3.4)	40.2 (3.7)	29.9 (4.4)	38.2 (5.0)
Rest of New Jersey	17.2 (1.3)	18.8 (1.5)	19.4 (2.2)	19.9 (2.3)
New Mexico	35.8 (2.0)	36.8 (2.0)	50.7 (3.3)	53.4 (3.3)
Southern counties[4]	38.1 (2.8)	40.1 (3.0)	56.1 (4.4)	59.1 (4.6)
Rest of New Mexico	35.0 (2.5)	35.6 (2.5)	48.6 (4.2)	51.2 (4.1)
New York	21.4 (1.1)	23.5 (1.2)	23.2 (1.7)	26.8 (1.9)
City of New York counties[5]	26.0 (1.5)	29.4 (1.6)	25.7 (2.4)	29.8 (2.7)
Rest of New York	18.0 (1.5)	19.1 (1.6)	21.5 (2.3)	24.7 (2.6)
North Carolina	34.3 (1.7)	34.7 (1.7)	46.3 (2.6)	47.1 (2.6)
North Dakota	39.9 (1.8)	40.2 (1.7)	44.9 (3.5)	50.0 (3.2)
Ohio	35.5 (1.3)	36.8 (1.4)	41.2 (2.2)	44.7 (2.4)
Cuyahoga County	34.3 (2.9)	38.1 (3.2)	31.1 (4.0)	37.0 (4.2)
Franklin County	40.9 (3.7)	41.8 (3.7)	43.9 (4.4)	43.1 (4.5)
Rest of Ohio	34.9 (1.6)	35.9 (1.7)	42.2 (2.7)	46.0 (2.9)
Oklahoma	37.1 (2.0)	39.0 (2.0)	46.1 (3.2)	50.9 (3.4)
Oregon	37.2 (2.1)	36.8 (2.2)	38.6 (3.4)	41.5 (3.4)
Pennsylvania	25.0 (1.2)	26.2 (1.3)	29.9 (2.1)	31.4 (2.1)
Allegheny County	39.4 (3.2)	40.4 (3.4)	42.0 (5.2)	43.9 (5.4)
Philadelphia County	33.5 (2.6)	37.8 (2.9)	40.8 (4.2)	46.8 (4.4)
Rest of Pennsylvania	21.8 (1.4)	22.7 (1.6)	26.9 (2.5)	27.6 (2.5)
Rhode Island	19.5 (1.7)	24.9 (1.8)	25.5 (3.4)	34.8 (3.4)
South Carolina	37.0 (1.9)	39.0 (2.1)	48.3 (3.2)	54.5 (3.3)
South Dakota	§	§	§	§
Tennessee	35.9 (1.6)	37.8 (1.7)	47.3 (2.6)	52.3 (2.6)
Davidson County	48.0 (3.5)	51.2 (3.6)	55.5 (5.2)	61.8 (5.4)
Shelby County	43.2 (3.2)	46.2 (3.3)	49.4 (4.8)	54.1 (4.7)
Rest of Tennessee	32.9 (2.0)	34.5 (2.1)	45.8 (3.2)	50.7 (3.3)
Texas	42.6 (1.1)	44.5 (1.2)	51.9 (1.7)	54.2 (1.7)
Bexar County	41.4 (2.3)	42.6 (2.5)	52.1 (3.6)	57.0 (3.9)
Dallas County	55.0 (2.6)	56.5 (2.6)	63.0 (3.6)	65.9 (3.6)
El Paso County	§	§	§	§
Harris County	44.1 (2.0)	47.0 (2.1)	49.2 (2.8)	54.8 (2.9)
Rest of Texas	40.9 (1.5)	42.9 (1.6)	50.4 (2.2)	52.0 (2.2)
Utah	42.3 (2.0)	46.6 (1.9)	43.8 (2.8)	48.5 (2.6)
Vermont	29.0 (2.1)	29.9 (1.9)	22.6 (3.5)	24.5 (3.2)
Virginia	30.1 (1.8)	32.0 (1.9)	32.2 (2.5)	36.2 (2.7)
Washington	37.3 (1.5)	39.4 (1.6)	37.5 (2.1)	41.8 (2.2)
Eastern counties[6]	32.1 (2.2)	34.2 (2.4)	40.7 (3.6)	44.2 (3.7)
King County	45.3 (2.8)	46.0 (2.9)	38.6 (4.0)	41.0 (4.0)
Rest of Washington	34.6 (2.3)	37.6 (2.4)	35.4 (3.1)	41.1 (3.4)
West Virginia	27.3 (2.4)	30.2 (2.4)	36.1 (3.6)	42.7 (3.6)
Wisconsin	35.2 (1.8)	39.0 (2.0)	38.0 (2.8)	44.5 (3.0)
Milwaukee County	§	§	§	§
Rest of Wisconsin	32.9 (2.1)	36.6 (2.2)	34.8 (3.2)	41.0 (3.5)
Wyoming	§	§	§	§

§ Model-based estimates for Maryland-Prince George's County, Montana, South Dakota, Texas-El Paso County, Wisconsin-Milwaukee County, and Wyoming are not reported because, for at least one telephone service use category, direct estimates from the National Health Information 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.

[1]Includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity.
[2]Includes Adams, Arapahoe, Denver, and Douglas.
[3]Includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.
[4]Includes Catron, Chaves, Curry, De Baca, Dona Ana, Eddy, Grant, Hidalgo, Lea, Lincoln, Luna, Otero, Roosevelt, Sierra, and Socorro.
[5]Includes Bronx, Kings, New York, Queens, and Richmond.
[6]Includes Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima.

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

SOURCES: CDC/NCHS, National Health Interview Survey, 2007–2012; U.S. Census Bureau, American Community Survey, 2006–2011; and infoUSA.com consumer database, 2007–2012.

