BROADBAND ADOPTION IN ILLINOIS:

Who is online, who is not,
and how to expand home high-speed adoption

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Executive Summary

The Partnership for a Connected Illinois (PCI) conducted a statewide survey of Illinois residents in the first quarter of 2012 that sought to understand broadband adoption patterns across the state, as well as the reasons why some Illinois households choose not to have broadband at home. Because PCI had commissioned other survey work focusing on the City of Chicago, the survey conducted for this report focuses on areas in the state outside of Chicago, i.e., excluding Cook County. Specifically, the telephone survey for this report provides a regional breakdown of broadband use in Illinois' 10 eTeam regions.

The survey's main findings are:

- 68% of Illinois adults surveyed in this report have broadband Internet connections at home; 56% of African Americans and 56% of Hispanics have broadband at home. The overall figure is in line with the 68.7% adoption rate that the U.S. Department of Commerce reported for Illinois in late 2010.[1]
- There is significant regional variation in home broadband adoption rates. In 4 eTeam regions of the state – Northwest, Southeast Central, Southern, and West Central – home broadband rates are below 60%. The Northeast section of the state (excluding Cook County) has the highest rate of home broadband adoption with 76%, with the North Central region coming in next at 70%.
- Smartphones have a strong foothold in how people in Illinois access the Internet. Some 46% of Illinois residents have a Smartphone, which permits wireless online access using a handheld device; that figure matches the national Smartphone adoption rate.[2] For the most part, those with Smartphones also have broadband at home – 85% of Smartphone users have home high-speed service. This translates into just 7% of those surveyed having "Smartphones only" as their sole means of online access.

[1] U.S. Department of Commerce, *Digital Nation: Expanding Internet Usage*. NTIA Research Preview, February 2011. Available online at: http://www.ntia.doc.gov/files/ntia/publications/ntia_internet_use_report_february_2011.pdf

[2] Lee Rainie, *Smartphone Ownership Update: September 2012.* Pew Research Center's Internet & American Life Project. Available online at: http://www.pewinternet.org/Reports/2012/Smartphone-Update-Sept-2012/Findings.aspx.

  - Smartphone adoption is particularly strong for African Americans (52%) and Hispanics (60%).
  - Some 15% of African Americans and 18% of Hispanics are "Smartphone only" users (i.e., they have a Smartphone but no home broadband subscription).

- Smartphones are key ingredients to online engagement for those who have them. Illinois residents with Smartphones and home broadband do a greater scope of online activities than those with only broadband at home or Smartphone only access. The Smartphone/home broadband combination is also a significant driver in shaping users' attitudes about how broadband helps in carrying out everyday tasks.
- However, those with Smartphone-only access do substantially fewer online activities than those with both broadband and Smartphones, or broadband-at-home alone. Smartphone only users also have less enthusiastic views about how broadband can help with personal productivity and in carrying out tasks than broadband users, as well as those with broadband and a Smartphone.
- The 32% of Illinois adults without broadband at home are older, more rural, and have lower incomes than broadband users in the state. Overall, the familiar triumvirate of cost, not seeing broadband's relevance, and digital literacy come to the fore as the most important reasons people do not have broadband. At the same time, Illinois non-broadband adopters typically cite multiple reasons for not having service.
  - Some one-quarter (24%) of non-broadband users in Illinois say they would be interested in getting broadband service at home. These users do not have broadband because they cannot afford it, but they also say they would be interested in getting health care information, keeping up with family and friends, and using entertainment applications if they had broadband.
  - Three-quarters (76%) of non-adopters exhibit little interest in home broadband service and they typically cite a range of reasons for not having high-speed Internet at home – such as not seeing the relevance of broadband, digital literacy, and cost barriers.

The PCI statewide survey has the following implications for stakeholders in Illinois:

- Given regional variations in broadband adoption, stakeholders should direct resources to encourage home broadband adoption to areas with lower-than-average home high-speed adoption.
- Smartphones have made significant inroads into addressing access inequities across racial and ethnic categories. However, while Smartphones open the door to online engagement, they do not open the door as widely as does home broadband access.
- The advent of Smartphones indicates that mobile wireless access is a powerful means to drawing current and future broadband users to deeper engagement with the benefits of digital resources. Stakeholders should understand the wireless and wireline infrastructure both play key roles in strategies to improve online access.
- For one-quarter of non-broadband adopters, cost relief – both lower monthly access prices and low-cost computer offerings – is crucial to luring them to broadband. Such users would also benefit from education efforts that emphasize the benefits of health care and information-gathering applications.
- The three-quarters of non-adopters who do not have a strong interest in broadband, comprehensive training programs that emphasize the benefits of broadband – while also providing cost relief and training on how to use the Internet – are important.

Methodology

The PCI survey is a random digit dial telephone survey of 3,506 Illinois adults, conducted between February 23 and April 24, 2012 by Princeton Survey Research Associates International. The survey excluded Cook County. The survey was administered using both cell phones and landline telephones; 1,608 landline interviews were conducted and 1,898 interviews were conducted for respondents using cell phones. Respondents were given the option of completing the survey in English or Spanish.

Introduction

For residents of Illinois, a home broadband connection serves as a pathway to the wonders and benefits of the Internet. For the 68% of Illinoisans with high-speed connections at home, broadband allows them to connect with family, friends, and neighbors, look for bargains, find health and medical information, or communicate with government. The remaining third of Illinois residents who lack broadband service at home miss out on the fun and functionality of the Internet. They also suffer from narrowing offline alternatives to carry out daily tasks, as more ways of doing things migrate to cyberspace and less investment is devoted to "old" offline means.

This report charts broadband and other online access options in places in Illinois outside the City of Chicago. Because the Partnership for Connected Illinois (PCI) commissioned an in-depth survey of online access in the City of Chicago, PCI chose to devote resources for a telephone survey of all other areas in Illinois. PCI also chose a regional approach in survey design; each of PCI's 10 eTeam regions throughout the state were surveyed so that stakeholders could understand broadband adoption patterns in those places.

In addition to asking about broadband adoption, the survey also explored other ways people go online and the devices they use for access. Of particular interest were Smartphones, which nearly half of all Americans have, but the survey also asked about tablet computers and e-readers. The other main focus of the survey was non-adoption – not only understanding the size and nature of those in Illinois without broadband at home, but also the reasons they do not have service. The PCI survey was conducted from late February to early April 2012.

Here are key survey findings for the entire state of Illinois (excluding the City of Chicago):

- 79% of those surveyed are Internet users, which may include dial-up access, access from school, work, or a library, or some other site.
- 68% of those surveyed have broadband service at home.
- 46% of those surveyed have Smartphones that allow them to go online with a handheld mobile device.

Non-adopters in this report refer to the 32% of those surveyed who do not have broadband at home. Some of these may be Internet users – through old-fashioned dial-up or the latest

Smartphone. Or perhaps they use the Internet at school, a library, the workplace, or elsewhere. When asked why they do not have broadband service at home, non-adopters, when permitted to cite more than one reason, said the following:

- 65% cited cost as a reason, such as the monthly service fee (52%) or cost of a computer (31%).
- 58% cited lack of relevance (e.g., they think the Internet is a waste of time or that there is nothing online worth viewing).
- 44% cited digital literacy (they are worried about bad things that could happen online or they are uncomfortable using a computer).
- 22% cited some other reason.
- 15% said the Internet was not available where they live.

The typical non-broadband adopter cited 3 reasons for not having a high-speed Internet connection at home.

When asked to specify the *most important* reason they do not have broadband at home, here is what the non-adopters surveyed in Illinois said:

- 29% stated cost was the main reason, with 16% citing the monthly fee and 9% computer affordability.
- 17% said lack of relevance was the main reason they do not have service.
- 13% cited digital literacy.

Filling out the balance, 21% cited some other reason, 2% said service was not available where they live, and the remaining 18% declined to answer.

This report has five main sections. First, after providing an overview of statewide results, the report shows how access to the Internet varies throughout eTeam regions in the state of Illinois. Second, the report highlights the reasons non-broadband users do not have broadband at home. Third, given the advent of Smartphones as an access device for the Internet, the report investigates where Smartphones fit in people's online usage patterns. The fourth section talks about what might draw non-adopters to Internet use at home. A final section discusses implications of the report's findings.

I. Internet Access in Illinois

a. A portrait of access statewide

Table 1 shows survey results for areas in Illinois outside the City of Chicago for online access, broadband access, cell phone use, Smartphone use, and other relevant technologies. Overall, 68% of Illinois residents in the sample have broadband at home as of the first quarter of 2012. In Chicago, 67.5% of residents had broadband in a survey conducted in 2011.[3] These results compare well to the National Telecommunications and Information Administration's (NTIA) findings for Illinois based on a large scale national survey of 54,000 households; NTIA finds that 68.7% of Illinois households had broadband as of November 2010.

Table 1

	% of all respondents who are …	% of Whites	% of African Americans	% of Hispanics
Cell phone users	91%	91%	91%	95%
Internet users	79	79	73	76
Home broadband users	68	69	56	56
Desktop computer	63	64	50	52
Laptop computer	59	60	51	61
Smartphone users	46	44	52	60
E-reader	20	21	17	13
Tablet users	19	19	19	18
Broadband ***and*** Smartphone users	39	38	37	42
Broadband-at-home ***only*** users	26	27	17	13
Broadband ***and*** Smartphone ***and*** Tablet users	14	13	14	14
Smartphone *only* users	7	6	15	18
Number of cases	3,506	3,108	178	170

Table 1 also shows results broken down by race and ethnicity, with familiar patterns of higher rates of home broadband adoption for whites than for African Americans and Hispanics. However, African Americans and (especially) Hispanics are more likely to have Smartphones than whites.

[3] Karen Mossberger, Caroline J. Tolbert, Allison Hamilton, *Measuring Digital Citizenship: Mobile Access and Broadband*. International Journal of Communication, Vol. 6 (2012). Available online at: http://ijoc.org/ojs/index.php/ijoc/article/view/1777.

The relationship between Smartphone and home broadband access is worth examining in greater detail, as both provide "always on" access of a different sort – one fixed in the home, the other wireless and on-the-go. With 68% of Illinois residents with broadband at home and 46% with Smartphones, it is clear that many have both types of access. Among those with broadband at home, 85% have a Smartphone, suggesting that, for the most part, Smartphones complement people's online access assets. Put differently, "Smartphone only" access is a reality for only 7% of those surveyed, meaning that this small share of respondents have only a Smartphone as their primary online access means, not broadband. Adding broadband to Smartphone access, 75% of those surveyed in Illinois have access either via broadband at home or from a Smartphone.

With African Americans and Hispanics having higher rates of Smartphone adoption than whites, but lower rates of home broadband adoption, it follows that these two minority groups have higher rates of Smartphones only as their online access means. Looking at Smartphone only access in Illinois:

- 18% of Hispanics report having Smartphone only access;
- 15% of African Americans report having Smartphone only access;
- 6% of whites report having Smartphone only access.

As Figure 1 shows below, adding Smartphone access to home broadband access goes a long way toward closing Internet access gaps when focusing on race and ethnicity.

Figure 1

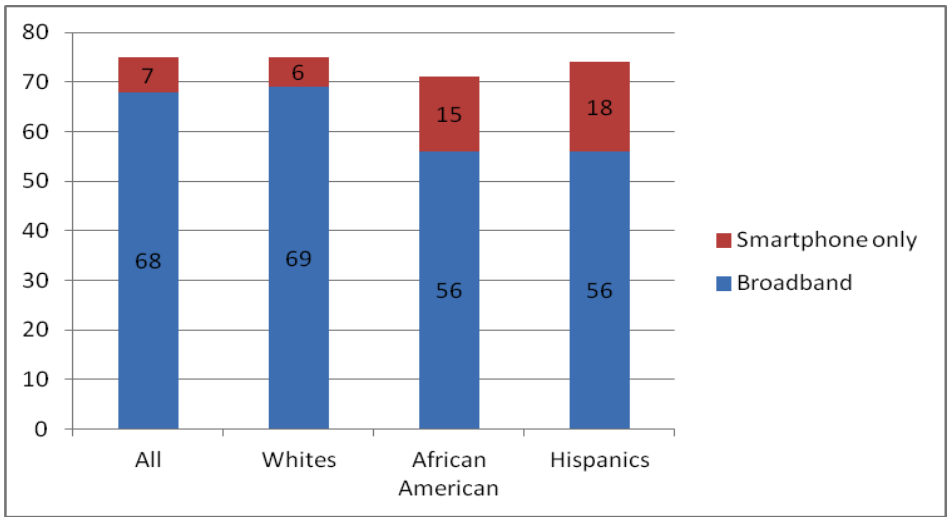

Table 2 presents a more complete picture of the breakdown of broadband-at-home and Smartphone access.

Table 2

	% in each group with broadband at home	% in each group with a Smartphone
Male	69%	49%
Female	66	43
Parents with minor children at home	76	58
Age		
Ages 18-24	76	70
25-34	75	66
35-44	75	58
45-64	71	38
65+	41	13
Race/Ethnicity		
White (not Hispanic)	69	44
Black (not Hispanic)	56	52
Hispanic (English or Spanish speaking)	56	60
Education		
Less than high school	32	28
High school grad	55	39
Some college	74	49
College +	86	55
Household income		
Under $20K	44	31
$20K-$30K	50	31
$30K-$40K	63	42
$40K-$50K	69	43
$50K-$75K	78	48
$75K-$100K	88	56
Over $100K	92	72
Don't know/refused	57	38
Geography		
Urban	73	51
Suburban	73	49
Rural	56	35
Unclassified	56	39
Number of cases	2,622	1,383

In addition to the distinct access patterns by race and ethnicity, there is clearly a more even distribution of Smartphones across socio-economic categories compared to broadband. Less educated Illinois respondents are nearly as likely to have a

Smartphone as broadband at home. Nearly one-third of low-income Illinoisans have Smartphone, while 4 in 9 have broadband. It is nonetheless the case that lower educated and lower income respondents have lower levels of Internet access than their counterparts higher up the ladder. Finally and not surprisingly, young people are more likely to have Smartphones than older Americans, with about two-thirds of those under the age of 35 with Smartphones.

For more detailed information on the demographic breakdowns of all survey respondents, those with broadband at home, those with Smartphones, and Smartphone only users, please see Table I in the report's Appendix.

b. Online access in eTeam regions

The following three tables show results for the 10 eTeam regions that PCI has created for the state as a means to improve regions' capacities to improve their broadband environments.

Table 3a

	Region 1 Central	Region 2 N Central	Region 3 NE Central	Region 4 North Stateline
Cell phone users	89%	92%	90%	90%
Internet users	75	83	81	76
Home broadband users	64	70	67	64
Desktop computer	62	65	59	60
Laptop computer	52	65	59	54
Smartphone users	36	43	43	42
E-reader	17	23	17	20
Tablet users	18	19	13	15
Broadband ***and*** Smartphone users	29	37	36	35
Broadband-at-home ***only*** users	29	30	28	25
Broadband ***and*** Smartphone ***and*** Tablet users	10	12	9	12
Smartphone *only* users	7	6	7	
Number of cases	300	300	301	302

Table 3b

	Region 5 Northeast (excl Cook County)	Region 6 North West	Region 7* SE Central
Cell phone users	93%	85%	84%
Internet users	85	71	66
Home broadband users	76	58	50
Desktop computer	67	60	57
Laptop computer	67	52	46
Smartphone users	55	33	31
E-reader	24	14	16
Tablet users	24	14	11
Broadband ***and*** Smartphone users	49	26	21
Broadband-at-home ***only*** users	24	29	27
Broadband ***and*** Smartphone ***and*** Tablet users	19	7	6
Smartphone *only* users	6	7	10
Number of cases	801	302	300

Table 3c

	Region 8* Southern	Region 9 Southwest	Region 10 West Central
Cell phone users	87%	90%	88%
Internet users	66	74	69
Home broadband users	54	63	54
Desktop computer	54	54	54
Laptop computer	46	55	42
Smartphone users	35	48	29
E-reader	17	17	17
Tablet users	15	15	16
Broadband ***and*** Smartphone users	27	39	22
Broadband-at-home ***only*** users	24	22	29
Broadband ***and*** Smartphone ***and*** Tablet users	9	9	9
Smartphone *only* users	8	9	7
Number of cases	300	300	300

As the tables show, the northeastern portion of Illinois – excluding Cook County – boasts the highest rate of information and communications technology (ICT) adoption, leading the way in home broadband adoption, Smartphone use, as well as adoption of computers, tablets, and e-readers. Other parts in northern Illinois fare well, with the

North Central and Northeast Central regions at or slightly above average on most measures of ICT adoption.

With the exception of the Southwest portion of the state, where Smartphone adoption is somewhat above average and home broadband adoption is slightly below average, other regions significantly lag the Illinois average. The Southeast Central region has the lowest rate of home broadband adoption, at 50% and a low (31%) rate of Smartphone adoption. Its overall Internet adoption rate is 66%, below the statewide average of 79% and equal to the rate in the Southern region. The Southern region has a low home broadband adoption rate of 54% and a 35% Smartphone adoption rate. The West Central region is also comparable to the Southern region, despite its higher overall Internet adoption rate (74%); 54% of residents there have broadband at home and just 29% have Smartphones. The Northwest region of the state has similarities to West Central, with 58% of residents there with broadband at home and 33% with Smartphones.

eTeam regions with lower broadband adoption are all places that are more rural, older, with populations with lower incomes and lower levels of educational attainment – factors that correlate with lower-than-average broadband adoption rats. However, two regions – Southeast Central and the Southern region – have lower broadband adoption rates than expected – even taking into account the factors noted above that predict lower broadband adoption.[4]

For readers interested in the demographic breakdowns for respondents in each of the 10 eTeam regions, please see Tables IIa, IIb, and IIc in the Appendix.

[4] Regression analysis modeled broadband adoption as a function of factors expected to influence the probability of adopting (education, income, geography, age, parental status, and race/ethnicity) *as well as* eTeam region in which the respondent resides. Except for the two regions noted, this variable made no difference; for the two regions noted, the impact was negative and significant.

II. Patterns of online use & the role of Smartphones

The PCI survey also asked respondents about the kinds of things they do online in order to get a profile of the level of interest in various online applications, ranging from educational uses to online shopping. The table below displays the share of Internet users who have *ever* done an activity online about which they were asked. The table also shows frequency of activity by the nature of respondents' online access. This section will have particular interest in Smartphones and their impact on the scope of respondents' online activities.

Table 4 below lists the online activities the survey queried and shows frequencies depending on the kinds of access assets respondents have. More is clearly better when it comes to access points and scope of online activities. The relatively elite set of respondents (14%) who have tablet computers, broadband at home, *and* a Smartphone do the most online. At the other end of the spectrum, those whose only form of online access is a Smartphone do, on average, less online activity than do Smartphone and home broadband users.

Table 4

	All home broadband users	Broadband and Smartphone and Tablet users	Broadband *and* Smartphone users	Broadband-at-home *only* users	Smartphone *only* users
Email	98%	100%	99%	96%	90%
Participate in social networks like Facebook or Linked In	82	89	89	74	82
Research consumer goods and services	87	94	91	84	71
Job search or look for employment opportunities	65	70	73	55	65
Research for education, training or school work	76	87	84	66	73
Search for medical or health-related information	86	91	88	84	70
Buy goods and services online	83	92	86	81	52
Average number of activities (out of 7)	5.8	6.2	6.1	5.4	5.0
Number of cases	2,232	378	1,158	999	225

As the preceding discussion of the demographic and socio-economic status of various groups indicates, there are substantial differences in the make-up of those who are home broadband users and those whose only online access is through a Smartphone. Relative to home broadband users, "Smartphone only" users are younger, have lower levels of educational attainment, lower incomes, and are more likely to be African American or Hispanic. These factors – and not just access means – might explain differences in online usage patterns. In other words, a young Hispanic person might simply be less interested than an older white home broadband user in searching for health information online. That lower level of interest may explain the different likelihoods of looking for such information, not the means by which the two groups go online.

To disentangle these different effects, this paper employs regression analysis, which examines whether access means is linked to observed differences in the scope of online activities or other factors. A simple ordinary least squares model was specified that framed the number of online activities engaged in (on a linear scale of 1 to 7) as a function of various demographic factors (age, gender, parents with minor children at home, level of education), economic ones (household income), and access means (broadband only at home, broadband and a Smartphone, Smartphone only, and other gadgets such as tablet computers and e-readers). The model was run for all internet users in the sample (79%, which includes not just home broadband users, but dial-up users, Smartphone only users, and those who use the internet someplace other than home).

The model finds that there is no correlation between having Smartphone access as one's only online access tool and doing more online activities. In other words, holding demographic and socio-economic factors constant, the analysis confirms the basic finding that Smartphone access alone is linked to greater online engagement. Unsurprisingly, having broadband at home *only* has a positive and significant association with doing more online activities and having *both* broadband at home and a Smartphone has the strongest association. It is also worth noting that the model finds no link between race and the number of online activities when controlling for the factors identified above.

The upshot of this exercise is that Smartphones play a valuable role in opening up access to groups, such as Hispanics, African Americans, and lower-income Americans, who have home broadband adoption rates that lag the average. However, when looking at usage patterns, "Smartphone only" access shows its limits. Those who have it as their means for accessing the Internet do fewer things online than those with home broadband. At the same time, Smartphones are an accelerant for online use in combination with other means, such as home broadband access or tablet computing. Those with both Smartphones and home broadband (and the vast majority of Smartphone users have broadband at home) are heavier users of the Internet than just broadband-at-home users or Smartphone only users.

Access tools and attitudes about online applications

Not only do respondents with different access tools do a somewhat different configuration of online activities, they also have different attitudes about how the internet can impact their lives. The survey asked internet users how the internet can help various parts of their lives, such as saving time, saving money, improving communication with family and friends, improving access to government services, reducing travel time for commuting or visiting others, and making it possible to commute at home. Table 5 below shows what all Internet users said when asked to consider the benefits of online access to their household.

Table 5

Views of the Internet's benefits for the household
(based on all Internet users)

	Very Important	Somewhat Important	Not important	Doesn't apply
Improving communication with family, friends, colleagues and others	52%	34%	9%	4%
Making it possible to work from home	35	16	12	36
Saving time for day-to-day activities	33	37	19	11
Saving money, for example through online shopping	27	36	21	16
Improving access to government services	27	35	19	18
Reducing travel time, for example for commuting or personal errands	27	33	22	18
Number of cases = 2,622				

Table 6 below shows the responses for all internet users, broadband users, broadband *and* Smartphone users, Smartphone users, and those with *only* broadband as their sole access device.

Table 6

How important are the following possible benefits of the internet for your household? (% who said "very important")	All internet users	Home broadband users	Home broadband *and* Smart-phone users	All Smart-phone users	Smart-phone *only* users
Saving time for day-to-day activities	33%	35%	44%	41%	21%
Saving money, for example through online shopping	27	28	34	33	22
Improving communication with family, friends, colleagues and others	52	54	63	61	50
Improving access to government services	27	27	32	31	30
Reducing travel time, for example for commuting or personal errands	27	28	35	34	26
Making it possible to work from home	35	37	46	44	26
Average number identified as "very important"	2.0	2.1	2.5	2.3	1.3
Number of cases	2,622	2,232	1,158	1,383	225

As with online activities, there are significant differences in how respondents with different access tools view the potential benefits of the internet. Those with both a home broadband connection *and* a Smartphone are much more likely to say the internet is very important to them in the listed areas as are Smartphone only users.

A key difference when focusing on attitudes about the internet's benefits versus online activities has to do with Smartphones. When analyzing online activities, broadband-at-home access and the combination of Smartphone and broadband access are both predictors of doing a wider scope of online activities. Doing similar analysis for attitudes, *only* the combination of having *both* a Smartphone and a home broadband subscription is positively associated with seeing the internet as being very important in the areas queried. The Smartphone, then, turns out to be a key ingredient in shaping individuals' view of the internet's value. The Smartphone plays a distinct role in shaping how people

perceive the benefits of the digital world – a not-so-secret sauce by which mobile wireless access kicks people's attitudes about the Internet's benefits into sharp focus.

The importance of wireless shows up in responses to another question asked of all Internet users on whether they think a wireline or wireless connection is better for various tasks. Specifically, the survey asked online users whether activities such as shopping online or sharing content was better done on a wireline connection using a desktop or laptop, or a wireless broadband connection on a mobile device. Here is what they said:

Table 7

Attitudes on the type of broadband connection and online affordances	Wireless	Wireline /Wired	Depends	Don't know
Improving communication with family, friends, colleagues and others	66%	19%	3%	10%
Sharing content with others, such as photos, videos, or text	58	27	2	11
Keeping up with the news in your community	56	26	3	12
Shopping online	49	31	3	14
Improving access to government services	46	32	3	16
Playing games online	41	32	2	21
Watching TV shows, movies and other video online	38	39	1	17
Number of cases = 2,622				

For the most part, Internet users believe a wireless broadband connection on a mobile device is better for online activities – especially for communicating with family and friends, sharing content, and keeping up with news.

Discussion

Smartphones are a strong compliment to online access tools. Those respondents with a Smartphone who also have broadband at home do the widest range of the online activities explored in the Illinois survey. For those who have *only* a Smartphone for accessing the internet, online access is less robust in that these users do fewer things online than broadband or broadband-plus-Smartphone users.

The Illinois survey offers another reason why Smartphone-only access has limits. The survey asked computer users (those with desktops or laptops) and mobile users how confident there were that they could *easily* find information online.

Tables 8 and 9 show that respondents have a higher level of confidence in their ability to find information using a desktop or laptop than with a wireless device. The question on wireless was directed to those who have a tablet computer, wireless enabled laptop, or Smartphone. However, there were no significant differences in responses attributable to which device the respondent said he uses most often for wireless access. When looking at "Smartphone only" users, they have a lower level of confidence in their ability to *easily* find information on their devices, though half are nonetheless very confident.

Table 8

How confident are you that you can easily find the information you need on the internet using your desktop or laptop computer?	All desktop/laptop users	Home broadband users	Broadband *and* Smartphone users
Very confident	75%	78%	85%
Somewhat confident	21	19	14
Not too confident	3	2	1
Not at all confident	1	1	*
Number of cases	2,440	2,189	1,158

Table 9

How confident are you that you can easily find the information you need on the internet using your wireless device?	All users of the internet on a mobile device	Home broadband users	Smartphone *only* users
Very confident	63%	66%	51%
Somewhat confident	29	28	37
Not too confident	5	4	8
Not at all confident	2	1	3
Number of cases	1,422	1,238	225

With smaller screens and generally slower access speeds, it is not too surprising that respondents have lower levels of confidence about the ease of finding online information. Still, people's level of confidence about the utility of Smartphones for finding information easily is strong.

