

CUYAHOGA COUNTY SURVEY OF INTERNET ACCESS AND USE

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EXECUTIVE SUMMARY

Internet use is necessary to participate in society online, and for access to information on jobs, government services, and health care. Yet, many individuals remain excluded from economic and social benefits of the information society. This report examines patterns of Internet access and use in Cuyahoga County, with subsamples for Cleveland and inner-ring suburbs with poverty rates above 25%, and for the balance county areas.

We examine variation by geography and demography in several critical areas: different forms of access (including mobile and broadband), activities online (by forms of access), Internet access among recipients of a variety of social services, and Internet use for school involvement by parents. As we will show below, different forms of access represent differences in quality. The “less-connected” who lack broadband or multiple forms of access clearly have a lower capacity to participate in society online. Digital government has the potential to generate cost savings through service delivery online, and to improve interactions with citizens (West 2005; Tolbert and Mossberger 2006). Yet, an important barrier for the development of e-government is unequal access and use of the Internet, especially among low-income and elderly populations that are most likely to utilize social services. Similarly, the Internet offers new opportunities for communication between parents and teachers, forging a stronger connection between home and school (Mossberger, Tolbert and Franko 2012). Those parents who are not online are likely to be in households with other educational disadvantages, and the lack of connectivity with schools can compound these challenges.

KEY FINDINGS

Access

- Rates of Internet use are similar to those found in national surveys. In Cuyahoga County as a whole, 81% use the Internet, 63% have high speed access at home, 34% have Internet access on their smartphones, 6% have only mobile phones to go online, and 29% are fully-connected, with both home broadband and mobile access.
- Geography matters, across the findings in the survey. Within Cuyahoga County, Cleveland and the inner-ring suburbs are relatively disadvantaged in comparison with the balance county areas, in most instances. A few exceptions are noted below, primarily for mobile Internet use which is higher in the Cleveland area.
- Demography matters as well. Patterns of Internet access and use generally vary in ways that are similar to national trends, with older, lower-income, less-educated, and African-American, and non-native English speakers trailing behind. Latinos as a whole in Cuyahoga County, however, have similar rates of Internet use (anywhere) and home broadband use as non-Hispanics. But in mobile access, some of the traditionally disadvantaged groups are in the forefront.

- Older Cuyahoga County residents over 65 are online at substantially lower rates. The interaction between age and poverty is visible through comparison of Internet use and broadband adoption in the Cleveland area and the balance suburbs. For the Cleveland region, only 49% of residents over 65 use the Internet anywhere, and 33% have broadband at home. In contrast, 74% of outer county residents in this age group use the Internet, and 57% have home broadband.
- Mobile Internet use breaks with other patterns of Internet access, as African-Americans are about 11 percentage points more likely to have mobile access in the Cleveland area than whites (38% to 27%). Similarly, cell-phone use is higher for Latinos than non-Latinos in all 3 areas. For the county as a whole 55% of Latinos have mobile access, compared with 33% of non-Hispanics.
- But these high rates of mobile access do not necessarily lead to full digital inclusion. Disadvantaged groups are also most likely to be mobile-only Internet users who rely upon smartphones as their primary form of access. While this provides greater personal access than Internet use outside the home, as the section on activities shows, mobile-only users are less likely to perform activities online, across a wide range of questions.
- Individuals who have both mobile and home broadband are fully-connected, with the advantages of continuous mobile access and the functionality of desktop or laptop computers for more reading or writing-intensive activities. In Cuyahoga County as a whole, 29% of residents are fully connected, compared to 26% in the Cleveland area and 32% out-county.
- Low-income individuals, with annual household incomes below \$20,000 are among those who are least-connected. While 57% of these low-income individuals in the County use the Internet, this is largely outside the home. Only 32% have broadband at home, and 25% have mobile Internet access. They are most likely to be mobile-only users (at 10% compared to 3% for households with incomes of \$50,000 and above). Only 15% are fully-connected.
- Young people (18-29) are almost universally online (at 95%) in all three geographic areas, and also have the highest rates of mobile access (at 70% for the county).
- Parents are almost universally likely to be Internet users, ranging from 93% to 98% across the three geographic areas. They are also more likely than non-parents to be home broadband adopters. In the county, for example, 80% of parents have home broadband, compared with 59% of non-parents. The 21 percentage point difference is striking.

Activities Online

- In the county, the most common activities on the Internet are looking up health information (64% of residents report doing this), banking (53%), getting information about politics (47% during a national election campaign where Ohio was a critical swing state), and use of the Cuyahoga County website (47%).
- Geographic disparities in access are reflected in differences in activities online. Comparing the 3 geographic areas, Cleveland area residents are least likely to do many activities online: find health information; bank; take a class, get information about politics; find property tax information; pay taxes, parking tickets, or fees; or to use the Cuyahoga County website.