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, 2012

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service[1]	Total
	Percent (standard error)						
Alabama	36.4 (2.0)	16.0 (1.5)	21.6 (1.9)	16.3 (1.6)	7.8 (1.3)	2.0	100.0
Jefferson County	41.7 (2.8)	17.6 (2.1)	20.7 (2.5)	12.1 (1.8)	6.5 (1.6)	1.5	100.0
Rest of Alabama	35.5 (2.3)	15.7 (1.7)	21.7 (2.1)	17.0 (1.8)	8.0 (1.4)	2.0	100.0
Alaska	31.6 (2.7)	17.7 (2.2)	30.3 (2.9)	12.2 (1.9)	6.6 (1.6)	1.6	100.0
Arizona	41.2 (1.9)	16.4 (1.4)	18.8 (1.6)	10.7 (1.1)	10.8 (1.4)	2.1	100.0
Maricopa County	44.6 (2.6)	17.1 (1.9)	18.8 (2.2)	6.0 (1.2)	11.8 (1.9)	1.8	100.0
Rest of Arizona	36.1 (2.7)	15.5 (2.0)	18.9 (2.4)	17.6 (2.1)	9.4 (1.9)	2.6	100.0
Arkansas	49.0 (2.1)	15.1 (1.5)	15.8 (1.6)	10.9 (1.3)	6.7 (1.1)	2.4	100.0
California	32.6 (0.8)	21.5 (0.7)	25.6 (0.8)	11.3 (0.5)	7.4 (0.5)	1.5	100.0
Alameda County	34.2 (2.9)	17.6 (2.3)	30.1 (3.1)	10.6 (1.8)	6.3 (1.7)	1.2	100.0
Fresno County	33.8 (2.9)	9.6 (1.8)	32.1 (3.1)	10.8 (1.9)	12.3 (2.3)	1.3	100.0
Los Angeles County	31.7 (1.6)	22.9 (1.4)	26.6 (1.5)	9.8 (1.0)	7.5 (0.9)	1.4	100.0
Northern counties[2]	30.5 (3.0)	15.2 (2.3)	23.6 (3.1)	19.2 (2.5)	10.1 (2.3)	1.4	100.0
San Bernardino County	38.9 (2.7)	22.5 (2.3)	23.6 (2.6)	9.8 (1.6)	*3.9 (1.2)	1.2	100.0
San Diego County	26.6 (2.0)	21.1 (1.8)	32.0 (2.3)	9.4 (1.3)	8.3 (1.4)	2.6	100.0
Santa Clara County	31.4 (2.5)	21.2 (2.2)	27.9 (2.7)	9.3 (1.6)	9.0 (1.8)	1.1	100.0
Rest of California	33.6 (1.3)	22.1 (1.1)	23.3 (1.2)	12.5 (0.9)	7.1 (0.7)	1.4	100.0
Colorado	41.7 (2.0)	16.9 (1.5)	20.9 (1.8)	11.9 (1.3)	6.7 (1.1)	1.8	100.0
City of Denver counties[3]	37.8 (2.7)	19.0 (2.1)	23.5 (2.6)	12.0 (1.8)	6.1 (1.5)	1.7	100.0
Rest of Colorado	44.3 (2.7)	15.6 (2.0)	19.3 (2.4)	11.8 (1.8)	7.1 (1.6)	1.9	100.0
Connecticut	20.6 (1.7)	18.8 (1.6)	32.0 (2.1)	18.5 (1.6)	9.0 (1.3)	1.1	100.0
Delaware	23.3 (1.9)	22.5 (1.9)	30.0 (2.2)	17.1 (1.7)	6.0 (1.1)	1.2	100.0
District of Columbia	46.0 (2.6)	18.3 (2.1)	17.3 (2.1)	9.1 (1.5)	6.6 (1.4)	2.6	100.0
Florida	39.7 (1.2)	17.2 (0.9)	22.6 (1.1)	11.5 (0.8)	6.5 (0.7)	2.5	100.0
Miami-Dade County	37.6 (3.1)	13.0 (2.1)	27.8 (3.2)	11.9 (2.1)	7.1 (2.0)	2.6	100.0
Duval County	44.4 (2.3)	18.8 (1.8)	19.9 (2.0)	6.4 (1.1)	6.5 (1.3)	4.0	100.0
Orange County	46.5 (3.2)	22.2 (2.7)	18.7 (2.8)	6.2 (1.6)	*4.5 (1.6)	1.9	100.0
Rest of Florida	38.4 (1.5)	16.7 (1.2)	23.1 (1.4)	12.9 (1.1)	6.6 (0.8)	2.3	100.0
Georgia	37.0 (1.7)	22.8 (1.4)	20.2 (1.5)	11.0 (1.1)	6.4 (0.9)	2.6	100.0