Data caps

One element that may be a factor in people's use of the Internet on their Smartphone is data caps. Many carriers, including major ones such as AT&T and Verizon, place a cap on monthly data usage on mobile devices; once a customer reaches the cap, additional data use includes an additional cost. In this survey, people who pay a monthly data fee on their mobile device were asked whether their plan comes with a data cap, and 43% said they had a cap while 49% said they did not, with 7% saying they did not know. A follow-up question to those with a data cap inquired whether they were aware of their data usage in the context of their cap. Half were either always aware (27%) or mostly aware (22%) of their data caps, with 18% somewhat aware and 29% rarely aware.

Data caps – and awareness of them – have little impact on scope of online activities, at least among the set of activities about which this survey inquired. Those with data plans with caps do the same number of online activities as those without – both an average of 6.2 out of the 7 activities. For those always or mostly aware of data caps, the average number of online activities they reported doing was 6.2, with those on the other side – somewhat or rarely aware – reporting an average 6.3 online activities. The small difference is not statistically significant.

III. Non-adopters in Illinois

One-third (32%) of Illinois residents outside of Chicago do not have broadband at home and a comparable number in Chicago lack broadband. Although it is tempting to see non-adoption as on the other side of a boundary, the fact is that the boundary is permeable. Many non-broadband-at-home users have some online experience and interest in getting high-speed service at home. Among the 11% of respondents who are either dial-up users, Smartphone only users, or go online from work, school, or a friend's house, nearly two-thirds (64%) have used broadband at some point. That is significantly higher than the 46% figure recorded in the FCC survey for the National Broadband Plan.[5] Some 36% of those with dial-up or Smartphone-only access say they would be interested in getting broadband at home.

Non-Internet users also, on occasion, have other members of the household who go online at home. For the nearly 30% of Illinois respondents who do not use the Internet at home or use it at all, 26% say that someone in the house goes online from home. For the most part (57% of the time), that is a broadband connection, though many (29%) of non-Internet users do not know the type of connection being used in their household by someone else.

Many non-broadband users, then, have a relationship to the Internet, through dial-up, through online use elsewhere, or through past home subscription. One size does not fit all with respect to non-adoption, and the reasons for non-adoption similarly do not fall neatly into one category. Non-broadband-at-home users fall into three categories of respondents who received (largely) the same questions in probing into why they do not use broadband at home. For a breakdown of the demographic profiles of home broadband adopters compared to non-adopters in Illinois, please see Table III in the Appendix.

[5] John B. Horrigan, *Broadband Adoption and Use in America.* Federal Communications Commission, OBI Working Paper No. 1. Available online at: http://online.wsj.com/public/resources/documents/FCCSurvey.pdf

a. Dial-up users and those only use their cell phone for online access at home

This group makes up 6% of Illinois respondents and 20% of non-broadband adopters, and here is what they said when asked first whether a specific item listed was a reason for non-adoption and then, as a follow-up, to identify the main reason.

Table 10

Reasons for not having broadband at home (Based on those who have dial up/undesignated type of broadband connection at home or those who only use their cell phone for internet at home)	**Yes**	**No**
You're happy with your current service	64%	31%
The monthly cost is too expensive	49	40
You do not want to enter into a long-term service contract	47	48
The activation or installation fee to get service is too much	43	47
You do not use the internet that much	36	59
You do not need the additional speed it would offer	32	61
It's not available where you live	27	56

When asked to cite the *most important* reason for not having broadband at home, here is what with dial-up or Smartphone only users said.

Table 11

Most important reason for not having broadband at home (Based on those who have dial up/undesignated type of broadband connection at home or those who only use their cell phone for internet at home)	**Yes**
You're happy with your current service	28%
The monthly cost is too expensive	22
It's not available where you live	13
You do not want to enter into a long-term service contract	8
You do not use the internet that much	7
The activation or installation fee to get service is too much	6
You do not need the additional speed it would offer	3
Other (don't know, combination, reason not listed)	14

b. Non-Internet users in non-online households

Illinois respondents who do not use the Internet and do not live in a household with an Internet user are a larger group than dial-up/Smartphone-only users. Some 16% of all Illinois residents interviewed for this survey neither use the Internet nor live in a home with an online user; this comes to 48% of all non-broadband adopters. Here are the reasons they cite for not having broadband Internet service at home.

Table 12

Reasons for not having broadband at home (Based on those who do not use the Internet at all and live in non-Internet homes)	**Yes**	**No**
Monthly cost is too expensive	52%	40%
The activation and installation fee to get service is too much	51	41
You cannot afford a computer	43	55
You are worried about all the bad things that can happen if you use the internet	42	55
The internet is just a waste of time	41	54
You are not comfortable using a computer	40	53
There is nothing on the internet you want to see or use	34	61
You can use the internet all you need to at work	11	84
It's not available where you live	10	84

Turning to the *most important* reason, non-online users in non-online homes said the following.

Table 13

Most important reason for not having broadband at home (Based on those who do not use the Internet at all and live in non-Internet homes)	
You cannot afford a computer	16%
Monthly cost is too expensive	14
You are worried about all the bad things that can happen if you use the internet	10
The internet is just a waste of time	10
You are not comfortable using a computer	10
There is nothing on the internet you want to see or use	7
The activation and installation fee to get service is too much	3
You can use the internet all you need to at work	2
It's not available where you live	1
Other (combination of reasons, don't know, refused, no reason listed)	28

c. *Not-at-home Internet users or those who do not use the Internet at all but live in an Internet household*

A final category of non-broadband adopter encompasses those who do not use the Internet at home, as well as non-users in a house with an online user. This comes to 10% of those surveyed and 32% of non-adopters. As with other non-adopters, this group was asked why they do not have broadband at home.

Table 14

Reasons for not having broadband at home (Not-at-home Internet users or those who do not use the Internet but live in an Internet household)	Yes	No
Monthly cost is too expensive	54%	42%
The activation and installation fee to get service is too much	46	51
You are worried about all the bad things that can happen if you use the internet	36	63
You cannot afford a computer	33	65
You are not comfortable using a computer	29	68
The internet is just a waste of time	25	73
There is nothing on the internet you want to see or use	23	73
You can use the internet all you need to at work	23	75
It's not available where you live	13	83

When asked for the *most important* reason, this group said the following.

Table 15

Most important reason for not having broadband at home (Not-at-home Internet users or those who do not use the Internet but live in an Internet household)	
Monthly cost is too expensive	21%
You are not comfortable using a computer	13
You are worried about all the bad things that can happen if you use the internet	10
You cannot afford a computer	10
The internet is just a waste of time	8
The activation and installation fee to get service is too much	6
You can use the internet all you need to at work	6
There is nothing on the internet you want to see or use	4
It's not available where you live	1
Other (combination of reasons, don't know, refused, no reason listed)	21

d. *Combining Results*

Although there are slight variations in the kinds of questions asked across each category of non-adopter, it is nonetheless possible to aggregate the results into a single table that gives an overall portrait of the reasons why Illinois residents surveyed do not have broadband at home – as well as *most important* reasons.

Table 16

Reasons for not having broadband at home (% for non-broadband users)	Cited as a reason	Cited as *most important* reason
Cost (monthly fee, computer affordability, activation fee)	65%	29%
Monthly fee	52	16
Can't afford computer	31	9
Relevance (Don't want more speed, don't use internet much, nothing you want to see online, internet is waste of time)	58	17
Digital Literacy (worried about bad things online, not comfortable with computer)	44	13
Availability (not available where I live)	14	2
Other (happy with current service, use the internet at work)	22	21
Number of cases	1,274	1,274

In looking at the combined results, it is clear that, when permitted to cite more than one reason for not having broadband, non-adopters indeed do so. On average, non-adopters cite three reasons for not having broadband at home, with cost leading the way and lack of relevance following. In looking at the cost breakout, half (52%) of those without broadband at home say the monthly fee is too much. At the same time, the belief that the Internet is not relevant to them and problems with digital literacy also loom large for non-adopters in Illinois.

The most important reasons that respondents cite for non-adoption in Illinois track fairly closely to those listed in a national sample for the FCC survey conducted for the national broadband plan. In the FCC survey, 36% cited a reason pertaining to cost, 22% cited

problems with digital literacy, and 19% cited a reason that indicated that they did not find the Internet relevant to them.[6] The main difference between the Illinois survey in 2012 and the FCC survey in 2009 is that digital literacy recedes as an issue in Illinois, which is consistent with the finding in the Illinois survey that a large share of Illinois non-adopters have past experience with a computer, something far fewer non-adopters said in 2009 in the FCC survey.

[6] Horrigan, *Broadband Adoption and Use in America*. Ibid.

IV. Luring non-adopters to broadband

An important part of PCI's mission is to get more people online in Illinois with broadband. The survey sought to explore that issue through questions that asked about non-adopters' interest in getting online with broadband and inquiring about the kinds of applications that might draw people to broadband.

When dial-up Internet users or those with a cell phone as their home access means are asked whether they are interested in having broadband at home, 36% said they were interested – about the same share (41%) as in the 2009 FCC survey. A similar question was posed to those who do not use the Internet at home or do not use it at all, and 21% said they would be interested in having Internet service at home. Putting those two sets of non-broadband users together (and recognizing that non-users outnumber dial-up and cell-only users), this means that 24% of non-broadband adopters in Illinois have some interest in broadband service at home. The remaining three quarters express little interest in getting high-speed Internet service at home.

The two different groups of non-adopters – those with interest in service and those who are not – express very different reasons for not having service at home as the following table shows:

Table 17

Reasons for not having broadband at home (% for non-broadband users)	Interested in home broadband		Not interested in home broadband	
	Cited as a reason	Cited as *most important* reason	Cited as a reason	Cited as *most important* reason
Cost (monthly fee, computer affordability, activation fee)	79%	49%	61%	23%
Monthly fee	60	25	50	14
Can't afford computer	38	17	29	7
Relevance (Don't want more speed, don't user internet much, nothing you want to see online, internet is waste of time)	60	9	64	20
Digital Literacy (worried about bad things online, not comfortable with computer)	27	5	50	16
Availability (not available where I live)	28	6	10	1
Other (happy with current service, use the internet at work)	26	13	21	23
Smartphone as sole online access	32%		17%	
Number of cases	277		997	

For those interested in broadband service at home, cost is the most prominent barrier, with factors such as relevance and digital literacy receding as most important reasons. In contrast, those not interested in broadband at home, though concerned about cost, register relatively high levels of concern that the Internet is not relevant to them or that they lack the skills to get online. Finally, it is notable that those interested in broadband are about twice as likely to have Smartphones as their access means. This indicates that, while this group can clearly afford a Smartphones and monthly fee for data, their budgets are constrained such that an additional service – that is, home broadband – is out of reach for many.

To go beyond interest in broadband to what might actually lure people to subscribing, the survey undertook two approaches. First, recent Internet adopters were asked to identify whether or not certain online affordances drew them to home Internet service. Second, non-home broadband users who expressed interest in getting broadband were asked whether certain online activities might tip them to getting the Internet at home.

Respondents who said they had gotten online service at home within the past three years received the question about reasons behind that choice. That definition yielded a modest, though usable, set of 110 respondents. Respondent who do not use the Internet at home or at all and expressed interest in service came to 218 respondents.

Table 18

Reasons for getting online access at home
(those online for three years or less)

	Yes	No	Not working/No kids in School/Not in school/n/a
To email and stay in touch with family and friends	69%	31%	0
To gain access to music, movies and other entertainment	47	52	1
To get health and medical information online	47	52	1
You felt that key information was only available online	37	59	3
Your children wanted internet access	36	50	14
Your children needed it for school	31	55	14
You needed it for school	19	76	5
Your job required online access	18	77	4

Turning to the hypothetical, 218 respondents who were not online users at home or at all received questions on what *would* be a reason for subscribing to home Internet service.

Table 19

Reasons "not at home" or non-Internet users would get service at home (among those interested in getting service)	Yes	No	Not working/No kids in School/Not in school/n/a
To get health and medical information online	80%	19%	n/a
To email and stay in touch with family and friends	75	22	n/a
You felt that key information was only available online	62	32	n/a
To gain access to music, movies and other entertainment	57	41	n/a
Your children needed it for school	50	38	10
You needed it for school	45	49	6
Your job required online access	43	51	5
Your children wanted internet access	43	39	14

There are several commonalities among those who recently became Internet users and those who express interest in it. Both groups say the social dimensions of the Internet draw them in; email and staying in touch with family and friends rise to the top in both instances. Entertainment is also a key motivator in both cases, with its role registering more prominently in the hypothetical question posed to those without home access, but interested in having it. There is also a clear sense that the Internet is the only source for important information; three-fifths of those interested in getting access at home say they believe key information is available only online, while 37% of recent adopters said this.

The desire to find health care and medical information online differs markedly across the two groups. About half of recent at-home adopters cite this as a reason they got service, while 80% of those interested in home broadband service say that this would be a reason for subscribing. One can only guess at the reasons behind this high number, but, demographically, non-adopters interested in getting broadband are – relative to other non-adopters – younger (an average age of 43 versus 57 for non-interested non-adopters), with low-incomes, and high rates of Smartphone-only adoption (with high incidence of getting health care information on the smart handheld device). It is possible

that, with a likely lower rate of having health insurance and a taste of the scope of health information available online, non-adopters with an interest in broadband will see home high-speed service as a way to fill-in the gaps in their access to health care.

Finally, and not least, many recent or interested non-adopters see home access as beneficial for their children, with educational purposes playing a role. Half of interested non-adopters would want it because their children need it for school and nearly half say they would want it for their own educational purposes. Among recent subscribers, about one-third say they got access because their children wanted it and a similar number said it was because their children needed it for school.

For those interested in detailed demographic profiles of those interested in getting broadband at home versus those who are not, please see Table IV in the Appendix.

V. Implications

In looking at the findings of the statewide survey of Illinois residents outside of Chicago, several striking findings emerge:

1) The overall broadband adoption rate in Illinois tracks the national average closely, but the statewide survey reveals that certain parts of the state – mainly in the southern and central parts of the state, but also the northwest – have home broadband adoption rates that significantly trail the average. In 4 eTeam regions of the state – Northwest, Southeast Central, Southern, and West Central – home broadband rates are below 60%. This suggests that stakeholders should channel resources to encourage home broadband adoption to these areas.
2) Smartphones close access gaps for some Illinois residents – with particularly important impacts for African Americans and Hispanics. Some 46% of Illinois residents have a Smartphone (a result that is the same as the national average) and 7% are "Smartphone only" users in that their sole means of online access is the Smartphone and they do not have home broadband access. For African Americans, 15% are "Smartphone only" and the figure for Hispanics is 18%. Although Smartphones are an important access avenue, those with Smartphone only access do a narrower range of online activities than other Internet users. These findings suggest that, while Smartphones open the doors to online access for those who use it as their sole way to get online, they do not open the door as widely as does home broadband access.
3) Smartphones are an important accelerant to both online use *and* people's perceptions about the Internet's ability to help their everyday productivity. Most (85%) of Smartphone users also have broadband at home, and this combination of online assets aligns with greater online engagement when compared to the 7% of respondents with Smartphones only and 26% with broadband at home *only* as their online access means. Those with Smartphones and broadband are also much more likely than others to view the Internet as a way to save time, money, as well as improve how they access government service and work from home. This finding indicates that mobile wireless access is a powerful means to draw current and future broadband users to deeper engagement with the benefits of digital resources. Stakeholders should understand the wireless and wireline infrastructure both play key roles in strategies to improve online access.

4) Non-adopters of broadband at home make up about one-third (32%) of Illinois residents surveyed. Affordability – either of monthly service or computers – are the reason nearly one-third of non-adopters are not online, with lack of digital literacy or lack of awareness of the Internet's value cited as the main reasons for other non-adopters. It is important to recognize, though, that non-adopters cite multiple reasons for not having broadband at home; the typical non-adopter cites 3 reasons (from a menu that covers barriers such as cost, digital literacy, and lack of relevance) for not having broadband.

   Yet non-adopters are not a monolithic group. Some one-quarter say they are interested in getting broadband at home and cost – mainly the monthly access fee but also computer affordability – is the principle reason "interested non-adopters" cite for not having access. The "interested non-adopters" also say getting health and medical information is something they would do with home broadband access, as well as socializing with family and friends and getting key information and entertainment. These findings suggest that cost relief, with education efforts that stress health care and information-gathering applications, could effectively draw these users to sustained home broadband use.

   For the majority of non-adopters – three-quarters of them – the challenge is greater. This group is older and has lower incomes than "interested non-adopters," but it has a more varied set of reasons for not having broadband. Although cost is clearly a problem, this group of non-adopters, when permitted to cite more than one reason for non-adoption, is most likely to say they do not see the relevance of having broadband. Half also cite problems with digital literacy as a reason they do not have broadband. For the majority of non-adopters who do not have a strong interest in broadband, comprehensive training programs that emphasize the benefits of broadband – while also providing cost relief and training on how to use the Internet – are important.

APPENDIX – Detailed Tables

Table I

Demographic & socio-economic overview of respondents by access categories	All surveyed	Home Broadband Users	Smartphone Users	Smartphone Only Users
Male	49%	50%	52%	53%
Female	50	50	48	47
Parents with minor children at home	33	36	41	39
Ages 18-24	12	14	19	26
25-34	16	18	24	29
35-44	18	20	23	16
45-64	36	38	30	23
65+	16	10	5	6
Average Age	**47**	**44**	**39**	**37**
White (not Hispanic)	84	86	81	71
Black (not Hispanic)	8	6	9	17
Hispanic (English or Spanish speaking)	8	6	10	20
Less than high school	10	5	6	21
High school grad	28	22	24	31
Some college	32	35	34	32
College +	30	38	37	16
Household income				
Under $20K	17	11	12	31
$20K-$30K	11	8	7	10
$30K-$40K	8	7	7	11
$40K-$50K	7	8	7	6
$50K-$75K	12	14	12	12
$75K-$100K	13	17	16	8
Over $100K	16	21	25	5
Don't know/refused	16	14	14	17
Geography				
Urban	22	23	24	22
Suburban	49	52	52	40
Rural	18	15	14	23
Unclassified	12	10	10	15
Number of cases	3,506	2,622	1,158	225

Source: Partnership for Connected Illinois Survey, February-April 2012.

Table IIa

Demographic & socio-economic overview of respondents by Illinois Region	Region 1 Central	Region 2 N Central	Region 3 NE Central	Region 4 North Stateline
Male	49%	54%	44%	53%
Female	51	46	56	47
Parents with minor children at home	32	36	32	28
Age				
Ages 18-24	10	9	16	13
25-34	18	13	19	17
35-44	18	26	16	17
45-64	36	34	34	35
65+	19	17	14	19
Average Age	**48**	**47**	**45**	**47**
Race/Ethnicity				
White (not Hispanic)	88	86	75	85
Black (not Hispanic)	9	7	12	10
Hispanic (English or Spanish speaking)	4	4	3	10
Education				
Less than high school	12	8	9	12
High school grad	31	24	34	33
Some college	32	34	29	32
College +	25	33	28	23
Household income				
Under $20K	21	14	27	18
$20K-$30K	11	12	9	16
$30K-$40K	9	7	10	10
$40K-$50K	9	9	8	9
$50K-$75K	16	10	9	9
$75K-$100K	11	16	10	15
Over $100K	10	15	13	12
Don't know/refused	14	16	14	11
Geography				
Urban	39	42	48	26
Suburban	15	30	26	46
Rural	27	12	5	15
Unclassified	19	16	20	11
Number of cases				

Source: Partnership for Connected Illinois Survey, February-April 2012.

Table IIb

	Region 5 Northeast (excl Cook County)	Region 6 North West	Region 7 SE Central
Male	51%	47%	47%
Female	49	53	53
Parents with minor children at home	34	29	34
Age			
Ages 18-24	15	9	7
25-34	16	14	16
35-44	18	20	19
45-64	39	34	35
65+	13	22	22
Average Age	**45**	**50**	**49**
Race/Ethnicity			
White (not Hispanic)	82	93	93
Black (not Hispanic)	7	3	3
Hispanic (English or Spanish speaking)	12	4	3
Education			
Less than high school	8	12	16
High school grad	24	28	32
Some college	29	41	37
College +	37	19	16
Household income			
Under $20K	13	23	23
$20K-$30K	8	14	15
$30K-$40K	7	6	11
$40K-$50K	5	10	9
$50K-$75K	12	15	9
$75K-$100K	16	8	8
Over $100K	22	8	7
Don't know/refused	18	14	18
Geography			
Urban	22	17	1
Suburban	72	23	2
Rural	1	43	81
Unclassified	6	17	17
Number of cases			

Table IIc

	Region 8 Southern	Region 9 Southwest	Region 10 West Central
Male	49%	45%	39%
Female	51	55	61
Parents with minor children at home	26	35	29
Age			
Ages 18-24	13	13	10
25-34	17	21	18
35-44	11	16	13
45-64	39	31	33
65+	22	18	27
Average Age	**49**	**45**	**50**
Race/Ethnicity			
White (not Hispanic)	89	81	95
Black (not Hispanic)	4	16	2
Hispanic (English or Spanish speaking)	3	2	4
Education			
Less than high school	17	10	16
High school grad	32	31	29
Some college	27	34	35
College +	24	25	20
Household income			
Under $20K	23	19	22
$20K-$30K	11	11	15
$30K-$40K	9	10	10
$40K-$50K	10	6	6
$50K-$75K	12	15	12
$75K-$100K	9	13	8
Over $100K	9	11	9
Don't know/refused	16	14	18
Geography			
Urban	2	*	*
Suburban	3	83	73
Rural	71	4	1
Unclassified	24	13	25
Number of cases			

Table III

	Broadband Adopter	Non Broadband Adopter
Male	50%	47%
Female	50	53
Parents with minor children at home	36	25
Age		
Ages 18-24	14	10
25-34	18	13
35-44	20	14
45-64	38	33
65+	10	30
Average Age	**44**	**57**
Race/Ethnicity		
White (not Hispanic)	86	82
Black (not Hispanic)	6	10
Hispanic (English or Spanish speaking)	6	10
Education		
Less than high school	5	23
High school grad	22	39
Some college	35	26
College +	38	13
Household income		
Under $20K	11	30
$20K-$30K	8	16
$30K-$40K	7	9
$40K-$50K	8	7
$50K-$75K	14	8
$75K-$100K	17	4
Over $100K	21	3
Don't know/refused	14	21
Geography		
Urban	23	18
Suburban	52	41
Rural	15	22
Unclassified	10	16
Number of cases	2,622	1,274

Table IV

Demographics those non-adopters interested in getting service compared to those not	Non-adopters interested in service	Non-adopters not interested in service
Male	48%	47%
Female	52	53
Parents with minor children at home	39	20
Age		
Ages 18-24	15	8
25-34	19	11
35-44	23	11
45-64	33	33
65+	10	37
Average age	**43**	**59**
Race/Ethnicity		
White (not Hispanic)	76	84
Black (not Hispanic)	15	9
Hispanic (English or Spanish speaking)	14	9
Education		
Less than high school	20	23
High school grad	38	39
Some college	28	25
College +	14	13
Household income		
Under $20K	36	28
$20K-$30K	13	17
$30K-$40K	11	9
$40K-$50K	7	7
$50K-$75K	10	7
$75K-$100K	5	4
Over $100K	5	3
Don't know/refused	12	24
Geography		
Urban	17	18
Suburban	41	41
Rural	17	23
Unclassified	14	17
Number of cases	277	997

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Broadband Adoption
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Measuring Digital Citizenship: Mobile Access and Broadband

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How should we measure broadband adoption by individuals and communities, given different modes of access, including home broadband, smartphone use, and public access? We measure online activities and indicators of skill to understand opportunities for digital citizenship, or participation in society online. Based on a 2011 survey in Chicago, we find more mobile phone adoption among Blacks than among non-Hispanic Whites, and greater likelihood of Internet use for job searches among residents who rely primarily on smartphones to go online than among home broadband adopters. Yet our analysis also shows that broadband at home remains critically important for digital citizenship, and that the growth in mobile phone use has not erased inequalities in participation online and seems unlikely to do so. Moreover, smartphones are not bridging the gap in disadvantaged communities. Multilevel statistical models show inequality in both Internet access and economic and political activities across geographic areas, or communities. Technology disparities that are patterned by place have implications for opportunity and equity at the neighborhood level.

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Measuring Digital Citizenship: Mobile Access and Broadband

How should we measure broadband adoption by individuals and communities? The National Broadband Plan calls for universal access to broadband, but this access is a means to achieve other ends, such as improvements in health, government services, civic engagement, education, and economic development.

At the individual level, broadband adoption is an important policy issue insofar as it facilitates what has been called digital citizenship, or the *ability* to participate in society online (Mossberger, Tolbert, & McNeal, 2008, p. 1). In much the same way that education and literacy have promoted democracy and economic growth, more widespread use of the Internet has the potential to generate "spillover benefits" for communities and society as a whole (DiMaggio & Bonikowski, 2008; Krueger, 2006; Mossberger, Tolbert, & McNeal, 2008). It facilitates social inclusion through greater access to resources for individual well-being, such as government services, online news, and health care information (DiMaggio, Hargittai, Celeste, & Shafer, 2004).

Digital citizenship requires regular and effective Internet access and the skills to use the technology. This suggests meeting multiple needs—access to high-speed connections at home, hardware and software, technical skills, and critical thinking skills—to enable evaluation and use of information online.[2] Both access and skills vary in quality, defying a simple dichotomy or divide (DiMaggio et al., 2004; Hargittai, 2002; Mossberger, Tolbert, & Stansbury, 2003; Van Dijk, 2009; Warschauer, 2003).

This article compares home broadband use to Internet use among the "less connected," focusing on mobile-only access. We examine unequal access and digital citizenship, first for individuals and then for communities, using multilevel models. In 2012, nearly half of Americans use the Internet on mobile phones. Those who primarily rely on smartphones to go online are disproportionately young, minority, and poor, and thus popular rhetoric holds that cell phones (smartphones) are bridging the access divide. Yet our research empirically shows the limits of depending on this form of Internet access. Regarding online activities, the 2011 Chicago survey described here shows some improvement for mobile-only Internet users compared with those with no personal Internet access at all. Overall, however, those who rely exclusively upon smartphones or Internet access outside the home display less skill and are less engaged online than individuals with home broadband.

In this article, we focus on the regular access to high-speed connections that is important for digital citizenship and is most often achieved through home broadband use.[3] Yet the most recent national data show that less than two thirds of Americans had home broadband access in 2012 (Zickuhr & Smith, 2012) and more than one third are offline or "less connected" (Mossberger, Tolbert, & Franko, 2012).

[2] The latter has been called "information literacy" (see Mossberger et al., 2003 for a review), but basic literacy and educational competencies also greatly enrich the capacity to use the Internet.

[3] We are agnostic about the precise technologies used to attain regular and full access to the Internet. For example, a laptop with a wireless aircard may achieve outcomes similar to a home connection and a personal computer.

