DIGITAL EXCELLENCE IN CHICAGO:

TRACKING TRENDS IN INTERNET USE

2008-2013

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EXECUTIVE SUMMARY

The Internet has become a platform for economic innovation and activity, and also for advances in education, health care, government service delivery, civic participation, public safety, and more. Through new applications of broadband, mobile technologies and other forms of Internet access, cities can engage with residents, businesses, and nonprofit institutions to improve the prosperity and quality of life in their communities. A critical challenge for realizing the potential of technology is to encourage widespread adoption and use.

For the first time, the federal government released data on high-speed broadband adoption at home for cities around the nation, in late 2014. According to these figures from the 2013 American Community Survey conducted by the U.S. Bureau of the Census, 69% of Chicago residents had broadband at home. While this large and high-quality national survey provides important information for policies in Chicago, the data is for the city as a whole and at a single point in time. It does not track change in recent years in the city, or disentangle varied patterns for populations and neighborhoods within the city.

This report examines trends in broadband adoption, mobile adoption, and activities online in Chicago over a five-year period – citywide, and for Chicago's 77 official community areas. Based on three citywide surveys conducted in 2008, 2011 and 2013, the report provides a unique, close-up view of trends in Internet use in one of the nation's largest and most diverse cities. This includes estimates for forms of Internet access, activities online, and change in Internet use by neighborhood. Maps of these estimates convey visually both patterns of progress over the years and continued need in some low-income communities.

Since the 2007 report of the Mayor's Advisory Council on Closing the Digital Divide, the City of Chicago has worked with a number of partners to promote widespread adoption and use of the Internet. Initiatives have included the federally-funded Smart Communities program in nine neighborhoods and Smart Chicago public computer centers throughout the city, as well as FamilyNet Centers supported by the City of Chicago, Americorps, and Comcast. During this period, Comcast also began the Internet Essentials program, offering discounted broadband to eligible households. Change over the period of these initiatives is measured through citywide surveys that were funded by the John D. and Catherine T. MacArthur Foundation in 2008, and by the Partnership for a Connected Illinois through a federal broadband mapping grant in 2011 and 2013. Prior reports using the citywide surveys have shown that from 2008 to 2013, the 9 Smart Communities neighborhoods had higher increases than similar Chicago neighborhoods in several areas: for Internet use (anywhere), broadband adoption at home, and some activities online (see Measuring Change in Internet Use and Broadband Adoption at https://www.cpi.asu.edu). This report examines more general patterns of change across the city.

The trends and neighborhood-level estimates discussed here suggest implications for policy beyond Chicago. Previous research indicates that concentrated poverty and the neighborhood context influence technology use, and this is true nationally as well as in Chicago (Mossberger, Tolbert, Bowen and Jimenez 2012; Mossberger, Tolbert and Franko 2012; Mossberger, Tolbert and Gilbert 2006). Neighborhood disparities in Internet use may create a vicious cycle, exacerbating the lack of resources in poor communities for finding work, affordable housing, good schools, health information, and more.

To what extent is this changing, as a result of market trends such as smartphone use, and public and private efforts to increase broadband adoption and Internet use?

Forms of Access and the Rise of Mobile

In 2013, Internet use and broadband adoption in Chicago closely resembled national averages reported by the census bureau, as well as by the Pew Internet and American Life Project, with 84% of Chicago residents reporting Internet use in some location and 70% with broadband at home. The Pew data on mobile use is more comparable to this Chicago survey, so this is a better point of reference on the mobile Internet. Smartphone use was slightly higher in Chicago compared to the rest of the nation, with 63% of Chicago residents who accessed the Internet on their smartphones, according to this survey, compared with 56% of American adults in May 2013 reported by Pew (Duggan and Smith 2013). Tracking the Chicago survey results, this is a large increase since 2011 in Chicago – 23 percentage points.

Between 2008 and 2011, both Internet use in any location and home broadband adoption increased in Chicago, but flattened out or decreased slightly between 2011 and 2013. The decreases are small enough to be within the margin of error for the surveys, but the plateau in reported Internet use in any location and in broadband access at home occurred at the same time that smartphone use accelerated. There is also some evidence in national data that there has been a leveling-off in broadband adoption (Anderson 2015).

While Latinos have been the group least likely to be online in Chicago and elsewhere, in 2013 they had smartphone Internet use at the same rate as the city average – 63%. For Latinos, smartphone use exceeded home broadband access, which was only 54%. Although smartphone use grew for all other demographic groups as well, Latinos were the only racial or ethnic group where smartphone use exceeded home broadband in Chicago.

The largest increases in smartphone use were often in demographic groups that were most disadvantaged – for those who speak English as a second language, and for the least-educated and lowest-income Chicago residents. Those under 30 were most heavily invested in smartphones, but the largest increase since 2011 was 25 percentage points for residents between the ages of 30 and 49. In contrast, there was an increase of only 4 percentage points in smartphone use among Chicagoans over 65.

Broadband, Mobile and Activities Online

Over the five-year period, there was an increase in most of the online activities asked about in the survey. In 2013, nearly 80% of employed Chicago residents used the Internet for their jobs, up from only about half in 2008. More than half of the city's residents searched for jobs online, though this has leveled off since 2011, likely reflecting improvements in the economy. In 2013, nearly ¾ of Chicago residents read news online or used the Internet to look for health information. Over half (58%) used the City of Chicago website and nearly half (45%) had taken a class online. The percentage of Chicago residents reporting these online activities increased between 7 and 14 percentage points between 2008 and 2013.

An important question to explore is whether mobile access facilitates activities online in the same way as broadband – is it closing the access gap in ways that matter? In 2013, approximately 9% of Chicago residents went online primarily through smartphones rather than through laptops or personal computers, and the data indicates that they are different from most mobile users, who have broadband as well. They were more likely to use public access than residents with broadband at home, although, somewhat surprisingly, less than half of the smartphone-reliant Internet users reported using the Internet at libraries. Given the more limited functions of smartphones for writing, filling out forms, and printing, supplementing smartphone access with library Internet use could help fill gaps in functionality.

Smartphone-only Internet users were also less likely to engage in activities online, in comparison with home broadband adopters. Differences between broadband and smartphone-only users ranged from 12 percentage points for social network use, 13 percentage points for health information and online job search, 14 percentage points for use of the City of Chicago website, 16 percentage points for transit information, 23 percentage points for news, 29 percentage points for online courses, 32 percentage points for banking, and 35 percentage points for political information. Yet, some evidence indicates that smartphone access increases the range of civic and economic activities online compared to Internet users who have no personal access – and the benefits are disproportionate for African Americans and Latinos in Chicago – for groups that have had less broadband access at home (Mossberger, Tolbert and Anderson 2014). So, while there are limitations to smartphones, they may represent a pathway to fuller access later.

Neighborhood-level Estimates

In 2013, broadband adoption at home remained lowest on the South and West sides of the city, in neighborhoods where poverty rates are highest and where African-American and Latino residents predominate. Internet use in any location was also lower than in the rest of the city in many of these neighborhoods. But some community areas with low home broadband adoption had rates of Internet use anywhere that were similar to city averages, especially in largely African-American communities on the South side. This indicates that Internet use outside the home and on smartphones was relatively high in these neighborhoods. And, maps of cell phone use to access the Internet in 2013 show that some predominantly African-American and Latino neighborhoods with low rates of broadband access had relatively high use of cell phones. This was uneven, however, as some community areas were low in both home broadband and smartphone use.

To examine the way in which disparities affect the resources for economic and community development in Chicago neighborhoods, we compared 6 neighborhoods with around 90% broadband adoption with 7 that had less than 45% of residents with broadband at home. The most-connected neighborhoods had higher rates than city averages for all activities online, with the exception of job search.

For all activities online, the lowest-ranked neighborhoods lagged far behind city averages, ranging from 18 to 31 percentage points below average. In such neighborhoods, fewer residents had access to online education or information on

health, jobs, mass transit, government services, or politics. In these poor communities, this lack of resources may reinforce existing disadvantage, making it more difficult to have access to good jobs throughout the region, to access government services, or to secure democratic representation.

Selected maps show patterns of Internet use for health information, job search, mass transit, and government information. While these replicated the disparities for broadband and Internet use, some low-income communities had relatively high rates of job search online.

Although disparities remain, there is positive news as well. Maps tracing change in broadband adoption and Internet use anywhere from 2008-2013 indicate that some of the largest growth occurred in neighborhoods on the South and West sides over this period. Some of the low-income and minority neighborhoods that were further behind made the greatest gains.

Community area estimates corresponding to the maps in this report are included in the appendix.

Conclusion

Tracking trends online over a five-year period offers a unique view of the progress and challenges facing Chicago. The Internet is becoming increasingly mobile, especially since 2011. Nearly all demographic groups have experienced substantial growth in smartphone use (except Chicago residents over 65). In particular, Latinos are just as likely to be smartphone users as other Chicago residents, even though their home broadband access lags behind. Mobile access had its greatest impact for African Americans and Latinos in Chicago. Yet, mobile phones fell short of providing a ready solution to digital inequality. Even with the growth of the mobile Internet, those who relied primarily on mobile phones to go online were also less likely to engage in a variety of activities online, with less access to information in many critical areas, including jobs, health, education, government services, and their communities. Mobile phones are indeed providing an entry point to Internet use in some of these neighborhoods, yet home broadband access is also needed for access to the full potential of the Internet.

At the neighborhood level, low-income and minority communities on the South and West sides of the city are making strides forward, according to our examination of neighborhood change since 2008. Between 2008 and 2013, many neighborhoods on the South and West sides of the city experienced higher rates of growth in both home broadband adoption and Internet use anywhere. Some neighborhoods that had relatively low rates of broadband access showed high cell phone use, though others are low in both. Activities online showed the impact of limited Internet use in low-income neighborhoods, with lower access to information and services, though job search online was especially evident even in underserved neighborhoods. Despite progress, the 2013 data showed that there was a continued need for outreach, training, and affordable access in many community areas and for individuals who remained offline or less-connected.

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DIGITAL EXCELLENCE IN CHICAGO:

TRACKING TRENDS IN INTERNET USE 2008-2013, NEIGHBORHOOD PATTERNS IN 2013

Broadband, or high-speed Internet, is as essential for cities as water or electricity, as President Obama declared in his 2015 State of the Union address(Obama 2015). The Internet has also become a platform for economic innovation, education, health care, government service delivery, civic participation, public safety, and more. For these reasons, broadband has been a focus of federal policy as part of the National Broadband Plan (FCC 2010). An important challenge for realizing the potential of broadband is to encourage widespread adoption and use, not just the availability of high-speed networks. Even more than a needed utility, Internet use represents access to information, and opportunities for individuals to participate in society online. Through new applications of broadband, mobile technologies and other forms of Internet access, cities can engage with residents, businesses, and nonprofit institutions to improve the prosperity and quality of life in their communities.

Since the 2007 report of the Mayor's Advisory Council on Closing the Digital Divide, the City of Chicago has worked with a number of partners to promote widespread adoption and use of the Internet. Initiatives have included the federally-funded Smart Communities program in nine neighborhoods, Smart Chicago public computer centers throughout the city,[1] and FamilyNet centers supported by the City of Chicago, Americorps, and Comcast. Since 2011, Comcast's Internet Essentials program has also offered discounted broadband for households with children who receive free or reduced-price school lunches. The federal funding for Smart Communities and Smart Chicago ended during 2013, and this report examines changes citywide, toward the end of the grant period, and as new initiatives are being planned. To track changes in Internet use in Chicago over time, citywide surveys were funded by the John D. and Catherine T. MacArthur Foundation in 2008, and by the Partnership for a Connected Illinois through a federal broadband mapping grant in 2011 and 2013.

This report is based on those surveys, and examines trends in broadband adoption, mobile adoption, and activities online in Chicago from 2008-2013 – citywide, and for Chicago's 77 official community areas.

For the first time, the federal government released data on high-speed broadband adoption at home for cities around the nation, in late 2014. According to the 2013 American Community Survey conducted by the U.S. Census Bureau, 69% of Chicago residents had broadband at home. While this large and high-quality national survey provides important information for policies in Chicago, the data is for the city as a whole and at a single point in time. It cannot track change in recent years in the city, or disentangle varied patterns for populations and neighborhoods within the city.

Based on three Chicago surveys, this report provides a unique, close-up view of trends in Internet use in one of the nation's largest and most diverse cities. While the 70% who reported broadband use at home in the 2013 Chicago survey parallels the American Community Survey estimates of 69%, this report provides further information. This analysis of the Chicago surveys explores trends in Internet use in a major urban area where both broadband and wireless are available, but where some residents remain offline or only tenuously connected to the Internet. Data on activities online offers a view of how different types of Internet access are related to capabilities for Internet use. The results for the three surveys show the growth of mobile and broadband use over time, as well as continued need for some Chicago residents.

The neighborhood-level data suggests implications for policy beyond Chicago. Previous research in Chicago and the nation indicates that concentrated poverty and the neighborhood context influence technology use (Mossberger, Tolbert, Bowen and Jimenez 2012; Mossberger, Tolbert and Franko 2012; Mossberger, Tolbert and Gilbert 2006). Neighborhood disparities in Internet use may create a vicious cycle, exacerbating the lack of resources in poor communities for finding work, affordable housing, good schools, health information, and more.