Fulton/DeKalb counties	41.8 (3.0)	21.6 (2.5)	21.3 (2.8)	9.0 (1.8)	*4.2 (1.4)	2.1	100.0
Rest of Georgia	36.0 (1.9)	23.1 (1.7)	20.0 (1.7)	11.4 (1.3)	6.8 (1.1)	2.7	100.0
Hawaii	31.6 (2.2)	19.6 (1.8)	28.9 (2.2)	11.6 (1.5)	6.5 (1.2)	1.7	100.0
Idaho	52.3 (1.9)	10.4 (1.1)	17.5 (1.5)	12.3 (1.2)	4.9 (0.9)	2.7	100.0
Illinois	38.0 (1.5)	17.5 (1.2)	24.3 (1.5)	13.2 (1.1)	5.5 (0.8)	1.6	100.0
Cook County	42.2 (2.1)	14.9 (1.5)	24.2 (2.0)	10.4 (1.3)	6.3 (1.1)	2.0	100.0
Madison/St. Clair counties	36.5 (3.6)	17.5 (2.8)	25.3 (3.7)	13.7 (2.5)	*5.4 (2.1)	1.6	100.0
Rest of Illinois	36.8 (2.0)	18.2 (1.6)	24.3 (1.9)	14.0 (1.4)	5.2 (1.0)	1.4	100.0
Indiana	36.1 (1.8)	15.4 (1.4)	20.9 (1.6)	15.5 (1.3)	9.5 (1.2)	2.7	100.0
Lake County	33.1 (3.0)	15.1 (2.2)	23.5 (2.9)	16.8 (2.3)	10.1 (2.2)	1.4	100.0
Marion County	44.9 (3.3)	8.8 (1.9)	16.5 (2.7)	16.8 (2.5)	9.0 (2.2)	3.9	100.0
Rest of Indiana	34.8 (2.2)	16.6 (1.7)	21.4 (2.0)	15.1 (1.6)	9.5 (1.5)	2.6	100.0
Iowa	42.2 (2.1)	18.4 (1.6)	19.4 (1.8)	11.9 (1.4)	5.7 (1.1)	2.3	100.0
Kansas	42.3 (1.9)	13.5 (1.3)	23.2 (1.7)	11.0 (1.2)	8.3 (1.2)	1.7	100.0
Johnson/Wyandotte counties	35.0 (3.3)	14.2 (2.4)	31.8 (3.5)	10.8 (2.1)	*6.6 (2.0)	1.7	100.0
Rest of Kansas	44.8 (2.2)	13.3 (1.5)	20.3 (1.9)	11.0 (1.4)	8.8 (1.4)	1.7	100.0
Kentucky	37.0 (2.2)	15.3 (1.7)	19.7 (2.0)	16.6 (1.7)	9.1 (1.5)	2.4	100.0
Louisiana	36.2 (2.2)	16.5 (1.7)	26.4 (2.2)	11.9 (1.5)	7.1 (1.3)	1.9	100.0
Maine	35.0 (2.3)	13.4 (1.6)	21.0 (2.1)	22.6 (2.0)	6.8 (1.3)	1.3	100.0
Maryland	29.4 (1.6)	18.1 (1.4)	28.4 (1.7)	17.8 (1.4)	4.6 (0.8)	1.6	100.0
Baltimore City	39.6 (3.2)	11.7 (2.1)	23.4 (3.1)	12.1 (2.2)	9.4 (2.3)	3.8	100.0
Prince George's County	§	§	§	§	§	§	§
Rest of Maryland	27.6 (2.0)	17.9 (1.7)	30.3 (2.2)	19.0 (1.8)	3.8 (1.0)	1.4	100.0
Massachusetts	24.1 (1.6)	17.0 (1.4)	34.3 (2.0)	15.0 (1.4)	8.4 (1.2)	1.1	100.0
Suffolk County	37.5 (3.6)	17.5 (2.8)	19.8 (3.4)	12.2 (2.5)	11.2 (2.8)	1.6	100.0
Rest of Massachusetts	22.6 (1.7)	16.9 (1.6)	36.0 (2.1)	15.4 (1.5)	8.1 (1.2)	1.1	100.0
Michigan	39.5 (1.7)	14.4 (1.2)	21.6 (1.6)	15.8 (1.3)	6.5 (1.0)	2.2	100.0
Wayne County	46.6 (2.8)	16.9 (2.1)	16.8 (2.4)	9.4 (1.6)	5.8 (1.5)	4.6	100.0
Rest of Michigan	39.0 (1.9)	14.2 (1.3)	21.9 (1.7)	16.3 (1.4)	6.6 (1.0)	2.1	100.0
Minnesota	35.7 (1.7)	17.5 (1.3)	26.5 (1.7)	13.8 (1.2)	5.0 (0.9)	1.4	100.0
Twin Cities counties[4]	36.7 (2.3)	18.3 (1.8)	27.9 (2.3)	12.5 (1.6)	3.2 (0.9)	1.3	100.0
Rest of Minnesota	34.6 (2.5)	16.6 (1.9)	24.9 (2.5)	15.3 (1.9)	7.2 (1.5)	1.4	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, 2012—Con.