Among the less connected are individuals who depend on public access or other connections outside the home, such as wireless hot spots, coffee houses, or the homes of friends and relatives. The less connected also include those who cannot access the full content of the Web owing to slow dial-up connections at home, and individuals who use the Internet on their mobile phones but do not have broadband at home. These smartphone-reliant Internet users made up only 8% of the U.S. population in 2011, according to estimates by the Pew Research Center (Zickuhr & Smith, 2012), and 4% of Chicago residents in the 2011 survey analyzed here. Of the 46% of Americans connected to the Internet with smartphones in 2012, the majority have high-speed broadband at home as well (Horrigan, 2012; Zickuhr & Smith, 2012)

We present evidence from a 2011 study of Chicago, comparing the activities and skills of smartphone and home broadband users at the individual level, and patterns of access and use across poor and minority neighborhoods. Using a unique random digit-dialed telephone survey of 3,000 respondents in Chicago, we employ multilevel statistical analysis to estimate home broadband adoption, smartphone use, and activities online across Chicago's 77 official neighborhoods. The models show that neighborhood context exacerbates individual-level inequalities. Maps provide further evidence of these disparities in Internet access and use across geographic areas and their collective impacts. The results underscore the continued importance of broadband, showing that quality of access matters considerably for individual capabilities and potential public benefits.

Mobile Access: Is It a Game Changer?

The ways in which people connect to the Internet are more varied today than they were a decade ago. As of 2011 one in five Americans is completely offline, and almost 4 in 10 lack high-speed access at home. A 2011 Pew survey found 62% of all American adults have high-speed Internet at home, including two thirds (66%) of Whites. But only half of Blacks (49%) and Hispanics (51%) have such access (Zickuhr & Smith, 2012). The survey also found gaps based on age, income, and educational attainment. The proliferation of mobile devices is unquestionably changing the way in which many people go online, and cell phone adoption is prevalent among minorities and the young. How do cell phone-only Internet users compare with those who have broadband at home? Do they differ from other Internet users who are "less connected," such as those who depend upon public access or dial-up connections?

In 2012, smartphone adoption was slightly higher nationally for Blacks and Latinos (at 49%) than for non-Hispanic Whites (at 45%) (Zickuhr & Smith, 2012). This contrasts with home broadband adoption, where Blacks and Latinos lag behind (Horrigan, 2012; NTIA, 2011). Most mobile phone Internet users, however, also have home broadband (Horrigan, 2012) and are generally younger, higher-income, and more educated than those without smartphones (Zickuhr & Smith, 2012).

Among smartphone owners, young adults, minorities, those with no college experience, and those with lower household income levels are more likely than other groups to say that their phone is their main source of Internet access (Mossberger et al., 2012; Zickuhr & Smith, 2012). Smartphones are also used by low-income teens at higher than average rates, often to compensate for a lack of Internet access at home (Brown, Campbell, & Ling, 2011). Smartphone-only Internet users are more likely to be young than others who are less connected (Mossberger et al., 2012).

Given that the data presented in this article are for Chicago, it is important to note how central city residents differ from national trends in previous research. In multivariate models based on national data from 2009, race and ethnicity predicted mobile phone access differently across geography (Mossberger et al., 2012). Among urban residents, Blacks were more likely than Latinos to have only mobile Internet access.[4] These patterns may reflect the tendency for urban Latinos to be more recent immigrants, as Spanish-dominant Latinos are less likely than any other group to have experience with the Internet (Livingston, 2010). Controlling for language, studies show inner-city Latinos are more technologically disadvantaged than either rural or suburban Latinos. City residents who are less connected tend to have no Internet access at home, rather than dial-up (Mossberger et al., 2012, Chapter 3).

The Chicago data allow us to examine whether smartphone use is closing gaps in Internet use in low-income urban communities. A large literature on "neighborhood effects" in urban policy suggests that living in areas of concentrated poverty or segregation influences opportunities for education, jobs, health care, and more (Federal Reserve & Brookings Institution, 2008; Jargowsky, 1997; Newburger, Birch, & Wachter, 2011; Wilson, 1987, 1996). Environmental factors such as the quality of schools and other public institutions, access to labor markets, and knowledge or resources in social networks may have effects beyond individual-level poverty or disadvantage. Neighborhood context also affects technology use and barriers to home Internet use, magnifying inequalities (Kaplan & Mossberger, 2012; Mossberger, Tolbert, & Gilbert, 2006; Mossberger, Kaplan, &, Gilbert, 2008; Mossberger, Tolbert, Bowen, & Jimenez, in press).

Could affordable smartphone use remedy disparities in access, given the enthusiasm for the devices among many demographic groups that are offline or less connected? Are they assisting low-income individuals and low-income communities? This is a contention often reflected in popular headlines (Peterson, 2010; Wortham, 2009), though others have countered that this is second-class access (Crawford, 2011). Despite the development of many new applications, reliance on cell phones to go online offers users a more functionally limited Internet. Mobile phones may be useful for social networking, texting, gaming, and reading headline news, but may not replace high-speed access on laptop or desktop computers for activities such as applying for jobs, carrying out work-related tasks, and researching health issues (Horrigan, 2012; Wortham, 2009).

Modes of Access and the Measurement of Digital Citizenship

The activities that individuals engage in online provide an important measure for comparing modes of access against their potential for digital citizenship and spillover benefits for society as a whole. Hargittai (2002) has characterized variation in activities online as a second-level digital divide that emerges in a society as some experience with the Internet becomes more widespread. This variation suggests differences in abilities as well. A 2012 Pew survey found that over 90% of Internet users in the United States use e-mail or have used a search engine, and 66% use a social networking site such as

[4] Of individuals living in the suburbs, Latinos are more likely to connect to the Internet on mobile devices than non-Hispanic Whites, but suburban Blacks do not differ (statistically) from suburban Whites (Mossberger, Tolbert, & Franko, 2012, Chapter 4).

Facebook. Eight in 10 Internet users check the weather online, 75% read news online (up from 61% in 2011), and more than 6 in 10 look up political information online. They also seek out government information: 67% have visited a local, state or federal government website (up from 56% in 2011). Economic activity online is widespread: 60% do banking online, 71% have purchased a product online, and 56% look online for information about a job. Online information even affects people's place of residence: 4 in 10 Internet users look for a place to live online (Zickuhr & Smith, 2012; Pew Internet and American Life Project 2012). But which activities should we measure as indicators of digital citizenship?

In the context of the United States, liberal ideas of citizenship have supported the belief that individuals should have equal access to the tools necessary to compete economically (Hartz, 1955; Smith, 1993). Civic republicanism, which also forms a part of the American political heritage, emphasizes citizen participation (Skocpol, 1992; Smith, 1993). Thomas Jefferson argued that Americans' participation in a democratic form of government, was the primary justification for public education. Building on these traditions of citizenship, Mossberger and colleagues (2008) developed the argument that the ability to participate in society online, or digital citizenship, requires economic opportunity and political participation.

Thus political and economic activities online, but not entertainment or other online activities, may justify government policy. There is indeed evidence that such activities influence outcomes important for equal opportunity: Internet use at work has been linked to higher wages (DiMaggio & Bonikowski, 2008; Goss & Phillips, 2002; Mossberger, Tolbert, & McNeal, 2008), even for less educated workers (Mossberger, Tolbert, & McNeal, 2008), as well as for various aspects of political participation. Individuals reading online news or political information are more likely to vote and participate in politics in myriad ways (Bimber, 2003; Gibson, Lusoli, & Ward, 2005; Krueger, 2006; Mossberger, Tolbert, & McNeal, 2008; Tolbert & McNeal, 2003; see Boulianne, 2009 for a review).

More broadly, online activities related to health, education, housing, government services, and transit (among others) expand capabilities needed for economic opportunity and democratic participation. Some scholars (DiMaggio et al., 2004; Hargittai, 2002, 2006) have seen these Internet activities as enhancing human capital. Not coincidentally, such activities are also identified as policy objectives for broadband use in the National Broadband Plan (Federal Communications Commission [FCC], 2010), given the promise they hold for creating spillover benefits for society as well as individuals. Questions on economic, political, and health-related activities online have consistently been asked by the Pew Internet and American Life Project since 1995 and are included in the U.S. Census Bureau's 2011 Current Population Survey.

The ability to fully participate in society online, however, requires regular (that is, frequent) access to the Internet, with devices and speeds that can accommodate the activities mentioned above. Also required are the skills to use technology effectively for these purposes. This includes technical competence to use the necessary hardware and software, as well as the information literacy needed to find, comprehend, evaluate, and apply the online information (Mossberger et al., 2003). Daily Internet use is a measure of regular access and at least some basic level of skill, and is another indicator of digital citizenship (Mossberger, Tolbert, & McNeal, 2008).

Home Broadband Access

Previous research suggests that the combination of broadband and home use supports the development of digital citizenship. High-speed connections and home access are both predictors of more frequent Internet use, especially daily use (Mossberger, Tolbert, & McNeal, 2008). Higher speeds facilitate online transactions and full multimedia experience of the Internet. Compared with home broadband users, dial-up users go online less often to perform fewer tasks (Horrigan, 2010). Frequency of use fosters skill and a greater range of activities online (Howard, Rainie, & Jones, 2001).

A recent longitudinal study showed that home Internet use is related to higher wages, controlling for other factors (DiMaggio & Bonikowski, 2008). Home access affords greater flexibility and convenience than public access or the workplace, allowing individuals to explore a greater range of uses and to gain experience (DiMaggio et al., 2004; Hargittai & Hinnant, 2008). While use in multiple venues is even more strongly related to human capital activities online (Hassani, 2006), home access is particularly important as a resource for digital citizenship.

Less connected individuals, who do not have broadband at home, may manage to go online in various ways. Many, with and without home Internet connections, find a technology lifeline at libraries, community centers, and other places offering public access. Such public access sites offer training, support, and help finding information online. Additionally, they can build social capital as community gathering places and spaces for collective learning (Edwards, Rauseo, & Unger, 2012). Youth and minorities are among the most frequent public access users (Becker et al., 2010; see also Gant, Turner-Lee, Li, & Miller, 2010). Yet those who depend upon public access as their primary means of going online lack the regular, around-the-clock access to the Internet that home Internet connections afford. In 2010–2011, 76% of public libraries reported they did not have enough computers to meet demand (American Library Association, 2011), which led to long waits and time limits.

Mobile Access on Smartphones

Because of their portability, smartphones provide personal Internet access that in some ways affords even greater convenience and more continuous use than home access. Mobile phones with applications that provide real-time or locational information have advantages over home broadband. However, their small screens and keyboards render them poor substitutes for laptops or desktop computers in filling out forms, writing, and reading complex documents not formatted for mobile access. Slow speeds on wireless networks often impede downloading or uploading of information, and data usage caps (common in most wireless plans) may discourage online exploration (Goldman, 2012; Wortham, 2011). Focus groups conducted by researchers at the University of Illinois at Chicago with smartphone-reliant Internet users indicate that such individuals often cobble together multiple forms of access to try to perform activities online. While the term "smartphone-only" is a convenient shorthand for those who rely primarily on their mobile phones to access the Internet, these less connected individuals also use public

access and other Internet resources outside the home to the extent that they can.[5]

Previous research comparing mobile-only Internet users with home broadband users indicates a big gap in activities online, even controlling for demographic differences. Multivariate regression analysis of the national 2009 FCC survey demonstrates that, controlling for other factors, individuals with home broadband were significantly more likely to perform a variety of tasks online than the less connected, including smartphone-only users (Mossberger et al., 2012, Chapter 4). Compared to others without home broadband, such as dial-up or public access users, mobile-only Internet users were somewhat more likely to get local or community news; to search local, state, or federal government websites (e-government); and to obtain national or international news using the Internet.[6] Still, those who relied exclusively on mobile access were clearly disadvantaged compared to those who had home broadband (Mossberger et al., 2012, Chapter 4). Smartphones have increased in sophistication since 2009, and there are now more applications to enable mobile Internet use for banking, e-commerce, news, e-government alerts, and real-time information on public transportation. Using the 2011 Chicago survey, we are able to explore more recent trends in a demographically and economically diverse city with large Black and Latino populations. Moreover, the Chicago data allow us to explore the effects of residence in high-minority or high-poverty neighborhoods, and to map differences across the 77 official community areas of Chicago. We thus seek to measure digital inequality across individuals with varying forms of access, but also geographically, across neighborhoods.

Data and Methods

We draw on a random-sample telephone survey of more than 3,500 Chicago residents aged 18 and older, conducted in July and August 2011. The survey was carried out via both landlines and cell phones. Follow-up included five callbacks to nonresponding numbers, unless a hard refusal was given. Chicago's ZIP codes were used to create the overall geographic area from which the random sample was drawn. Designed by the authors, the survey was administered in Spanish and English and conducted by the Eagleton Poll at Rutgers University.

Previous research has shown Chicago is a median city in terms of technology access, so the patterns of access and inequality found here can be roughly generalized to the nation's urban areas (Mossberger et al., 2012). Results for Chicago are comparable with national averages, as 80% of residents

[5] In 2011, two focus groups were conducted (one in English and one in Spanish) with Chicago, IL, residents who own and use smartphones but do not have Internet access at home. The focus groups were conducted at the University of Illinois at Chicago survey research laboratory.

[6] The FCC survey of 5,005 U.S. residents, conducted in October and November 2009, included questions about a number of activities online, allowing us to compare the types of activities performed by mobile-only Internet users, other less connected individuals, and home broadband users. We analyze economic, political, educational, and health-related activities associated with human capital as well as public policy objectives. Appendix Table A1 (2009 FCC survey, from Mossberger, Tolbert, & Franko, 2012) compares online activities of mobile-only users and home broadband adopters. Frequencies are weighted. The sample is based on the 3,477 respondents who use the Internet.

reported using the Internet in 2011, and 67.5% said they had broadband at home. The national 2012 Pew figures estimate Internet use anywhere at 78% and broadband adoption at 62% of American adults (Zickuhr & Smith, 2012).

Chicago is also an excellent case for observing the differences across racial and ethnic groups, as well as across economically diverse neighborhoods. The city has neighborhoods boasting multimillion-dollar real estate as well as areas of concentrated poverty that scholars have studied (Jargowsky, 1997; Massey & Denton, 1993; Wilson, 1987). According to the 2010 census, Chicago is 32% White non-Hispanic, 32% Black, 29% Latino, and 5% Asian.[7]

To track Internet use in Chicago neighborhoods, the questionnaire asked the respondents for their cross streets, which were used to geocode each respondent's location. Of the 3,500 respondents, roughly 3,000 could be accurately located in a neighborhood. We merged individual-level survey data with census tract-level data from the 2010 U.S. Census measuring socioeconomic conditions of Chicago neighborhoods, including age distributions, poverty, and racial and ethnic populations.

These data were analyzed using multilevel statistical models (random intercept models) to simultaneously test how neighborhood- and individual-level factors affect the probability of having various forms of access to the Internet, or doing activities online (Raudenbush & Bryk, 2002; Steenbergen & Jones, 2002). Many studies of Internet use have relied on descriptive statistics or other methods of analysis that lack multivariate controls to untangle overlapping influences. Descriptive statistics, such as the percentage of mobile phone users who are Black, are useful for tracking trends. But understanding, for example, the effect of home broadband versus mobile access on online political activities requires the use of methods that can better isolate cause and effect. Individuals using mobile access only may differ from home broadband users in a number of ways beyond their race or ethnicity: They may be younger, less affluent, less educated, or live in poorer racially segregated neighborhoods. Multivariate methods allow us to examine which factors are statistically significant for predicting outcomes, holding other factors constant.

To obtain more precise estimates of individual-level access, we use not only multilevel models (individuals nested in neighborhoods) but also statistical models to determine probabilities of access for geographic areas. We use the same method of hierarchical linear modeling discussed above with poststratification weights to estimate Internet use across Chicago's 77 neighborhoods or community areas. These neighborhood-level estimates are mapped. While federal programs have mapped broadband availability based on service provider data, we are able to portray actual use based on estimates of the percent of the population with high-speed Internet at home, for example. We build on work by Lax and Phillips (2009) to create geographic estimates from the multilevel models drawn from both individual- and aggregate-level variables.

[7] U.S. Census Bureau. (2010). *Profile of general population and housing characteristics* [2010 demographic profile data, DP-1, Chicago City, Illinois]. American FactFinder. U.S. Census Bureau.

Despite the advanced methods underlying the findings, we present the results in a format accessible to readers without a background in statistics: tables and figures based on probability simulations that are as easy to understand as simple percentages, but that are based on the multivariate regression coefficients and illustrate the relative size of the impact on outcomes, holding other variables in the models constant at mean values (Long, 1997). The predicted values for the regression models can be read and interpreted in the same way as simple percentages, but they provide a more accurate picture of technology opportunity and inequality.

Comparing Mobile-Only Access and Home Broadband

Tables 1–4 present percentages of Chicago's populations with different forms of access to the Internet. Columns from left to right list increasingly regular and effective access to the Internet, with home broadband access—what we call first-class access—in column 4. Column 3 is individuals who lack home broadband but have mobile access via their smartphones. Following Crawford (2011), we refer to this as second-class access. In column 2 are Internet users who have no personal access—neither home broadband nor mobile Internet—but go online in public libraries, friends' homes, and so on. Finally, in column 1 are the generally less connected, including everyone without home broadband, those who are offline or unconnected, and the small percentage of dial-up users. This is our reference group. Of our sample of 2,905 Chicago residents, 67.5% had high-speed Internet at home, leaving 912 respondents who were less connected, that is, lacking home broadband. We compare these different types of less connected individuals, looking at those who have Internet access on their mobile phones only, as well as Internet users without mobile or home access.

Table 1 lists the demographic characteristics of respondents with these varying forms of Internet access. Column 5 shows the difference between those with mobile access only and those with broadband at home. Blacks are 20% more likely than non-Hispanic Whites to rely on mobile Internet access, and Latinos are 13% more likely. Among Whites, however, home broadband access is most common. Among those with home broadband, 57% are White non-Hispanic, whereas only 23% of those with only mobile access are. Of Chicago residents with mobile access only, 45% are Black and 24% are Latino. Clearly, mobile access on cell phones is common among racial and ethnic minorities in Chicago.

Table 1. Demographics for Mobile Internet Access Only Versus Home Broadband (%).

	No Home Broadband/ Unconnected	Internet User/ No Personal Access	Mobile Access Only	Home Broadband	Difference: Mobile/ Broadband
Race:					
White	34	38	23	57	-34
Black	39	36	45	26	19
Latino	23	22	24	11	13
Asian	1	1	2	3	-1
Other	3	3	6	3	3
Total:	100%	100%	100%	100%	
Education Level:					
Less High School	22	12	12	3	9
High School Degree	32	24	37	12	25
Some College	24	29	27	25	2
Bachelor's or More	22	36	23	59	-36
Total:	100%	101%	99%	99%	
Income:					
Under 20k	44	30	34	12	22
20–39k	28	32	30	18	12
40–75k	20	26	29	25	4
Over 75k	8	13	6	45	-39
Total:	100%	101%	99%	100%	
Age:					
18–29	10	10	50	14	36
30–49	16	25	26	35	-9
50–64	27	34	13	32	-19
65+	48	31	10	19	-9
Total:	101%	100%	99%	100%	
Gender:					
Male	34	39	41	44	-3
Female	66	61	59	56	3
Total:	100%	100%	100%	100%	
Spanish Interview:					
Yes	17	15	10	3	7
No	83	85	90	97	-7
Total:	100%	100%	100%	100%	
Married:					
Yes	33	33	33	50	-17
No/Other	67	67	67	50	17
Total:	100%	100%	100%	100%	

Note: Some columns do not add up to 100% due to rounding.

Note: Frequencies for home broadband access are from a sample of 2,905 Chicago residents responding to a telephone survey conducted in July and August 2011 that included calls to cell phone numbers. No home broadband/unconnected = all individuals without home broadband. Internet users with no personal access comprise 242 of 807 people with no home broadband or mobile access. Mobile access only = individuals using their smartphones to connect to the Internet, from a sample of 912 individuals without home broadband access. Survey conducted by the Eagleton Poll, Rutgers University.

Similar patterns are found for the young and poor. The young, aged 18–29, are 40% more likely to rely on smartphone-only Internet connections than to have home broadband, while the middle-aged (50–64) are 19% less likely to rely on mobile access only than to have home broadband. Individuals earning over $75,000 a year are almost 40% less likely to have mobile access only versus a home broadband connection. The poor, with annual incomes under $20,000, are 20% more likely to have access only via cell phones than to have broadband at home.

Those relying exclusively on mobile access are the young, racial and ethnic minorities, and lower-income individuals Meanwhile, individuals with the most education—a bachelor's degree or higher—are 36% more likely to have broadband access versus cell phone access only. Only 10% of those interviewed in Spanish are mobile-only users, compared to 24% of Latinos more generally, so Spanish-speaking Latinos are less likely to rely on mobile access. There are only small differences for gender, but unmarried individuals are 17% more likely to have mobile access only than to have high-speed Internet at home.

Previous research has found that home broadband promotes digital citizenship, with spillover benefits that confer economic and political advantages not only to the individuals using the technology but to society as a whole (Mossberger, Tolbert, & McNeal, 2008). The Chicago survey included questions about a number of activities online, allowing us to compare the types of activities performed on the Internet by mobile-only Internet users, other less connected individuals, and those with home broadband, as shown in Table 2.

Over the past four years, mobile phone capability for online activities has increased markedly (Mossberger et al., 2012), a trend that is evident in these data (see column 3 of Table 2). In fact, 83% of respondents with mobile access only had used the Internet to get information or apply for a job, compared to 60% of those with home broadband. This seems counterintuitive at first, but there are a few possible explanations. Respondents were asked about Internet use—which could include public access use—rather than what they do on their smartphones, per se. Additionally, smartphones can be used to check e-mail on a regular basis, a useful activity for job hunting. Finally, the young and Blacks are among those most likely to search for jobs online (Mossberger et al., 2003), as well as to be smartphone users.

Table 2. Economic and Political Activities Online for Mobile Access Only Versus Home Broadband Access (%).

	No Home Broadband/ Unconnected	Internet User/No Personal Access	Mobile Access Only	Home Broadband	Difference: Mobile vs. Broadband
Online Activities					
Use Internet to get community or neighborhood news	13%	29%	45%	53%	-8%
Use Internet to visit local, state, or federal government website	18%	43%	55%	75%	-20%
Use Internet to get news online	21%	45%	72%	80%	-8%
Use Internet to get information about politics	17%	42%	52%	73%	-21%
Use City of Chicago website	17%	43%	45%	63%	-18%
Use Internet to do work for a job	13%	32%	41%	58%	-17%
Use Internet to get job information or apply for job	23%	48%	83%	60%	23%
Use Internet to purchase things	11%	23%	38%	49%	-11%
Use Internet to get health information	27%	69%	76%	87%	-11%
Use Internet to get transportation information	21%	49%	69%	71%	-3%
Use Internet to take a class online	10%	23%	35%	41%	-6%
Number of cases	2,905	807	912	2,905	

Note: Frequencies for home broadband access are from a sample of 2,905 Chicago residents responding to a telephone survey conducted in July and August 2011 that included calls to cell phone numbers. No home broadband/unconnected = all individuals without home broadband. Internet users with no personal access comprise 242 people of 807 people with no home broadband or mobile access. Mobile access only = individuals using their smartphones to connect to the Internet, from a sample of 912 individuals without home broadband access. Survey conducted by the Eagleton Poll, Rutgers University.

Outside of online job searches, Internet use disparities between broadband adopters and mobile-only and other less connected users remain significant. Across the various online activities in Table 2 we continue to see gaps, with individuals with home broadband considerably more likely to use the Internet for political and economic activities. With the exception of looking for job information, home broadband users are between 10 and 25% more likely to be engaged in a range of activities: reading online news, obtaining community news, using e-government, doing work for a job, or obtaining online health and transportation information. Individuals with home broadband are 21% more likely than mobile-only users to get information about politics online, 20% more likely to have used e-government, and 18% more likely to have used the City of Chicago website. Despite the growing importance of mobile access, the range of activities differs markedly between those with high-speed Internet at home and those with only mobile phone access. As columns 1 and 2 show, individuals lacking personal access (home broadband or mobile access) are much less likely to engage in any online activities; thus they are less likely to be digital citizens.

Table 3: Entertainment Activities Online for Mobile Access Only Versus Home Broadband Access (%).

	No Home Broadband/ Unconnected	Internet User/No Personal Access	Mobile Access Only	Home Broadband	Difference: Mobile vs. Broadband
Online Entertainment Activities					
Use Internet to visit social networking sites	15%	27%	70%	58%	12%
Use Internet to watch videos	14%	24%	66%	57%	9%
Use Internet to play games	16%	36%	50%	45%	5%
Use Internet to download/listen online to music	19%	38%	73%	65%	8%

Note: Frequencies for home broadband access are from a sample of 2,905 Chicago residents responding to a telephone survey conducted in July and August 2011 that included calls to cell phone numbers. No home broadband/unconnected = all individuals without home broadband. Internet users with no personal access comprise 242 people of 807 people with no home broadband or mobile access. Mobile access only = individuals using their smartphones to connect to the Internet, from a sample of 912 individuals without home broadband access. Survey conducted by the Eagleton Poll, Rutgers University.

Table 3 shows the four types of access in relation to entertainment activities online. Mobile access has historically been used for texting and communication. Individuals with only mobile access are the most likely to use social media websites (Facebook, Twitter) and to watch videos, play games, and listen to music online. While home broadband is associated with a higher frequency of political and economic activities, online entertainment and social networking remain the domain of mobile access. Age may explain some of these differences, especially for social networks, but the results are also consistent with the historical predominance of entertainment among less experienced and less educated Internet users (DiMaggio, Hargittai, Neuman, & Robinson, 2001).

Table 4. Technology Skills for Mobile Access Only Versus Home Broadband Access (%).

Skills . . . know what an/a _____ is?	No Home Broadband/ Unconnected	Internet User/No Personal Access	Mobile Access Only	Home Broadband	Difference: Mobile vs. Broadband
Advanced search	30%	49%	65%	75%	-10%
Spyware	23%	38%	57%	73%	-16%
Preference setting	17%	26%	49%	64%	-15%
pdf	18%	31%	48%	70%	-22%
wiki	14%	20%	48%	52%	-4%
Phishing	16%	24%	16%	60%	-44%
Number of cases	2,905	807	912	2,905	

Note: Frequencies for home broadband access are from a sample of 2,905 Chicago residents responding to a telephone survey conducted in July and August 2011 that included calls to cell phone numbers. No home broadband/unconnected = all individuals without home broadband. Internet users with no personal access comprise 242 people of 807 people with no home broadband or mobile access. Mobile access only = individuals using their smartphones to connect to the Internet, from a sample of 912 individuals without home broadband access. Survey conducted by the Eagleton Poll, Rutgers University.