- In contrast, Cleveland area residents are actually *more* likely to look for a job, check a bus schedule, or use the City of Cleveland website, and are about as likely as others in the county to look for housing online.
- Broadband at home facilitates participation in society online. Across all of the activities included here, broadband users were more likely to perform them online than mobile access users. Some of the differences were dramatic. For example, 80% of county broadband adopters look for health information online, while only 44% of mobile Internet users do. For job search, the gap is nearly as wide: 75% to 50%.
- Social service users are an important audience for e-government and online service delivery. Currently, however, disparities in Internet access raise substantial barriers for implementing e-government without a parallel system of traditional service delivery.
- Countywide, only about half of Ohio Direction Card and WIC recipients have broadband at home. Broadband adoption rates are only 42% for individuals with Medicaid. For some services, broadband at home is higher. Sixty-three percent of Healthy Start recipients have home broadband, as do 64% of Ohio Work First and 69% of Employment Connection recipients. Those who qualify for senior or disabled bus passes have the lowest rate, at 34%.
- Overall, Cleveland area residents who receive social services have lower rates of access than the county as a whole. Mobile rates of access are generally somewhat lower than the percentages who have broadband at home.
- For families whose children qualify for free or reduced-rate lunches, 72% have broadband at home.
- Parental involvement with schools online is quite common – with 68% of parents reporting they have used their school’s website. This jumps to 88% for parents with home broadband.
- Emailing teachers is extremely common for parents with home broadband, as 90% reported doing this. For those with mobile access, only 56% had emailed teachers. Parents who have mobile access are less-connected with their child’s school than broadband users. They were also significantly less likely to access other education related information, including the school website, career, college or scholarship information online.
- Efforts to bring all Cuyahoga County residents online can improve individual opportunity and the quality of life in their communities. Government agencies can not only save money, but improve communication and interaction with residents, and important parental connections with schools.

CUYAHOGA COUNTY SURVEY OF INTERNET ACCESS AND USE

DATA, METHODS & ORGANIZATION

We draw on a random-sample telephone survey of 1,216 Cuyahoga County residents aged 18 and older, conducted in October 2012. The survey was carried out via both landlines and cell phones. Follow-up included five callbacks to non-responding numbers, unless a hard refusal was given. Cuyahoga County 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. Mirroring national polls, such as Gallup and Pew, the scientific random sample survey was designed and administered so that every resident of Cuyahoga County had the opportunity of being included in the sample. The results can thus be generalized to the county as a whole.

The survey includes an oversample of Cleveland and nine inner-ring suburbs that have food stamps rates of 25% of the population or higher. Zip codes were used to select the geographic regions for the target sample. Results for this target population are analyzed separately from the results for the county as a whole. Results are also reported for the balance areas; respondents residing in Cuyahoga County that do not reside in Cleveland or the nine-inner ring suburbs. The survey results are thus reported for three different samples: 1) the county as a whole, 2) Cleveland and inner-ring suburbs and 3) balance areas of the county. The data are reported unweighted, as we do not have weights for the target areas or the balance areas, only the county as a whole. The Appendix file included the results for the county using the survey weights (based on age, gender and race/ethnicity). There are small changes in the percentages when the county results are weighted.

Previous research has shown Cleveland 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 Tolbert and Hamilton 2012). Results for Cleveland are comparable with national averages, as 81% of residents reported using the Internet in 2011, and 63% said they had broadband at home in 2012. The national 2012 Pew figures estimate Internet use anywhere at 78% and broadband adoption at 62% of American adults (Zickuhr & Smith 2012). Cuyahoga County is also an excellent case for observing the differences across racial and ethnic groups, as well as across economically diverse neighborhoods. Phase II of this report will include estimates of Internet use by cities using the technique of multilevel statistical model.

Internet access is measured by five primary outcome variables. Variables are created to measure the percentage of the population with these five forms of access. We consider home broadband access to be the most important for participation and access to information online, followed by mobile Internet access.

1. We first measure Internet use at any location, which can include at home, work, school or other locations. Second, we measure the frequency of broadband (high speed) access at home.
2. Home broadband access has been found to be critical for digital citizenship, and for a range of economic, political and social activities online (Mossberger, Tolbert and McNeal 2008).
3. Third we measure mobile access by using the Internet on a cell phone or smartphone.
4. Fourth, we measure whether the respondent has mobile Internet access without home broadband. This category of respondents is called mobile-only.
5. And finally we measure individuals with multiple forms of connectivity, including mobile Internet and home broadband.

This report is organized into five sections. In Section I we report Internet access rates for the five variables discussed above for our three geographic samples. In Section II we report demographic cross-tabulations for the percentage of Cuyahoga County residents online by age, education, income, race, ethnicity and other demographic groups. Section III focuses on online activities, showing both the frequency of engaging in political, economic and social activities online, and variation by the type of Internet access. Section IV provides an analysis of variation in recipients of county social services by forms of Internet access (home broadband and mobile Internet). And the last section (V) reports variation in use of public school services by forms of Internet access (home broadband and mobile Internet).

SECTION I: FORMS OF ACCESS

Today Internet use occurs through a variety of devices, which make a difference for quality of access and activities online (Mossberger, Tolbert and Hamilton 2012; Mossberger, Tolbert and Franko 2012). Table 1 (below) shows different modes of access for the county as a whole and for different areas of the county: 1) Cleveland and inner ring suburbs, and 2) balance county areas. Inner ring suburbs with at least a 25% poverty rate were selected, so this Cleveland cluster has a higher poverty rate than the other areas of the county. The results demonstrate that there is indeed substantial geographic variation in Internet access across the county, with mobile access (smartphones) representing an interesting exception.

Table 1: Percent Population with Internet Access for Cuyahoga County, Cleveland and Inner Ring Suburbs and Non-Target Areas

	County (All)	Cleveland + Inner Ring Suburbs	Balance Areas (non-target)
Internet Access Anywhere	81.28 (1025)	75.51 (518)	88.17 (507)
Broadband Internet Access At Home (High speed)	63.36 (799)	54.52 (374)	73.91 (425)
Mobile Internet Access	34.26 (432)	33.82 (232)	34.78 (200)
Only Mobile Internet Access (no broadband)	5.71 (72)	7.73 (53)	3.30 (19)
Mobile and Broadband Access	28.55 (360)	26.09 (179)	31.48 (181)
N	1261	686	575

Note: N=1,261 Frequencies in parentheses.