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service[1]	Total
	Percent (standard error)						
Mississippi	49.4 (1.9)	12.6 (1.3)	16.0 (1.5)	14.2 (1.3)	5.8 (1.0)	2.1	100.0
Missouri	41.4 (2.0)	15.8 (1.4)	20.6 (1.7)	14.1 (1.4)	5.9 (1.0)	2.1	100.0
St. Louis County/City	38.1 (3.2)	15.4 (2.3)	25.1 (3.2)	13.4 (2.2)	6.4 (1.9)	1.5	100.0
Rest of Missouri	42.4 (2.4)	15.9 (1.7)	19.3 (2.0)	14.3 (1.7)	5.7 (1.2)	2.3	100.0
Montana	§	§	§	§	§	§	§
Nebraska	37.5 (2.0)	15.3 (1.5)	25.0 (1.9)	12.9 (1.4)	7.7 (1.2)	1.6	100.0
Nevada	38.9 (1.8)	21.2 (1.5)	19.9 (1.6)	9.4 (1.0)	9.1 (1.2)	1.5	100.0
Clark County	40.7 (2.2)	21.6 (1.9)	19.8 (1.9)	7.9 (1.2)	8.6 (1.4)	1.5	100.0
Rest of Nevada	34.4 (2.9)	20.1 (2.4)	20.1 (2.6)	13.0 (2.0)	10.5 (2.1)	1.7	100.0
New Hampshire	26.7 (1.9)	17.5 (1.6)	31.8 (2.1)	17.6 (1.6)	5.2 (1.0)	1.2	100.0
New Jersey	19.4 (1.4)	25.7 (1.6)	31.1 (1.8)	15.2 (1.3)	6.9 (1.0)	1.6	100.0
Essex County	40.2 (3.7)	14.8 (2.6)	30.9 (3.9)	*3.3 (1.3)	8.2 (2.4)	2.5	100.0
Rest of New Jersey	18.8 (1.5)	26.0 (1.6)	31.1 (1.8)	15.5 (1.3)	6.9 (1.0)	1.6	100.0
New Mexico	36.8 (2.0)	13.2 (1.4)	21.7 (1.9)	9.4 (1.2)	15.1 (1.7)	3.8	100.0
Southern counties[5]	40.1 (3.0)	9.4 (1.7)	22.7 (2.8)	9.2 (1.8)	15.3 (2.5)	3.3	100.0
Rest of New Mexico	35.6 (2.5)	14.6 (1.8)	21.4 (2.3)	9.4 (1.5)	15.1 (2.1)	4.0	100.0
New York	23.5 (1.2)	17.7 (1.1)	30.9 (1.4)	16.5 (1.1)	9.4 (0.9)	2.0	100.0
City of New York counties[6]	29.4 (1.6)	16.7 (1.3)	30.3 (1.7)	10.2 (1.1)	10.6 (1.2)	2.7	100.0
Rest of New York	19.1 (1.6)	18.4 (1.6)	31.3 (2.0)	21.3 (1.7)	8.6 (1.3)	1.4	100.0
North Carolina	34.7 (1.7)	12.7 (1.2)	26.2 (1.7)	17.2 (1.4)	7.6 (1.0)	1.7	100.0
North Dakota	40.2 (1.7)	10.8 (1.1)	23.2 (1.5)	8.4 (1.0)	15.6 (1.3)	1.7	100.0
Ohio	36.8 (1.4)	16.1 (1.1)	24.0 (1.3)	15.8 (1.1)	5.3 (0.7)	2.1	100.0
Cuyahoga County	38.1 (3.2)	18.4 (2.5)	19.3 (2.9)	16.2 (2.4)	6.1 (1.8)	1.9	100.0
Franklin County	41.8 (3.7)	17.1 (2.8)	25.4 (3.8)	10.7 (2.4)	†	2.4	100.0
Rest of Ohio	35.9 (1.7)	15.6 (1.3)	24.4 (1.6)	16.4 (1.3)	5.5 (0.8)	2.1	100.0
Oklahoma	39.0 (2.0)	19.2 (1.6)	21.2 (1.8)	11.3 (1.3)	7.6 (1.2)	1.8	100.0
Oregon	36.8 (2.2)	16.1 (1.7)	19.7 (1.9)	16.4 (1.7)	9.2 (1.4)	1.8	100.0
Pennsylvania	26.2 (1.3)	18.7 (1.2)	26.4 (1.4)	18.4 (1.2)	8.7 (0.9)	1.5	100.0
Allegheny County	40.4 (3.4)	12.6 (2.3)	24.5 (3.3)	14.4 (2.4)	*6.8 (2.0)	1.4	100.0
Philadelphia County	37.8 (2.9)	18.1 (2.2)	21.8 (2.7)	13.0 (2.0)	6.6 (1.7)	2.7	100.0
Rest of Pennsylvania	22.7 (1.6)	19.5 (1.5)	27.4 (1.7)	19.7 (1.5)	9.3 (1.2)	1.4	100.0
Rhode Island	24.9 (1.8)	22.0 (1.7)	28.5 (1.9)	15.9 (1.5)	6.9 (1.1)	1.7	100.0
South Carolina	39.0 (2.1)	16.3 (1.5)	18.7 (1.8)	16.0 (1.5)	8.0 (1.2)	2.0	100.0
South Dakota	§	§	§	§	§	§	§
Tennessee	37.8 (1.7)	16.7 (1.3)	24.6 (1.7)	13.3 (1.2)	5.4 (0.9)	2.1	100.0
Davidson County	51.2 (3.6)	16.5 (2.6)	16.1 (3.0)	10.4 (2.2)	*4.1 (1.7)	1.7	100.0
Shelby County	46.2 (3.3)	17.9 (2.5)	19.7 (2.9)	8.7 (1.8)	*5.6 (1.8)	1.9	100.0
Rest of Tennessee	34.5 (2.1)	16.5 (1.6)	26.7 (2.1)	14.6 (1.6)	5.6 (1.1)	2.2	100.0
Texas	44.5 (1.2)	18.5 (0.9)	18.0 (1.0)	9.4 (0.7)	7.5 (0.6)	2.0	100.0
Bexar County	42.6 (2.5)	16.1 (1.9)	17.7 (2.1)	5.8 (1.2)	16.0 (2.1)	1.7	100.0
Dallas County	56.5 (2.6)	16.4 (1.9)	13.1 (1.9)	7.1 (1.3)	5.2 (1.3)	1.8	100.0
El Paso County	§	§	§	§	§	§	§
Harris County	47.0 (2.1)	20.7 (1.7)	16.4 (1.7)	9.7 (1.3)	3.7 (0.9)	2.5	100.0
Rest of Texas	42.9 (1.6)	19.0 (1.2)	19.3 (1.3)	10.2 (1.0)	6.7 (0.8)	1.9	100.0
Utah	46.6 (1.9)	15.2 (1.3)	22.1 (1.6)	10.2 (1.1)	4.1 (0.8)	1.8	100.0
Vermont	29.9 (1.9)	11.5 (1.3)	23.9 (1.8)	22.4 (1.7)	11.1 (1.4)	1.2	100.0
Virginia	32.0 (1.9)	22.1 (1.7)	24.0 (1.9)	14.6 (1.4)	5.3 (1.0)	1.9	100.0
Washington	39.4 (1.6)	17.4 (1.2)	22.1 (1.5)	13.4 (1.1)	6.3 (0.9)	1.4	100.0
Eastern counties[7]	34.2 (2.4)	19.4 (2.0)	22.8 (2.3)	15.8 (1.9)	6.2 (1.4)	1.7	100.0
King County	46.0 (2.9)	16.9 (2.2)	21.0 (2.6)	9.8 (1.7)	*4.7 (1.4)	1.5	100.0
Rest of Washington	37.6 (2.4)	16.7 (1.9)	22.5 (2.3)	14.6 (1.8)	7.4 (1.5)	1.2	100.0
West Virginia	30.2 (2.4)	11.1 (1.6)	14.6 (1.9)	24.8 (2.2)	16.7 (2.1)	2.5	100.0
Wisconsin	39.0 (2.0)	11.3 (1.3)	20.2 (1.7)	18.0 (1.6)	9.8 (1.3)	1.7	100.0
Milwaukee County	§	§	§	§	§	§	§
Rest of Wisconsin	36.6 (2.2)	11.9 (1.5)	20.3 (2.0)	19.5 (1.8)	10.1 (1.5)	1.5	100.0
Wyoming	§	§	§	§	§	§	§