Finally, how do mobile-only users compare with home broadband adopters in measures of Internet skill? Table 4 presents results for questions about Internet knowledge. These questions are measures that have been validated with observations of skill in prior studies (see Hargittai & Hsieh, 2012). The particular measures used have been found appropriate for differentiating levels of skill in populations of less experienced Internet users (Hargittai & Hsieh, 2012). According to our results, smartphone-only

users displayed lower rates of skill than home broadband users on all questions, with the difference ranging from 4 to 44 percentage points. However, mobile-only users exceeded the skill levels of those with no personal access on five of six measures. In general, for both activities and skill, mobile-only users stand somewhere between other less connected individuals and home broadband users.

Why Type of Access Matters: Economic and Political Activities

So far we have described users who connect to the Internet via mobile phone but lack broadband access at home, comparing this group to those with a high-speed connection at home. While these descriptive patterns are illustrative, we need to control for the many factors that predict access. Table 5 uses the online activities reported in Table 2 as dependent or outcome variables. The variables are coded 1 if an individual has engaged in this activity online, and 0 if otherwise. Because the dependent variables are binary, logistic regression is used. Two binary explanatory variables measure broadband access at home or exclusive reliance on mobile access. The reference category is composed of other types of the less connected and individuals who are unconnected.

Table 5. Various Internet Activities, Mobile Access Only vs. Home Broadband Access (2011).

	Online News β/(se)	*Community News* β/(se)	*Political News* β/(se)	*Use for Work* β/(se)	*Find a Job* β/(se)	*Health Info* β/(se)	*Transit Info* β/(se)
Hispanic	-0.328*	-0.363**	-0.615**	0.344*	-0.301^{+}	-0.391*	-0.419**
	(0.16)	(0.14)	(0.17)	(0.15)	(0.18)	(0.17)	(0.16)
Black	-0.375**	-0.385**	-0.349**	-0.09	0.557**	-0.06	-0.287*
	(0.12)	(0.12)	(0.11)	(0.10)	(0.14)	(0.11)	(0.13)
Asian	0.21	-0.631*	-0.33	-0.05	0.09	-0.09	0.41
	(0.45)	(0.29)	(0.29)	(0.29)	(0.26)	(0.36)	(0.39)
Income	0.162**	0.119**	0.124**	0.272**	-0.056*	0.163**	0.03
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
Education	0.259**	0.155**	0.322**	0.368**	0.246**	0.244**	0.193**
	(0.03)	(0.03)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)
Age	-0.026**	-0.020**	-0.009**	-0.047**	-0.070**	-0.021**	-0.032**
	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Female	-0.339**	-0.170^{+}	-0.254*	-0.16	-0.08	0.389**	0.03
	(0.12)	(0.10)	(0.12)	(0.11)	(0.08)	(0.10)	(0.10)
Parent	0.266*	0.408**	0.14	0.16	0.04	0.24	0.15
	(0.12)	(0.09)	(0.11)	(0.11)	(0.14)	(0.16)	(0.13)
Broadband at home	2.311**	1.644**	2.196**	1.215**	1.537**	2.461**	1.929**
	(0.13)	(0.17)	(0.16)	(0.17)	(0.15)	(0.10)	(0.14)

Mobile Access	2.282**	1.564**	1.918**	0.868**	2.246**	2.080**	1.783**
only	(0.30)	(0.25)	(0.23)	(0.27)	(0.30)	(0.21)	(0.32)
Constant	-1.58**	-1.93**	-2.85**	-2.12**	1.31**	-1.84**	-0.56*
	(0.29)	(0.32)	(0.31)	(0.30)	(0.33)	(0.31)	(0.27)
Observations/*N*	2834	2831	2835	2835	2835	2816	2835
Log Pseudo likelihood	-1212.1	-1545.73	-1356.01	-1343.7	-1371.5	-1100.1	-1460.3
Pseudo R^2	0.36	0.19	0.30	0.03	0.30	0.37	0.25

**0.01, *0.05, $^{+}$0.1 Significance level based on two-tailed significance.

Note: Models estimate whether respondents use the Internet to (1) get news online, (2) get news about their community, (3) get political news, (4) do work for a job, (5) get information about jobs or apply for a job, (6) find health information, and (7) find information about transportation. Unstandardized logistic regression coefficients with robust standard errors clustered by community area are in parentheses.

Results reveal that across the online activities, individuals with a home broadband connection are more likely to be engaged economically and politically online. Similarly, individuals with mobile-only access are more likely than individuals without any personal Internet access to take part in these activities online, although the coefficients are smaller than for home broadband in every case except online job searching. The control variables in the model are in the expected direction, consistent with previous research on digital inequality (DiMaggio et al., 2001; Mossberger et al., 2003), with younger individuals much more likely to participate in all activities online. Those with more education and higher incomes are more likely to be active economically and politically online, while Latinos and Blacks are less likely to do so than White non-Hispanics. The exception is online job search, an activity Blacks are more likely to engage in than Whites—again, a finding consistent with previous research (Mossberger et al., 2003). Asians and White non-Hispanics have similar patterns of online activities.

Because interpretation of the logistic regression coefficients is complex, in Table 6 we convert the coefficients from Table 5 to predicted values (probabilities), holding other variables in the model constant at mean values and varying the type of Internet access. While these estimates are as easy to read as the percentages shown in Tables 1–4, they control for the multiple factors related to engagement in society online. Table 6 again highlights that individuals with home broadband are generally more likely than those with smartphones only to read the news online, do work for a job, find health information, and so on, but the gaps are smaller than what was reported in Table 2. In fact, there is only a 2% difference in using the Internet to obtain community news among home broadband users and those with mobile access only, and only a 3% difference among mobile and broadband users in terms of finding transportation information, which is unsurprising as mobile devices are designed for this activity. Home broadband users remain more likely to use the Internet to do work for a job than those with mobile access only. The only exception to this pattern is online job searching, which mobile-only users are 16% more likely to do than those with home broadband, consistent with the patterns shown in Table 2. Those without home broadband or

smartphones (shown in column 1) are much less likely to be engaged in any of these activities. Now that we can see these patterns of opportunity and inequality across individuals, it is important to understand how modes of access vary across geographic areas.

Table 6. Predicted Probability of Online Activities by Type of Internet Access
(from logit coefficients reported in Table 5).

	No Home Broadband/ Unconnected	Mobile Access Only	Home Broadband	Difference: Mobile vs. Broadband
Use Internet to get news online	24%	76%	76%	0%
Use Internet to get community news	14%	44%	46%	-2%
Use Internet to get information about politics	20%	62%	69%	-7%
Use Internet to do work for a job	20%	37%	45%	-8%
Use Internet to get job information or apply for job	21%	72%	56%	16%
Use Internet to get health information	34%	80%	86%	-6%
Use Internet to get transportation information	23%	64%	67%	-3%

Note: All other variables are set at their mean value.

Neighborhood Context and Individual-Level Predictors of Access

Tables 7 and 8 present random-intercept multilevel logistic regression models. These models are similar to those reported in Table 5, but include neighborhood-level aggregate variables measuring the percentage of Blacks, Latinos, and Asians in Chicago's 77 community areas (neighborhoods), as well as the percent of the population in poverty and the percent over the age of 65. Beyond individual-level factors, we expect neighborhoods with high racial and ethnic minority populations and concentrated poverty to be less likely to have residents with Internet access. Similarly, neighborhoods with older populations should have a higher percentage of the population offline. These expectations are generally borne out in the data.

Table 7 models use of the Internet in any location in column 1, home broadband access in column 2 (our primary outcome variable), mobile access in column 3, and mobile access only in column 4. Column 4 model is a subsample of those without home broadband.

Table 7. Internet Use by Type of Access, Random-Intercept Models.

	Use Internet		*Home Broadband*		*Mobile Access*		*Mobile Access Only*	
Individual Level	*β/(se)*	*p*	*β/(se)*	*p*	*β/(se)*	*p*	*β/(se)*	*p*
Hispanic	-0.89	0.01	-0.68	0.01	0.08	0.64	-0.52	0.14
	(0.22)		(0.17)		(0.17)		(0.35)	
Black	-0.17	0.45	-0.17	0.31	0.44	0.01	-0.05	0.91
	(0.22)		(0.17)		(0.16)		(0.40)	
Asian	0.94	0.37	0.70	0.17	-0.38	0.19	0.69	0.36
	(1.04)		(0.51)		(0.29)		(0.76)	
Income	0.34	0.01	0.33	0.01	0.23	0.01	0.08	0.39
	(0.04)		(0.03)		(0.03)		(0.10)	
Education	0.46	0.01	0.34	0.01	0.17	0.01	0.19	0.05
	(0.04)		(0.04)		(0.04)		(0.09)	
Age	-0.08	0.01	-0.04	0.01	-0.07	0.01	-0.09	0.01
	(0.01)		(0.00)		(0.00)		(0.01)	
Female	-0.16	0.25	-0.04	0.70	-0.14	0.15	0.02	0.94
	(0.13)		(0.11)		(0.10)		(0.25)	
Parent	0.11	0.57	0.35	0.01	0.18	0.10	0.14	0.63
	(0.20)		(0.14)		(0.11)		(0.28)	
Community Area Level								
Percent Latino	-0.66	0.15	-1.03	0.01	-1.45	0.01	-0.45	0.67
	(0.46)		(0.37)		(0.41)		(1.05)	
Percent Black	-0.16	0.73	-0.56	0.10	-0.72	0.08	0.24	0.80
	(0.46)		(0.36)		(0.40)		(0.92)	
Percent Asian	0.08	0.95	-0.74	0.43	0.84	0.40	3.50	0.21
	(1.21)		(0.94)		(1.01)		(2.77)	
Percent Poverty	-0.55	0.65	0.25	0.79	1.81	0.10	2.83	0.29
	(1.20)		(0.96)		(1.09)		(2.65)	
Percent 65+	-2.22	0.31	-5.60	0.01	-3.91	0.04	-0.92	0.88
	(2.18)		(1.71)		(1.85)		(6.12)	
Constant	3.45	0.01	1.08	0.01	0.93	0.02	0.77	0.57
	(0.55)		(0.40)		(0.41)		(1.36)	
Observations/*N*	2828		2828		2828		892	

Pseudo R^2	-	-	-	0.33
Log Likelihood	-834.86	-1241.1	-1364.86	-216.57
Wald Chi^2	566.35	639.12	544.57	164.4
Prob. > chi^2	0.001	0.001	0.001	0.001

Note: Use of Internet, home broadband, and mobile phone access are random-intercept multilevel logistic regressions models with standard errors in parentheses. Use of "mobile access only" is an unstandardized logistic regression with standard errors clustered by community area (presented in parentheses). Probabilities based on two-tailed significance tests.

Once we control for neighborhood-level factors, we find Blacks are no different from Whites in terms of Internet use, home broadband access, or relying exclusively on mobile access. Blacks are more likely to have mobile access than Whites, however. Latinos are considerably less likely to use the Internet in any location or have home broadband, a finding consistent with national results (Livingston, 2010; Mossberger et al., 2012). Notably, we find that context matters and has an independent effect on the probability of access. Individuals living in neighborhoods with higher Latino or Black populations are considerably less likely to have home broadband. They are also less likely to have mobile access to the Internet. Similarly, individuals in neighborhoods with older populations are much less likely to have home broadband or mobile access. Interestingly, residents of high-poverty areas are more likely to rely on mobile access. Thus, beyond individual level factors, community areas with high percentages of Blacks and Latinos are the least likely to have home broadband or mobile access. These contextual effects, which wash out the individual-level effects of Black race, are consistent with previous research based on national survey data collected a decade ago (Mossberger et al., 2006).

Table 8. Online Activities, Random-Intercept Models.

	Use Internet Daily		*Use for Work*		*Look for Job*	
	β/(se)	*p*	*β/(se)*	*p*	*β/(se)*	*p*
Individual Level						
Hispanic	-0.79	0.01	0.20	0.24	-0.52	0.01
	(0.17)		(0.17)		(0.16)	
Black	-0.22	0.17	0.02	0.89	0.34	0.03
	(0.16)		(0.16)		(0.16)	
Asian	-0.02	0.96	-0.08	0.80	0.05	0.87
	(0.39)		(0.31)		(0.33)	
Income	0.31	0.01	0.32	0.01	0.01	0.63
	(0.03)		(0.03)		(0.03)	
Education	0.35	0.01	0.41	0.01	0.32	0.01
	(0.04)		(0.04)		(0.04)	
Age	-0.06	0.01	-0.05	0.01	-0.08	0.01
	(0.01)		(0.01)		(0.01)	
Female	-0.14	0.18	-0.15	0.12	-0.08	0.40
	(0.10)		(0.10)		(0.10)	
Parent	-0.05	0.72	0.20	0.09	0.06	0.59
	(0.13)		(0.12)		(0.12)	
Community Area Level						
Percent Latino	-1.08	0.01	-0.22	0.52	0.61	0.09
	(0.36)		(0.34)		(0.36)	
Percent Black	-0.73	0.04	-0.07	0.83	0.73	0.04
	(0.35)		(0.34)		(0.35)	
Percent Asian	0.16	0.86	1.22	0.15	2.18	0.01
	(0.91)		(0.85)		(0.88)	
Percent Poverty	0.68	0.48	-0.17	0.85	-0.87	0.36
	(0.95)		(0.94)		(0.95)	
Percent 65+	-5.93	0.01	-4.31	0.01	-0.38	0.81
	(1.63)		(1.51)		(1.55)	
Constant	1.70	0.01	-0.78	0.03	2.07	0.01
	(0.39)		(0.36)		(0.38)	
Observations/*N*	2829		2830		2830	

Log Likelihood	-1288.3	-1372.29	-1442.58
Wald Chi^2	713.1	664.56	647.25
Prob. > chi^2	0.001	0.001	0.001

Note: Random-intercept multilevel logistic regressions models with standard errors are in parentheses. Probabilities based on two-tailed significance tests.

Table 8 presents similar multilevel statistical models, but the outcome variables are daily Internet use, using the Internet for work, and online job searching. In terms of individual-level factors, Latinos are less likely to be daily Internet users than White non-Hispanics, while Blacks, Asians, and Whites do not differ in daily use. Latinos are again less likely to search for a job online, while Blacks are more likely to do so. Here, again, contextual factors loom large. Individuals from neighborhoods with larger Latino and Black populations are considerably less likely to be online daily, mirroring the patterns for home broadband access or mobile access. Thus racially and ethnically segregated neighborhoods are less likely to have digital citizens. However, neighborhoods with higher Latino, Black, and Asian populations are each linked to higher use of the Internet for job searching. Ironically, these same disadvantaged neighborhoods where individuals are the least likely to have reliable Internet access are the ones where individuals are most likely to seek economic opportunity online, in terms of finding employment. The barrier is clearly affordable access to the Internet, not lack of effort.

Ranking Chicago Neighborhoods: Opportunity and Inequality

The multilevel statistical models presented in Tables 7 and 8, using poststratification weighting, are also used to create estimates of the percent of the population online across Chicago's 77 community areas. Table A1 (see Appendix) ranks the neighborhoods in terms of broadband access at home in column 1 from high to low. High-speed access at home ranges from a high of 94% of the population in majority-White North Center, to a low of 36% in predominantly Latino Hermosa and Black East Garfield Park. Thus, the variation in broadband access geographically is large, varying by over 50%. Columns 2–7 show, for each Chicago neighborhood, the estimated percentage of residents who use the Internet in any location, engage in daily Internet use, have mobile access, are limited to mobile access only, do work online for a job, and search online for jobs.

These estimates are also mapped in Figures 1–6. Figure 1 maps the estimated probability of home broadband access in Chicago, our key variable of interest. This clearly reflects the geography of poverty and segregation in Chicago, with the heavily Black and Latino south and west sides colored red and orange, showing the lowest levels of home broadband adoption. The predominantly Black south side has some variation in home broadband adoption, given that some community areas have long had middle-class Black populations or have experienced recent gentrification (Pattillo, 1999, 2007).

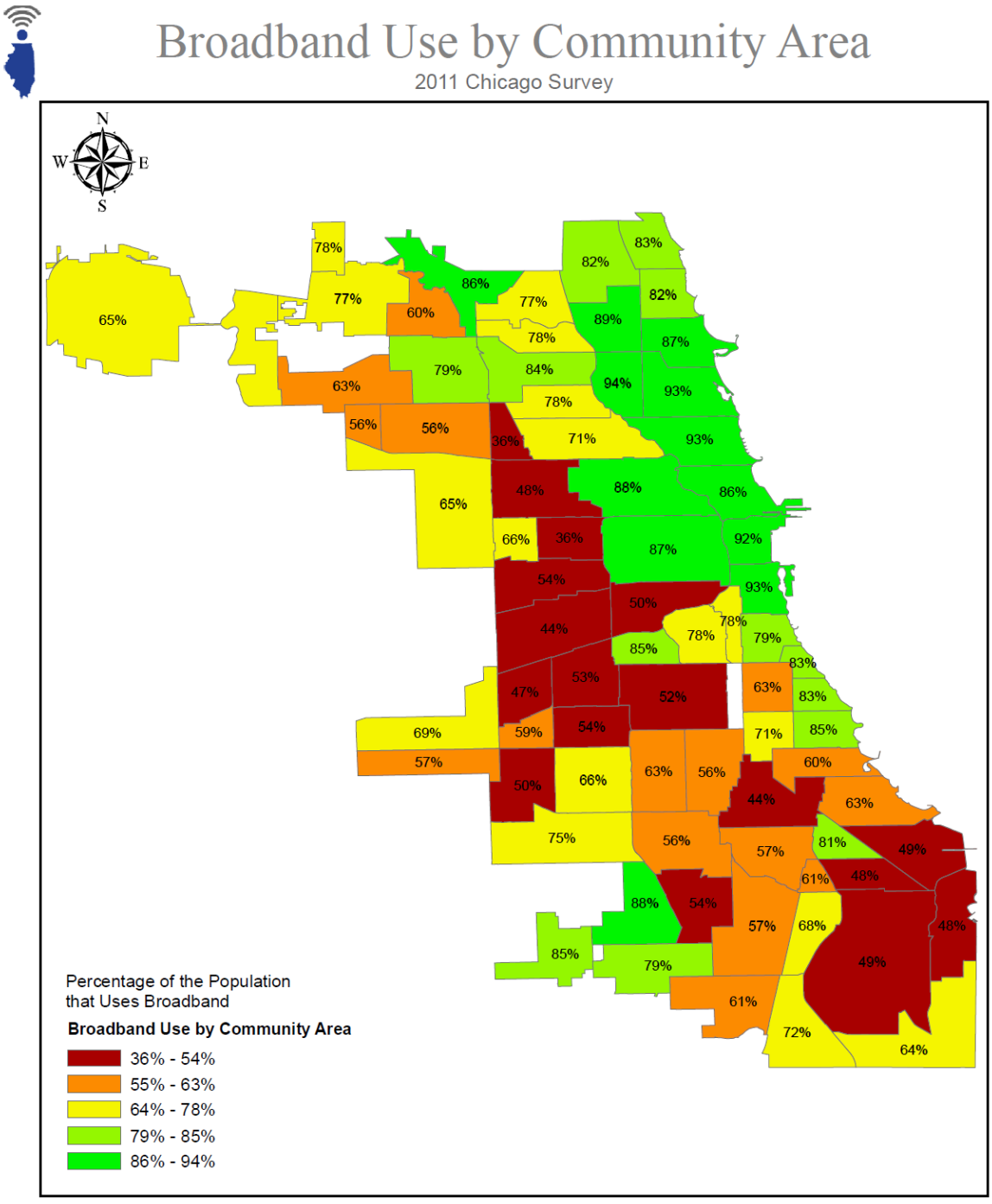

Figure 1. Estimated percent of the population with home broadband.

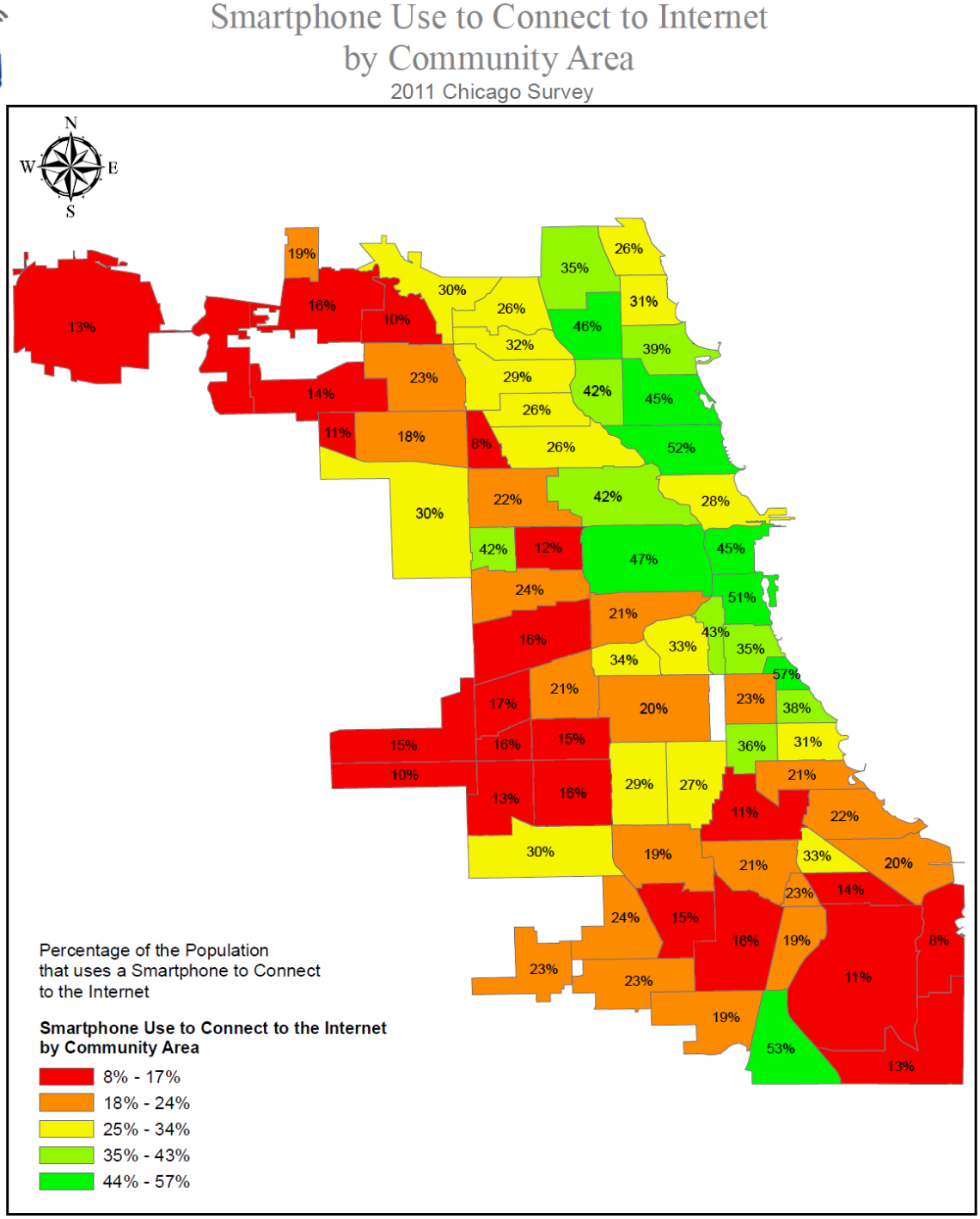

Figure 2. Estimated percent of the population with mobile Internet access.

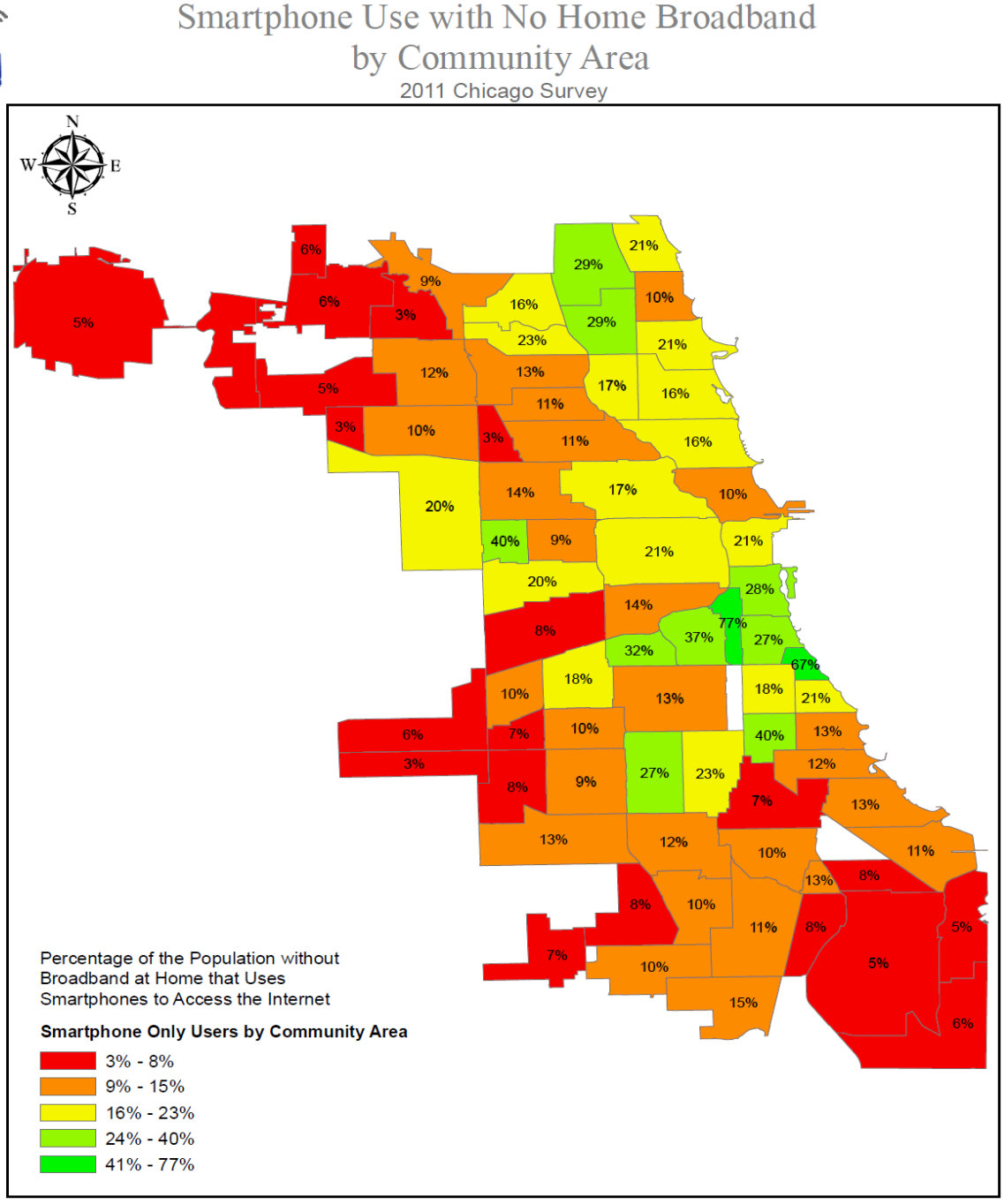

Figure 3. Estimated percent of the population with mobile Internet access only.