Residents of the Cleveland region generally have lower rates of Internet access than the balance county areas (and the county average), except for mobile Internet access, where about 34-35% of the population uses smartphones in all areas. The Cleveland cluster has more than twice as many mobile-only Internet users, who do not have broadband at home (7.73%), than the balance of the county (3.30%). While mobile-only use is higher in the Cleveland area, these individuals are “less-connected,” as they have a form of access that is more limited for performing functions such as filling out forms or for

reading-intensive activities online. Data caps for mobile broadband may also limit use (Mossberger, Tolbert and Hamilton 2012).

Internet access anywhere is only 76 percent in the Cleveland area, in comparison with 88% in the balance of the county (a 12 percentage point difference). Broadband gaps are larger, at 19%; 55% have broadband at home in the Cleveland area, but 74% of balance county residents do. Residents who are “fully-connected,” and who enjoy the advantages of both home broadband and continuous mobile access range between a quarter to a third of the population, so the differences are just 5 percentage points. In Cleveland, 26 percent are fully-connected and in the rest of the county 31% are.

SECTION II: DEMOGRAPHIC VARIATION IN FORMS OF ACCESS

Knowing whether or how different groups access the Internet can help for planning outreach and service delivery to particular populations. For example, to what extent are seniors online, and how feasible is it to disseminate information about senior housing or health care through these channels?

Service delivery tends to be localized. Individuals go to nearby health clinics and they participate in their neighborhood schools. Strategies for outreach or communication that are well-adapted for areas with higher Internet use may not be appropriate for other areas, unless residents are provided with Internet access and help, for example through libraries and community centers. What patterns, then, do we see in forms of Internet access for different demographic groups, for Cuyahoga County as a whole, for Cleveland and inner-ring suburbs, and for the balance areas of the county? The following tables show use by age, race and ethnicity, language, income, education, and parental status.

Internet Use by Age

Table 2 examines forms of Internet access by age. Across all three geographic areas, it is clear that the fault line for falling rates of Internet use is age 65 and older. Internet use anywhere for 18-29 year olds does not vary much across the three areas, as it is around 95 percent in all of them. Overall, the younger the county residents, the more connected they are.

The variation in the over-65 group across areas is fairly dramatic, demonstrating the confluence of age and poverty. In the Cleveland region only 49% of these older residents use the Internet anywhere, while in the balance of the county, 74% do. The gaps for broadband are similar – 33% in the Cleveland area vs. 57% out-county. Older Cleveland area residents use smartphones in the single digits, while in the balance areas mobile phone use is 12% and full connectivity is 10%.

Use of cell phones to go online skews heavily toward the young, and 18-29 year olds in the Cleveland region actually outpace the rest of the county in this regard. These young Cleveland area residents are highly mobile, with 75% who use smartphones, 14% who are smartphone-only users, and 60 percent who are fully-connected. In the balance of the county, only 62% of 18-29 year olds have mobile access (a 13 percentage point drop), but mobile-only use is similar (only a 2 percentage point drop at 12%). The youngest residents in the balance areas are actually 10 percentage points lower than Clevelanders in full connectivity – only 50% have both mobile and broadband, compared to 60% for the youngest Cleveland residents.

Table 2: Internet Use by Age (Percent)

	Age			
	18-29	30-49	50-64	65+
<u>Cuyahoga County (N=1261):</u>				
Use Internet At Any Location	94.67 (142)	92.72 (293)	87.82 (346)	60.85 (244)
Access Internet At Home Using High-Speed	76.00 (114)	72.78 (230)	70.30 (277)	44.39 (178)
Mobile Internet Access	70.00 (105)	53.16 (168)	29.95 (118)	10.22 (41)
Only Mobile Access	13.33 (20)	11.08 (35)	2.79 (11)	1.50 (6)
Mobile and Broadband Access	56.67 (85)	42.09 (133)	27.16 (107)	8.73 (35)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>				
Use Internet At Any Location	94.90 (93)	88.70 (157)	81.77 (166)	49.04 (102)
Access Internet At Home Using High-Speed	74.49 (73)	64.41 (114)	58.62 (119)	32.69 (68)
Mobile Internet Access	74.49 (73)	51.98 (92)	24.14 (49)	8.65 (18)
Only Mobile Access	14.29 (14)	15.25 (27)	4.43 (9)	1.44 (3)
Mobile and Broadband Access	60.20 (59)	36.72 (65)	19.70 (40)	7.21 (15)
<u>Balance Areas County:</u>				
Use Internet At Any Location	94.23 (49)	97.84 (136)	94.24 (180)	73.58 (142)
Access Internet At Home Using High-Speed	78.85 (41)	83.45 (116)	82.72 (158)	56.99 (110)
Mobile Internet Access	61.54 (32)	54.68 (76)	36.13 (69)	11.92 (23)
Only Mobile Access	11.54 (6)	5.76 (8)	1.05 (2)	1.55 (3)
Mobile and Broadband Access	50 (26)	48.92 (68)	35.08 (67)	10.36 (20)

Note: Entries are percentages with frequencies in parentheses.

Internet Use by Race and Ethnicity

Racial and ethnic differences are visible in Internet use. Only 73% of African-Americans in the county use the Internet anywhere, which is 11 percentage points lower than whites (at 84%). There is a

striking 21 percentage point difference for broadband at home (48% for African-Americans in comparison with 69% for whites). As is the case nationally, non-whites are more likely to access the Internet on their cell phones (Zickuhr and Smith 2012). While only 31% of white county residents use smartphones, 37% of African-Americans do. African-Americans are much more likely to be mobile-only users at 11%, versus the 3% of whites who rely upon smartphones in the county.