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

§ Model-based estimates for Maryland-Prince George's County, Montana, South Dakota, Texas-El Paso County, Wisconsin-Milwaukee County, and Wyoming are not reported because, for at least one telephone service use category, direct estimates from the National Health Information 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.

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

[1]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 2011 American Community Survey estimate for this proportion.

[2]Includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity.

[3]Includes Adams, Arapahoe, Denver, and Douglas.
[4]Includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.
[5]Includes Catron, Chaves, Curry, De Baca, Dona Ana, Eddy, Grant, Hidalgo, Lea, Lincoln, Luna, Otero, Roosevelt, Sierra, and Socorro.
[6]Includes Bronx, Kings, New York, Queens, and Richmond.
[7]Includes Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima.

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

SOURCES: CDC/NCHS, National Health Interview Survey, 2007–2012; U.S. Census Bureau, American Community Survey, 2006–2011; and infoUSA.com consumer database, 2007–2012.

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, 2012

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service[1]	Total
	Percent (standard error)						
Alabama	49.6 (3.2)	19.8 (2.7)	18.5 (2.9)	6.6 (1.6)	*3.5 (1.5)	2.1	100.0
Jefferson County	55.2 (4.4)	20.3 (3.7)	16.4 (3.7)	†	†	1.4	100.0
Rest of Alabama	48.7 (3.7)	19.7 (3.1)	18.8 (3.3)	7.2 (1.9)	*3.5 (1.6)	2.2	100.0
Alaska	25.7 (3.7)	27.6 (3.9)	30.6 (4.2)	10.1 (2.6)	*5.1 (2.1)	0.9	100.0
Arizona	49.9 (2.7)	19.7 (2.3)	16.3 (2.3)	3.7 (0.9)	8.4 (1.9)	2.0	100.0
Maricopa County	52.0 (3.7)	18.6 (3.0)	15.7 (3.0)	†	10.9 (2.8)	1.6	100.0
Rest of Arizona	46.3 (3.9)	21.4 (3.5)	17.4 (3.4)	7.8 (2.0)	*4.2 (2.0)	2.8	100.0
Arkansas	59.8 (3.1)	16.3 (2.5)	14.1 (2.5)	*4.1 (1.3)	*3.0 (1.3)	2.8	100.0
California	38.2 (1.2)	22.9 (1.1)	24.1 (1.1)	7.4 (0.6)	6.0 (0.6)	1.4	100.0
Alameda County	37.0 (4.3)	22.7 (4.0)	34.2 (4.9)	*4.9 (1.8)	†	0.7	100.0
Fresno County	36.1 (3.6)	11.5 (2.5)	28.3 (3.8)	8.1 (2.1)	14.7 (3.3)	1.3	100.0
Los Angeles County	36.7 (2.2)	24.4 (2.0)	23.5 (2.0)	7.2 (1.2)	6.5 (1.3)	1.6	100.0
Northern counties[2]	38.2 (4.4)	18.3 (3.8)	25.8 (4.6)	8.6 (2.4)	*7.6 (3.1)	1.5	100.0
San Bernardino County	45.8 (3.9)	22.9 (3.5)	19.8 (3.5)	6.9 (1.9)	*3.4 (1.7)	1.1	100.0
San Diego County	29.5 (3.0)	23.4 (2.9)	28.4 (3.3)	8.2 (1.8)	8.2 (2.1)	2.3	100.0
Santa Clara County	34.9 (3.7)	24.1 (3.5)	31.7 (4.1)	*3.9 (1.5)	*4.6 (2.0)	0.7	100.0
Rest of California	40.0 (2.0)	22.9 (1.7)	22.2 (1.7)	7.9 (1.1)	5.6 (1.0)	1.3	100.0
Colorado	45.1 (2.8)	21.1 (2.4)	23.7 (2.6)	6.1 (1.3)	*2.2 (1.0)	1.9	100.0
City of Denver counties[3]	46.3 (3.9)	20.2 (3.3)	24.5 (3.7)	*5.5 (1.7)	†	1.4	100.0
Rest of Colorado	44.2 (3.8)	21.7 (3.3)	23.1 (3.6)	6.5 (1.9)	†	2.2	100.0
Connecticut	25.4 (2.6)	20.6 (2.5)	32.9 (3.0)	11.8 (1.9)	8.4 (1.9)	0.8	100.0