Figure 2 demonstrates that smartphone use, which is not as prevalent as broadband, still follows a similar pattern, with high-adopting community areas marked in green tending toward the north side and a few other gentrifying or higher-income areas.

Examining the percentage of those without home broadband who use smartphones in Figure 3, areas with high rates of mobile-only use are not generally the poorest communities. This is clear in the multilevel models that were used to generate the estimates. The map shows that 77% of those without home access use smartphones to go online in Armour Square, home to Chicago's "Chinatown." Oakland, with 67%, is an area that is mostly Black, but has developed new middle-class and mixed-income housing that replaced high-rise public housing in the area (Pattillo, 2007). The exceptions are West Garfield Park (at 40%) and Englewood (at 27%), predominantly Black areas with relatively high rates of mobile-only access and high-poverty populations. Youthful populations may explain high rates of smartphone-only use in some other community areas, especially locations near universities. There is little consistency in the geography of mobile-only access in Chicago, but it is clear that mobile Internet is not necessarily closing the gaps in the low-income communities of racial and ethnic minorities with the lowest rates of broadband adoption. Many of the red and orange areas with the lowest rates of smartphone-only Internet use also rank at the bottom for home broadband.

Figures 4–6 reveal the impact of the geography of adoption in terms of activities online. Daily Internet use is an indicator of the regular access needed to participate in society online, and the map of daily use largely tracks the patterns of home broadband adoption in Figure 4.

Internet use for work is an important indicator of digital citizenship in Chicago neighborhoods. Of course, this reflects the residents' occupations and education as well as their acquisition of Internet skills. Yet Internet use is growing throughout the job market, even in less skilled jobs (Brynjolfsson & Saunders, 2010), and 49% of all Chicagoans used the Internet on the job in 2011. In Figure 5, Internet use for work is especially concentrated in the community areas on the north side of the city along Lake Michigan. Some of these north side areas are wealthy while others are economically and ethnically diverse, but they stand in contrast to the city's poorest communities. This points to technology disparities that exacerbate other inequalities in the labor market, and may contribute to more limited employment options for residents of the poorest and most segregated neighborhoods.

Figure 6 shows that the Chicago neighborhood profile differs markedly for job searching, compared with Internet use at work. Overall in 2011, 48% of Chicago residents used the Internet to look for a job or information about a job. As the models underlying the estimates demonstrate, low-income neighborhoods participate in online job searching at high rates despite low levels of home broadband adoption. Green and yellow areas of high online job searching are scattered throughout the city and over much of the south and west sides. Areas with relatively high Internet job searching (60% or more) include low-income, predominantly Black communities on the west side, such as Austin and West Garfield Park, as well as Washington Park in the south. This demonstrates the motivation to go online that is often apparent in studies of libraries and other public access sites in low-income communities (Becker et al., 2010; Dailey, Bryne, Powell, Karaganis, & Chung, 2010). Yet compared with those who have home broadband, those who are less connected experience greater constraints when looking for a job online.

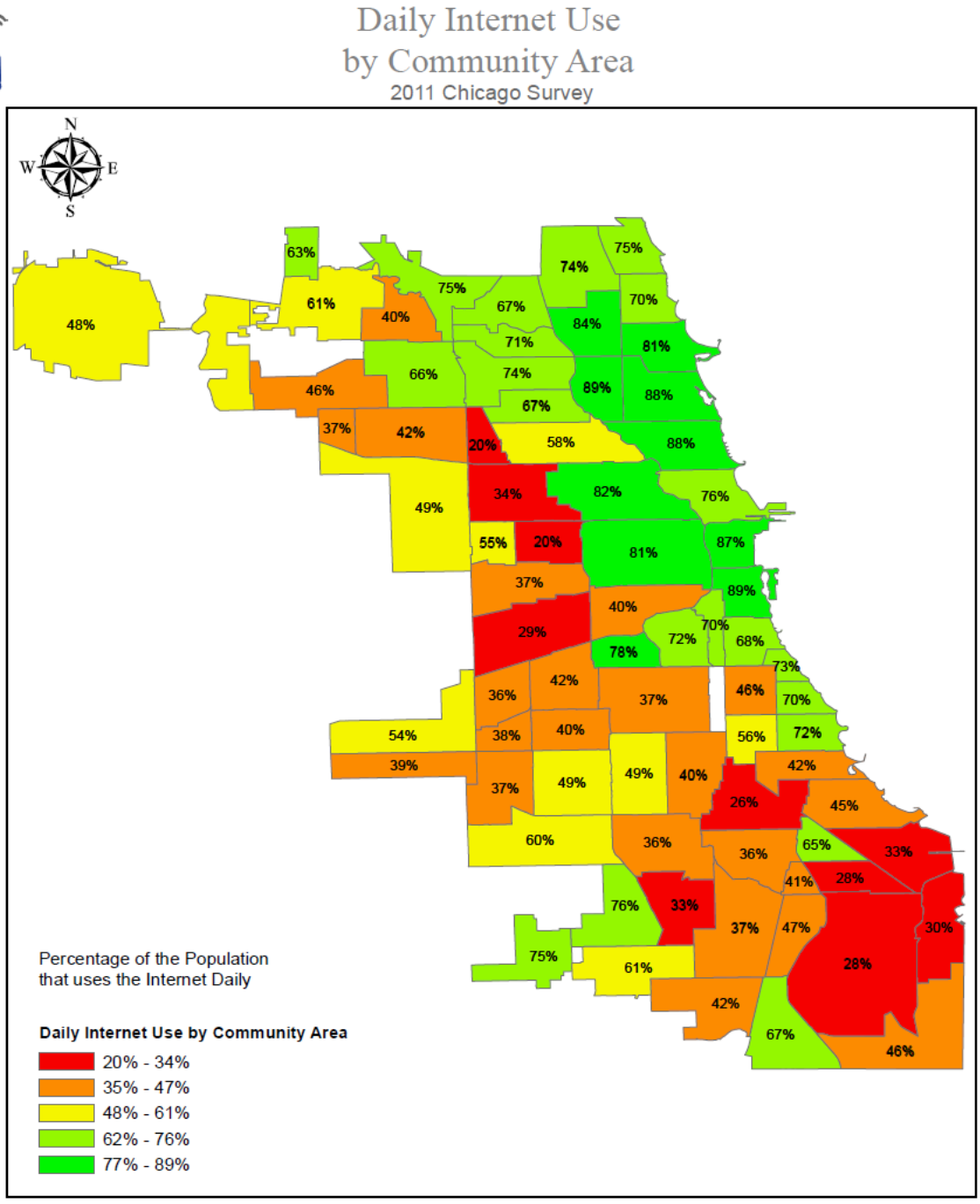

Figure 4. Estimated percent of the population using the Internet daily.

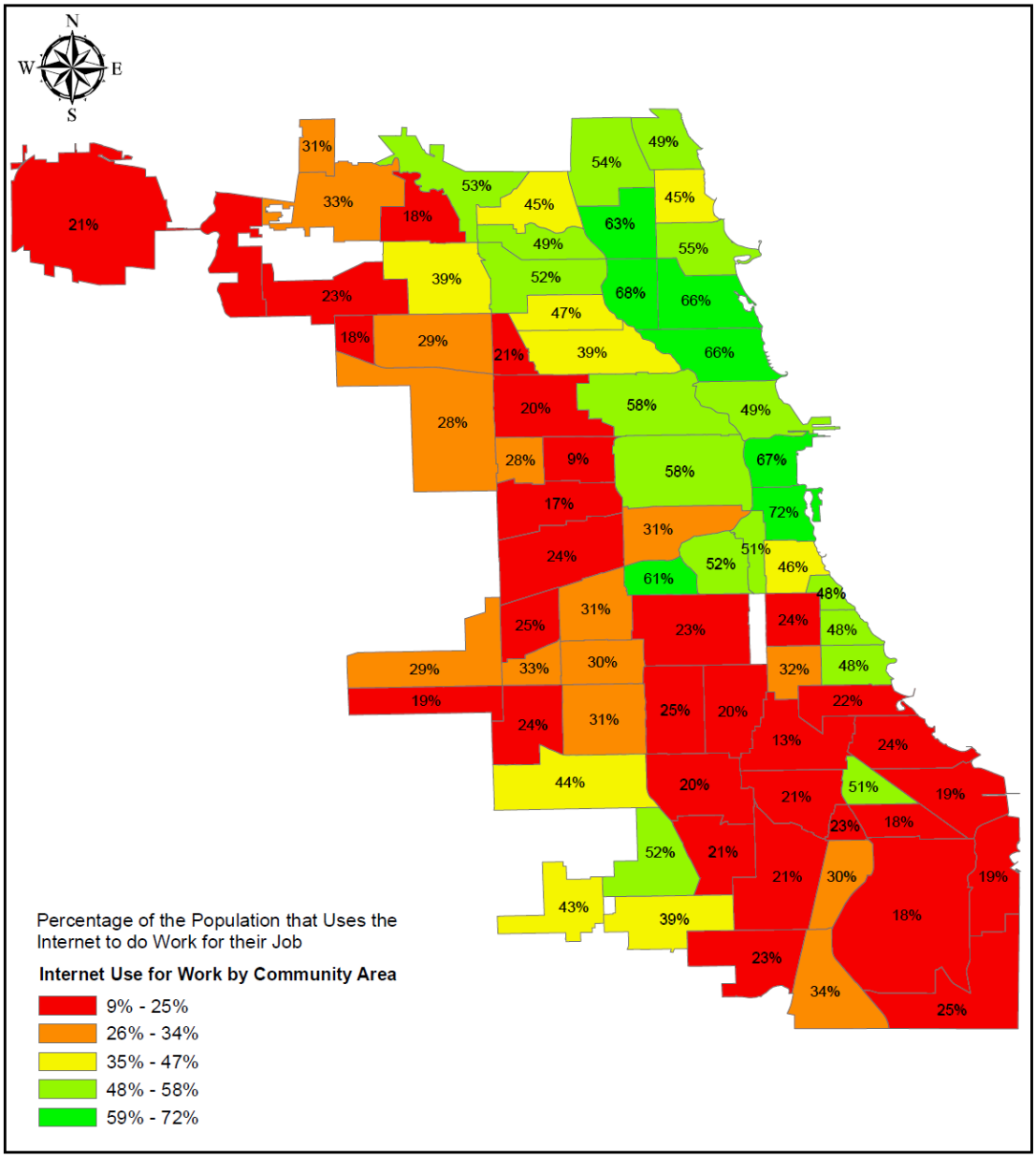

Figure 5. Estimated percent of the population using the Internet for work.

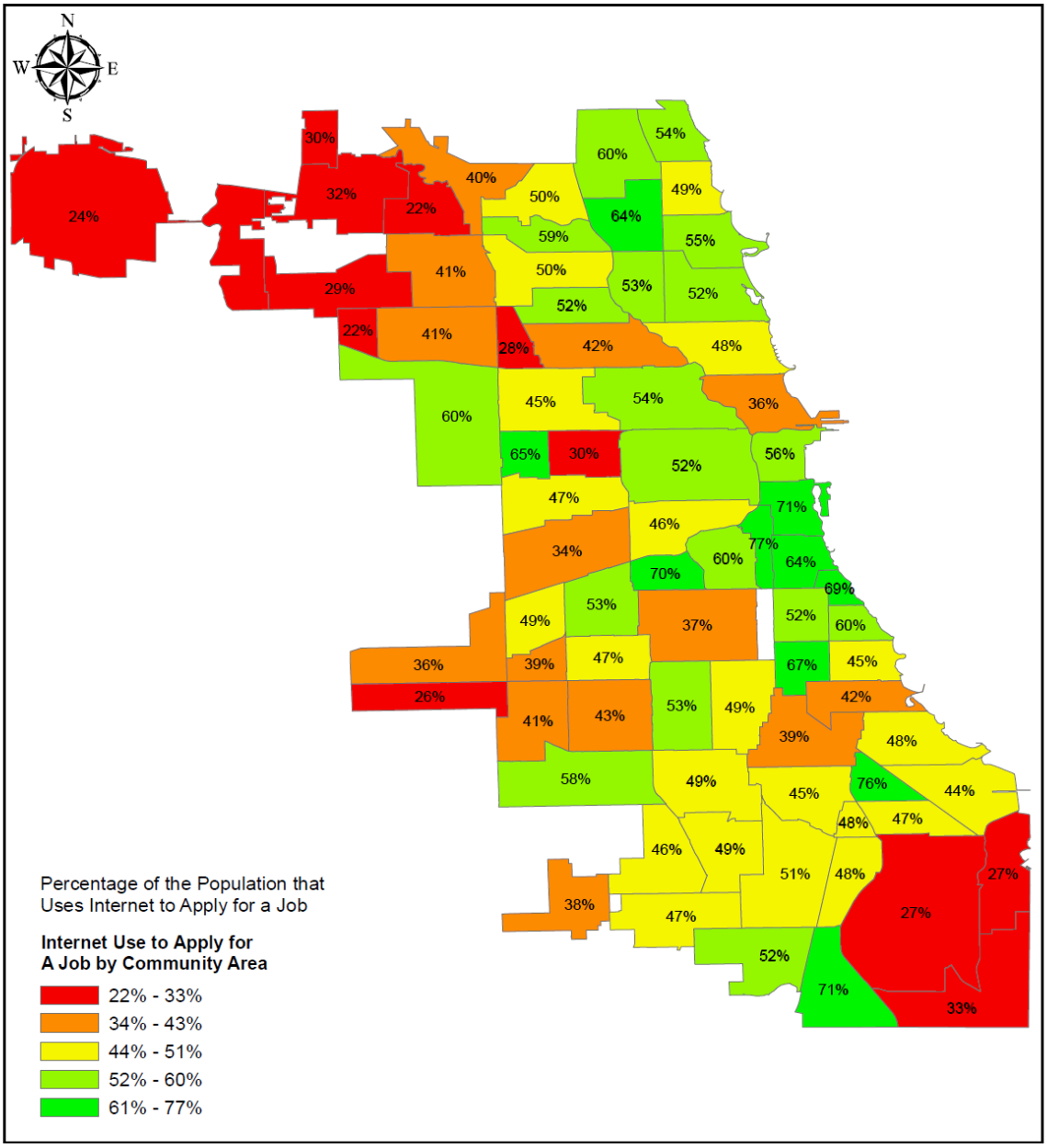

Figure 6. Estimated percent of the population using the Internet for job searches.

The patterns visible for the communities above suggest more than disadvantage at the individual level in poor neighborhoods. They also reinforce other social inequalities, especially for Internet use for work. Residents of poor communities may be more isolated, both from well-paying jobs and from local networks of friends and contacts who could connect them with better job opportunities that include Internet use for work (Kaplan & Mossberger, 2012).

Conclusion: Digital Citizens in Digital Communities

The analysis in this article demonstrates a strong link between different forms of access and capabilities for digital citizenship, including skills and activities online. Mobile phones have become a popular way to connect to the Internet among young people and minorities, and in fact Blacks in Chicago are more likely than Whites to be smartphone users. Yet despite common conceptions of mobile access as a solution for the disadvantaged, it remains a second-class mode of primary access: The personal convenience afforded by smartphones is counterbalanced by their more limited functions. Smartphone-reliant Internet users do better on many measures than other less connected individuals, but they compare unfavorably with home broadband adopters for many political and economic activities online and for all indicators of skill. They are also more likely than home broadband adopters to use the Internet for entertainment.

Mobile-only users in Chicago are, like other less connected individuals, more likely to be low-income, less educated, and Black, similar to results for central cities nationally in prior research (Mossberger et al., 2012). Latinos are most likely to be among those who are not online at all.

Federal programs support the mapping of broadband infrastructure, but the ability to map patterns of Internet use is of even greater consequence. The Internet has become a critical resource for work, job information, civic engagement, access to government services, and health. Yet we see that in Chicago, neighborhood poverty and segregation deepen disparities in access for low-income individuals.

- Residents of neighborhoods with high proportions of Blacks and Latinos (as well as older individuals) are actually *less* likely to own smartphones, as well as less likely to have home broadband. They are thus less likely to be digital citizens who use the Internet on a daily basis. Neighborhood context matters for opportunities to go online, and programs targeting such communities may be needed.

- While smartphone use is higher in poor neighborhoods (controlling for other neighborhood characteristics), mobile-only access does not seem to be closing gaps for many in the least connected community areas, which have low rates of both smartphone and broadband use.

Technology disparities have the potential to reinforce or even deepen existing place-based inequalities in health, the labor market, the democratic sphere, and access to public goods.

At the same time, there is some cause for optimism about future Internet use. One evident theme in these data is economic opportunity as a motivation for digital citizenship.

- Smartphone users, though relatively disadvantaged in access, have *higher* rates of online job searching than home broadband adopters.

- Internet job searching is most prevalent in communities with higher proportions of Blacks, Latinos, and Asians, even though some of these neighborhoods also have the lowest rates of broadband or smartphone access.

Together, these findings suggest that jobs motivate efforts to go online among both low-income individuals who are mobile-only users and residents of high-poverty racial and ethnic minority communities. This is consistent with previous research on attitudes regarding technology and economic opportunity among some disadvantaged groups, especially Blacks (Mossberger et al., 2003).

Additionally, these forms of more limited access may provide mobile-only Internet users and other less connected individuals with a gateway or a first step online. Mobile use is especially interesting in this regard, and more research about the attitudes of mobile-only users is needed to gauge the extent to which they are aware of other activities they could engage in online with more complete access, and whether they perceive a need to do more online. Mobile-only Internet users are younger than other less connected individuals (such as dial-up users), which raises the possibility of smartphone users gaining fuller access in the future. Reforms to the universal service fund and other policy solutions addressing affordability could help cell phone-only Internet users and other less connected individuals go online. But, as the evidence here shows, the growth in mobile phone use has not erased inequalities in economic and political participation online, and seems unlikely to do so as a primary form of Internet access.

The less connected continue to experience significant marginalization from society online, and there is a need for public policy to address the relevant disparities. A report by the Social Science Research Council concluded that the needs of many in low-income communities are "urgent" (Dailey et al., 2010, pp. 15–16), as "educational systems, employers, and government agencies at all levels have shifted services online—and are pushing rapidly to do more" (p. 4). Measuring users' activities online demonstrates the need for affordable broadband access as a critical element of digital citizenship and digital communities.

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Appendix A1. Predicted Probability of Online Activities by Chicago Community Area (CCA), from Tables 7 and 8.

	Home Broadband	*Use Internet Anywhere*	*Daily Internet*	*Mobile Phone Access*	*Mobile Access Only*	*Do Work for Job*	*Apply for Job*
CCA	Average	Average	Average	Average	Average	Average	Average
North Center	0.94	0.98	0.89	0.42	0.17	0.68	0.53
Lake View	0.93	0.98	0.88	0.45	0.16	0.66	0.52
Lincoln Park	0.93	0.98	0.88	0.52	0.16	0.66	0.48
Near South Side	0.93	0.99	0.89	0.51	0.28	0.72	0.71
Loop	0.92	0.98	0.87	0.45	0.21	0.67	0.56
Lincoln Square	0.89	0.98	0.84	0.46	0.29	0.63	0.64
West Town	0.88	0.96	0.82	0.42	0.17	0.58	0.54
Beverly	0.88	0.96	0.76	0.24	0.08	0.52	0.46
Uptown	0.87	0.97	0.81	0.39	0.21	0.55	0.55
Near West Side	0.87	0.96	0.81	0.47	0.21	0.58	0.52
Near North Side	0.86	0.96	0.76	0.28	0.1	0.49	0.36
Forest Glen	0.86	0.96	0.75	0.3	0.09	0.53	0.4
Hyde Park	0.85	0.95	0.72	0.31	0.13	0.48	0.45
McKinley Park	0.85	0.97	0.78	0.34	0.32	0.61	0.7
Mount Greenwood	0.85	0.95	0.75	0.23	0.07	0.43	0.38
Irving Park	0.84	0.95	0.74	0.29	0.13	0.52	0.5
Rogers Park	0.83	0.95	0.75	0.26	0.21	0.49	0.54
Oakland	0.83	0.95	0.73	0.57	0.67	0.48	0.69
Kenwood	0.83	0.95	0.7	0.38	0.21	0.48	0.6
West Ridge	0.82	0.96	0.74	0.35	0.29	0.54	0.6
Edgewater	0.82	0.96	0.7	0.31	0.1	0.45	0.49
Avalon Park	0.81	0.97	0.65	0.33	-	0.51	0.76
Portage Park	0.79	0.93	0.66	0.23	0.12	0.39	0.41
Douglas	0.79	0.94	0.68	0.35	0.27	0.46	0.64
Morgan Park	0.79	0.93	0.61	0.23	0.1	0.39	0.47
Edison Park	0.78	0.92	0.63	0.19	0.06	0.31	0.3
Albany Park	0.78	0.94	0.71	0.32	0.23	0.49	0.59
Avondale	0.78	0.93	0.67	0.26	0.11	0.47	0.52
Armour Square	0.78	0.97	0.7	0.43	0.77	0.51	0.77
Bridgeport	0.78	0.94	0.72	0.33	0.37	0.52	0.6

Norwood Park	0.77	0.93	0.61	0.16	0.06	0.33	0.32
North Park	0.77	0.95	0.67	0.26	0.16	0.45	0.5
Ashburn	0.75	0.93	0.6	0.3	0.13	0.44	0.58
Riverdale	0.72	0.91	0.67	0.53	-	0.34	0.71
Logan Square	0.71	0.88	0.58	0.26	0.11	0.39	0.42
Washington Park	0.71	0.91	0.56	0.36	0.4	0.32	0.67
Garfield Ridge	0.69	0.89	0.54	0.15	0.06	0.29	0.36
Pullman	0.68	0.89	0.47	0.19	0.08	0.3	0.48
West Garfield Park	0.66	0.9	0.55	0.42	0.4	0.28	0.65
Chicago Lawn	0.66	0.85	0.49	0.16	0.09	0.31	0.43
Austin	0.65	0.89	0.49	0.3	0.2	0.28	0.6
O'Hare	0.65	0.83	0.48	0.13	0.05	0.21	0.24
Hegewisch	0.64	0.86	0.46	0.13	0.06	0.25	0.33
Dunning	0.63	0.85	0.46	0.14	0.05	0.23	0.29
Grand Boulevard	0.63	0.86	0.46	0.23	0.18	0.24	0.52
South Shore	0.63	0.85	0.45	0.22	0.13	0.24	0.48
West Englewood	0.63	0.86	0.49	0.29	0.27	0.25	0.53
Burnside	0.61	0.86	0.41	0.23	0.13	0.23	0.48
West Pullman	0.61	0.85	0.42	0.19	0.15	0.23	0.52
Jefferson Park	0.6	0.79	0.4	0.1	0.03	0.18	0.22
Woodlawn	0.6	0.83	0.42	0.21	0.12	0.22	0.42
West Elsdon	0.59	0.81	0.38	0.16	0.07	0.33	0.39
Chatham	0.57	0.82	0.36	0.21	0.1	0.21	0.45
Roseland	0.57	0.84	0.37	0.16	0.11	0.21	0.51
Clearing	0.57	0.77	0.39	0.1	0.03	0.19	0.26
Montclare	0.56	0.76	0.37	0.11	0.03	0.18	0.22
Belmont Cragin	0.56	0.8	0.42	0.18	0.1	0.29	0.41
Englewood	0.56	0.8	0.4	0.27	0.23	0.2	0.49
Auburn Gresham	0.56	0.82	0.36	0.19	0.12	0.2	0.49
North Lawndale	0.54	0.77	0.37	0.24	0.2	0.17	0.47
Gage Park	0.54	0.79	0.4	0.15	0.1	0.3	0.47
Washington Heights	0.54	0.84	0.33	0.15	0.1	0.21	0.49
Brighton Park	0.53	0.81	0.42	0.21	0.18	0.31	0.53
New City	0.52	0.74	0.37	0.2	0.13	0.23	0.37
Lower West Side	0.5	0.79	0.4	0.21	0.14	0.31	0.46
West Lawn	0.5	0.77	0.37	0.13	0.08	0.24	0.41

South Chicago	0.49	0.77	0.33	0.2	0.11	0.19	0.44
South Deering	0.49	0.72	0.28	0.11	0.05	0.18	0.27
Humboldt Park	0.48	0.74	0.34	0.22	0.14	0.2	0.45
Calumet Heights	0.48	0.83	0.28	0.14	0.08	0.18	0.47
East Side	0.48	0.7	0.3	0.08	0.05	0.19	0.27
Archer Heights	0.47	0.78	0.36	0.17	0.1	0.25	0.49
South Lawndale	0.44	0.64	0.29	0.16	0.08	0.24	0.34
Greater Grand Crossing	0.44	0.72	0.26	0.11	0.07	0.13	0.39
Hermosa	0.36	0.57	0.2	0.08	0.03	0.21	0.28
East Garfield Park	0.36	0.57	0.2	0.12	0.09	0.09	0.3

Note: There were no survey respondents from Fuller Park, so no estimates could be generated.

Special Report: Who has access to broadband in Illinois?

The attached report from Broadband Illinois illustrates the percentages of households in Illinois that have access to high-speed internet.

The first three pie charts look at broadband access on a **statewide** level. Reports for each of our ten regional eTeams follow. It is important to note that this data focuses solely on broadband access, NOT broadband usage or adoption.

The report provides different "definitions" of broadband quality.

Using the NTIA Speed tiers, we determine who is "served" (who has access to higher-quality broadband) and who is "underserved" (who does not have access to higher-quality broadband). With higher-quality broadband, users can access the internet is more meaningful ways. We want to work for this high-quality broadband for all Illinois citizens.

We use the speed tiers defined by the NTIA to determine who is "served" and "underserved." From this, two key "definitions" follow:

1. FCC Advanced:
   "Served" means a download speed greater than or equal to 6 mbps
   "Underserved" means a download speed less than 6 mbps
2. NTIA and/or FCC:
   "Served" means Download speed greater than or equal to 3 mbps
   "Underserved" means download speed less than 3 mbps

For reference, we have also provided a speed-tier breakdown of the Illinois State Broadband Initiative data, which is used on the National Broadband Map. The NTIA defines broadband internet as having a download speed greater than or equal to 768 kbps.

Broadband is categorized by "definitions of quality" because the current NTIA standard is considered very low. Technology is advancing quickly, and this definition is quickly becoming obsolete. The average person cannot perform many needed tasks using speeds of 768 kbps. The categories of "served" and "underserved" are used to "raise the standard" of broadband quality.