To what extent can communities break this cycle? The neighborhood estimates shown in this report provide an opportunity for tracking outcomes for targeted programs, and measuring change at the neighborhood level. A separate report using these estimates shows that the Smart Communities experienced greater rates of increase from 2008-2013 in Internet use in any location, broadband adoption at home, Internet use for job search, health information, and transportation information. The differences are significant even controlling for demographic differences across the community areas, and demographic

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[1] Funding from the federal broadband stimulus grants (the Broadband Technology Opportunities Program) supported two efforts for digital excellence in Chicago, from 2010 to the end of 2012: the Smart Communities program and the Smart Chicago public computer centers. The Smart Communities program, which received $7 million for programs in 9 Chicago neighborhoods, included courses in basic Internet skills, training for community groups, digital media programs for youth, advertising, and outreach by "Tech Organizers." Another grant of $9 million funded the establishment and expansion of computer centers in libraries, city colleges, senior centers, public housing, and other public spaces throughout the city. The funding for these programs ended at the close of 2012, so the 2013 survey, which was conducted from November 2012 to January 2013, aligns closely with the end of the federal programs.

change over this period (see Mossberger, Tolbert and Anderson 2014 on Measuring Change in Internet Use and Broadband Adoption at https://www.cpi.asu.edu).

In this report, we examine general trends for Chicago and its neighborhoods. These are influenced by market forces, with the increasing popularity of mobile devices, as well as public-private efforts to increase Internet use. In addition to the Smart Communities outreach (http://www2.ntia.doc.gov/grantees/CityOfChicago) and Smart Chicago public computer center programs from 2010-2012 (http://www2.ntia.doc.gov/grantees/CityofChicago2), there are ongoing efforts to bring more Chicago residents online. The Smart Chicago Collaborative and City of Chicago's efforts promise to increase broadband access and digital skills training in Chicago. The city's official Chicago Tech Plan prioritizes making "Every Community a Smart Community" to ensure the full participation of Chicago residents and businesses, in the economy and in the civic sphere (http://techplan.cityofchicago.org/executive-summary/foundational-strategies/). The Comcast Internet Essentials program began providing discounts on broadband subscriptions to some households with children in free or reduced-price school lunch programs in fall of 2011, and Chicago has more subscribers in Internet Essentials than any other city, according to Comcast. There is a need to understand changes for the city and its neighborhoods in light of both past and continued efforts for digital inclusion and excellence.

HOW THIS STUDY WAS CONDUCTED

The surveys that provide the basis for this report were conducted by the Eagleton Institute at Rutgers University in English and Spanish, with citywide samples of Chicago residents totaling 3500 in 2008, 2500 in 2011, and 2400 in 2013. The random-sample telephone surveys were conducted using a unique geographic sampling frame, where respondents were drawn from each of Chicago's 77 community areas (in a stratified sample). To increase the probability of interviewing low-income respondents, the samples included cell phones and landlines, congruent with cell phone use at the time, as reported by the Centers for Disease Control (CDC). Similar questions on Internet access and activities online were asked all three years, allowing comparison over time. The results were weighted in terms of gender, race, etc.

While obtaining citywide estimates of Internet use from such surveys is fairly straightforward, how do we obtain estimates of access for smaller geographic areas, such as neighborhoods? There are problems using simple disaggregation from typical surveys to create geographic estimates, since most surveys have a small number of cases in any one geographic area. To generalize from a small sample to an entire neighborhood can be problematic and lead to bias. To overcome this problem, we use multilevel statistical modeling (hierarchical linear modeling) to estimate Internet access and use for Chicago's 77 neighborhoods at three points in time (2008, 2011 and 2013).

Respondents in the three surveys were asked to identify their cross-streets (we did not geocode respondents based on their telephone number from the survey, but rather on the information they provided about their home location). This information was used to geocode respondents and place them in census tracts. The survey data was merged with aggregate census tract-level information from the U.S. Census American Community Survey for the appropriate citywide survey (2008, 2011 or 2012) measuring the percentage of residents who live in poverty, graduated from high school, and are black, Latino and Asian-American, or over 65 years of age. The statistical models are based on data that combines individual and aggregate variables. We leverage the neighborhood-level data to provide more accurate and representative estimates than could be obtained from the individual-level data alone.

We use random intercept multilevel statistical modeling with post-stratification weights (a form of statistical simulation) to generate geographic estimates of broadband access and online activities for neighborhoods in Chicago. This method has been shown to work well with a small number of cases in each geographic area (Lax and Phillips 2009; Raudenbush and Bryk 2001; Steenbergen and Jones 2002). The results are point estimates or predictions of Internet access and use for various online activities for each of Chicago's 77 community areas for 2008 and 2011.

What do patterns of Internet use look like in Chicago, and how have they changed over time? How does Internet use in Chicago compare in 2013 to national data for the same time period?

FORMS OF ACCESS

National data shows that in 2012, growth in broadband adoption was slowing (Pew Internet and American Life Project, http://www.pewinternet.org/data-trend/mobile/device-ownership/; Wyatt 2013; NTIA 2014; and ACS 2014). There may be a number of factors responsible for this trend, including the cost of home broadband, and also the rise of mobile technologies.

One of the ways in which Internet use is changing, according to national data, is that multiple devices are now used to go online (see Pew Internet and American Life Project at http://www.pewinternet.org/data-trend/mobile/device-owner-ship/; as well as NTIA 2014). Smartphones enable users to have access to the Internet anytime and anywhere, and this is especially convenient for finding nearby businesses, navigating around the city, and accessing real-time information on mass transit through Chicago's BusTracker or TrainTracker. Cell phones can be used for online banking, for reading news online, for checking social media updates, and a variety of other activities. Mobile devices such as cell phones are changing the way we go online and expanding connectivity. Yet, personal computers and laptops offer some different advantages, such as larger screens and keyboards that facilitate word processing, spreadsheet use, and reading-intensive activities, especially for websites that are text-heavy or otherwise not formatted for mobile devices.

Chicago tracks national averages closely. Comparing the Chicago survey with national data from the Pew Internet and American Life Project, in 2013, broadband adoption at home was 70% in both Chicago and the nation (Pew Internet and American Life Project, www.pewinternet.org/threetechnology-revolutions/). Eighty-five percent of the U.S. population used the Internet in some location in May 2013, according to Pew's national data (Pew Internet and American Life Project, http://www.pewinternet.org/data-trend/internet-use/internet-use-over-time/), as did 84% of Chicago residents. Use of cell phones to connect to the Internet was also roughly similar – 63% for Chicago in our survey and 56% for the Pew survey of the U.S. population in May 2013 (Duggan and Smith 2013).

The Chicago surveys show substantial growth in all forms of Internet access between 2008 and 2011, but continued growth only in mobile use between 2011 and 2013. Trends in Chicago indicate flattening or even slightly decreasing rates of home broadband adoption. High-speed Internet (or broadband) connectivity at home grew to approximately 72.5% of Chicago residents by summer 2011, an increase of nearly 12 percentage points since the summer 2008 survey.[2] Between summer 2011 and January 2013, broadband adoption at home dropped slightly to just over 70.5% of Chicago residents.

While this small decrease is within the margin of error and could be due to differences in the random sample over the two years, it is possible that broadband adoption has fallen slightly. Indeed, a later Pew report (Anderson 2015) indicates a slight dip nationally in desktops and laptops by 2015. At best, it appears that growth in broadband has leveled off citywide in Chicago.

We also asked questions about whether respondents used the Internet at any place, including public libraries, the homes of friends and relatives, at work, at school, and other locations. Comparing the graphs in **Figure 1** and **Figure 2**, we can see that Internet use in any location appears to have decreased very slightly – less than a percentage point – from 85.19% in 2011 to 84.4% in 2013. Because the survey question wording is based on naming physical locations for Internet use, replicating question wording from 2008, it may not fully capture the growth of smartphone use in these different locations. Respondents may interpret this to be use of a desktop or laptop computer to access the Internet rather than use of any device. Again, however, this is a very small decrease that is within the margin of error.

At the same time that Internet use anywhere and broadband adoption at home had plateaued in Chicago, smartphone use was increasing; it rose 20 percentage points from 43% in 2011 to 63% of Chicago residents in 2013. Only 40% of Chicago residents used a tablet to connect to the Internet in 2013, so cell phones were the most common mobile device for going online. As smartphone use grew, it remained a supplement to home broadband for most Internet users (Horrigan 2012; Mossberger, Tolbert and Hamilton 2012).

Smartphone use was more likely to be an alternative to home broadband, and a primary form of Internet access for individuals who were young, low-income, less-educated, African-American, or Latino (Mossberger, Tolbert and Franko 2012; Mossberger, Tolbert and Hamilton 2012). According to our data, just over 9% of Chicago residents who lack broadband at home reported that they connected to the Internet through cell phones. Later in this report, we compare activities online for these less-connected mobile-only Internet users with those who have broadband at home.

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[2] These results are somewhat different than the unweighted data reported for the 2011 survey in Mossberger, Tolbert, and Hamilton 2012; above, we report data weighted consistently across the three surveys.

Figure 1. Broadband Access in Chicago, 2008-2013

Broadband Access

Year	Value
2008	61
2011	72.56
2013	70.49
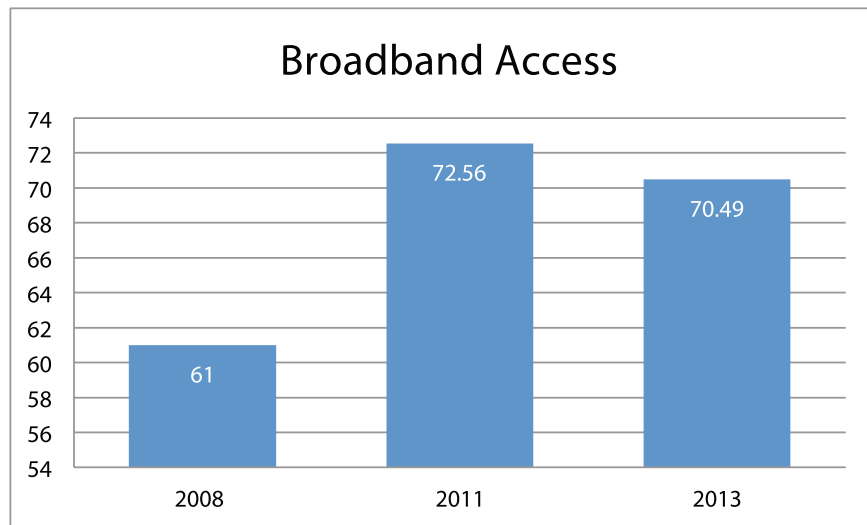
Figure 2. Internet Use (at Any Place) in Chicago, 2008-2013

Use Internet At Any Place

Year	Value
2008	75
2011	85.19
2013	84.4
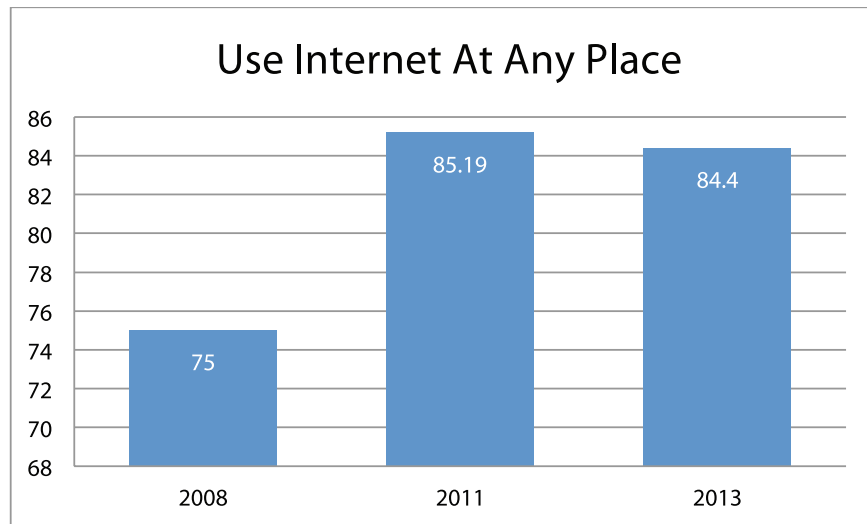
Figure 3. Use of Cell Phone for Internet Access in Chicago, 2008-2013

Use Cell Phone To Connect To Internet

Year	Value
2008	26
2011	42.74
2013	62.98
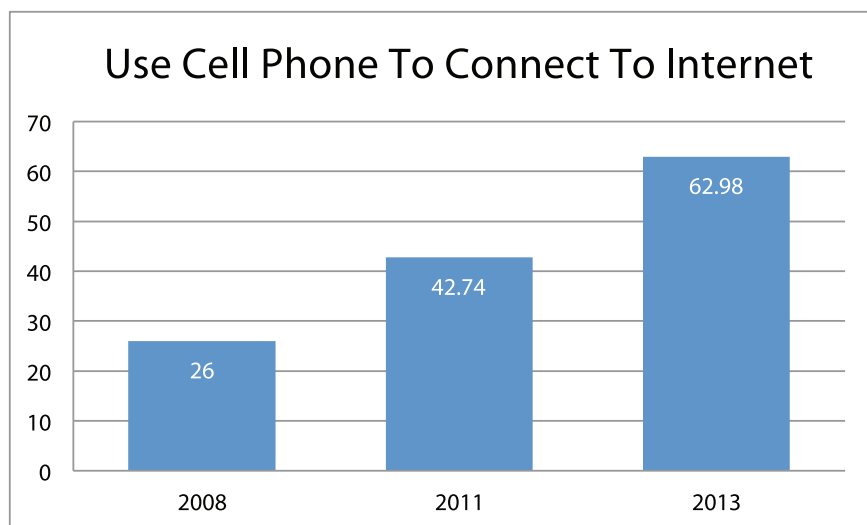
MOBILE AND BROADBAND ACCESS ACROSS GROUPS

Chicago is a diverse city, and offers an opportunity to examine differences in access for demographic groups. According to the 2012 American Community Survey, Chicago was 34% black and 28% Hispanic.[3]

The most striking demographic change in Internet use was the rapid increase in smartphone access for Latinos between 2011 and 2013, from 37% to 63%. At the same time, home broadband adoption among Chicago Latinos stayed the same, around 54%. All other racial and ethnic groups had higher rates of home broadband use than mobile use, though all increased smartphone use. Asian-Americans in Chicago had the highest rates of smartphone use at 77% and showed decreased broadband adoption, from 94% to 87%. For most groups other than Asian-Americans, there was little change in Internet use (reported in any location) or in broadband adoption at home over time.