Delaware	26.8 (3.3)	28.5 (3.5)	35.5 (3.9)	5.9 (1.8)	†	1.2	100.0
District of Columbia	42.2 (4.4)	19.4 (3.7)	25.3 (4.0)	*3.8 (1.7)	*7.2 (2.6)	2.2	100.0
Florida	49.2 (1.8)	21.1 (1.6)	21.4 (1.6)	2.6 (0.6)	2.7 (0.7)	3.1	100.0
Miami-Dade County	53.2 (4.6)	18.3 (3.8)	21.1 (4.3)	†	†	2.9	100.0
Duval County	54.2 (3.3)	18.6 (2.8)	18.6 (2.9)	*1.9 (0.9)	†	5.7	100.0
Orange County	51.4 (4.6)	23.3 (4.2)	21.1 (4.4)	†	†	1.7	100.0
Rest of Florida	47.7 (2.3)	21.5 (2.0)	22.0 (2.1)	3.0 (0.8)	3.0 (0.9)	2.7	100.0
Georgia	45.9 (2.4)	24.6 (2.2)	18.7 (2.0)	3.9 (1.0)	3.8 (1.1)	3.0	100.0
Fulton/DeKalb counties	48.8 (4.4)	25.1 (4.1)	22.8 (4.3)	†	†	2.1	100.0
Rest of Georgia	45.4 (2.7)	24.5 (2.5)	18.0 (2.3)	4.5 (1.1)	4.4 (1.3)	3.2	100.0
Hawaii	43.8 (3.9)	18.6 (3.2)	28.6 (3.9)	*3.7 (1.4)	*3.5 (1.7)	1.7	100.0
Idaho	62.2 (2.6)	9.1 (1.6)	17.8 (2.2)	7.0 (1.4)	†	2.7	100.0
Illinois	42.4 (2.3)	21.3 (2.0)	26.5 (2.2)	5.9 (1.1)	*2.3 (0.8)	1.6	100.0
Cook County	42.3 (3.2)	16.2 (2.5)	32.4 (3.3)	*4.1 (1.3)	*2.5 (1.2)	2.4	100.0
Madison/St. Clair counties	45.6 (5.5)	21.4 (4.7)	25.9 (5.6)	*5.8 (2.4)	†	1.2	100.0
Rest of Illinois	42.2 (2.9)	22.7 (2.6)	25.0 (2.8)	6.4 (1.4)	*2.3 (1.0)	1.4	100.0
Indiana	46.3 (2.9)	16.0 (2.2)	19.5 (2.5)	6.5 (1.4)	8.3 (1.9)	3.4	100.0
Lake County	44.5 (5.2)	18.9 (4.2)	21.0 (4.8)	*5.5 (2.3)	*8.0 (3.6)	2.1	100.0
Marion County	52.8 (4.7)	11.0 (3.1)	21.0 (4.3)	*5.2 (2.0)	*5.9 (2.8)	4.1	100.0
Rest of Indiana	45.3 (3.5)	16.6 (2.8)	19.1 (3.1)	6.9 (1.7)	8.7 (2.4)	3.4	100.0
Iowa	45.4 (3.2)	27.5 (3.0)	18.0 (2.7)	*3.3 (1.1)	*2.7 (1.2)	3.0	100.0
Kansas	52.5 (2.7)	15.9 (2.1)	21.9 (2.4)	5.2 (1.2)	*3.2 (1.1)	1.4	100.0
Johnson/Wyandotte counties	41.5 (4.8)	17.6 (3.9)	32.9 (5.2)	*5.0 (2.0)	†	1.1	100.0
Rest of Kansas	56.4 (3.2)	15.3 (2.4)	18.0 (2.7)	5.3 (1.4)	*3.6 (1.4)	1.4	100.0
Kentucky	52.5 (3.2)	16.2 (2.5)	14.6 (2.5)	9.4 (1.8)	*4.3 (1.5)	3.0	100.0
Louisiana	45.1 (3.1)	21.5 (2.7)	24.4 (3.0)	4.8 (1.3)	†	2.2	100.0
Maine	41.6 (3.3)	17.9 (2.7)	21.8 (3.0)	16.1 (2.5)	†	0.6	100.0
Maryland	33.6 (2.4)	22.7 (2.3)	30.6 (2.7)	9.7 (1.6)	†	2.1	100.0
Baltimore City	51.8 (5.3)	12.5 (3.6)	22.0 (4.9)	*6.7 (2.5)	†	5.4	100.0
Prince George's County	§	§	§	§	§	§	§
Rest of Maryland	30.0 (3.0)	23.3 (2.9)	32.8 (3.4)	10.6 (2.0)	†	1.9	100.0
Massachusetts	26.7 (2.7)	22.3 (2.7)	37.9 (3.3)	8.6 (1.7)	*3.3 (1.3)	1.2	100.0
Suffolk County	48.9 (6.8)	22.0 (5.8)	*20.2 (6.1)	†	†	2.8	100.0
Rest of Massachusetts	24.9 (2.8)	22.3 (2.9)	39.4 (3.5)	8.9 (1.8)	*3.4 (1.4)	1.1	100.0
Michigan	44.2 (2.6)	18.6 (2.2)	23.5 (2.5)	8.1 (1.5)	*3.2 (1.1)	2.3	100.0
Wayne County	59.6 (4.1)	19.5 (3.7)	12.4 (3.4)	*2.8 (1.3)	†	3.5	100.0
Rest of Michigan	42.9 (2.8)	18.6 (2.3)	24.5 (2.7)	8.6 (1.6)	*3.3 (1.2)	2.2	100.0
Minnesota	36.7 (2.6)	22.5 (2.4)	30.0 (2.8)	8.3 (1.5)	†	1.2	100.0
Twin Cities counties[4]	37.0 (3.7)	19.9 (3.2)	33.1 (4.0)	9.0 (2.1)	†	0.8	100.0
Rest of Minnesota	36.3 (3.7)	25.7 (3.6)	26.1 (3.8)	7.4 (2.0)	†	1.5	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, 2012—Con.

Geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service[1]	Total
	Percent (standard error)						
Mississippi	63.4 (3.0)	15.4 (2.4)	11.3 (2.2)	5.5 (1.4)	*2.5 (1.1)	1.9	100.0
Missouri	55.2 (3.0)	17.8 (2.4)	16.4 (2.4)	5.9 (1.4)	*2.3 (1.1)	2.5	100.0
St. Louis County/City	39.2 (4.8)	22.9 (4.4)	28.6 (5.1)	*6.5 (2.3)	†	2.1	100.0
Rest of Missouri	59.4 (3.5)	16.5 (2.8)	13.1 (2.6)	5.8 (1.6)	†	2.5	100.0
Montana	§	§	§	§	§	§	§
Nebraska	43.7 (3.2)	19.7 (2.7)	26.8 (3.2)	5.8 (1.5)	*2.4 (1.2)	1.6	100.0
Nevada	41.7 (2.8)	27.2 (2.6)	20.8 (2.5)	4.0 (1.1)	*4.7 (1.4)	1.7	100.0
Clark County	40.6 (3.4)	25.0 (3.1)	22.9 (3.1)	*4.0 (1.3)	*6.1 (1.9)	1.5	100.0
Rest of Nevada	44.6 (5.0)	33.5 (4.8)	15.0 (3.9)	*3.9 (1.9)	†	2.2	100.0
New Hampshire	30.3 (3.2)	23.4 (3.1)	32.7 (3.6)	9.8 (2.1)	†	1.2	100.0
New Jersey	20.6 (2.2)	31.2 (2.7)	33.2 (2.9)	8.5 (1.6)	4.8 (1.4)	1.7	100.0
Essex County	38.2 (5.0)	20.4 (4.3)	33.1 (5.5)	†	†	4.3	100.0
Rest of New Jersey	19.9 (2.3)	31.6 (2.8)	33.2 (3.0)	8.8 (1.6)	*4.8 (1.5)	1.6	100.0
New Mexico	53.4 (3.3)	15.2 (2.5)	18.7 (2.8)	*2.7 (1.1)	*5.1 (1.8)	4.8	100.0
Southern counties[5]	59.1 (4.6)	10.4 (2.9)	20.7 (4.3)	†	†	4.5	100.0
Rest of New Mexico	51.2 (4.1)	17.1 (3.2)	17.9 (3.5)	*3.4 (1.5)	*5.5 (2.3)	5.0	100.0
New York	26.8 (1.9)	21.0 (1.8)	34.5 (2.2)	10.7 (1.3)	4.9 (1.1)	2.0	100.0
City of New York counties[6]	29.8 (2.7)	20.3 (2.5)	34.7 (3.0)	7.3 (1.5)	5.3 (1.5)	2.7	100.0
Rest of New York	24.7 (2.6)	21.6 (2.5)	34.3 (3.1)	13.1 (2.0)	*4.7 (1.4)	1.6	100.0
North Carolina	47.1 (2.6)	17.8 (2.1)	23.2 (2.4)	6.9 (1.3)	*3.4 (1.1)	1.6	100.0
North Dakota	50.0 (3.2)	16.3 (2.4)	25.2 (2.9)	†	6.8 (1.8)	1.5	100.0
Ohio	44.7 (2.4)	18.1 (1.9)	22.8 (2.2)	8.5 (1.3)	*2.9 (1.0)	3.0	100.0
Cuyahoga County	37.0 (4.2)	20.5 (3.8)	25.5 (4.4)	14.2 (3.0)	†	2.5	100.0
Franklin County	43.1 (4.5)	19.7 (3.8)	28.5 (4.7)	*5.4 (2.0)	†	1.6	100.0
Rest of Ohio	46.0 (2.9)	17.5 (2.3)	21.7 (2.6)	8.2 (1.6)	*3.4 (1.2)	3.2	100.0
Oklahoma	50.9 (3.4)	24.8 (3.0)	15.1 (2.6)	*3.3 (1.2)	*4.6 (1.6)	1.3	100.0
Oregon	41.5 (3.4)	21.4 (3.0)	22.3 (3.2)	7.2 (1.8)	*5.7 (1.9)	1.9	100.0
Pennsylvania	31.4 (2.1)	24.6 (2.1)	29.9 (2.4)	8.5 (1.3)	3.6 (1.0)	2.1	100.0
Allegheny County	43.9 (5.4)	21.7 (4.7)	28.6 (5.6)	*4.7 (2.2)	†	0.9	100.0
Philadelphia County	46.8 (4.4)	17.1 (3.4)	22.3 (4.1)	8.5 (2.3)	†	2.7	100.0
Rest of Pennsylvania	27.6 (2.5)	26.1 (2.6)	31.2 (2.8)	8.9 (1.6)	*4.1 (1.3)	2.2	100.0
Rhode Island	34.8 (3.4)	27.9 (3.3)	25.4 (3.4)	6.5 (1.8)	*3.4 (1.5)	1.9	100.0
South Carolina	54.5 (3.3)	19.0 (2.7)	16.2 (2.6)	5.8 (1.5)	*2.5 (1.2)	2.1	100.0
South Dakota	§	§	§	§	§	§	§
Tennessee	52.3 (2.6)	18.1 (2.1)	20.6 (2.4)	5.9 (1.3)	†	2.3	100.0
Davidson County	61.8 (5.4)	17.6 (4.2)	17.5 (4.6)	†	†	2.1	100.0
Shelby County	54.1 (4.7)	22.4 (4.2)	16.8 (4.0)	†	†	1.4	100.0
Rest of Tennessee	50.7 (3.3)	17.2 (2.6)	21.8 (3.0)	7.2 (1.7)	†	2.5	100.0
Texas	54.2 (1.7)	21.6 (1.5)	14.7 (1.3)	4.1 (0.7)	3.4 (0.7)	2.1	100.0
Bexar County	57.0 (3.9)	18.4 (3.2)	16.4 (3.2)	†	*5.9 (2.2)	1.6	100.0
Dallas County	65.9 (3.6)	17.6 (3.0)	10.7 (2.6)	*3.6 (1.4)	†	2.0	100.0
El Paso County	§	§	§	§	§	§	§
Harris County	54.8 (2.9)	22.6 (2.5)	13.5 (2.1)	4.7 (1.2)	*2.1 (1.0)	2.4	100.0
Rest of Texas	52.0 (2.2)	22.8 (1.9)	15.3 (1.7)	4.6 (0.9)	3.4 (0.9)	1.9	100.0
Utah	48.5 (2.6)	19.7 (2.1)	23.5 (2.3)	4.5 (1.0)	*1.9 (0.8)	1.9	100.0
Vermont	24.5 (3.2)	13.5 (2.6)	32.8 (3.7)	20.7 (3.0)	8.2 (2.3)	0.2	100.0
Virginia	36.2 (2.7)	24.3 (2.5)	27.6 (2.7)	6.9 (1.4)	*3.1 (1.1)	2.0	100.0
Washington	41.8 (2.2)	20.6 (1.9)	23.9 (2.1)	7.8 (1.2)	4.6 (1.2)	1.3	100.0
Eastern counties[7]	44.2 (3.7)	23.4 (3.3)	21.5 (3.4)	7.2 (1.9)	†	1.8	100.0
King County	41.0 (4.0)	19.3 (3.5)	31.9 (4.4)	*4.7 (1.7)	†	1.4	100.0
Rest of Washington	41.1 (3.4)	19.9 (3.0)	20.7 (3.2)	9.8 (2.0)	7.5 (2.2)	1.0	100.0
West Virginia	42.7 (3.6)	11.9 (2.4)	13.9 (2.7)	18.6 (2.8)	10.0 (2.5)	2.9	100.0
Wisconsin	44.5 (3.0)	17.4 (2.5)	24.3 (3.0)	8.6 (1.7)	*2.6 (1.2)	2.7	100.0
Milwaukee County	§	§	§	§	§	§	§
Rest of Wisconsin	41.0 (3.5)	18.5 (2.9)	25.6 (3.5)	9.9 (2.1)	†	2.5	100.0
Wyoming	§	§	§	§	§	§	§