For the Cleveland area, the black-white gap is slightly smaller because technology use is somewhat lower for both groups. Yet, the patterns are largely the same. Sixty percent of white Cleveland area residents have broadband at home, but only 46% of African-Americans do. In contrast, 38% of African-Americans are mobile Internet users, compared with only 27% of Cleveland area whites. Twelve percent of blacks in the Cleveland cluster are mobile-only users, comprising most of those in this category. Because of higher rates of mobile use, a slightly higher proportion of Cleveland area African-Americans are fully connected (26%) in comparison with whites (24%).

Despite disparities in other forms of Internet access, African-Americans in Cleveland are at the forefront of the movement toward mobile. As with 18-29 year olds in Table 2, Table 3 shows that **city and inner suburban residents are ahead in smartphone adoption, with and without other forms of access.** In the balance suburbs, black-white disparities are relatively small, with all groups having much greater rates of Internet access. While 88% of out-county whites use the Internet anywhere, 82% of African-Americans are Internet users. Broadband gaps are a bit wider, with only 64% of suburban African-Americans who have broadband at home compared to 76% of whites. Mobile Internet use is essentially the same for both groups (33%), with small differences in mobile-only access and full connectivity.

Cuyahoga County Latinos are just as likely to use the Internet as non-Hispanic whites, although broadband adoption is 7 percentage points lower at 57%. **Cell phone use is remarkably higher for Latinos, at 55% compared with only 33% for non-Hispanics, for a 22 percentage point difference.** Fourteen percent of Latinos are mobile-only Internet users, in comparison with 5% of non-Hispanics and 6% of the County.

Cleveland area Latinos have virtually the same rates of Internet use anywhere and broadband adoption as non-Latinos. The differences are in mobile access. Half of Latinos have a smartphone, in comparison with one-third of non-Latinos. They are twice as likely to be mobile-only Internet users, with 16 percent of Latinos falling in this category, compared with only 7 percent of non-Latinos.

In the balance area of the County, Asians and other race individuals continue to be the most active Internet users in many ways. The differences between African-Americans and Latinos in these suburban areas are small. Compared with whites, African-Americans have rates of Internet use anywhere that are only 5 percentage points lower, have broadband access rates that are 11 percentage points lower, and the same rates of cell phone use to go online. Mobile-only use is slightly higher for African-Americans and full connectivity is slightly lower, compared with suburban whites.

Across the three geographic areas, Internet use anywhere is the same for Latinos and non-Latinos. Balance suburban Latinos lag behind in broadband adoption at home compared to whites in the area (at 67% vs. 74%), and so at the county level there are some disparities in broadband as well for this group (with 57% who have broadband compared to 74% of non-Hispanics). However, broadband adoption is similar in Cleveland regardless of Latino ethnicity.

Latino mobile access stands out. In all three areas, Latinos are *more* mobile-oriented than non-Latinos. Comparisons of the Cleveland cluster and the out-county suburbs are the most informative. In the balance suburbs 67% of Latinos have smartphones, compared with 34% of non-Latinos. This is

nearly double. They are also more likely than non-Latinos to be mobile-only users (11% vs. 3%) and to be full-connected as well (56% versus 31%). In the Cleveland area, Latinos are also more likely than non-Latinos to be smartphone and mobile-only users, but somewhat less likely to be fully-connected (at 23% for Latinos but 35% for non-Latinos). Latinos are embracing mobile access. In some cases they still fall behind in other forms of access, but this is uneven across geographic areas. Nationally, Latinos are the group that is furthest behind in broadband access (Mossberger, Tolbert and Franko 2012), but not in Cuyahoga County.

Finally, Asians are the most connected group in Cuyahoga County, just as they are around the nation. They rank highest for all forms of Internet use, with 100% who have broadband and 80% who have mobile access in the balance suburbs. Only 89% of Cleveland Asians have broadband at home, and 56% have mobile access, but they still rank first in all forms of access within the Cleveland area.

Table 3: Internet Use by Race and Ethnicity (Percent)

	Race			Ethnicity	
	White	Black	Asian	Hispanic	Non-Hispanic
<u>Cuyahoga County (N=1261):</u>					
Use Internet At Any Location	83.51 (699)	72.58 (217)	100 (14)	81.16 (56)	81.29 (969)
Broadband Access at Home (High Speed)	69.18 (579)	48.49 (145)	92.86 (13)	56.52 (39)	63.79 (760)
Mobile Internet Access	30.70 (257)	37.12 (111)	64.29 (9)	55.07 (38)	33.05 (394)
Only Mobile Access	2.99 (25)	10.70 (32)	0 (0)	14.49 (10)	5.2 (62)
Mobile and Broadband Access	27.72 (232)	26.42 (79)	64.29 (9)	40.58 (28)	27.85 (332)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>					
Use Internet At Any Location	76.92 (270)	70.87 (180)	100 (9)	74.51 (38)	75.59 (480)
Broadband Access at Home (High Speed)	60.11 (211)	45.67 (116)	88.89 (8)	52.94 (27)	54.65 (347)
Mobile Internet Access	27.35 (96)	37.8 (96)	55.56 (5)	50.98 (26)	32.44 (206)
Only Mobile Access	3.42 (12)	11.81 (30)	0 (0)	15.69 (8)	7.09 (45)
Mobile and Broadband Access	23.93 (84)	25.98 (66)	55.56 (5)	35.29 (161)	23.35 (18)
<u>Balance Areas County (N=575):</u>					
Use Internet At Any Location	88.27 (429)	82.22 (37)	100 (5)	100 (18)	87.79 (489)
Broadband Access at Home	75.72	64.44	100	66.67	74.15

(High Speed)	(368)	(29)	(5)	(12)	(413)
Mobile Internet Access	33.13 (161)	33.33 (15)	80 (4)	66.67 (12)	33.75 (188)
Only Mobile Access	2.67 (13)	4.44 (2)	0 (0)	11.11 (2)	3.05 (17)
Mobile and Broadband Access	30.45 (148)	28.89 (13)	80 (4)	55.56 (10)	30.70 (171)

Note: Entries are percentages with frequencies in parentheses.