Similarly, among those for whom English is a second language, smartphone adoption rose 30 percentage points, from 32% to 62% between 2011 and 2013. This was even more than for native English speakers in Chicago, who increased their cell phone Internet use 17 percentage points from 46% to 63% over the same period.

Table 1: Internet Use by Race/Ethnicity, Chicago 2013

Race/Ethnicity	Internet Use Anywhere		Broadband		Mobile	
	2011	2013	2011	2013	2011	2013
White	91.18	91.34	83.62	81.28	43.90	62.78
Black	82.44	81.49	66.07	66.45	43.27	59.75
Asian	98.23	96.62	93.74	86.61	45.97	77.36
Hispanic	73.87	73.80	54.94	54.83	36.98	63.1

Table 2: Internet Use by Language, Chicago 2013

Native Language*	Internet Use Anywhere		Broadband		Mobile	
	2011	2013	2011	2013	2011	2013
Non-Native English Speaker	71.7	71.52	54.91	52	32.2	61.99
Native English Speaker	88.82	88.88	77.31	76.92	45.57	63.32

*While respondents in all 3 years were given the option of taking the survey in English or Spanish, only the 2011 and 2013 surveys asked whether English was the respondent's native language.

Table 3 examines change in forms of access by education. For Chicago residents with less than a high school education, there was some increase between 2011 and 2013 in Internet use anywhere; a 5-percentage point increase, from 45% to 50%. Half of Chicago residents without a high school diploma said they used the Internet somewhere. There was a decrease in broadband at home over this period for Chicago residents who were not high school graduates, from 28% who had broadband in 2011 to 24% in 2013. At the same time, there was a large jump in the percentage of this least-educated group using smartphones, from 14% in 2011 to 41% in 2013 – 27 percentage points or nearly a 300% increase in less than two years. Overall, it is clear from the other data in Table 3 that cell phone Internet use, like all Internet use, increased with education. But in an era of higher mobile use for all demographic groups, the largest change was for the least-educated – for those with less than a high school diploma. In contrast, the second-highest increase in smartphone use was for those with a bachelor's degree or higher, rising 20 percentage points from 51% to 71% of this group between summer 2011 and January 2013.

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[3] 5-year estimates, http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_5YR_DP05&prodType=table).

Table 3. Internet Use by Education, Chicago 2013

Education	Internet Use Anywhere		Broadband		Mobile	
	2011	2013	2011	2013	2011	2013
Less than High-School	45.16	50.31	28.34	23.96	13.83	40.90
High-School Graduate	76.20	71.48	52.37	54.16	36.03	53.75
Some College/ Technical	89.18	91.23	76.31	75.59	46.05	64.48
Bachelors or higher	96.16	95.82	89.11	88.13	50.81	71.36

Cell phone use also increases with income. **Table 4** shows that this ranged from 49% for residents with an annual household income of less than $20,000 to 79% for those with an income of $75,000 or more. Change across income categories was even greater than change across levels of education, with close to a 20 percentage point rise in smartphone use for most categories of income. Notably, there was a nearly 8 percentage point decrease in broadband at home for the less than $20,000 income category, from approximately 48% to just over 39%.

Table 4. Internet Use by Income, Chicago 2013

Income	Internet Use Anywhere		Broadband		Mobile	
	2011	2013	2011	2013	2011	2013
Under 20,000	68.48	60.96	47.93	39.37	28.31	49.19
20-Under 40,000	83.47	83.23	66.57	63.5	37.33	56.71
40-Under 75,000	93.93	91.2	80.57	82.73	44.36	63.08
Over 75, 000	98.15	97.78	94.95	90.42	60.16	79.91

Smartphone use varied substantially by age, and **Table 5** reveals that the largest group of mobile Internet users was the under-30 age group, at 83% at the beginning of 2013. This compared to only 14% of Chicago residents over 65 who had smartphones. The largest increase between 2011 and 2013 was for 30-49 year-olds, with a 25 percentage-point jump in smartphone use. In contrast, the change for those under 30 was approximately 16 percentage points, and 18 percentage points for Chicago residents aged 50-64. For Chicagoans over 65, there was a much more modest increase in smartphone use of only 4 percentage points.

In **Tables 1-4**, there are both some relatively small decreases and increases reported for Internet use anywhere and broadband adoption. **Table 5** displays results by age, and for Chicago residents aged 30 and up, home broadband adoption decreased somewhat, but Internet use anywhere stayed about the same, except for a decrease for ages 18-29. Again, this may mean that respondents are reporting the use of mobile devices at home and in varying locations, rather than use of fixed broadband connections. Internet use may not be decreasing overall.

Table 5. Internet Use by Age, Chicago 2013

Age	Internet Use Anywhere		Broadband		Mobile	
	2011	2013	2011	2013	2011	2013
18-29	95.87	90.85	75.29	77.45	66.43	83.32
30-49	91.28	89.43	80.72	76.26	50.03	74.79
50-64	81.16	82.25	71.09	66.95	26.15	43.81
65+	56.21	57.91	46.23	42.99	9.99	13.90

HOW HAVE ACTIVITIES ONLINE CHANGED OVER TIME?

While broadband adoption at home leveled off, more Chicago residents performed various activities online over this five-year period. Mobile devices make it possible to access the Internet around the clock in any location. Survey respondents were asked about whether they ever engage in a variety of activities online, especially activities related to the policy benefits of Internet use, for education, health, access to government services and more. **Table 6** in the next section of this report shows the full list of activities online included in the survey. The figures below indicate changes between 2008 and 2013 for selected activities online.

Over the five-year period, Internet use at work increased, from just under half to nearly 80% of employed Chicago residents who said that they used the Internet for their jobs. This reflects the increased significance of Internet use for a variety of jobs across a range of industries (Brynjolfsson and Saunders 2010). While over half of Chicagoans said that they have used the Internet to look for information about a job, this decreased slightly since 2011. This likely reflects improvements in the economy and less job search in 2013, rather than lower Internet use – particularly since activities online increased in other areas. Overall, then, we see an expansion of activities online.

Figure 4. Use of Internet for Work in Chicago, 2008-2013

Use Internet For Work (Employed)

- 2008: 48
- 2011: 51.34
- 2013: 79.38
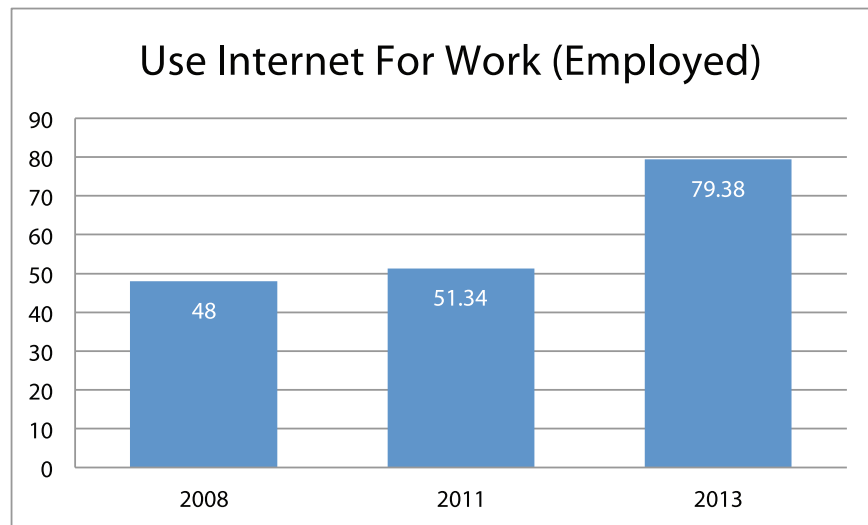
Figure 5. Use of Internet to Look for Job Information in Chicago, 2008-2013

Look For Job Information

- 2008: 50
- 2011: 59.49
- 2013: 57.76
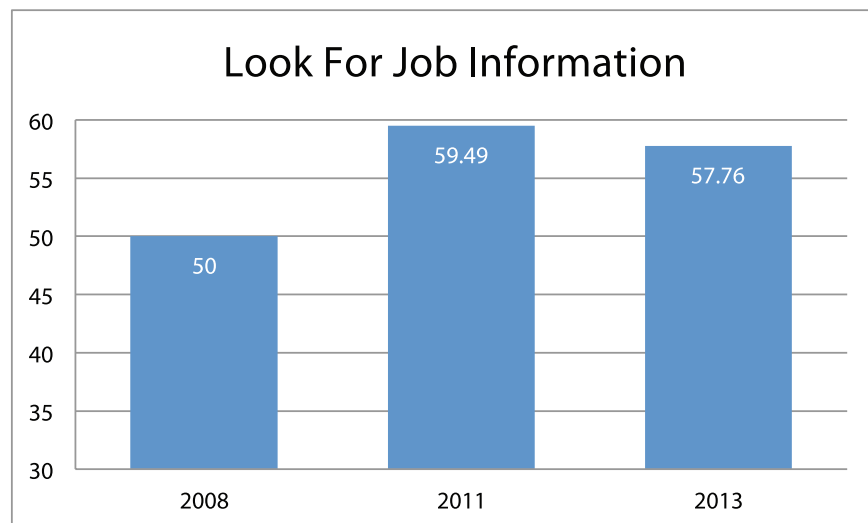
Among the most common activities online in our survey were reading news online and looking for health information online; approximately 74% of Chicago residents reported these activities on the Internet. This increased over the five-year period – nearly 7 percentage points for online news (**Figure 6**) and nearly 10 percentage points for health information (**Figure 7**).

Figure 6. Use of Internet to Read News Online in Chicago, 2008-2013

Figure 7. Use of Internet to Look for Healthcare Information in Chicago, 2008-2013
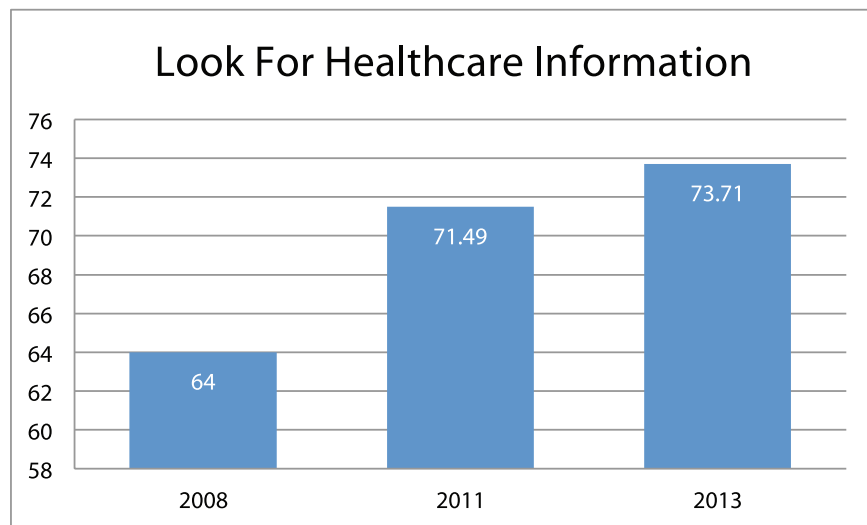
Figure 8. Use of City Website in Chicago, 2008-2013

Use Chicago City Website

Year	Value
2008	49
2011	51.01
2013	58.26
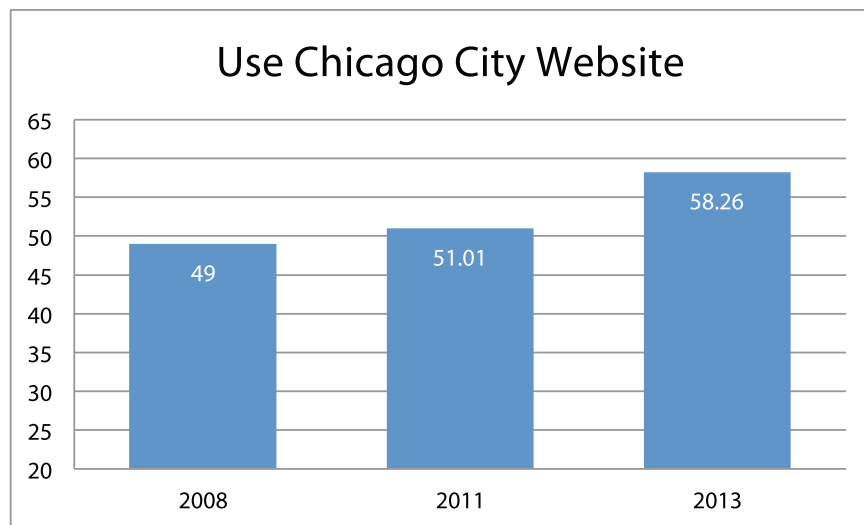
Use of the City's website provides residents with access to services delivered online and communication with elected and administrative officials, as well as information about services, events,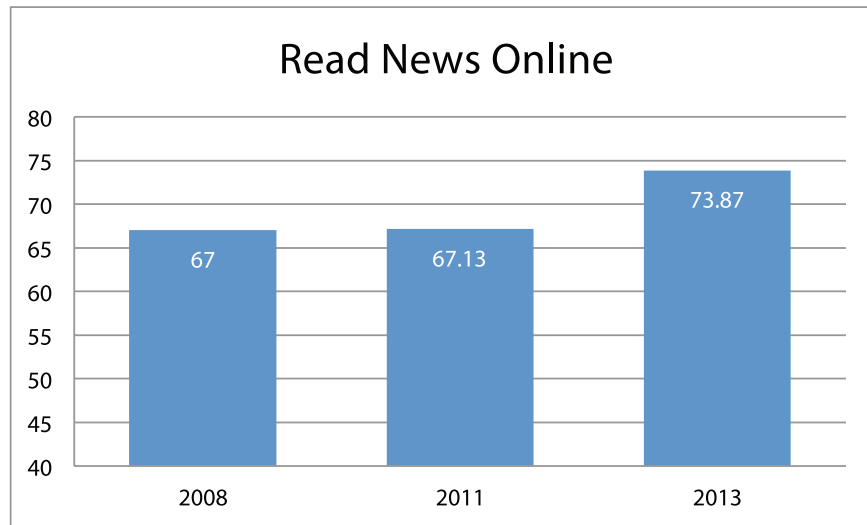 city policies, and neighborhoods. This grew 9 percentage points since 2008, and in 2013 58% of Chicago residents said they had used the City's website. Online classes and training have become more common. In 2008, only 31% of Chicago residents reported that they had taken a class online, whereas 45% said they had done this in 2013 (a 14 percentage point difference).