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

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

§ Model-based estimates for Maryland-Prince George's County, Montana, South Dakota, Texas-El Paso County, Wisconsin-Milwaukee County, and Wyoming are not reported because, for at least one telephone service use category, direct estimates from the National Health Information 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.

[1]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 2011 American Community Survey estimate for this proportion.

[2]Includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity.
[3]Includes Adams, Arapahoe, Denver, and Douglas.
[4]Includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington.
[5]Includes Catron, Chaves, Curry, De Baca, Dona Ana, Eddy, Grant, Hidalgo, Lea, Lincoln, Luna, Otero, Roosevelt, Sierra, and Socorro.
[6]Includes Bronx, Kings, New York, Queens, and Richmond.
[7]Includes Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima.

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

SOURCES: CDC/NCHS, National Health Interview Survey, 2007–2012; U.S. Census Bureau, American Community Survey, 2006–2011; and infoUSA.com consumer database, 2007–2012.

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 2012, and on American Community Survey (ACS) data collected from 2006 through 2011. NHIS is a multipurpose health survey conducted by the Centers for Disease Control and Prevention's (CDC) 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.

National Health Interview Survey

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 interview survey 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. Survey 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 NHIS data to be used 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, for 101,449 persons in 2011, and for 107,723 persons in 2012. Fewer than 0.5% of persons with completed NHIS family-level interviews had missing data for household telephone status.

NHIS was used to derive 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.

American Community Survey

ACS is a multistage probability survey that provides data on households and group quarters. In this report, a subset of the full ACS sample—the civilian noninstitutionalized population—is used to represent a population similar to that sampled for NHIS. Data are 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, 2012 ACS data will not be released until Fall 2013. 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 2009; data for 2009 were used in models for 2010; data for 2010 were used in models for 2011; and data for 2011 were used in models for 2012. Moreover, ACS was the source 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.

Auxiliary data source

The numbers of listed telephone lines within each state for 2007–2012 were obtained from a consumer database compiled by infoUSA.com (Infogroup, Papillion, NE). 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 pages 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 the selected 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 the 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 telephones, 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 nor 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 elsewhere (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.

NHIS and ACS sampling weights adjust for the probability of selection of each household, and 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.

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 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 telephone service use category and for each small area. Ratios were computed across all 6-month periods. 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: Maryland-Prince George's County, 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 Table below.

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, 2012

Age and geographic area	Wireless-only	Wireless-mostly	Dual-use	Landline-mostly	Landline-only	No telephone service[1]	Total
	Percent (standard error)						
Adults aged 18 and over							
Maryland-Prince George's County	32.2 (5.7)	21.3 (4.3)	29.6 (6.0)	13.3 (3.6)	†	1.0	100.0
Montana	39.9 (6.1)	16.9 (3.8)	17.7 (4.9)	14.7 (3.8)	†	2.4	100.0
South Dakota	38.6 (5.9)	15.1 (3.6)	21.8 (5.1)	13.9 (3.7)	†	2.0	100.0
Texas-El Paso County	43.8 (6.3)	14.3 (3.7)	23.2 (5.5)	†	†	3.8	100.0
Wisconsin-Milwaukee County	44.1 (6.1)	13.7 (3.5)	20.8 (5.1)	*9.7 (3.2)	†	2.4	100.0
Wyoming	39.3 (6.1)	15.7 (3.7)	19.8 (5.1)	13.3 (3.7)	†	2.1	100.0
Children under age 18							
Maryland-Prince George's County	35.6 (7.5)	24.8 (6.4)	31.2 (7.8)	†	†	1.0	100.0
Montana	49.7 (8.1)	22.9 (6.2)	*15.6 (6.0)	†	†	2.5	100.0
South Dakota	46.2 (7.7)	19.3 (5.6)	22.3 (6.5)	†	†	2.5	100.0
Texas-El Paso County	55.9 (7.4)	*15.2 (5.0)	*17.7 (6.0)	†	†	5.2	100.0
Wisconsin-Milwaukee County	51.5 (8.1)	*16.4 (5.4)	*21.1 (6.6)	†	†	3.4	100.0
Wyoming	47.3 (8.0)	21.0 (5.9)	*17.9 (6.3)	†	†	1.7	100.0

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

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

[1]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 2011 American Community Survey estimate for this proportion.

NOTES: Model-based estimates for these six areas are not reported in the main-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 should be used with caution because 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, 2006–2011; and infoUSA.com consumer database, 2007–2012.

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National Health Statistics Reports ■ Number 70 ■ December 18, 2013

Acknowledgments

NCHS thanks NORC at the University of Chicago and the State Health Access Data Assistance Center (SHADAC) at the University of Minnesota for providing resources that supported this research. The authors are solely responsible for the content of this report. Nadarajasundaram Ganesh developed the statistical models. The authors thank Marketing Systems Group for providing the auxiliary data on listed telephone numbers, and the staff of the NCHS Research Data Center for their assistance.

Suggested citation

Blumberg SJ, Ganesh N, Luke JV, Gonzales G. Wireless substitution: State-level estimates from the National Health Interview Survey, 2012. National health statistics reports; no 70. Hyattsville, MD: National Center for Health Statistics. 2013.

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SIGNATURE OF AFFIANT [signature] DAN A. NOBLE

Subscribed to me in my presence and before me this 22nd day of June, in the year 2015

SIGNATURE OF NOTARY PUBLIC Candice S. Hendry

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