Language

Table 4 contains the results for county residents for whom English was not their native language. Some of these residents, of course, may speak mainly English currently. Interestingly enough, there is little difference in broadband adoption based on language in any of the three areas. For Internet use anywhere, however, individuals who speak English as a second language are slightly behind native English speakers. This is greater in the Cleveland area (with 76% of native English speakers who use the Internet anywhere compared to 68% of non-native speakers). In the balance suburban areas, the differences are modest – 88% for native speakers vs. 86% for non-natives. As was true for Latinos in Table 3, mobile access is considerably higher for non-native English speakers across all three areas, and in fact they are much more likely than native speakers to be fully-connected. For Cleveland and its inner suburbs, 31% of non-native speakers are fully-connected compared to 26% of natives. In the balance suburbs, this rises to 52% of non-native speakers vs. only 30% for native English speakers. Clearly this partly reflects high mobile use among Latinos who have English as a second language.

Table 4: Internet Use by Language (Percent)

	Is English Your Native Language	
	No	Yes
<u>Cuyahoga County (N=1261):</u>		
Use Internet At Any Location	73.86 (65)	81.84 (960)
Broadband Access at Home (High Speed)	61.36 (54)	63.51 (745)
Mobile Internet Access	45.45 (40)	33.42 (392)
Only Mobile Access	7.95 (7)	5.54 (65)
Mobile and Broadband Access	37.50 (33)	27.88 (327)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>		
Use Internet At Any Location	67.80 (40)	76.24 (478)
Broadband Access at Home (High Speed)	55.93 (33)	54.39 (341)

Mobile Internet Access	38.98 (23)	33.33 (209)
Only Mobile Access	8.47 (5)	7.66 (48)
Mobile and Broadband Access	30.51 (18)	25.68 (161)
<u>Balance Areas County (N=575):</u>		
Use Internet At Any Location	86.21 (25)	88.28 (482)
Broadband Access at Home (High Speed)	72.41 (21)	73.99 (404)
Mobile Internet Access	58.62 (17)	33.52 (183)
Only Mobile Access	6.90 (2)	3.11 (17)
Mobile and Broadband Access	51.72 (15)	30.40 (166)

Note: Entries are percentages with frequencies in parentheses.

Income

Income disparities are most visible at the lowest extreme. In the county, for those who have incomes of \$20,000 or less, Internet use anywhere is only 57%. Likewise, only 32% of residents with incomes under \$20,000 have broadband at home. But, smartphone use is *highest* in this group, at 75%, compared to 65% overall. They are the group most likely to be mobile-only users, but least likely to be fully-connected.

The Cleveland area has nearly identical results, with Internet use anywhere at 56% and broadband adoption at 29% for residents with incomes less than \$20,000. This group has the highest rates also for mobile-only Internet use (at 11%), and is also least likely to be fully-connected.

In the outer county, Internet use anywhere at 61% is a bit higher for this lowest-income group (compared to 57% and 56% for the other two areas). Broadband at home is substantially higher, at 44% versus 32% and 29% for county and city area residents with incomes below \$20,000. Mobile access is modest, but this poorest category accounts for 6% of mobile-only users.

Even the poor do better in communities where poverty is lower. Small black-white disparities in the outer suburbs may be because racial income differences are small there. But, even when income is similar, the poorest residents have higher rates of access in more affluent areas.

Table 5: Internet Use by Family Income (Percent)

	Income				
	Less than 20,000	20,000 to 49,999	50,000 to 74,999	75,000 to 99,999	100,000 or more
<u>Cuyahoga County (N=1261):</u>					
Use Internet At Any Location	57.09 (149)	79.67 (388)	92.97 (172)	95.45 (126)	96.94 (190)
Broadband Access at Home (High Speed)	31.80 (83)	59.34 (289)	74.59 (138)	83.33 (110)	91.33 (179)
Mobile Internet Access	24.90 (65)	31.21 (152)	34.05 (63)	37.12 (49)	52.55 (103)
Only Mobile Access	9.58 (25)	6.78 (33)	3.24 (6)	2.27 (3)	2.55 (5)
Mobile and Broadband Access	15.33 (40)	24.44 (119)	30.81 (57)	34.85 (46)	50.00 (98)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>					
Use Internet At Any Location	55.83 (115)	77.26 (214)	88.89 (80)	94.55 (52)	98.28 (57)
Broadband Access at Home (High Speed)	28.64 (59)	56.68 (157)	70 (63)	76.36 (42)	91.38 (53)
Mobile Internet Access	27.18 (56)	34.30 (95)	40.00 (36)	36.36 (20)	43.10 (25)
Only Mobile Access	10.68 (22)	8.66 (24)	3.33 (3)	5.45 (3)	1.72 (1)
Mobile and Broadband Access	16.5 (34)	25.63 (71)	36.67 (33)	30.91 (17)	41.38 (24)
<u>Balance Areas County (N=569):</u>					
Use Internet At Any Location	61.82 (34)	82.86 (174)	96.84 (92)	96.10 (74)	96.38 (133)
Broadband Access at Home (High Speed)	43.64 (24)	62.86 (132)	78.95 (75)	88.31 (68)	91.30 (126)
Mobile Internet Access	16.36 (9)	27.14 (57)	28.42 (27)	37.66 (29)	56.52 (78)
Only Mobile Access	5.45 (3)	4.29 (9)	3.16 (3)	0 (0)	2.9 (4)
Mobile and Broadband Access	10.91 (6)	22.86 (48)	25.26 (24)	37.66 (29)	53.62 (74)

Note: Entries are percentages with frequencies in parentheses.