Figure 9. Use of the Internet to Take an Online Class in Chicago, 2008-2013

Take An Online Class

Year	Value
2008	31
2011	36.41
2013	45.03
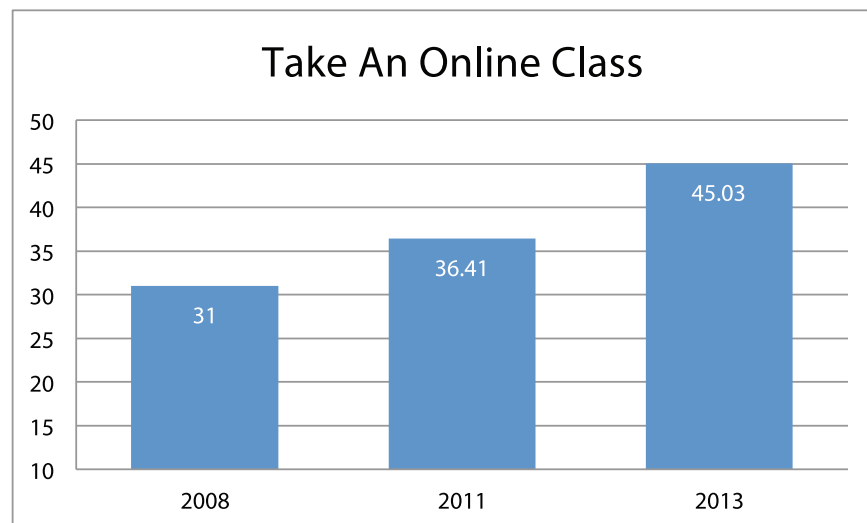
In the next section, we examine the connection between activities online and forms of access. To what extent does broadband enable a range of activities online? We compare cell phone-only Internet users with those with home broadband access. Given the flattening out of the broadband adoption curve, it is important to ask to what extent mobile adoption is addressing digital disparities.

FORMS OF ACCESS AND ACTIVITIES ONLINE

What do these trends in mobile access mean for public policy, especially digital inequality? As **Table 1** showed, mobile access in Chicago in 2013 was roughly the same for African Americans (60%), Latinos (63%) and non-Hispanic whites (63%). On the surface, this suggests that the "digital divide" is a relic of the past. But, is this equal access to the Internet?
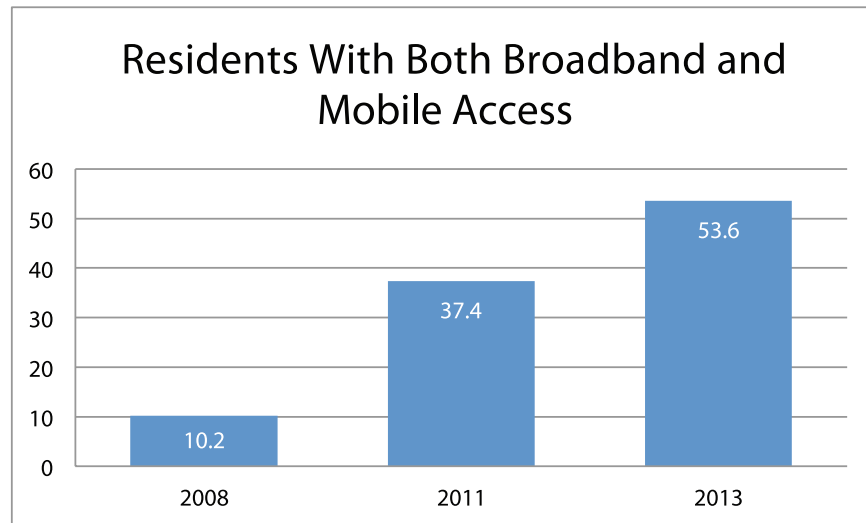
For most Chicago residents, smartphones supplement broadband access, providing continuous availability and convenient features such as maps, directions, real-time transit updates and information on nearby services. Those who have access to the Internet on multiple devices are truly fully-connected. This group of fully-connected Chicago residents has rapidly grown over time, as **Figure 10** shows below. In 2008, this accounted for only 10% of residents, but more than half by 2013.

Figure 10. Chicago Residents with Both Broadband and Mobile, 2008-2013

Residents With Both Broadband and Mobile Access

Year	Value
2008	10.2
2011	37.4
2013	53.6

Yet, there is a relatively small group of Internet users – 9% of Chicago residents in 2013 – who relied upon smartphones as their primary form of Internet access. The critical question is the capacity of different forms of access to promote what the City of Chicago has called digital excellence, or what we have referred to as "digital citizenship" (Mossberger, Tolbert and McNeal 2008), or the ability to participate in society online. This requires not only access but also skill, and can be measured in terms of the range of activities that individuals participate in online. Many mobile-only Internet users are from traditionally disadvantaged groups, including less-educated, lower-income, and African-American and Latino residents (Mossberger, Tolbert and Frank 2012), and factors such as education and experience are related to activities online (DiMaggio et al. 2001). Yet, prior research on Chicago that has controlled for these differences still showed that mobile-only users were less likely to engage in many activities online, including use of the Internet for health information, political information, e-government, banking, and more. Interesting enough, mobile-only Internet users were most likely to report using the Internet to find a job in 2011, although the question did not ask specifically about how the Internet was used for job search – it could have been to check email rather than to fill out applications (Mossberger, Tolbert and Hamilton 2012).

Table 6 shows the percentages of Chicago residents who use the Internet for a variety of activities online in 2013. Smartphone-only Internet users were less likely to perform any of these activities online, including job search. Mobile users (including those with home broadband) were slightly more likely to look for a job online, look for a home online, or use social networks – by about 4 percentage points in all of these cases - according to **Table 6**. Other differences were more modest and may be due to sampling. In general, mobile and broadband users were similar, which makes sense, given that most mobile Internet users also have home broadband. But mobile-only Internet users continue to differ from home broadband users and those who are fully-connected, with multiple devices.

Even with the growth of mobile and the increase in mobile-friendly formats for news, banking, and other activities, mobile-only Internet users lag behind those with home broadband. Smartphone users without home broadband were somewhat more likely to report use of public access to supplement their cell phone Internet use; 45% with smartphone-only personal access reported using public libraries, compared with 38% of Chicago residents with home broadband. Public access can help to compensate for some of the limits of cell phone Internet use, but over half did not report using this.

While mobile-only users were less likely to engage in any of the other activities online, the gaps were smaller for some activities than for others. Looking at the most common activities in **Table 6** (those that at least 50% of the broadband users participated in online), we can see that the differences between mobile and broadband users were smallest for:

1. social network use (66% of mobile-only users and 78% of home broadband users, for a 12 percentage-point difference)
2. job search online (57% of mobile-only users compared to 70% of home broadband adopters, for a 13 percentage-point difference)
3. health information (75% of mobile-only users vs. 88% of broadband adopters, also a 13 percentage-point difference)
4. use of the City of Chicago website (57% of mobile-only Internet users vs. 71% of home broadband users, for a 14 percentage-point difference)
5. transit information (64% for mobile-only vs. 80% for home broadband users, for a 16 percentage-point difference).

Given these patterns of use, it is clear that even with the rapid growth of smartphones, that mobile-only users remain less-connected. The largest gaps between smartphone-reliant and broadband Internet users are for online courses (a 29 percentage-point difference), banking (a 32 percentage point difference), government websites in general (a 33 percentage-point difference), and political information (a 35 percentage-point difference).

Table 6. Percent Performing Activity Online, By Form of Access

	Broadband	Mobile	Mobile Only
Use Internet For Job	76.07 (1171)	77.9 (1071)	54.25 (111)
Find Health Information Online	88.30 (1359)	88.15 (1212)	75.19 (154)
Look for a Job Online	70.48 (1085)	74.55 (1025)	56.63 (116)
Online Banking	80.88 (1245)	80.06 (1101)	48.99 (100)
Online Course/Training	57.25 (881)	57.68 (793)	27.71 (57)
Information about Politics	75.85 (1167)	73.03 (1004)	41.33 (85)
Get Public Transportation Schedule Online	79.96 (1230)	80.00 (1100)	64.24 (132)
Get Government Information Online	76.57 (1178)	74.1 (1019)	44.26 (91)
Check Power Use Online	21.57 (332)	23.55 (324)	20.03 (41)
Advertise Business/Sell Products	32.36 (498)	33.51 (461)	18.42 (38)
Find Property Tax Online	*44.34* (682)	43.77 (602)	31.06 (64)
Look for a Home Online	59.71 (919)	63.91 (879)	41.17 (84)
Use Chicago City Website	*70.52* (1085)	70.01 (962)	57.17 (117)
Read News Online	90.26 (1389)	89.03 (1224)	66.76 (137)
Get Neighborhood Information Online	68.06 (1047)	68.87 (947)	49.90 (102)
Get Information from Social Networks	78.19 (1203)	82.34 (1132)	66.01 (135)
Use Public Access Internet	38.05 (586)	38.97 (536)	44.73 (92)

INTERNET USE IN CHICAGO NEIGHBORHOODS

The citywide Chicago Internet studies conducted from 2008-13 have the unique advantage of providing estimates of Internet access and activities online across Chicago's official neighborhoods, or community areas. While obtaining citywide estimates of Internet use from such surveys is fairly straightforward, how do we obtain estimates of access for smaller geographic areas, such as neighborhoods? There are problems simply using the small sample of survey respondents in each of the 77 Chicago community areas, as the small sample sizes may not be representative of the neighborhood. To overcome this problem, we use multilevel statistical modeling (hierarchical linear modeling) to estimate mobile Internet use for Chicago's 77 neighborhoods in 2013. The results are point estimates or predictions of Internet access and use for various online activities for each of Chicago's 77 community areas.[4]
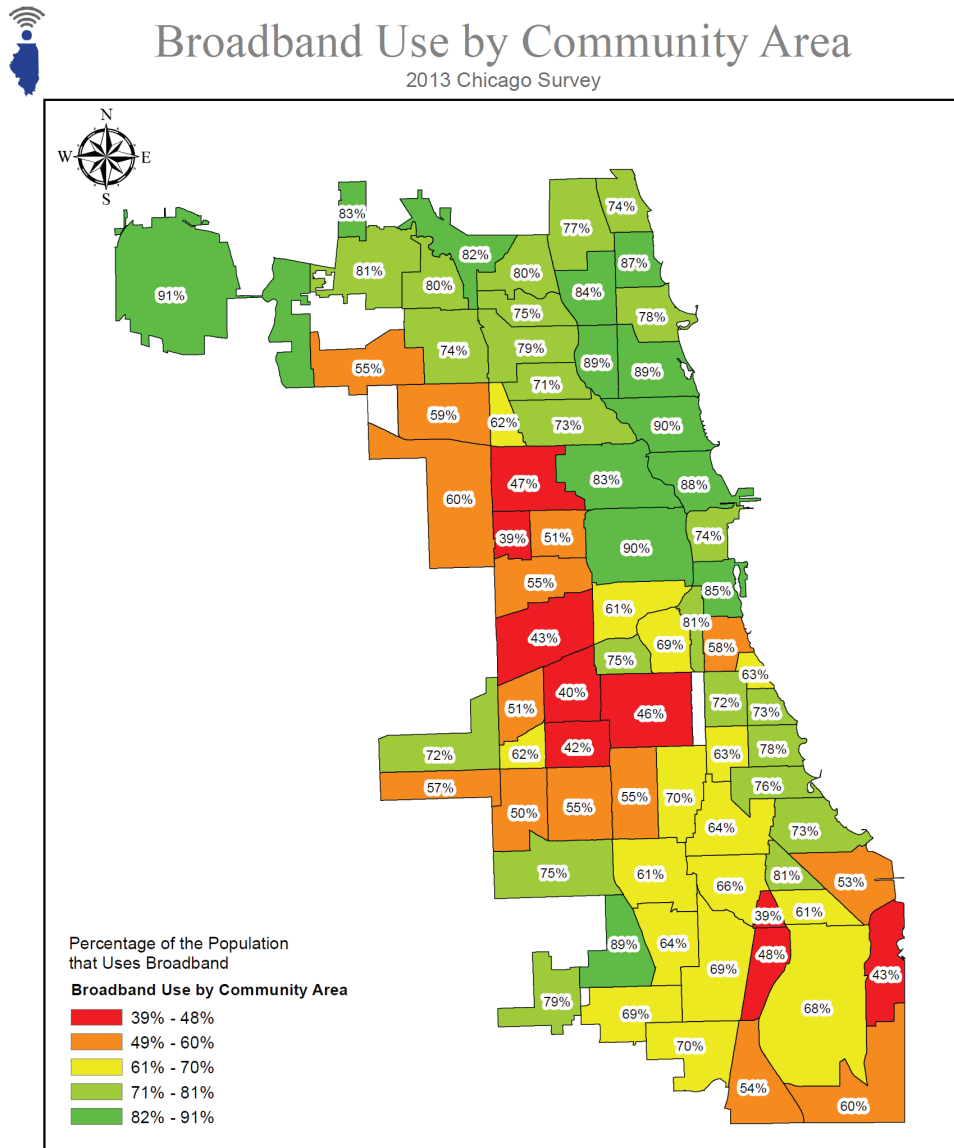
These estimates were used to map patterns of Internet access across Chicago's neighborhoods, in **Figures 11-13**. Community area estimates corresponding to the maps in this report are included in the appendix.