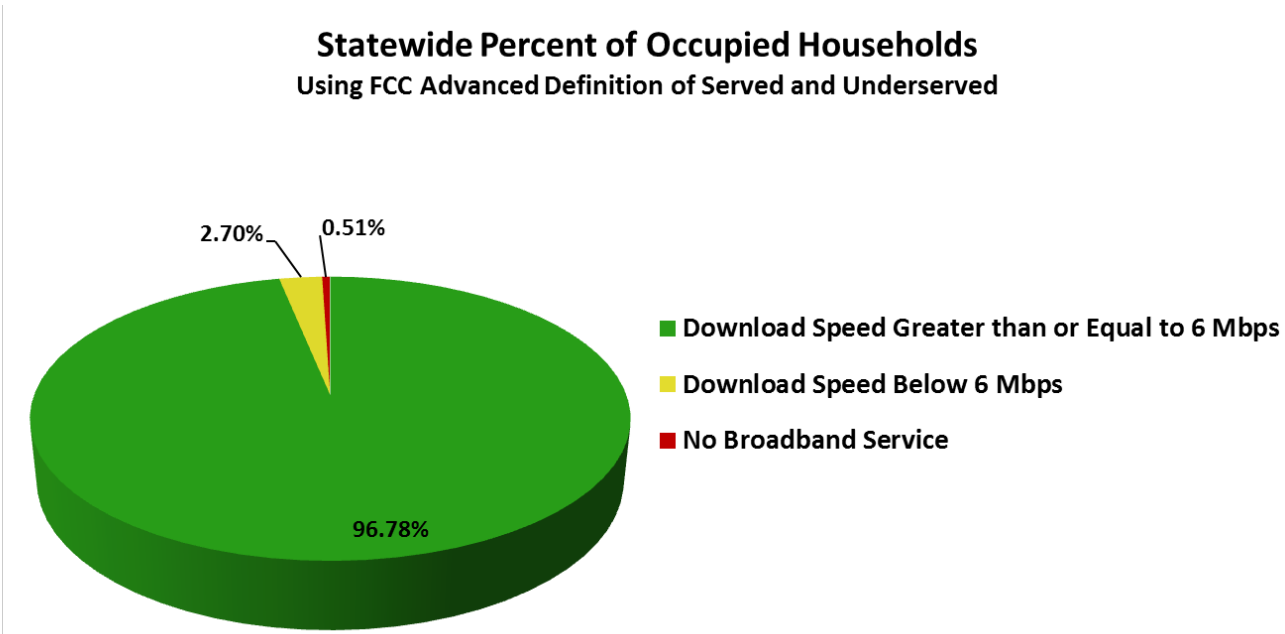
Broadband Illinois uses these quality definitions to align with progress in broadband quality on a national level.

Each of our ten regional eTeams is also documented in this report, using the same data and definitions as the "statewide" report.

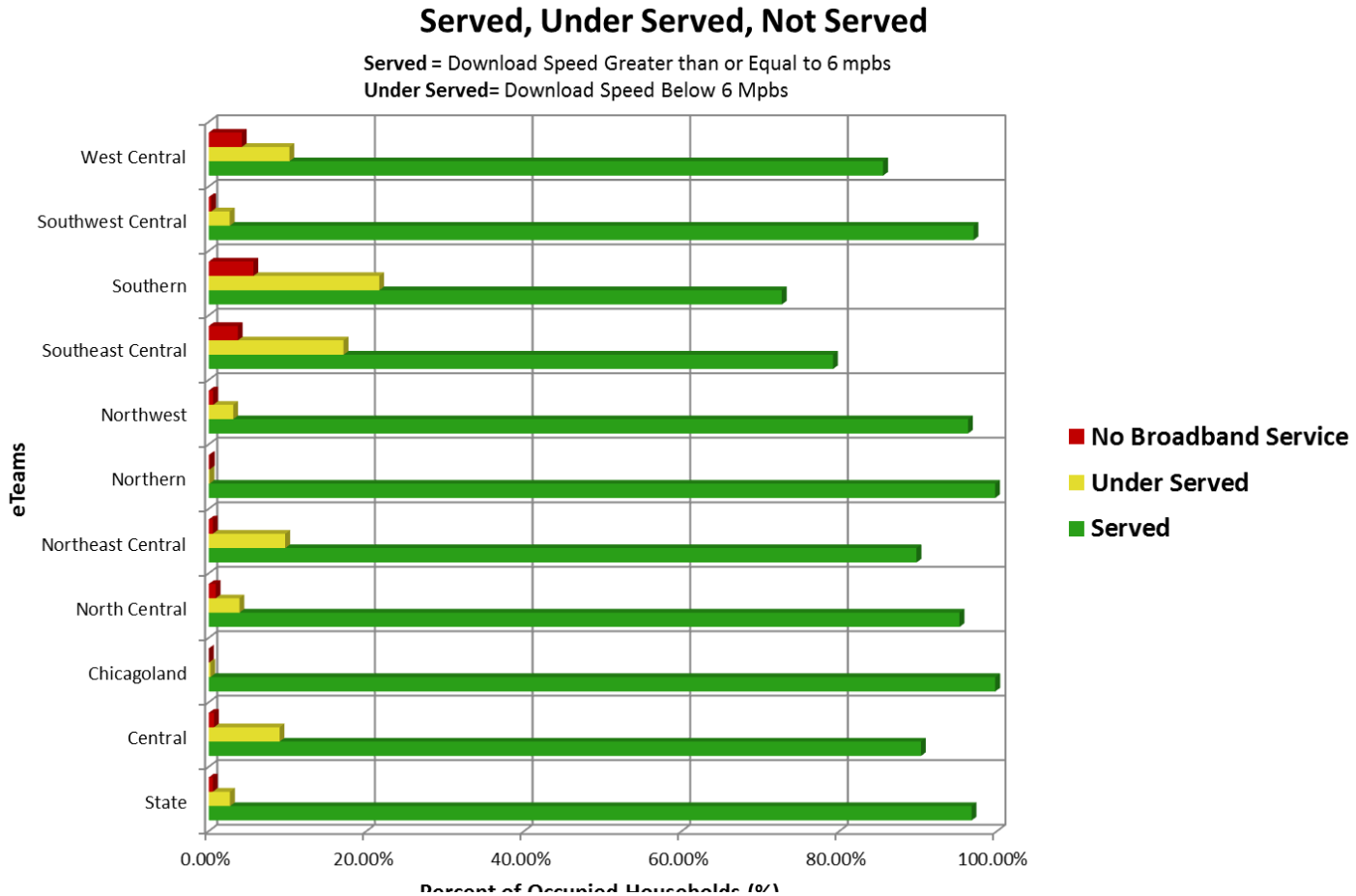
For example, readers will notice that the Chicagoland eTeam region has a 99.78 percent "served" rate, according to the "FCC Advanced" definition. This means 99.78 of Chicagoland residents have access to broadband at 6 mbps or faster.

In contrast, the Southern eTeam region has a 72.70 percent "served" rate, according to the same "FCC Advanced" definition.

Statewide

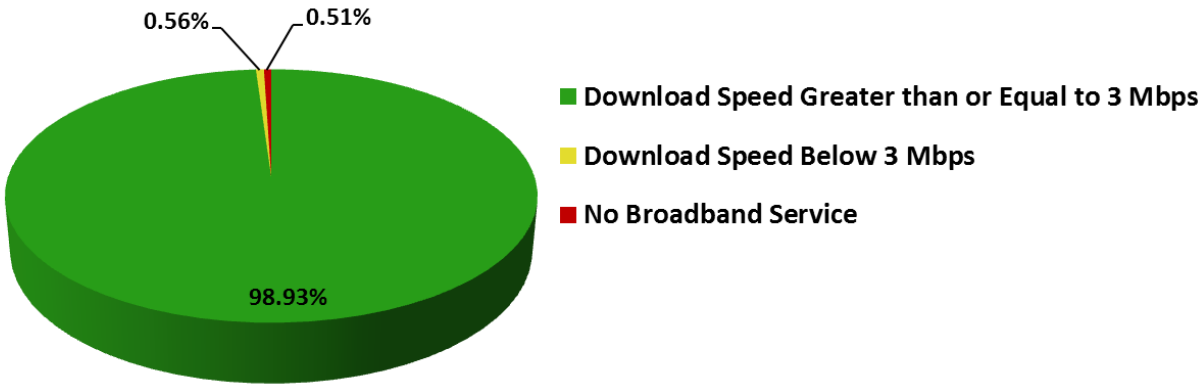


FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	96.78%
Under Served	Download Speed Below 6 Mbps	2.70%
No Broadband Service	No Broadband Service	0.51%



Statewide Percent of Occupied Households

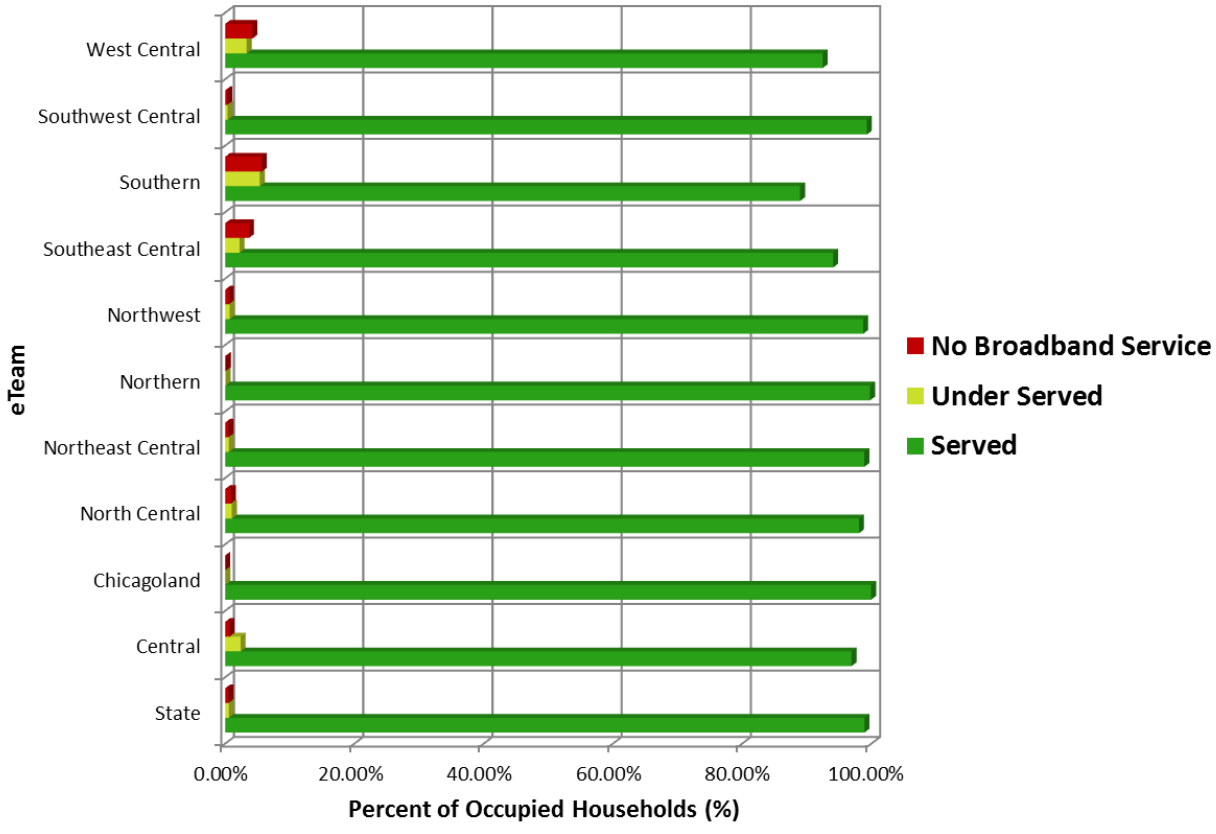
Using NTIA/FCC Definition of Served and Underserved



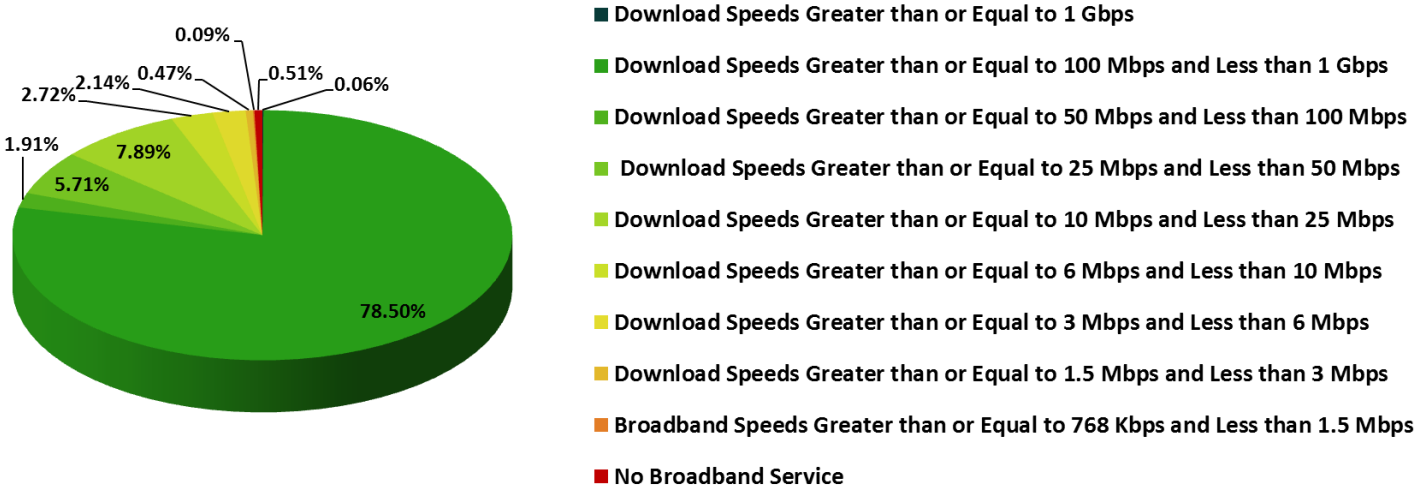
NTIA/FCC	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 3 Mbps	98.93%
Under Served	Download Speed Below 3 Mbps	0.56%
No Broadband Service	No Broadband Service	0.51%

Served, Under Served, Not Served

Served = Download Speed Greater than or Equal to 3 mpbs
Under Served= Download Speed Below 3 Mpbs



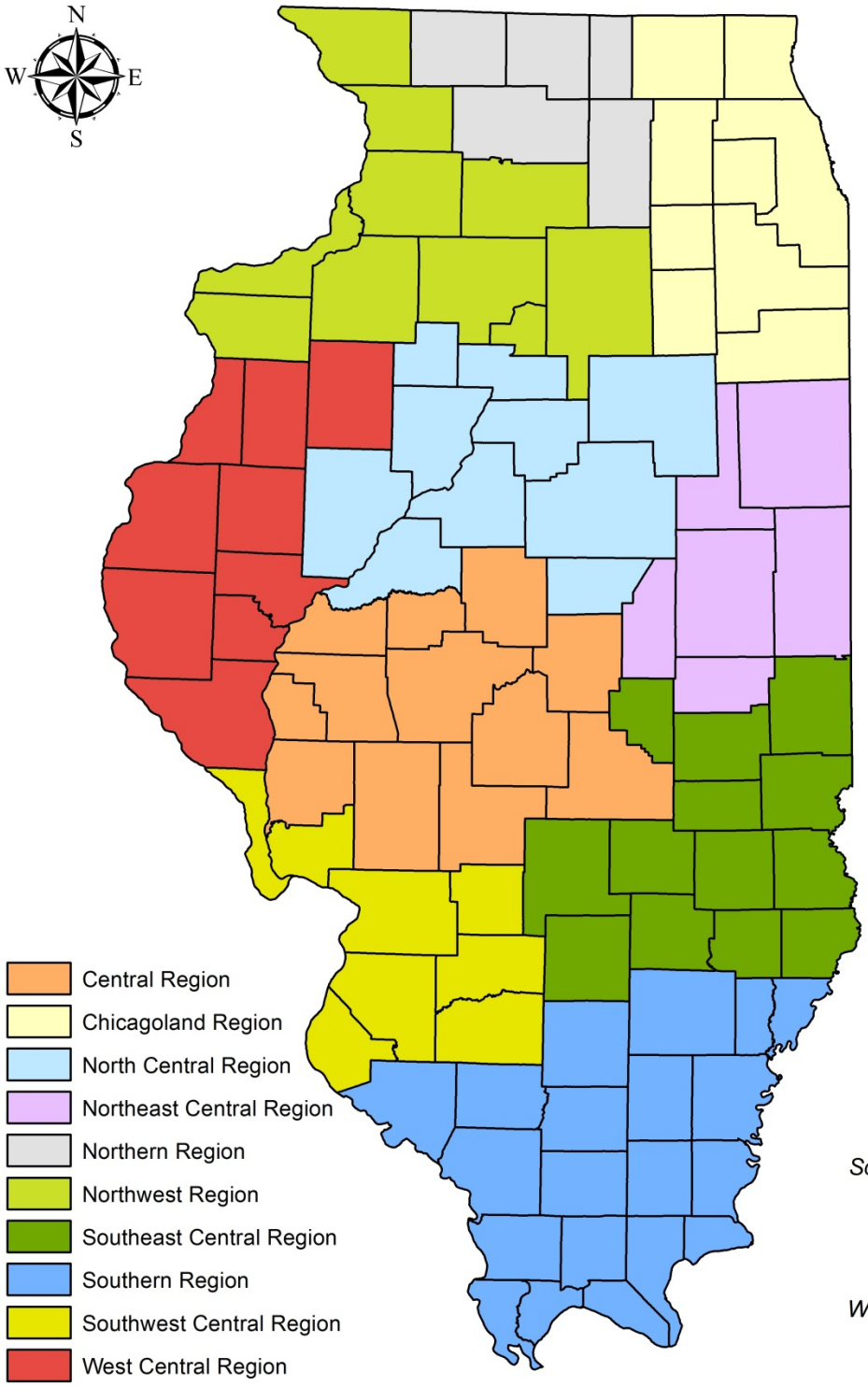
Statewide Percent of Occupied Households by Maximum Advertised Download Speed Tier



NTIA Speed Tier	Speed Tier Description	% of Occupied Households
11	Download Speeds Greater than or Equal to 1 Gbps	0.06%
10	Download Speeds Greater than or Equal to 100 Mbps and Less than 1 Gbps	78.50%
9	Download Speeds Greater than or Equal to 50 Mbps and Less than 100 Mbps	1.91%
8	Download Speeds Greater than or Equal to 25 Mbps and Less than 50 Mbps	5.71%
7	Download Speeds Greater than or Equal to 10 Mbps and Less than 25 Mbps	7.89%
6	Download Speeds Greater than or Equal to 6 Mbps and Less than 10 Mbps	2.72%
5	Download Speeds Greater than or Equal to 3 Mbps and Less than 6 Mbps	2.14%
4	Download Speeds Greater than or Equal to 1.5 Mbps and Less than 3 Mbps	0.47%
3	Broadband Speeds Greater than or Equal to 768 Kbps and Less than 1.5 Mbps	0.09%
0	No Broadband Service	0.51%

broadbandillinois.org eTeams

Statewide eTeam Map



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This map was created by the Partnership for a Connected Illinois - Nov. 26, 2012

0 50 100 Miles

broadbandillinois.org eTeams

Central Region

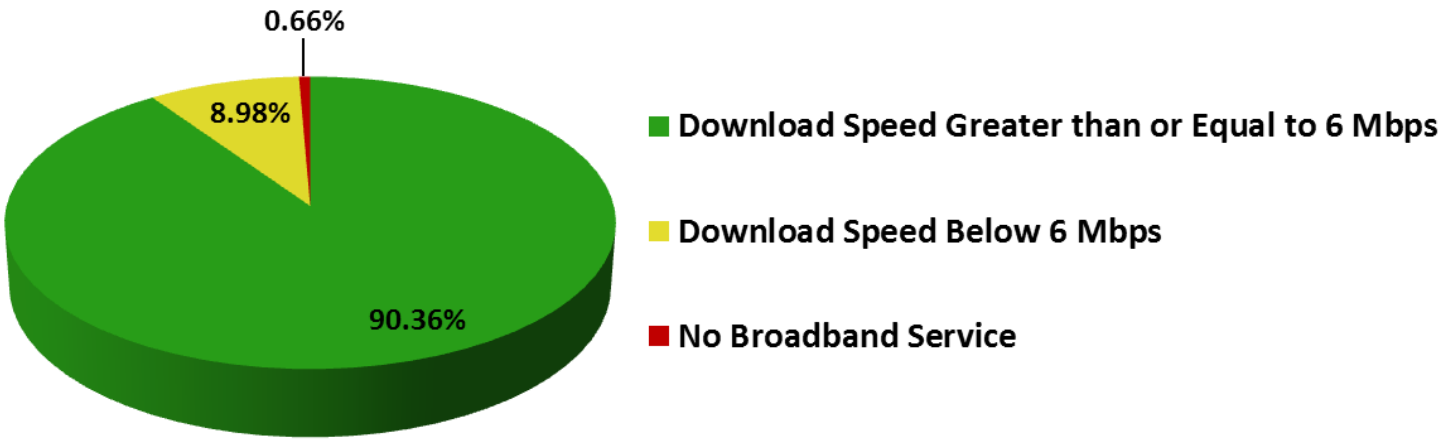
This map was created by the Partnership for a Connected Illinois - January 31, 2012

broadbandillinois.org

Central eTeam

Central eTeam Region Percent of Occupied Households

Using FCC Advanced Definition of Served and Underserved



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	90.36%
Under Served	Download Speed Below 6 Mbps	8.98%
No Broadband Service	No Broadband Service	0.66%

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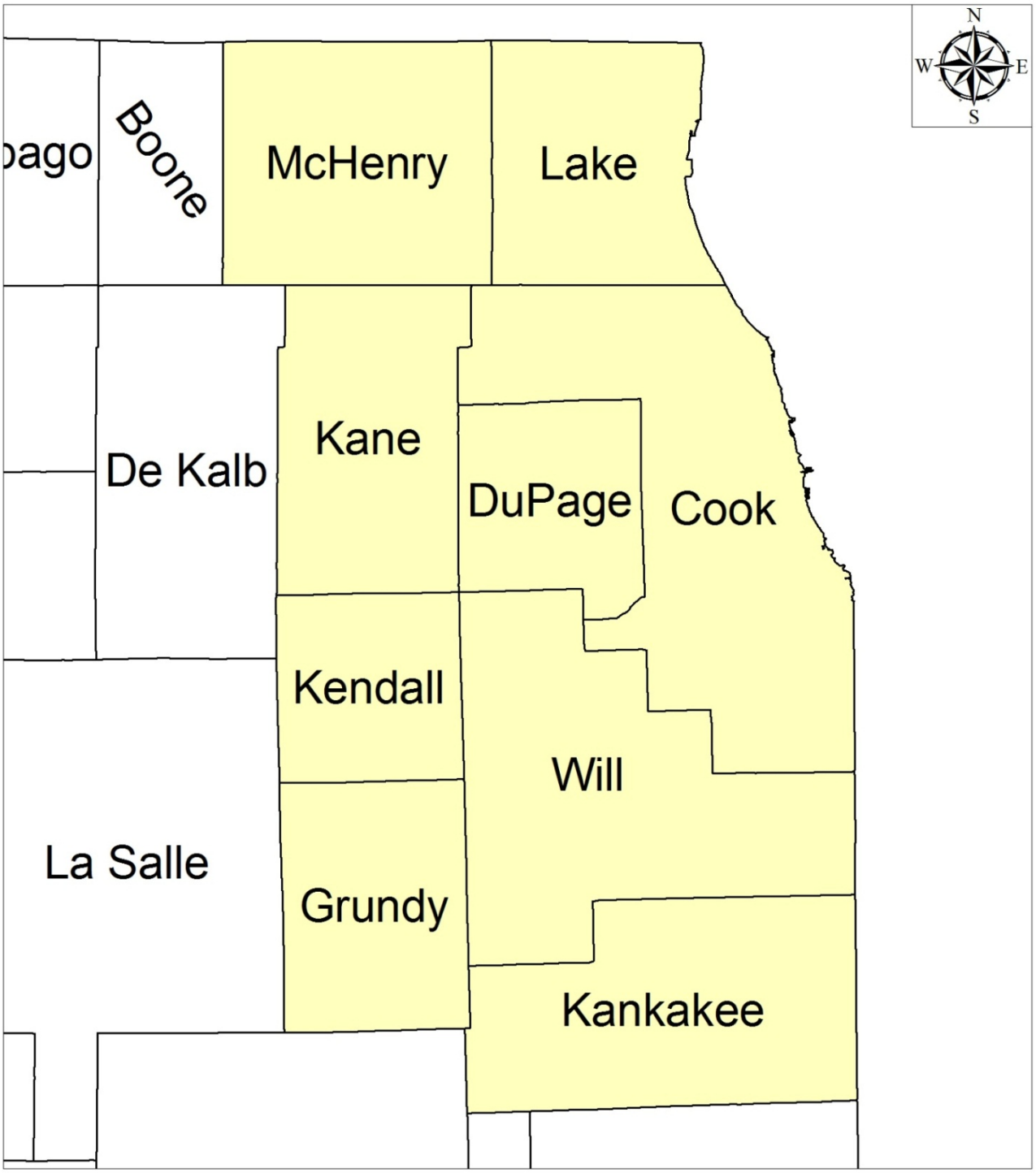
Chicagoland Region



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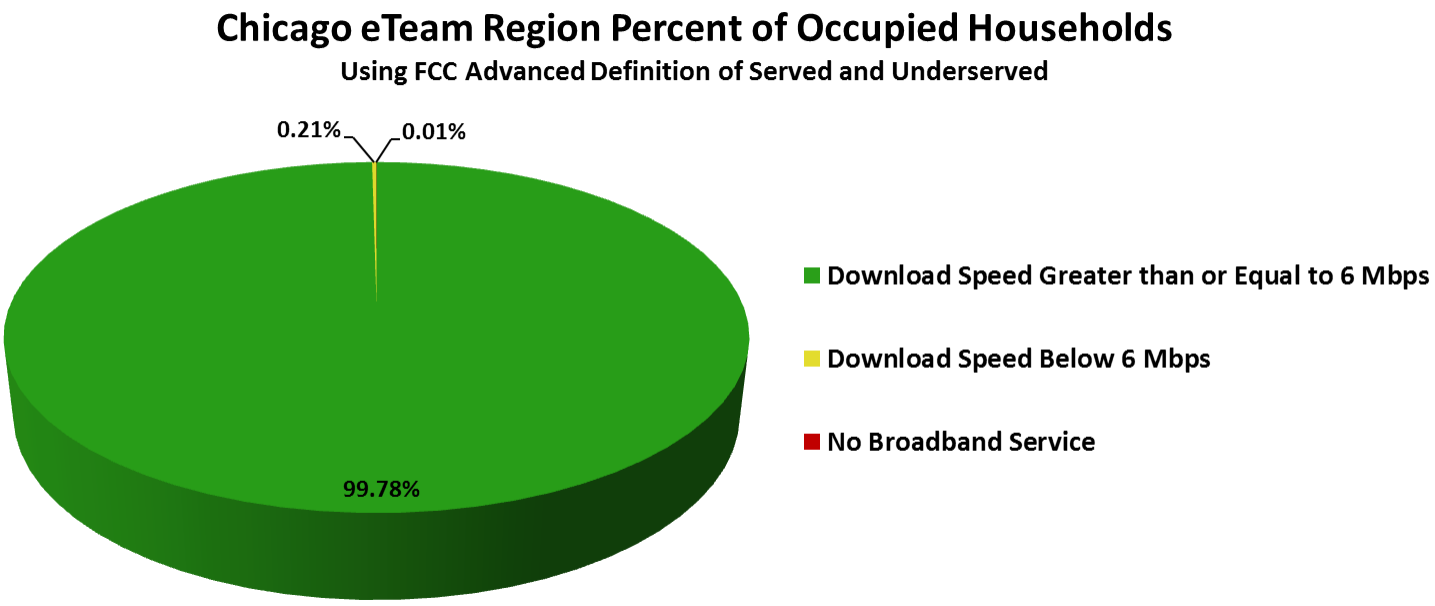
Chicagoland eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	99.78%
Under Served	Download Speed Below 6 Mbps	0.21%
No Broadband Service	No Broadband Service	0.01%