Education

Education is also an important determinant of Internet use, as shown in Table 6. In the county, only 47% of residents without a high school education use the Internet anywhere. Less than half as many without a high school education use broadband at home – 27% (compared with 63% for the county average). High school graduates are also disadvantaged, with only 48% who are broadband adopters – a 15 percentage point difference from the county average of 63% reported in Table 1. Mobile phone use is slightly lower among the less-educated, but mobile-only use is a little higher. Only 13% of residents without a high school diploma are fully-connected in the county.

Less-educated individuals in Cleveland lag even a bit further behind, with parallel trends. For Internet use anywhere, 44% of those who have not finished high school have used the Internet. Only 21% of these least-educated individuals have broadband at home, and only 23% use mobile phones. High school graduates are actually a little more likely to be mobile-only users in Cleveland in comparison with those who have not graduated (9% vs. 8%). Fourteen percent of those without a high school diploma have multiple types of access, and this is about the same as in the county as a whole.

Less-educated individuals are relatively better-off in the balance regions of the county. Even 59% of those without a high school education use the Internet somewhere, in comparison with ranges in the mid-40's in the rest of the county and city. More than twice as many have broadband at home (45% versus 21% in the Cleveland area). Yet, this is a small group of individuals out-county. Mobile use is lowest (around 13%) and only 9% of the least-educated are fully-connected. So those who live further out in the county and are less-educated are least likely to be mobile Internet users, but gaps in Internet use and broadband anywhere are smaller.

Table 6: Internet Use by Education (Percent)

	Education			
	Less than High School	High School Graduate	Some College, Associate's	Bachelor's or Higher
<u>Cuyahoga County (N=1251):</u>				
Use Internet At Any Location	47 (47)	69.58 (215)	83.61 (250)	93.37 (507)
Broadband Access at Home (High Speed)	27 (27)	47.57 (147)	65.89 (197)	78.08 (424)
Mobile Internet Access	21 (21)	29.77 (92)	33.78 (101)	39.78 (216)
Only Mobile Access	8 (8)	8.09 (25)	6.02 (18)	3.68 (20)
Mobile and Broadband Access	13 (13)	21.68 (67)	27.76 (83)	36.10 (196)
<u>Cleveland and Inner Ring Suburbs (N=682):</u>				
Use Internet At Any Location	43.59 (34)	67.66 (136)	76.47 (130)	92.70 (216)
Broadband Access at Home (High Speed)	21.79 (17)	42.79 (86)	59.41 (101)	72.10 (168)

Mobile Internet Access	23.08 (18)	30.85 (62)	37.65 (64)	37.77 (88)
Only Mobile Access	8.97 (7)	9.45 (19)	8.24 (14)	5.58 (13)
Mobile and Broadband Access	14.10 (11)	21.39 (43)	29.41 (50)	32.19 (75)
Balance Areas County (N=569):				
Use Internet At Any Location	59.09 (13)	73.15 (79)	93.02 (120)	93.87 (291)
Broadband Access at Home (High Speed)	45.45 (10)	56.48 (61)	74.42 (96)	82.58 (256)
Mobile Internet Access	13.64 (3)	27.78 (30)	28.68 (37)	41.29 (128)
Only Mobile Access	4.55 (1)	5.56 (6)	3.10 (4)	2.26 (7)
Mobile and Broadband Access	9.09 (2)	22.22 (24)	25.58 (33)	39.03 (121)

Note: Entries are percentages with frequencies in parentheses.

Parental Status

Table 7 demonstrates that parents are significantly more likely to use the Internet in some location or to have home broadband. Nearly all - 98% - of parents in the outer suburbs report Internet use anywhere, and 93% do so in Cleveland. Yet, home broadband adoption is lower, with 88% in the outer suburbs and 72% in the Cleveland area. *Broadband adoption rates are 19 percentage points higher for balance suburban parents than non-parents, and 22 percentage points higher for Cleveland parents than those without children.* These are large gaps. Those who do not have broadband at home in this group may be highly motivated to do so in the future, given that it could benefit their children as well.

Mobile access is also more common among parents, in all its forms. In Cleveland, 41% of parents are fully-connected, compared to non-parents. In the outer suburbs, 51% of parents have both mobile and home broadband, while only 26% of non-parents do.

Table 7: Parent (Percent)

	Are you the parent or guardian of children under age 18?	
	No	Yes
Cuyahoga County (N=1261):		
Use Internet At Any Location	77.33 (764)	95.60 (261)
Broadband Access at Home (High Speed)	58.81 (581)	79.85 (218)
Mobile Internet Access	28.85 (285)	53.85 (147)

Only Mobile Access	5.06 (50)	8.06 (22)
Mobile and Broadband Access	23.79 (235)	45.79 (125)
<u>Cleveland and Inner Ring Suburbs</u> (N=686):		
Use Internet At Any Location	71.01 (387)	92.91 (131)
Broadband Access at Home (High Speed)	49.91 (272)	72.34 (102)
Mobile Internet Access	28.99 (158)	52.48 (74)
Only Mobile Access	6.79 (37)	11.35 (16)
Mobile and Broadband Access	22.20 (121)	41.13 (58)
<u>Balance Areas County (N=575):</u>		
Use Internet At Any Location	85.10 (377)	98.48 (130)
Broadband Access at Home (High Speed)	69.75 (309)	87.88 (116)
Mobile Internet Access	28.67 (127)	55.30 (73)
Only Mobile Access	2.93 (13)	4.55 (6)
Mobile and Broadband Access	25.73 (114)	50.76 (67)

Note: Entries are percentages with frequencies in parentheses.