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[4] Respondents were asked to identify their cross-streets (we did not geocode respondents based on their telephone number from the survey, but rather on the information they provided about their home location and cross-streets). This information was used to geocode each respondent and place them in a census tract. The survey data was merged with aggregate level census tract information from the U.S. Census American Community Survey for the appropriate citywide survey (2012) measuring the percent of the population in poverty, educational attainment (percent high school graduates), percent black, Latino and Asian American and percent over 65 years of age. The statistical models are based on data that combines individual and aggregate variables. We leverage the neighborhood-level data to provide more accurate and representative estimates than could be obtained from the individual-level data alone.

We use random intercept multilevel statistical modeling with post-stratification weights (a form of statistical simulation) to generate geographic estimates of mobile access for neighborhoods in Chicago. This method creates geographic estimates of critical outcome variables, but uses the neighborhood-level socioeconomic data to improve estimates based on individual-level data. This method has been shown to work well with a small number of cases in each geographic area (Lax and Phillips 2009; Raudenbush and Bryk 2001; Snijders and Bosker 2011; Steenbergen and Jones 2002).

Figure 11 is a map of broadband use in 2013 by community area. Red, orange, and yellow areas are all below city averages, with neighborhoods shaded in red having the lowest rates of home broadband adoption. The South and West sides of the city are clearly the most disadvantaged in terms of home broadband. In Chicago, these are the highest-poverty neighborhoods, with high concentrations of African-Americans and Latinos. The West side, in particular, had more neighborhoods marked in red and orange. These included community areas with large populations of Latinos, the group in Chicago that is most disadvantaged in Internet use. Some Westside African-American communities, like West Garfield Park, are also shaded red, showing low rates of home broadband adoption.

Figure 11. Broadband Use by Community Area, Chicago 2013

Broadband Use by Community Area
2013 Chicago Survey

Percentage of the Population that Uses Broadband
Broadband Use by Community Area
- 39% - 48%
- 49% - 60%
- 61% - 70%
- 71% - 81%
- 82% - 91%

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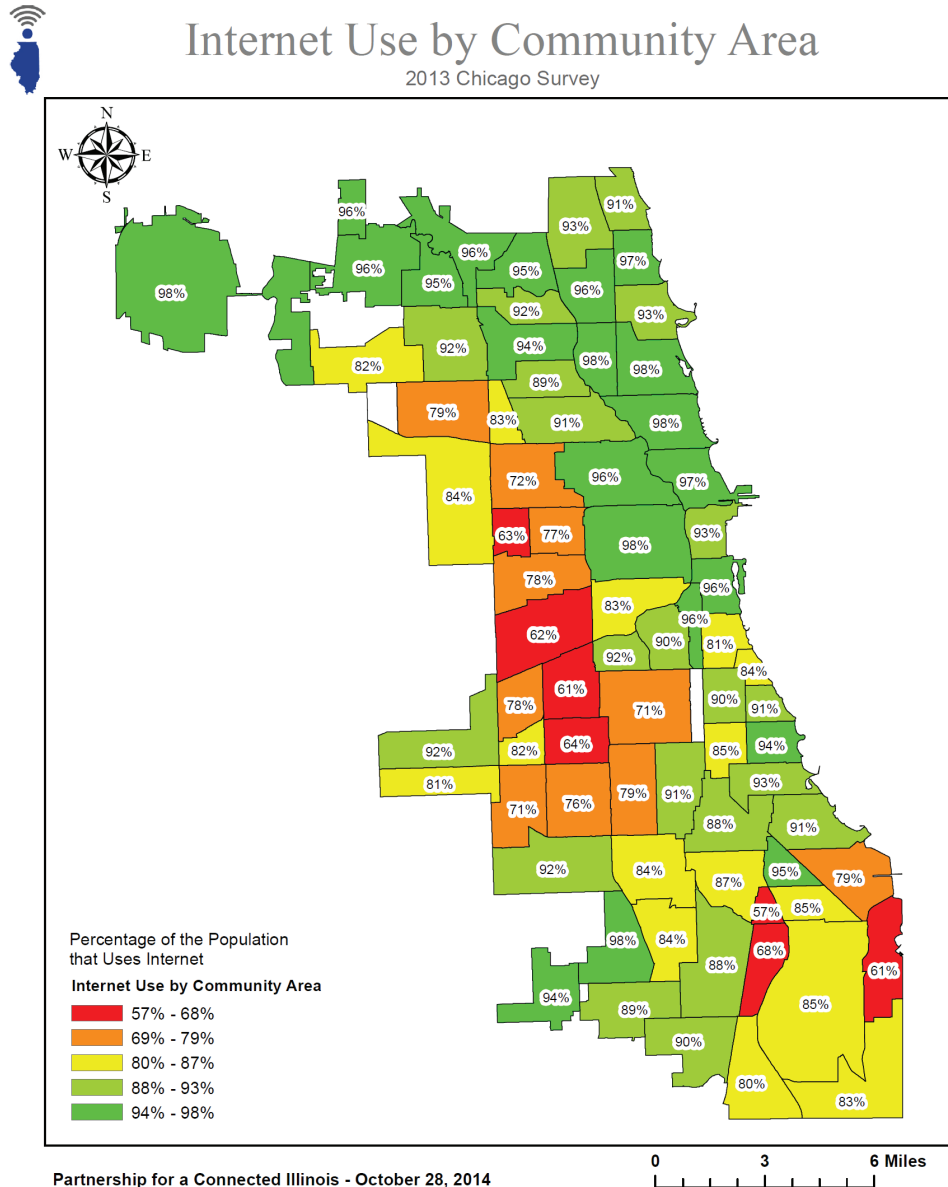
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Figure 12, which shows Internet use by community area in 2013, also reveals patterns of disparity for the South and West sides. But many predominantly African-American community areas on the South side, in particular, approximate or exceed citywide averages for Internet use (in any location). Some of these same community areas are somewhat below average in broadband adoption at home. This indicates that Internet use outside the home is relatively more important in these neighborhoods. African-Americans were among those who were most likely to use public access in 2008 (Mossberger and Tolbert 2009), and this pattern of use outside the home is still visible at the neighborhood level in 2013.

Figure 12. Internet Use in Any Location by Community Area, Chicago 2013

Internet Use by Community Area
2013 Chicago Survey

Percentage of the Population that Uses Internet
Internet Use by Community Area
- 57% - 68%
- 69% - 79%
- 80% - 87%
- 88% - 93%
- 94% - 98%

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Coupled with this pattern of Internet use outside the home, we see in **Figure 13**, which maps mobile use, some predominantly African-American (and Latino) neighborhoods where mobile Internet use exceeded half of the population in 2013, colored in light or dark green. Cell phone Internet use exceeded 60% of the population, for example, in Woodlawn and Englewood, marked in dark green on the South side. Smartphone use was not uniformly high in neighborhoods with relatively low broadband use, as some such areas on the South and West sides of the city are marked in red, orange or yellow, indicating relatively low rates of mobile use.

Figure 13. Cell Phone Internet Use by Community Area, Chicago 2013

Cell Phone Internet Use by Community Area
2013 Chicago Survey

Percentage of the Population that
uses Cell Phones to Access the Internet

Cell Phone Internet Use by Community Area
- 16% - 27%
- 28% - 40%
- 41% - 50%
- 51% - 61%
- 62% - 82%
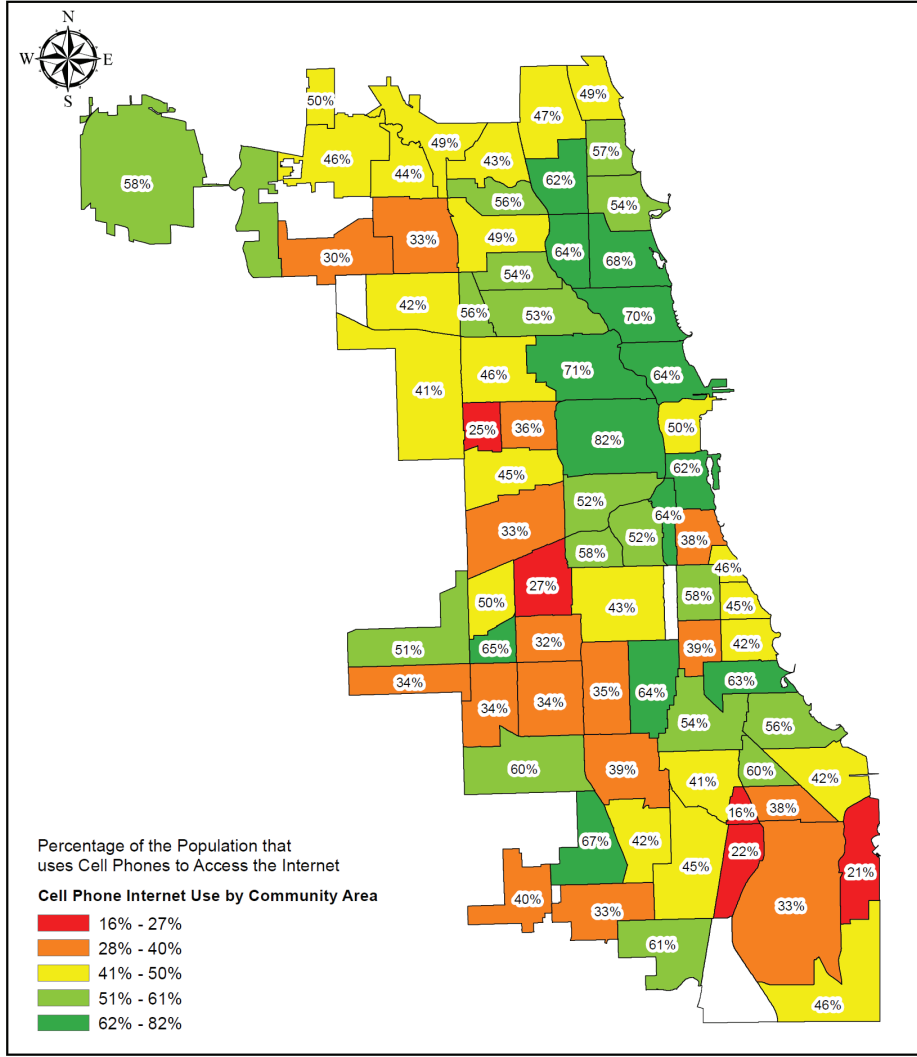
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With the continued importance of broadband at home for performing activities online, we have selected for comparison the community areas with the highest rates of home broadband adoption in Table 7, and the lowest rates of broadband adoption in Table 8. The percentage of the community area population that has broadband at home is in parentheses next to the name of the community area at the far left of the tables, and citywide averages are shown in bold in the bottom rows.

Table 7. Internet Use and Online Activities for Highest-Ranked Chicago Community Areas, 2013

Broadband Adoption Highest-Ranked Area (%)	Internet Use Percentage	Health Info Percentage	Job Search Percentage	Online Class Percentage
O'HARE (91%)	98	91	48	55
NEAR WEST SIDE (90%)	98	85	70	60
LINCOLN PARK (90%)	98	86	52	51
BEVERLY (89%)	98	86	54	50
LAKEVIEW (89%)	98	86	51	50
NORTH CENTER (89%)	98	85	51	49
CITY AVERAGE (70%)	**84**	**74**	**58**	**45**

Broadband Adoption Highest-Ranked Area (%)	Transportation Info Percentage	E-government Info Percentage	Chicago Govt. Website Percentage	Politics Info Percentage
O'HARE (91%)	84	83	75	84
NEAR WEST SIDE (90%)	84	79	73	80
LINCOLN PARK (90%)	82	79	73	80
BEVERLY (89%)	75	76	73	75
LAKEVIEW (89%)	80	78	72	78
NORTH CENTER (89%)	78	78	77	76
CITY AVERAGE (70%)	**66**	**61**	**58**	**60**

In the highest-ranked Chicago neighborhoods listed in Table 7, Internet use was almost universal and around 9 out of 10 residents had broadband at home. These high-ranked neighborhoods were in affluent or solidly middle-class areas, mostly on the North side (with the exception of Beverly on the South side). Residents of these community areas were much more likely to perform most activities online in comparison with city averages, with the exception of job search online. In highly-connected neighborhoods, residents exceeded city averages for health information online by at least 11 percentage points, and by at least 4 percentage points for online education, at least 9 percentage points for transportation information, at least 15 percentage points for e-government, at least 14 percentage points for use of the city website, and at least 15 percentage points for online political information.