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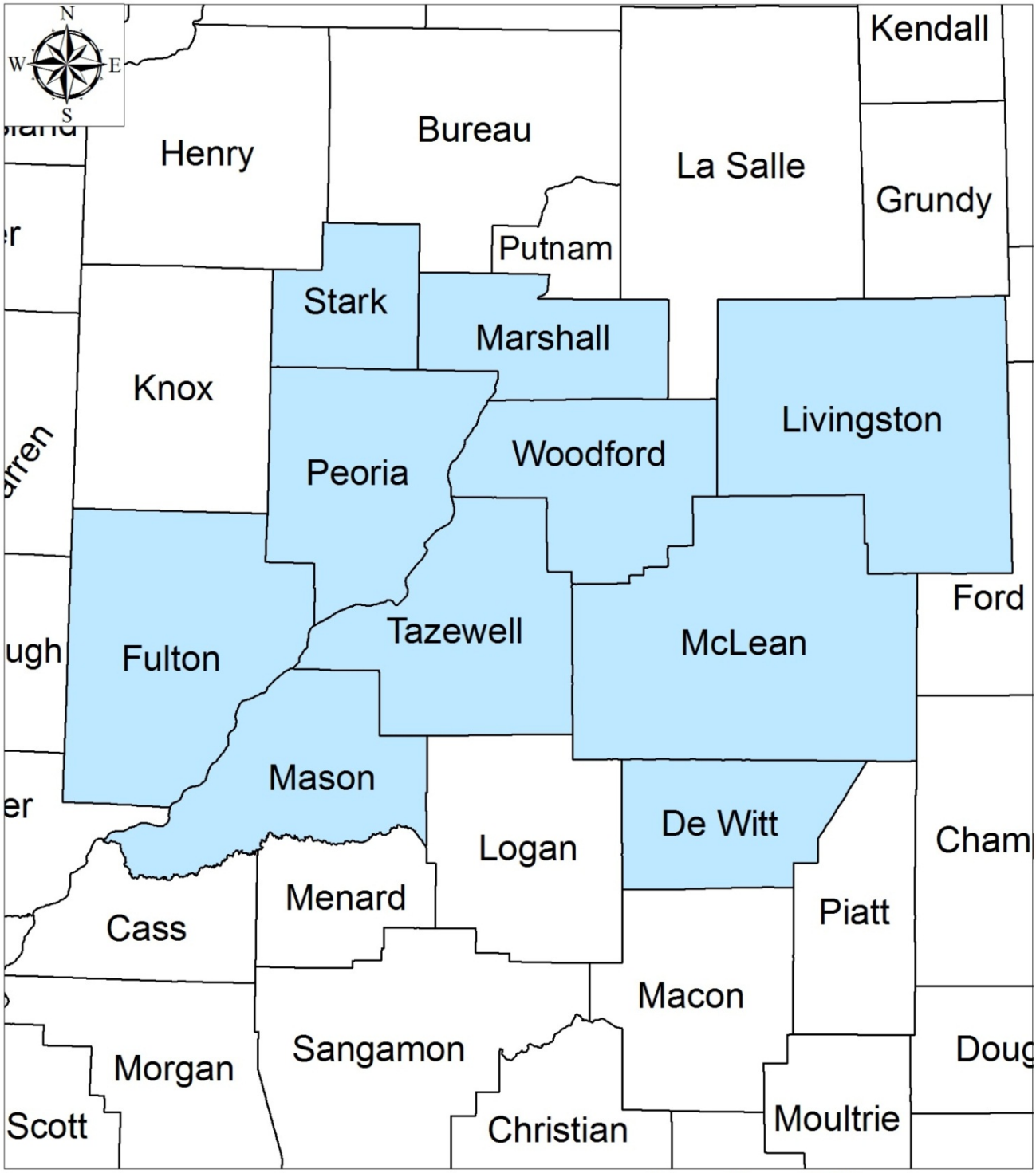
North Central Region



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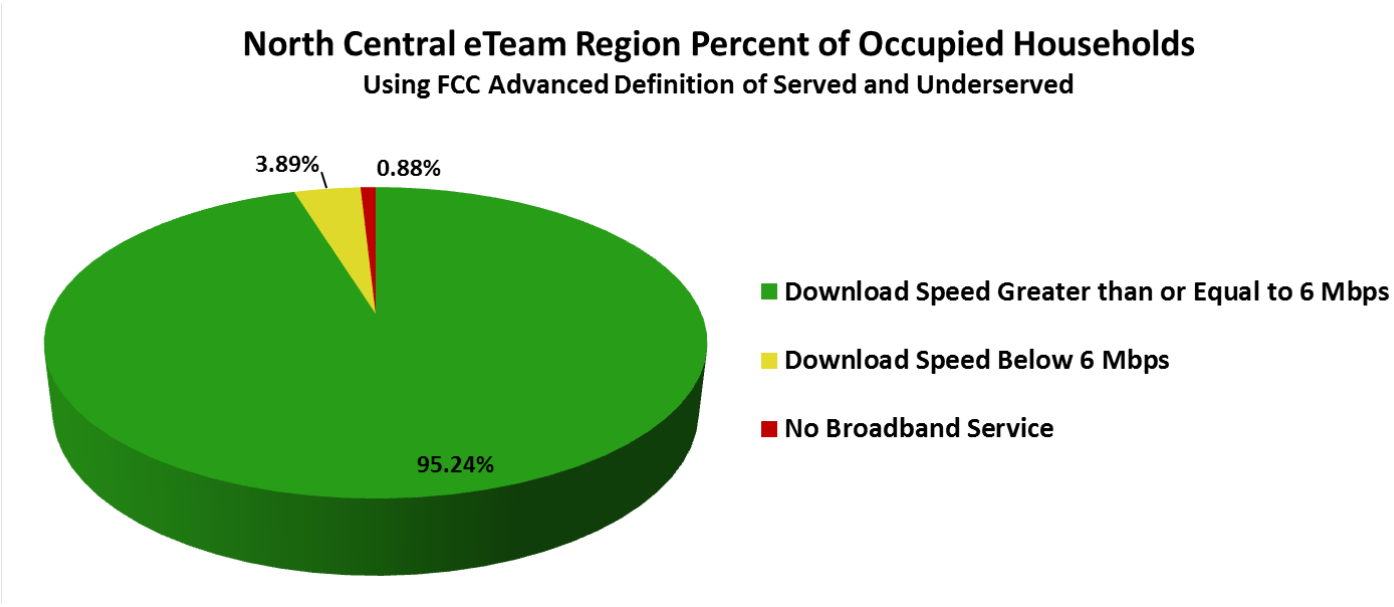
North Central eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	95.24%
Under Served	Download Speed Below 6 Mbps	3.89%
No Broadband Service	No Broadband Service	0.88%

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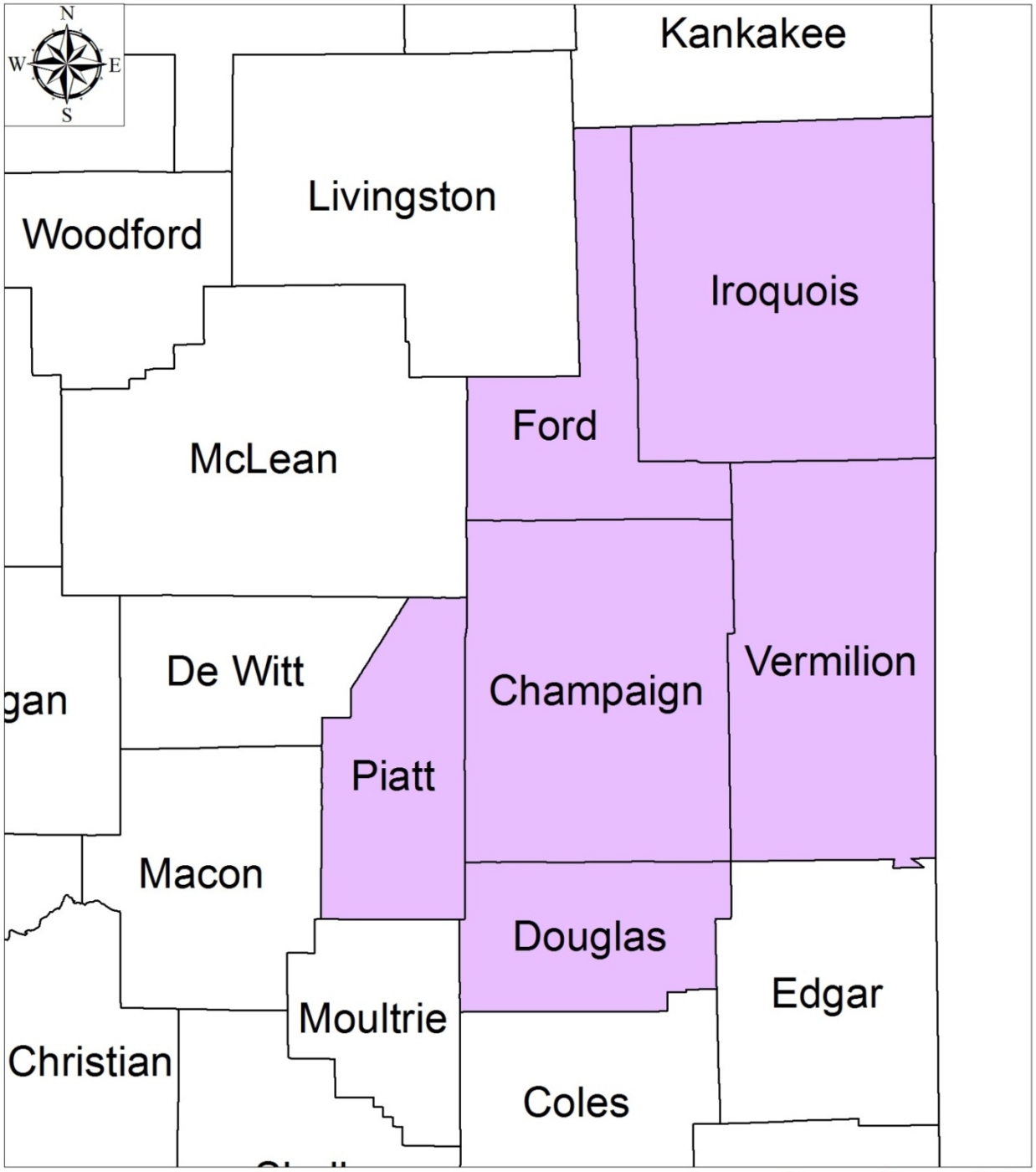
Northeast Central Region



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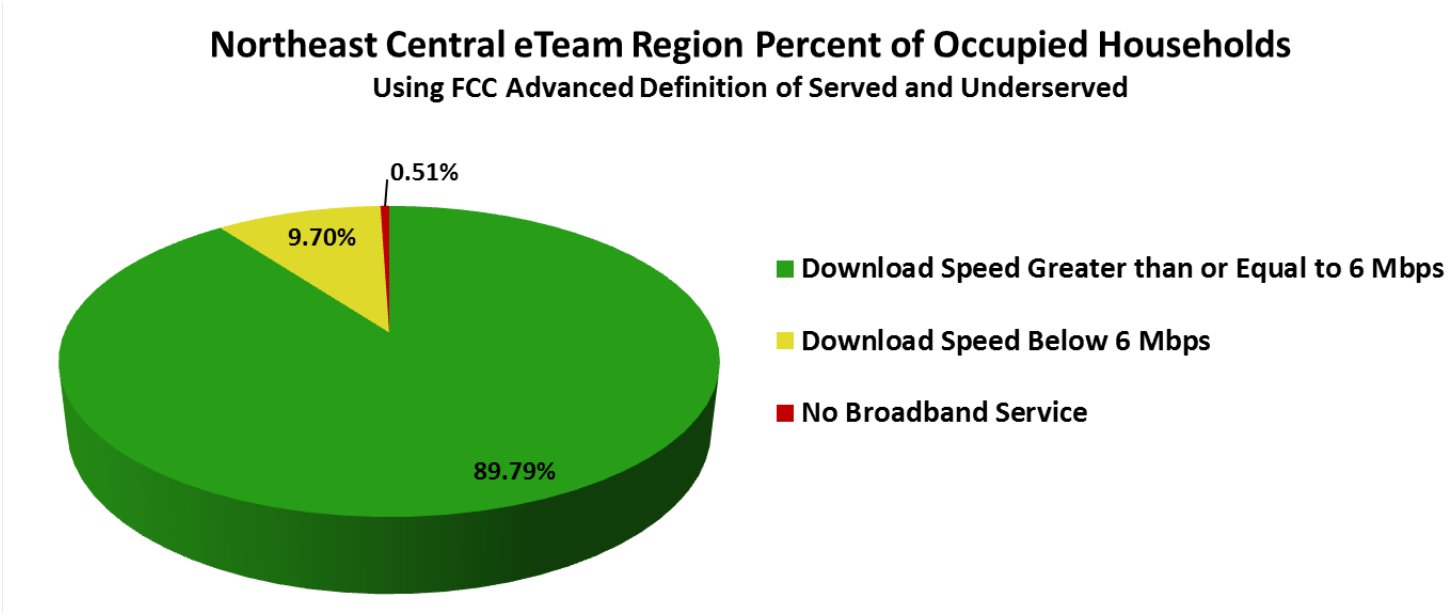
Northeast Central eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	89.79%
Under Served	Download Speed Below 6 Mbps	9.70%
No Broadband Service	No Broadband Service	0.51%

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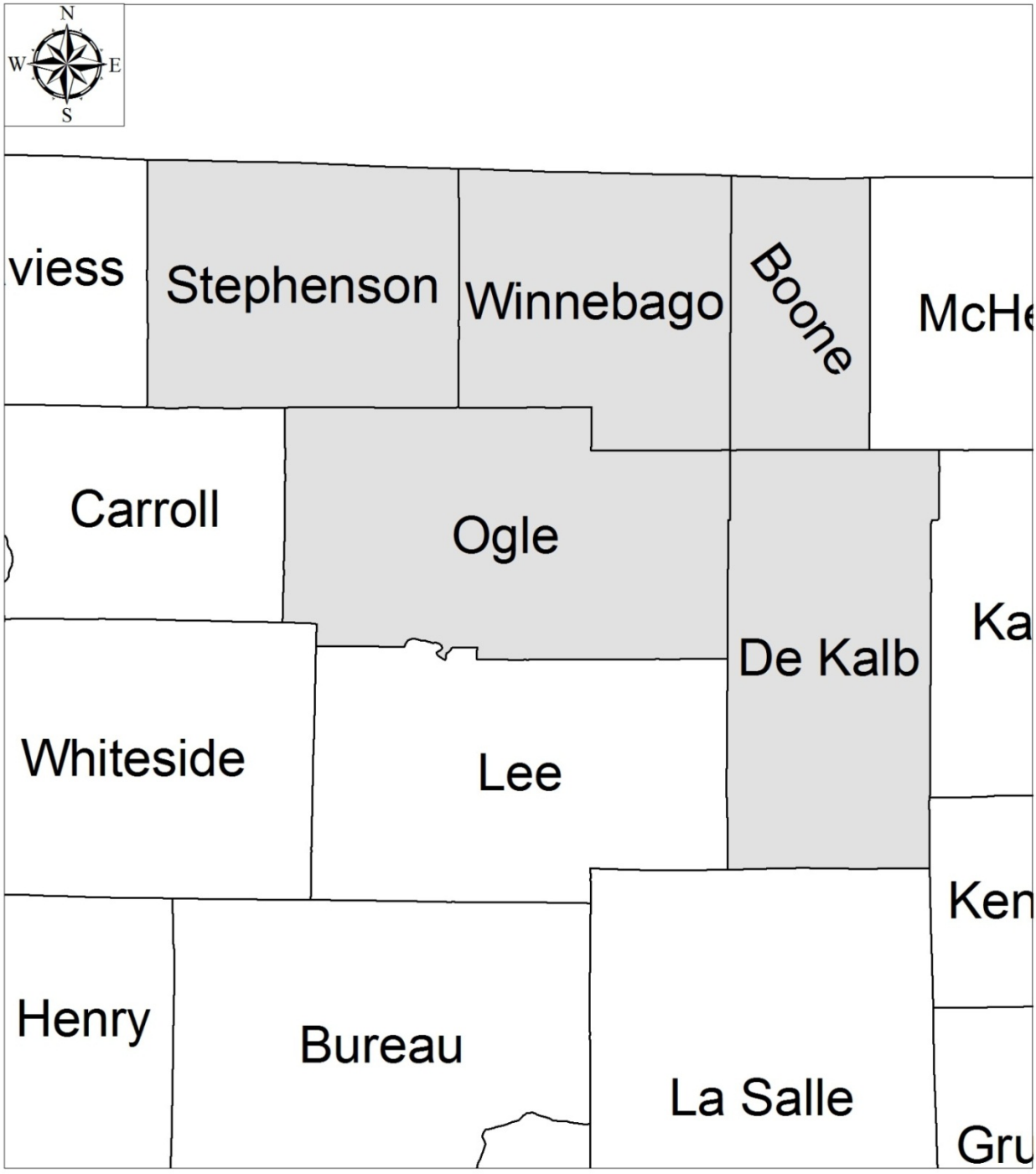
Northern Region



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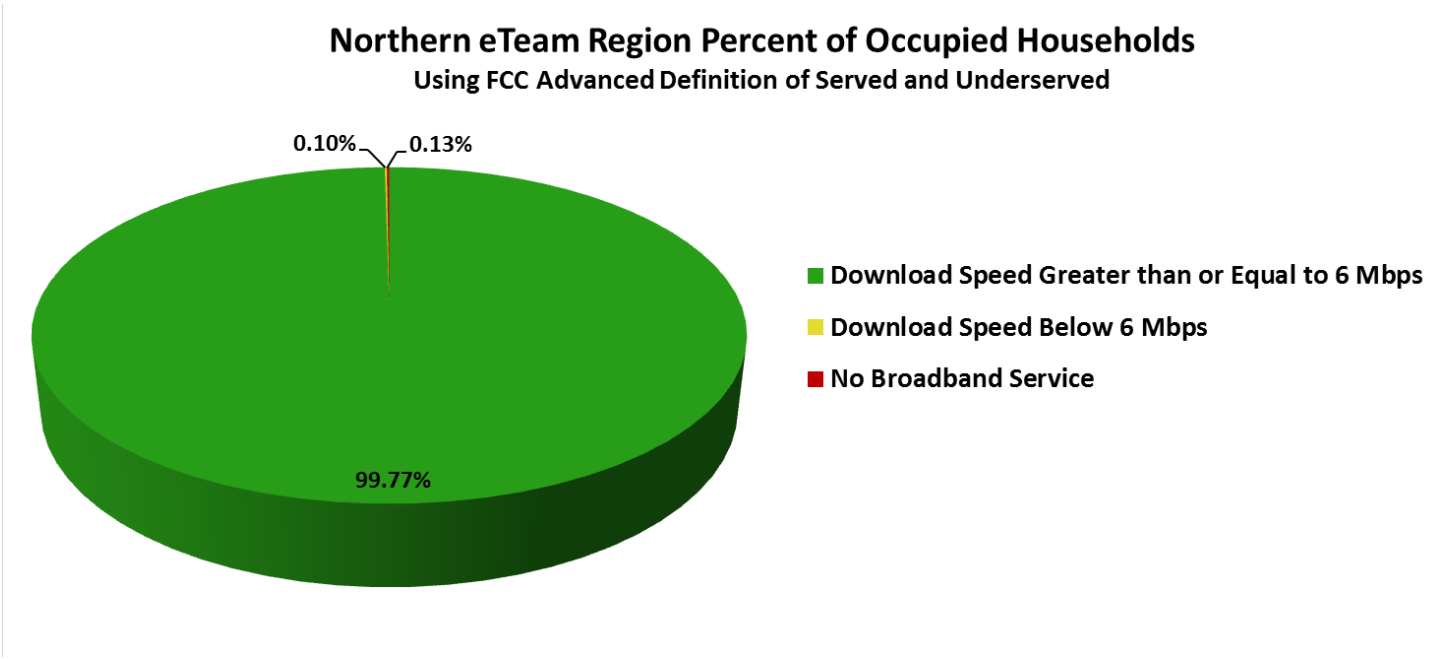
Northern eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	99.77%
Under Served	Download Speed Below 6 Mbps	0.10%
No Broadband Service	No Broadband Service	0.13%

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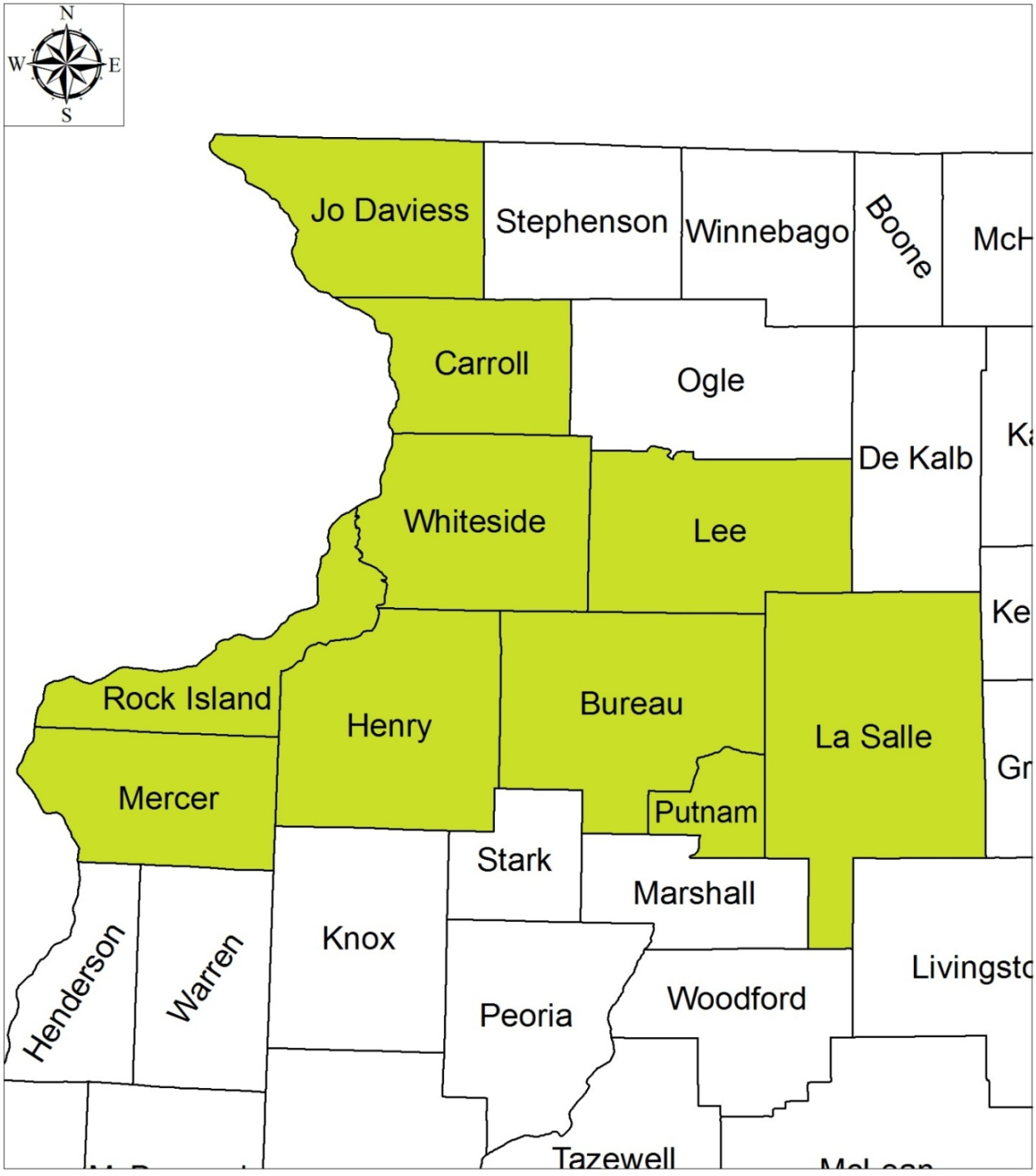
Northwest Region



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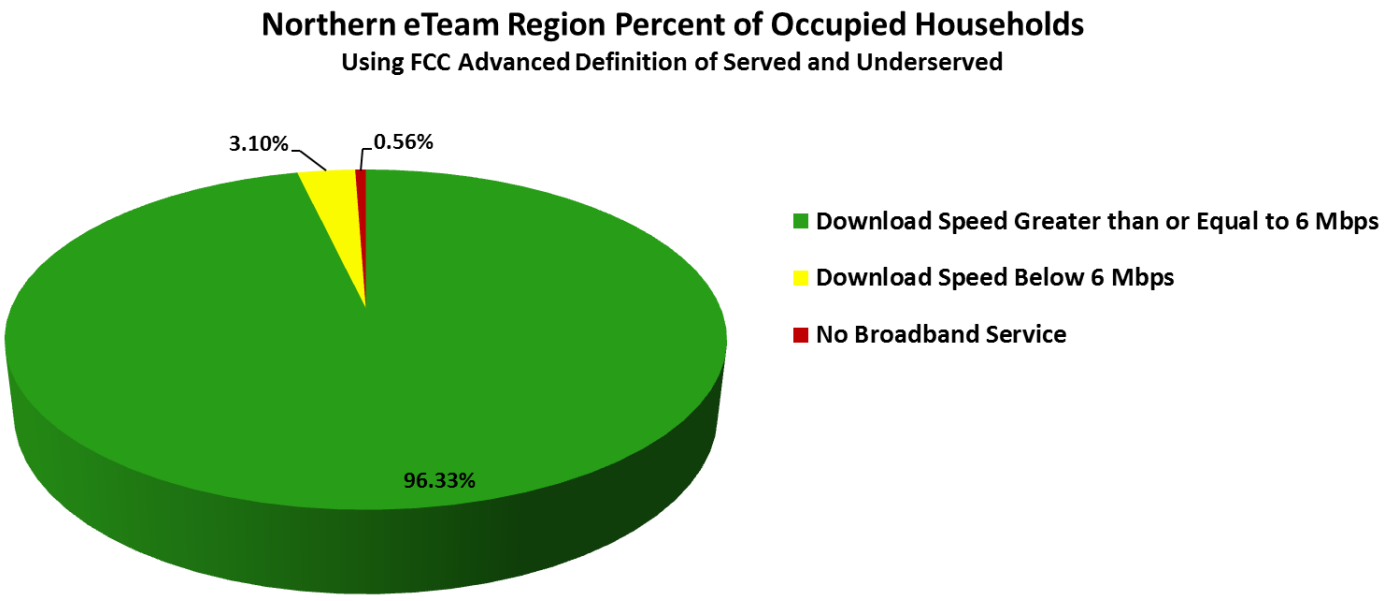
Northwest eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	96.33%
Under Served	Download Speed Below 6 Mbps	3.10%
No Broadband Service	No Broadband Service	0.56%