SECTION III: ACTIVITIES ONLINE

Today Internet access is needed to participate in society, where more information and services are rapidly moving online (Mossberger, Tolbert and McNeal 2008). Internet access is important for the activities that it enables, especially for activities that can promote social inclusion and spillover benefits for communities. These are the purposes prioritized in the National Broadband Plan.

In this section, we first review activities online by the three geographic areas. Next, we discuss how different modes of access affect the likelihood of performing various activities online, and how this is patterned by place.

In the county overall, going online for health information is most common (at 64%), followed by banking online (53%). Least common are taking a class online or paying taxes or parking tickets online, which are both done by about 30% of county residents. The sheer diversity of activities is striking, and there is substantial variation between health and online courses. Most activities are performed at higher rates in the balance suburbs compared with Cleveland and the county. This is consistent with higher rates

of Internet access. There are a few exceptions – online job search (where the differences are small), checking bus schedules, and using the City of Cleveland website.

Table 8. Percent of Population Engaging in Online Activities (Percent)

	County Disaggregated		
	County (N=1261)	Cleveland and inner ring (N=686)	Non-target areas (N=575)
Find Health Information (Q10A)	64.31 (811)	59.48 (408)	70.09 (403)
Look for a Job (Q10B)	39.73 (501)	40.67 (279)	38.61 (222)
Bank Online (Q10C)	52.58 (663)	46.36 (318)	60.00 (345)
Take a Class Online (Q10D)	29.82 (376)	27.26 (187)	32.87 (189)
Get Information about Politics (Q10E)	47.42 (598)	42.13 (289)	53.74 (309)
Check bus schedule (Q10F)	36.16 (456)	38.05 (261)	33.91 (195)
Find Property Tax Information (Q10G)	37.59 (474)	32.22 (221)	44.00 (253)
Pay Taxes, Parking Tickets (Q10H)	29.90 (377)	26.09 (179)	34.43 (198)
Find a Place to Live (Q10I)	31.48 (397)	31.05 (213)	32.00 (184)
Use Cuyahoga County Website (Q10K)	46.87 (591)	44.61 (306)	49.57 (285)
Use City of Cleveland Website (Q10L)	36.64 (462)	41.25 (283)	31.13 (179)

Note: Entries are percentages with frequencies in parentheses.

Health and Job Search

In Table 9, we compare Internet users with home broadband with mobile Internet users (who may or may not also have broadband at home). Across areas, it is clear that broadband at home is more strongly related to popular Internet uses like searching for health information or jobs. Again, comparing the Cleveland area to the outer county is most instructive.

In the Cleveland cluster, residents with home broadband are nearly 3 times as likely to look up health information online – 74% with broadband have done this compared with 26% without broadband. In contrast, 44% of those with mobile Internet access have searched for health information. This is 30 percentage points lower than the proportion of broadband users accessing health information. While the balance area of the county has higher health search overall, the pattern is the same. Fully 87% of broadband users have looked for health information online, while only 43% of mobile Internet users have. Job search is also higher for broadband users, in contrast to prior research in other cities (Mossberger, Tolbert and Hamilton 2012). Seventy percent of Cleveland area residents with broadband have looked for a job online, compared with 53% with mobile Internet. The differences are magnified in the balance suburbs. Broadband users are even more likely to look for jobs in the outer suburbs, with 87% reporting having done this. On the other hand, mobile users are less likely in the balance suburbs to search for jobs, compared with Cleveland mobile users – only 44 percent have looked for job information. The mobile users in Cleveland, are more motivated than smartphone users in the outer suburbs. But, they are still far removed from the activity online demonstrated by home broadband adopters.

Table 9: Internet Use by Online Activities (Health and Job Search) (Percent)

	Find Health Information		Look for a job	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	35.69 (450)	64.31 (811)	60.27 (760)	39.73 (501)
Broadband Access at Home (High Speed)	32.67 (147)	80.39 (652)	53.82 (409)	77.84 (390)
Mobile Internet	16.67 (75)	44.02 (357)	24.34 (185)	49.30 (247)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	40.52 (278)	59.8 (408)	59.33 (407)	40.67 (279)
Broadband Access at Home (High Speed)	25.54 (71)	74.26 (303)	43.73 (178)	70.25 (196)
Mobile Internet	17.99 (50)	44.61 (182)	20.39 (83)	53.41 (149)
<u>Balance Areas County (N=575):</u>	29.91 (172)	70.09 (403)	61.39 (353)	38.61 (222)
Broadband Access at Home (High Speed)	44.19 (76)	86.60 (349)	65.44 (231)	87.39 (194)
Mobile Internet	14.53 (25)	43.42 (175)	28.90 (102)	44.14 (98)

Note: Entries are percentages with frequencies in parentheses.

Banking and Online Classes

Whatever the geographic area, clearly broadband promotes both online banking and classes (see Table 10). This is true even though there are many mobile applications proliferating for banking, and while online courses by their nature suggest the need for more than a small cell phone screen for many of the activities involved.

For the Cleveland area, 82% of residents who have home broadband have used online banking, while only 54% of mobile users have done this. In the balance suburbs the differences are even larger: 89% of broadband users and only 48% of mobile Internet users, a more than 40% difference. Again, the Cleveland area mobile Internet users are slightly more likely to engage in this activity online.

For online classes or training, we find that 80 percent of Cleveland residents with broadband report this activity, compared to only 54% with Internet on smartphones. In the balance suburbs, 89 percent of residents have taken some kind of education online, but only 50 percent of mobile Internet users have. The differences between broadband and mobile Internet are large across places, 36 and 39 percentage points for Cleveland and the outer suburbs, respectively.