In contrast, the disadvantages for the least-connected neighborhoods were clear. The least-connected community areas had rates of broadband access of approximately 40%, compared to the citywide average of 70%. In all of these cases, less than half of the community area had broadband at home. For all activities online, the lowest-ranked neighborhoods lagged far behind city averages, ranging from 18 to 35 percentage points below average. In such neighborhoods, fewer residents had access to online education or information on health, jobs, mass transit, government services, or politics. In these poor communities, this lack of resources may reinforce existing disadvantage, making it more difficult to have access to good jobs throughout the region, to access government services, or to secure democratic representation.
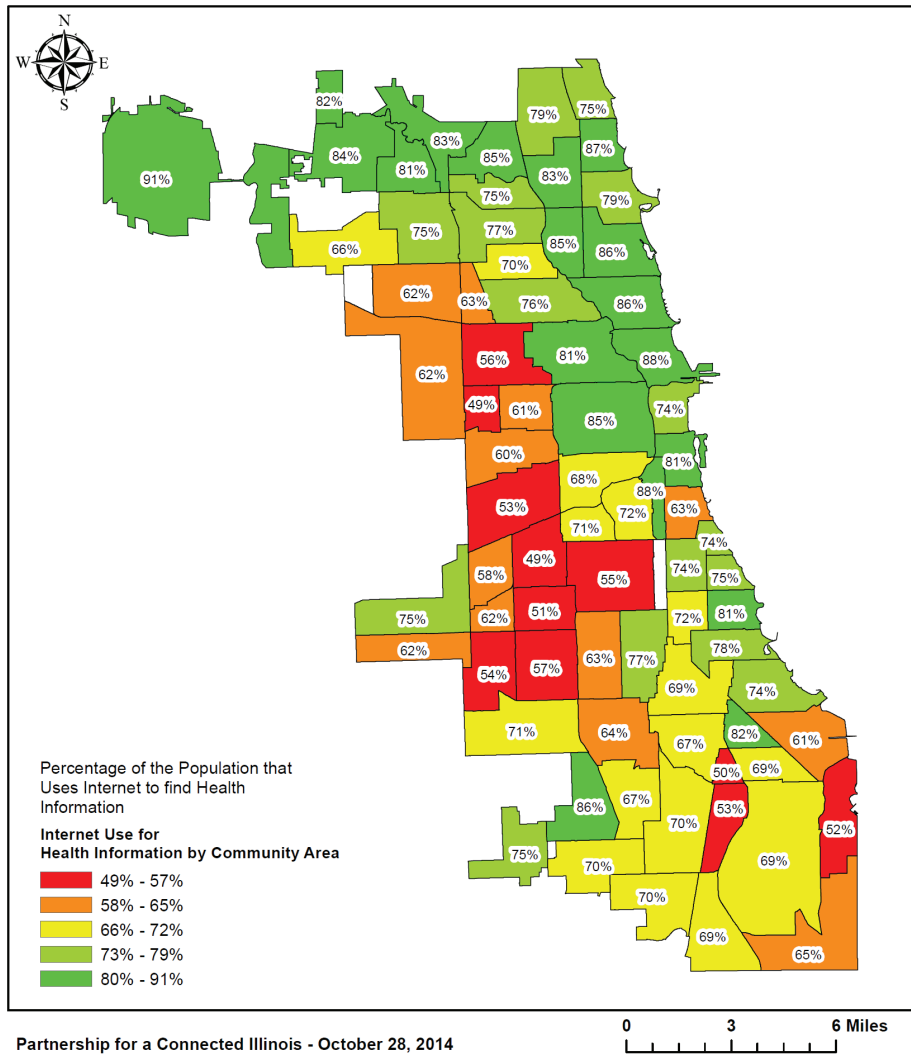
Table 8. Internet Use and Online Activities for Lowest-Ranked Chicago Community Areas, 2013

Broadband Adoption Lowest-Ranked Area (%)	Internet Use Percentage	Health Info Percentage	Job Search Percentage	Online Class Percentage
WEST GARFIELD PARK (39%)	63	49	30	17
BURNSIDE (39%)	57	50	24	17
BRIGHTON PARK (40%)	61	49	25	17
GAGE PARK (42%)	64	51	28	16
SOUTH LAWNDALE (43%)	62	53	33	17
EAST SIDE (43%)	61	52	24	15
CITY AVERAGE (70%)	84	74	58	45

Broadband Adoption Lowest-Ranked Area (%)	Transportation Info Percentage	E-government Info Percentage	Chicago Govt. Website Percentage	Politics Info Percentage
WEST GARFIELD PARK (39%)	45	36	41	35
BURNSIDE (39%)	36	40	40	38
BRIGHTON PARK (40%)	36	32	37	26
GAGE PARK (42%)	34	31	36	25
SOUTH LAWNDALE (43%)	34	33	36	27
EAST SIDE (43%)	35	35	36	30
CITY AVERAGE (70%)	**66**	**61**	**58**	**60**

We can see patterns of general advantage or disadvantage within neighborhoods by selecting the community areas with the highest and lowest rates of broadband use. But, how do activities online compare across the city – are there differences for health compared to job search, for example? **Figures 14-17** map selected activities online, for health, job search, mass transit use, and government information. These are activities that have been identified as common for public access use in low-income communities (Becker et al. 2010) and all except e-government use showed significantly higher rates of growth in the Smart Communities neighborhoods during the period covering these digital inclusion initiatives (Mossberger, Tolbert and Anderson 2014).

Figure 14. Internet Use for Health Information by Community Area, Chicago 2013

Internet Use for
Health Information by Community Area
2013 Chicago Survey

Percentage of the Population that
Uses Internet to find Health
Information

**Internet Use for
Health Information by Community Area**

- 49% - 57%
- 58% - 65%
- 66% - 72%
- 73% - 79%
- 80% - 91%

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Looking up health information online (**Figure 14**) was one of the most common activities citywide, with 74% of Chicago residents reporting they had done this. The disparities in broadband at home are largely replicated in the map of health information in **Figure 14**, although the disparities on the Westside are especially noticeable, with many neighborhoods in red and orange. These areas include both heavily Latino communities and a few predominantly African-American neighborhoods.

In comparison, **Figure 15** indicates that more of the low-income South and Westside community areas showed job search online at rates that were close to city averages. There were still areas of low online job search, marked in red. But, there was greater variation, with some of these higher-poverty communities showing relatively high rates of Internet use for job search, in green. Job search was clearly important in low-income communities. Some of the high broadband communities on the North side showed slightly lower rates of Internet use for job search, compared to city averages. This likely indicates fewer residents engaged in job search in these communities online or offline, given high rates of Internet use for other activities, such as accessing health information.

Figure 15. Internet Use to Apply for a Job by Community Area, Chicago 2013

Internet Use to
Apply for a Job by Community Area
2013 Chicago Survey

Percentage of the Population that
Uses Internet to Apply for a Job

**Internet Use to Apply for
A Job by Community Area**

- 21% - 28%
- 29% - 38%
- 39% - 47%
- 48% - 58%
- 59% - 70%

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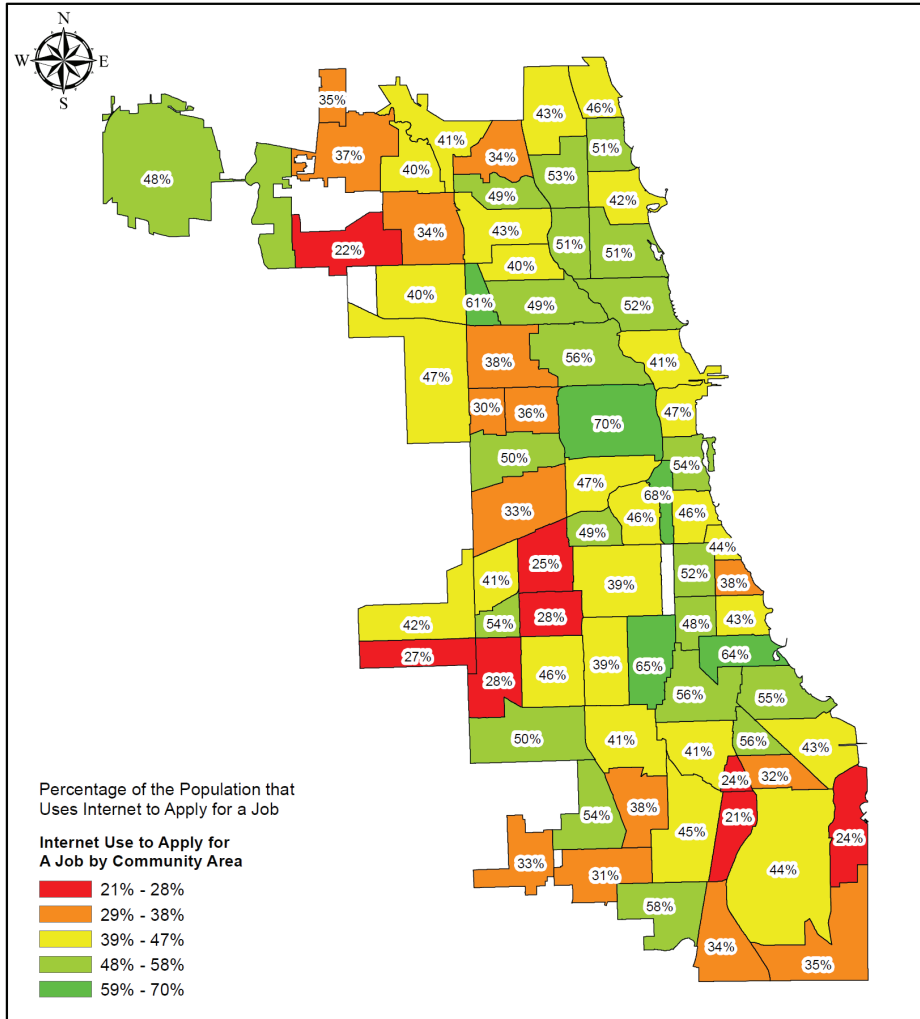
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Chicago has real-time information available on buses and "L" trains that can be accessed on a computer or a mobile phone, and use of the Internet for mass transit information was one of the most common activities online in Chicago. Low-income communities tend to be more dependent on mass transit, yet many of the neighborhoods on the South and West sides showed low use of the Internet for mass transit information. The Chicago Transit Authority does make information available through texting. This may be an alternative used in these communities. But, Internet users have access to more information than those who text, including the ability to map routes, manage transit card accounts, and more.

Figure 16. Internet Use for Mass Transit Information by Community Area, Chicago 2013
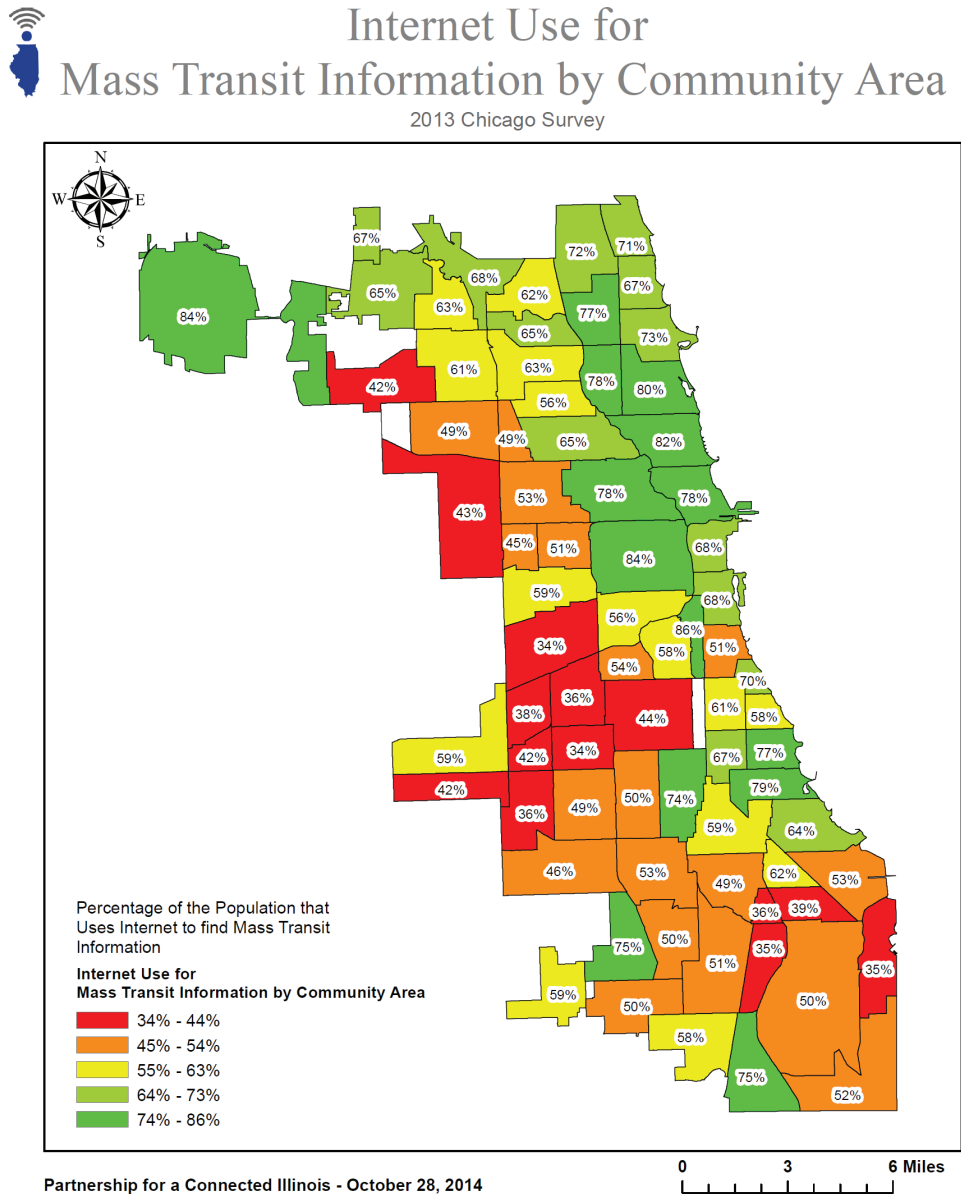
Internet Use for
Mass Transit Information by Community Area
2013 Chicago Survey