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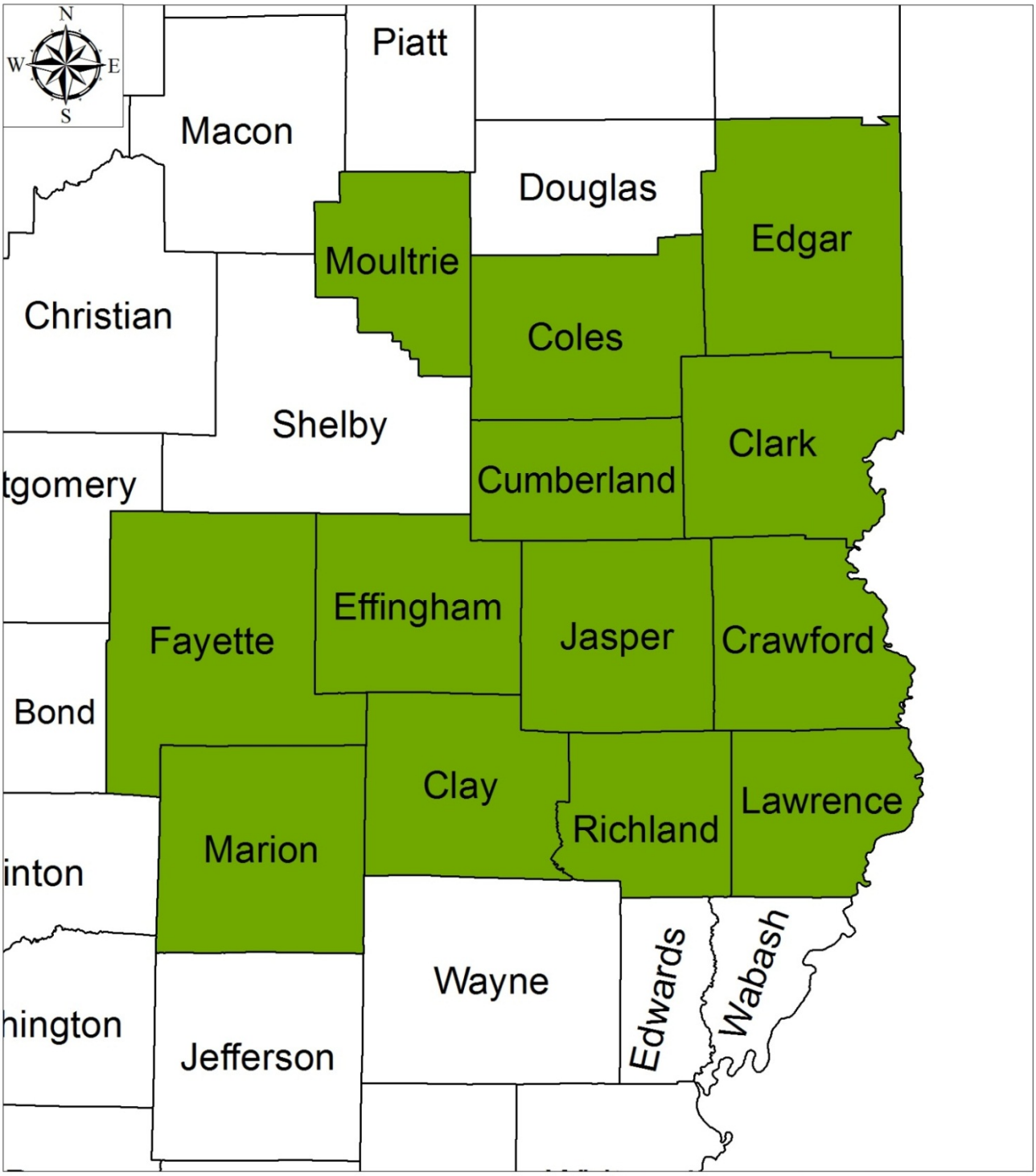
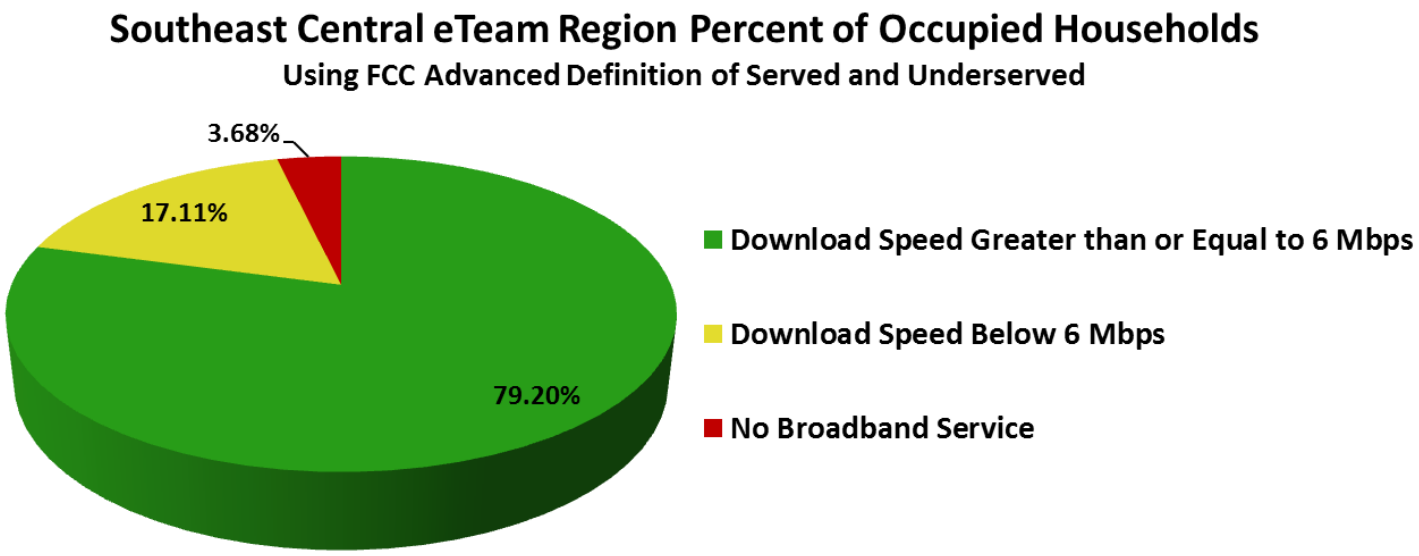
Southeast Central Region



Southeast Central eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	79.20%
Under Served	Download Speed Below 6 Mbps	17.11%
No Broadband Service	No Broadband Service	3.68%

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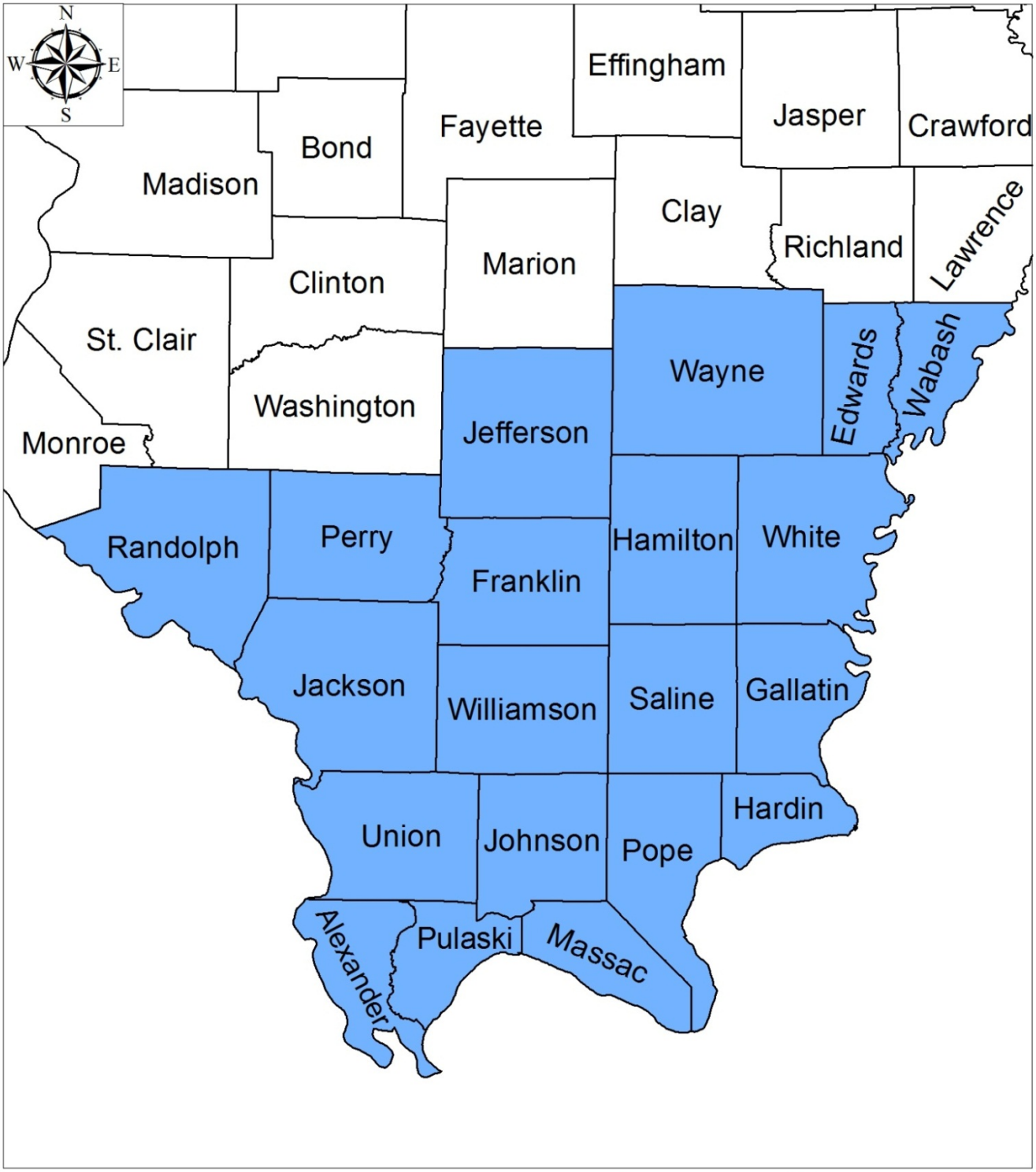
Southern Region



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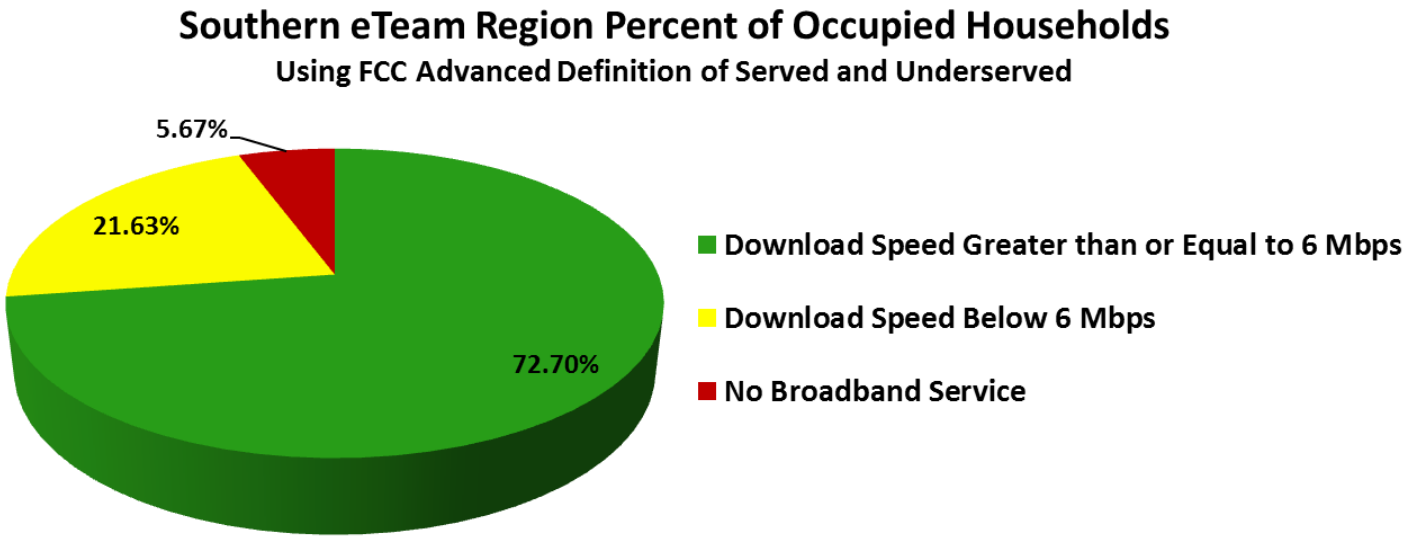
0 25 50 Miles

Southern eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	72.70%
Under Served	Download Speed Below 6 Mbps	21.63%
No Broadband Service	No Broadband Service	5.67%

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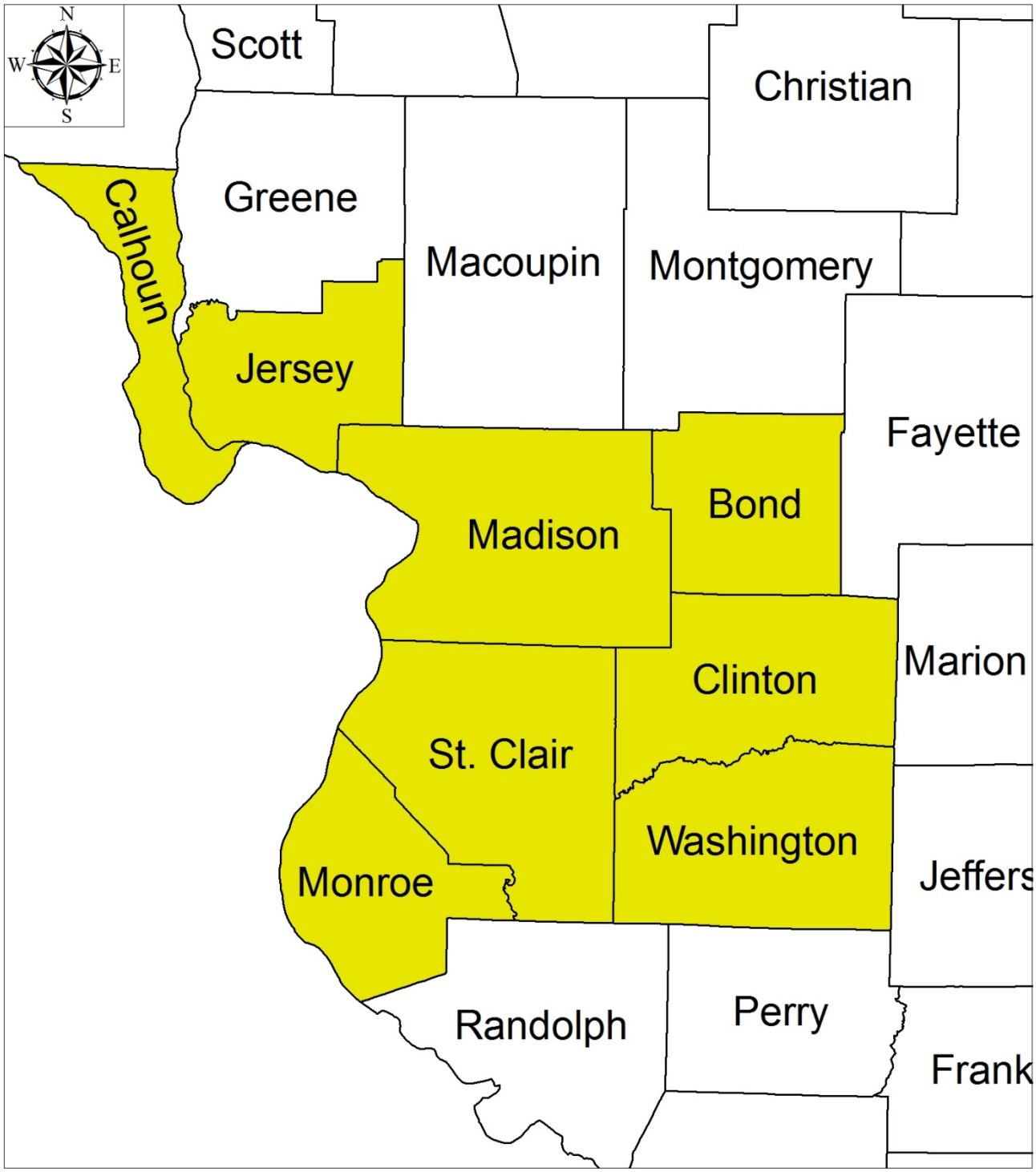
Southwest Central Region



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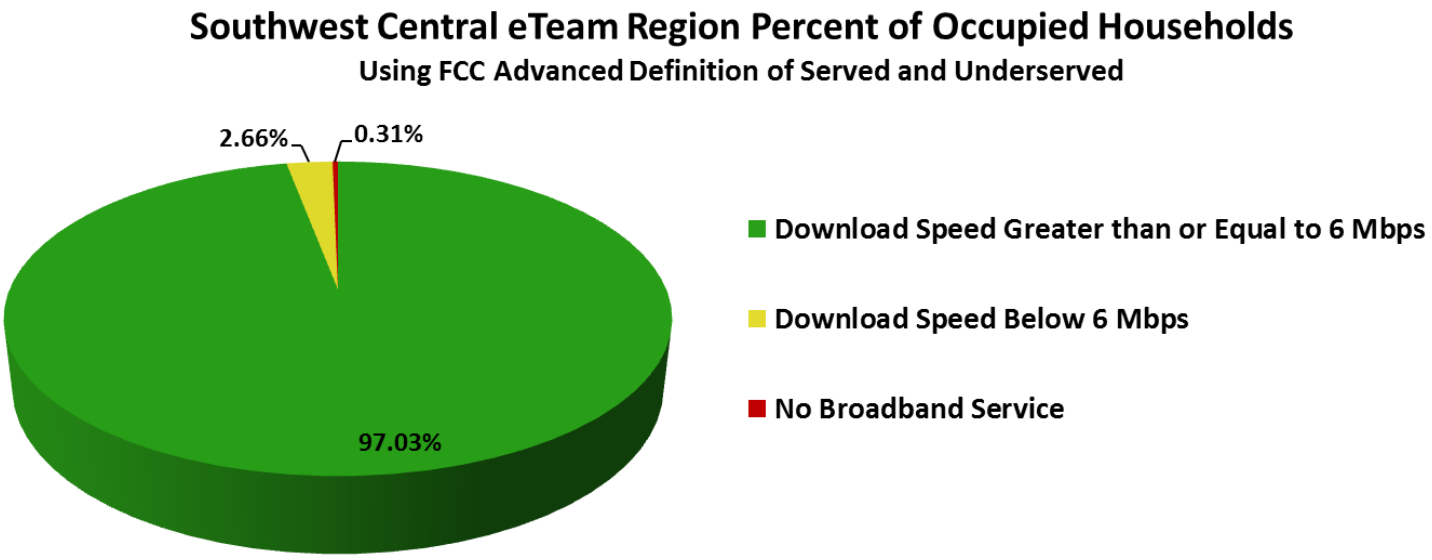
Southwest Central eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	97.03%
Under Served	Download Speed Below 6 Mbps	2.66%
No Broadband Service	No Broadband Service	0.31%

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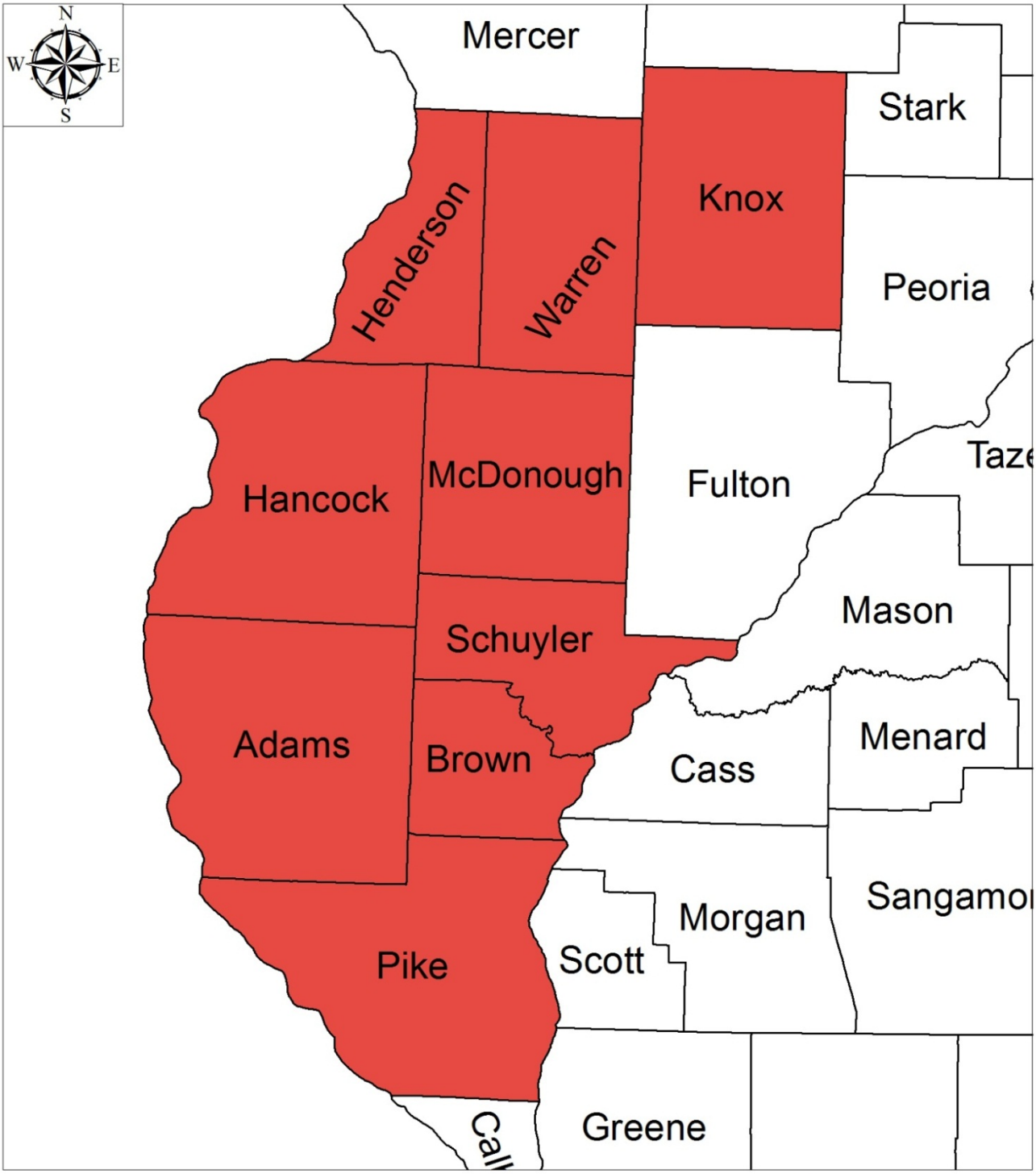
West Central Region



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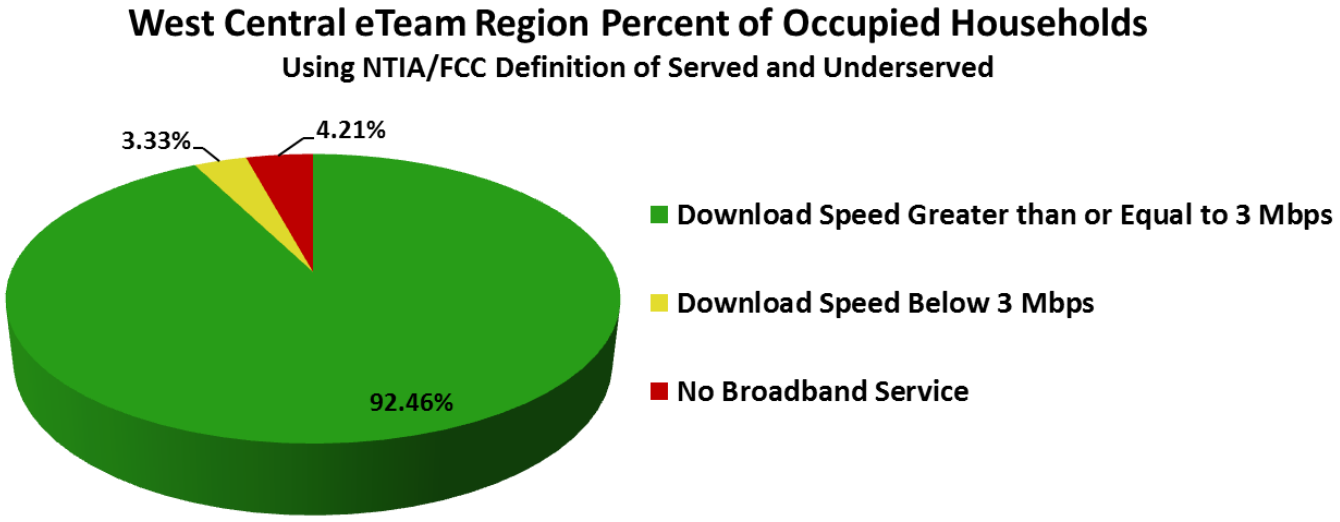
West Central eTeam



FCC Advanced	Speed Tier Description	% of Occupied Households
Served	Download Speed Greater than or Equal to 6 Mbps	85.56%
Under Served	Download Speed Below 6 Mbps	10.23%
No Broadband Service	No Broadband Service	4.21%