Percentage of the Population that
Uses Internet to find Mass Transit
Information

**Internet Use for
Mass Transit Information by Community Area**

- 34% - 44%
- 45% - 54%
- 55% - 63%
- 64% - 73%
- 74% - 86%

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0   3   6 Miles
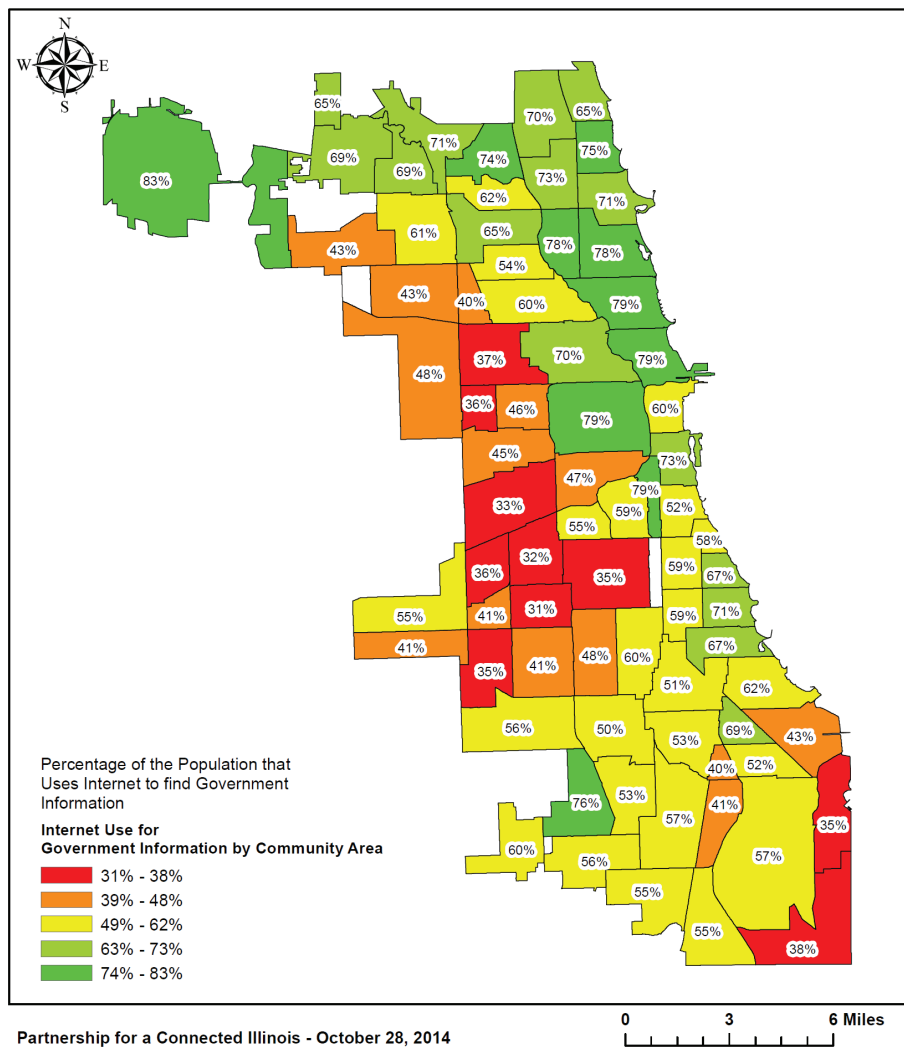
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Use of government information online (**Figure 17**) resembled the familiar patterns of inequality, but more of the South side neighborhoods that are largely African-American were in yellow, just below the citywide averages. The differences between these neighborhoods and other Chicago community areas were less pronounced than for transit.

Overall, low-income neighborhoods in Chicago exhibited disadvantages in activities online. Yet the disparities in online activities varied somewhat. Job search, and to a lesser extent, e-government use, showed smaller gaps between low income communities and other neighborhoods. Across activity areas, however, the city's West side appears to lag furthest behind. These community areas have high proportions of Latinos, and a few are predominantly African-American neighborhoods. Previous research has indicated residence in highly segregated areas of Chicago magnifies barriers to technology use for both African Americans and Latinos; but this is especially true for Latinos (Mossberger, Tolbert, Bowen and Jimenez 2012).

NEIGHBORHOOD CHANGE OVER TIME

Finally, we examine change in broadband adoption and Internet use by neighborhood from 2008 to 2013. The average community area change in broadband adoption at home was an increase of 6 percentage points. Most community areas experienced some increase in broadband adoption over this time period, as shown in **Figure 18** below. Areas with the highest increases, exceeding 13 percentage points in broadband adoption, appear in light or medium green. These tended to be on the South and West sides of the city. Neighborhoods with increases of 20 percentage points or more between 2008

Figure 18. Change in Broadband at Home by Community Area, 2008-13

Broadband Use by Community Area
Chicago Survey Change Over Time-2008 to 2013

Percentage of the Population that Uses Broadband

Broadband Use by Community Area

- -17% - -6%
- -5% - 4%
- 5% - 12%
- 13% - 20%
- 21% - 37%

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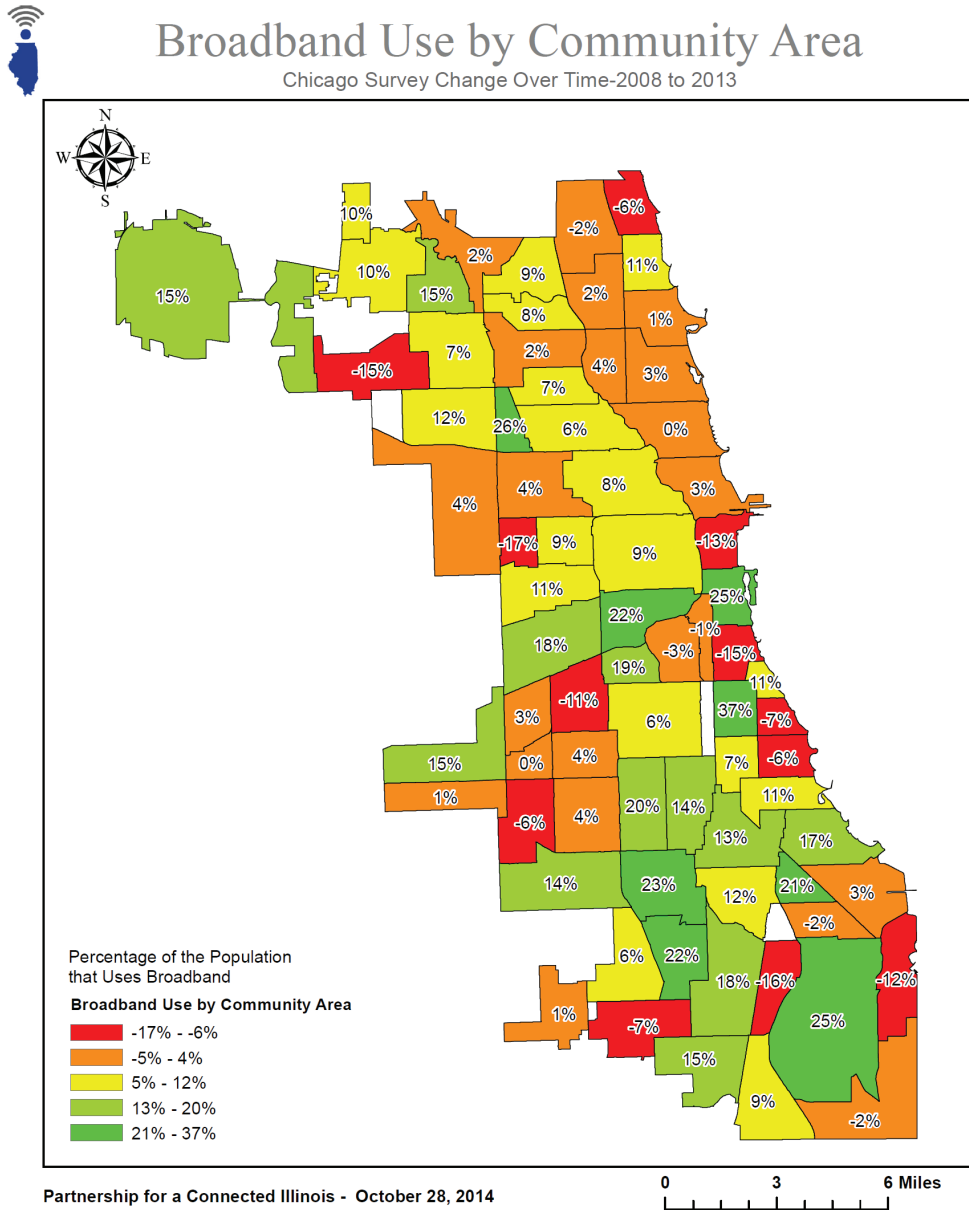
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and 2013 included Grand Boulevard (37 percentage points), Hermosa (26 percentage points), South Deering (25 percentage points), Near South Side (25 percentage points), Auburn Gresham (23 percentage points), Lower West Side (22 percentage points), Washington Heights (22 percentage points), Avalon Park (21 percentage points), West Englewood (20 percentage points), and McKinley Park (20 percentage points). In other words, the community areas with the greatest growth in broadband adoption over this period tended to be poor and minority communities.

In a few community areas, there were some decreases. Red-shaded areas show decreases between 6-17 percentage points. Areas with the largest decreases (over 15 percentage points) were also on the South and West sides and included West Garfield Park (17 percentage points), Pullman (16 percentage points) and Douglas and Dunning at 15 percentage points each. There are a variety of reasons that these decreases could have occurred, such as population change or increased mobile use. Because surveys use a sample of the population to estimate the behavior of the population, there is a "margin of error," plus or minus a few percentage points in each survey, which also might account for some of the apparent changes over time. The change in the areas marked in orange were more modest – with small increases or decreases of up to 5 percentage points. The citywide survey results showed some small decreases in broadband adoption between 2011 and 2013, and this may be reflected in the modest changes in areas that had previously had relatively high adoption rates.

Internet use anywhere showed similar patterns, with community areas experiencing a 5 percentage point increase in Internet use on average, between 2008 and 2013. The greatest increases, in light and medium green, were evident in the South and Southwest sides of the city. In general, the communities with more than a 20 percentage-point increase in Internet use anywhere were those that had the highest increases in broadband adoption at home during this period. Community areas with gains of between 20 and 31 percentage points were Grand Boulevard, Auburn Gresham, Hermosa, Washington Heights, the Lower West Side, South Deering, and West Englewood. Again, these are predominantly low-income, African-American and Latino community areas, where gains in Internet use anywhere are greatest.

For Internet use anywhere, West Garfield Park and Pullman again had decreases of more than 15%, and most other areas were more stable, with incremental decreases (in orange) or small increases (in yellow). Areas that had relatively high Internet use may have experienced small decreases in Internet use in any location recently, consistent with the citywide results. Because the question was asked about Internet use by location as in the 2008 survey (and not specifically about mobile use), this may reflect some of the shift toward mobile Internet rather than a drop in Internet use. The trend toward mobile may account for some of the reported decreases in broadband as well, although demographic change and sampling may also be involved. A few areas, marked in red, had larger decreases in Internet use anywhere.

Figure 19. Internet Use by Community Area, Chicago 2008-2013

Internet Use by Community Area
Chicago Survey Change Over Time-2008 to 2013

Percentage of the Population
that Uses Internet

Internet Use by Community Area

- -17% - -11%
- -10% - 2%
- 3% - 8%
- 9% - 17%
- 18% - 31%
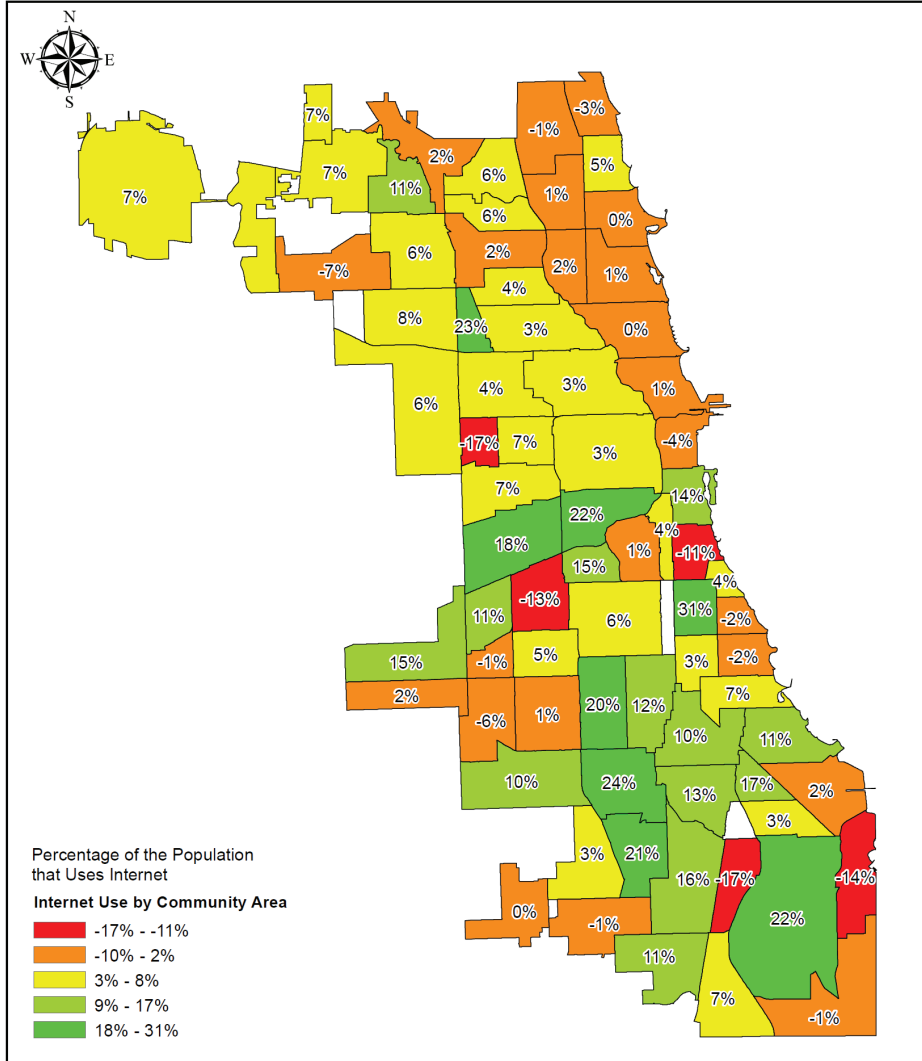
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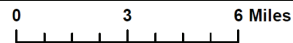
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CONCLUSION

Internet use and broadband at home grew between 2008 and 2011, but leveled off afterward. The 84% of Chicago residents who used the Internet in some way, and the 70% of residents who had broadband at home, mirrored the nation as a whole. Tracking broadband adoption and Internet use between 2008 and 2013 demonstrates that the Internet is becoming increasingly mobile, especially since 2011. Nearly all demographic groups experienced substantial growth in smartphone use (except Chicago residents over 65). Notably, Latinos were just as likely to be smartphone users as other Chicago residents, even though their home broadband use lagged behind.

In 2013, approximately 9% of Chicago residents went online primarily through smartphones rather than through laptops or personal computers, and the data indicates that they were different from most mobile users, who had broadband as well. While this was a small minority of city residents, it is important to ask whether or how smartphones were filling gaps in Internet access, especially for African Americans and Latinos. One way to measure the capacity to participate online is to examine the range of activities residents perform using the Internet. Those who relied primarily on mobile phones were less likely to engage in activities online, with less access to information in many critical areas, including jobs, health, education, government services, and their communities. Although those who had smartphones but lacked home broadband were more likely to report using the Internet at the library, still around half did not supplement their smartphone access in this way. Smartphones provided some personal access, but fully-connected Chicago residents were those who had broadband and mobile access, and could take advantage of the strengths of each.

At the neighborhood level, low-income and minority communities on the South and West sides of the city were most disadvantaged for broadband at home, but some of these community areas also experienced the highest rates of growth in broadband and Internet use over the five years. Mobile use was high in some low-income communities, indicating the role that mobile access played in widening Internet use in these neighborhoods. Yet, patterns were uneven, and some low-income neighborhoods lagged behind in both mobile and broadband. Activities online showed patterns of disparity as well, though job search online was especially evident even in underserved neighborhoods.

Increased mobile Internet use in Chicago is an opportunity, as residents who had previously lacked access are now more familiar with the Internet. Progress is evident since 2008 with the expansion of mobile access and increased Internet use in low-income neighborhoods. Yet the 2013 data shows that in order to realize the vision of the Chicago Tech Plan, where all residents and businesses can participate online in the economy and society, there is a continued need for outreach, training, and affordable home broadband access in many community areas and for individuals who remain offline or less-connected.

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Table A1 Community Area Estimates

CCA # Chicago Community Area	Broadband at Home 2013	Internet Use Anywhere 2013	Mobile 2013	Use For Work 2013	Use For Health Info 2013	Use For Job Search 2013	Use For Mass Transit 2013	Use For Govt Info 2013	2008-13 Change Internet Use 2013
1 Rogers Park	0.74	0.91	0.49	0.62	0.75	0.46	0.71	0.65	-0.03
2 West Ridge	0.77	0.93	0.47	0.67	0.79	0.43	0.72	0.70	-0.01
3 Uptown	0.78	0.93	0.54	0.67	0.79	0.42	0.73	0.71	0.00
4 Lincoln Square	0.84	0.96	0.62	0.77	0.83	0.53	0.77	0.73	0.01
5 North Center	0.89	0.98	0.64	0.80	0.85	0.51	0.78	0.78	0.02
6 Lakeview	0.89	0.98	0.68	0.79	0.85	0.51	0.80	0.78	0.01
7 Lincoln Park	0.90	0.98	0.70	0.80	0.86	0.52	0.81	0.79	0.00
8 Near North Side	0.88	0.97	0.64	0.73	0.88	0.41	0.78	0.78	0.01
9 Edison Park	0.83	0.96	0.50	0.56	0.82	0.35	0.67	0.65	0.07
10 Norwood Park	0.81	0.96	0.46	0.57	0.84	0.37	0.65	0.69	0.07
11 Jefferson Park	0.80	0.95	0.44	0.63	0.81	0.40	0.63	0.69	0.11
12 Forest Glen	0.82	0.96	0.49	0.65	0.83	0.41	0.68	0.71	0.02
13 North Park	0.80	0.95	0.43	0.68	0.85	0.34	0.62	0.74	0.06
14 Albany Park	0.75	0.92	0.56	0.71	0.75	0.49	0.65	0.62	0.06
15 Portage Park	0.74	0.92	0.33	0.55	0.75	0.34	0.61	0.61	0.06
16 Irving Park	0.79	0.94	0.49	0.66	0.77	0.43	0.63	0.65	0.02
17 Dunning	0.55	0.82	0.30	0.29	0.66	0.22	0.42	0.43	-0.07
18 Montclare*									
19 Belmont Cragin	0.59	0.79	0.42	0.41	0.62	0.40	0.49	0.43	0.08

* Community areas had sample sizes that were too small for estimates.

CCA #	Chicago Community Area	Broadband at Home 2013	Internet Use Anywhere 2013	Mobile 2013	Use For Work 2013	Use For Health Info 2013	Use For Job Search 2013	Use For Mass Transit 2013	Use For Govt Info 2013	2008-13 Change Internet Use 2013
20	Hermosa	0.62	0.83	0.56	0.47	0.63	0.61	0.49	0.41	0.23
21	Avondale	0.71	0.89	0.54	0.59	0.70	0.40	0.56	0.54	0.04
22	Logan Square	0.73	0.91	0.53	0.62	0.76	0.49	0.65	0.60	0.03
23	Humboldt Park	0.47	0.72	0.46	0.34	0.56	0.39	0.53	0.37	0.04
24	West Town	0.83	0.96	0.71	0.72	0.81	0.56	0.78	0.70	0.03
25	Austin	0.60	0.84	0.41	0.39	0.62	0.47	0.43	0.48	0.06
26	West Garfield Park	0.38	0.62	0.25	0.20	0.48	0.30	0.45	0.36	-0.17
27	East Garfield Park	0.50	0.77	0.36	0.29	0.61	0.37	0.50	0.45	0.07
28	Near West Side	0.90	0.98	0.82	0.88	0.85	0.70	0.84	0.79	0.03
29	North Lawndale	0.54	0.78	0.45	0.32	0.60	0.50	0.59	0.45	0.07
30	South Lawndale	0.43	0.62	0.33	0.30	0.53	0.33	0.34	0.33	0.18
31	Lower West Side	0.61	0.83	0.52	0.50	0.68	0.47	0.56	0.46	0.22
32	Loop	0.74	0.93	0.50	0.57	0.74	0.47	0.68	0.60	-0.04
33	Near South Side	0.85	0.96	0.62	0.76	0.81	0.54	0.68	0.73	0.14
34	Armour Square	0.81	0.96	0.64	0.84	0.88	0.68	0.86	0.79	0.04
35	Douglas	0.58	0.80	0.38	0.41	0.63	0.46	0.51	0.51	-0.11
36	Oakland	0.62	0.84	0.46	0.34	0.73	0.45	0.69	0.58	0.04
37	Fuller Park*									
38	Grand Boulevard	0.72	0.90	0.58	0.46	0.74	0.53	0.61	0.59	0.31
39	Kenwood	0.72	0.91	0.45	0.60	0.75	0.39	0.58	0.67	-0.02
40	Washington Park	0.62	0.84	0.39	0.40	0.72	0.49	0.67	0.59	0.03
41	Hyde Park	0.78	0.94	0.42	0.63	0.80	0.43	0.77	0.71	-0.02
42	Woodlawn	0.75	0.93	0.63	0.62	0.78	0.64	0.79	0.67	0.07
43	South Shore	0.73	0.91	0.56	0.52	0.74	0.55	0.64	0.62	0.11
44	Chatham	0.66	0.87	0.41	0.40	0.67	0.41	0.49	0.53	0.13
45	Avalon Park	0.82	0.95	0.60	0.60	0.82	0.55	0.62	0.69	0.17
46	South Chicago	0.53	0.79	0.42	0.32	0.61	0.43	0.53	0.43	0.02
47	Burnside	0.39	0.57	0.16	0.17	0.50	0.24	0.36	0.40	*
48	Calumet Heights	0.61	0.85	0.38	0.36	0.70	0.32	0.39	0.53	0.03
49	Roseland	0.70	0.88	0.45	0.42	0.70	0.45	0.51	0.57	0.16
50	Pullman	0.48	0.68	0.22	0.22	0.53	0.21	0.35	0.41	-0.17

* Community areas had sample sizes that were too small for estimates.

CCA #	Chicago Community Area	Broadband at Home 2013	Internet Use Anywhere 2013	Mobile 2013	Use For Work 2013	Use For Health Info 2013	Use For Job Search 2013	Use For Mass Transit 2013	Use For Govt Info 2013	2008-13 Change Internet Use 2013
51	South Deering	0.68	0.85	0.33	0.43	0.69	0.44	0.50	0.57	0.22
52	East Side	0.43	0.61	0.21	0.26	0.52	0.24	0.35	0.35	-0.14
53	West Pullman	0.70	0.90	0.61	0.46	0.70	0.58	0.58	0.55	0.11
54	Riverdale*									
55	Hegewisch	0.60	0.83	0.46	0.35	0.65	0.35	0.53	0.39	-0.01
56	Garfield Ridge	0.73	0.92	0.51	0.51	0.75	0.42	0.59	0.55	0.15
57	Archer Heights	0.52	0.78	0.50	0.43	0.59	0.41	0.38	0.37	0.11
58	Brighton Park	0.40	0.61	0.27	0.33	0.49	0.25	0.36	0.32	-0.13
59	Mckinley Park	0.76	0.92	0.58	0.67	0.71	0.49	0.54	0.55	0.15
60	Bridgeport	0.69	0.90	0.52	0.73	0.72	0.46	0.58	0.59	0.01
61	New City	0.46	0.71	0.43	0.33	0.55	0.40	0.44	0.35	0.06
62	West Elsdon	0.62	0.82	0.65	0.52	0.62	0.54	0.42	0.42	-0.01
63	Gage Park	0.42	0.64	0.32	0.31	0.51	0.28	0.34	0.31	0.05
64	Clearing	0.57	0.82	0.34	0.34	0.62	0.27	0.42	0.41	0.02
65	West Lawn	0.50	0.71	0.34	0.33	0.55	0.28	0.36	0.36	-0.06
66	Chicago Lawn	0.55	0.76	0.34	0.35	0.57	0.46	0.49	0.41	0.01
67	West Englewood	0.54	0.79	0.35	0.32	0.62	0.39	0.50	0.47	0.20
68	Englewood	0.70	0.91	0.64	0.48	0.77	0.66	0.74	0.60	0.12
69	Greater Grand Crossing	0.64	0.88	0.54	0.39	0.69	0.56	0.59	0.51	0.10
70	Ashburn	0.75	0.92	0.60	0.59	0.71	0.50	0.47	0.56	0.10
71	Auburn Gresham	0.61	0.84	0.39	0.35	0.64	0.41	0.53	0.50	0.24
72	Beverly	0.89	0.98	0.67	0.75	0.86	0.54	0.75	0.77	0.03
73	Washington Heights	0.64	0.84	0.42	0.38	0.67	0.38	0.50	0.53	0.21
74	Mount Greenwood	0.79	0.94	0.40	0.52	0.75	0.33	0.59	0.60	0.00
75	Morgan Park	0.70	0.89	0.33	0.42	0.71	0.31	0.50	0.56	-0.01
76	O'Hare	0.91	0.98	0.58	0.81	0.90	0.48	0.84	0.83	0.07
77	Edgewater	0.87	0.97	0.57	0.70	0.87	0.51	0.67	0.75	0.05

* Community areas had sample sizes that were too small for estimates.