Table 10: Internet Use by Online Activities (Banking and Class/Training) (Percent)

	Bank Online		Class or Training Online	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	47.42 (598)	52.58 (663)	70.18 (885)	29.82 (376)
Broadband Access at Home (High Speed)	38.80 (232)	85.52 (567)	54.46 (482)	84.31 (317)
Mobile Internet	16.05 (96)	50.68 (336)	26.78 (237)	51.86 (195)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	53.64 (368)	46.36 (318)	72.74 (499)	27.26 (187)
Broadband Access at Home (High Speed)	30.98 (114)	81.76 (260)	45.09 (225)	79.68 (149)
Mobile Internet	16.58 (61)	53.77 (171)	26.45 (132)	53.48 (100)
<u>Balance Areas Count (N=575):</u>	40 (230)	60 (345)	67.13 (386)	32.87 (189)
Broadband Access at Home (High Speed)	51.30 (118)	88.99 (307)	66.58 (257)	88.89 (168)
Mobile Internet	15.22 (35)	47.83 (165)	27.2 (105)	50.26 (95)

Note: Entries are percentages with frequencies in parentheses.

Table 11 compares broadband and mobile access for politics and transportation information online. For Cleveland area residents who have broadband at home, 78% have engaged in political activity on the Internet, whereas only 48% of mobile users have – a 30 percentage point difference. An even larger gap emerges from the balance suburban data, as 91% of these respondents say they have looked up political information online, but only 46% of mobile users have. This is a 45 percentage point difference. In this case, it is mostly because broadband users in the outer suburbs are more politically active. For transportation, we see similar patterns. For example, 76% of Cleveland area broadband respondents have looked up information on buses, but only 52% of mobile respondents have. In the outer suburbs, broadband residents are even more likely to look up transportation information (at 88%), and mobile users about as likely as in Cleveland (at 47%).

Table 11: Internet Use by Online Activities (Politics and Transportation) (Percent)

	Information about Politics		Transportation (Trains, Buses)	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	52.58 (663)	47.42 (598)	63.84 (805)	36.16 (456)
Broadband Access at Home (High Speed)	44.19 (293)	84.62 (506)	53.42 (430)	80.92 (369)
Mobile Internet	22.93 (152)	46.82 (280)	25.34 (204)	50.00 (228)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	57.87 (397)	42.13 (289)	61.95 (425)	38.05 (261)
Broadband Access at Home (High Speed)	37.53 (149)	77.85 (225)	41.18 (175)	76.25 (199)
Mobile Internet	23.68 (94)	47.75 (138)	22.59 (96)	52.11 (136)
<u>Balance Areas County (N=575):</u>	46.26 (266)	53.74 (309)	66.09 (380)	33.91 (195)
Broadband Access at Home (High Speed)	54.14 (144)	90.94 (281)	67.11 (255)	87.91 (170)
Mobile Internet	21.80 (58)	45.95 (142)	28.42 (108)	47.18 (92)

Note: Entries are percentages with frequencies in parentheses.

Property Tax and Payment of Fees

E-government can offer citizens greater transparency and more convenient transactions with government (see Table 12). Property taxes are a common concern for residents, and we find that many have looked these up online. In the Cleveland area, 81% of broadband users have accessed information on property taxes, but only 42% of mobile users have, for a 39 percentage point difference. Outer

suburban residents are a little more likely to have done this, but still the gaps are large by type of access: 87% of suburban residents have looked for tax information, and 50% of mobile users have done this.

Payment of fees for fines, taxes or licenses can be done more quickly through government websites than in person or by mail. Respondents were asked if they had ever used the Internet to pay taxes, parking tickets or license fees. We find that 85% of broadband users in the Cleveland region report paying this way, in comparison with 59 percent of mobile Internet users. In the balance suburbs, fewer mobile users pay fees online, contributing to a somewhat larger gap (89% of broadband users and 49% of mobile users).

Table 12: Internet Use by Online Activities (Property Taxes and Pay Fees) (Percent)

	Find Property Tax Information		Pay Taxes, Parking Tickets or License Fees	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	62.41 (787)	37.59 (474)	70.10 (884)	29.90 (377)
Broadband Access at Home (High Speed)	51.08 (402)	83.76 (397)	53.62 (474)	86.21 (325)
Mobile Internet	27.06 (213)	46.20 (219)	25.90 (229)	53.85 (203)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	67.78 (465)	32.22 (221)	73.91 (507)	26.09 (179)
Broadband Access at Home (High Speed)	42.37 (197)	80.09 (177)	43.79 (222)	84.92 (152)
Mobile Internet	29.89 (139)	42.08 (93)	24.85 (126)	59.22 (106)
<u>Balance Areas Count (N=575):</u>	56 (322)	44 (253)	65.57 (377)	34.43 (198)
Broadband Access at Home (High Speed)	63.66 (205)	86.96 (220)	66.84 (252)	87.37 (173)
Mobile Internet	22.98 (74)	49.80 (126)	27.32 (103)	48.99 (97)

Note: Entries are percentages with frequencies in parentheses.

Housing Search and Cuyahoga County Website

Broadband users are advantaged in looking for housing online, a primary expense for most families. The gap based on mode of access is a bit smaller for this activity in the Cleveland area, as 74% of residents with broadband in the Cleveland region have searched for a place to live, but only 60% of mobile users have. In comparison, many (90%) outer suburban residents have looked for housing online, but mobile residents in the balance suburbs were even less active than Cleveland mobile users, as only 52% (rather than 60%) reported doing this.

Use of the Cuyahoga County website follows the same patterns based on mode of access. There is a 30 percentage point difference in Cleveland area residents – with 73% of broadband adopters using the website compared to 43% of mobile Internet users. In the outer suburbs, 86% of broadband users have used the county website, but only 45% of mobile residents have.

Table 13: Internet Use by Online Activities (Rental/Real Estate and E-Government) (Percent)

	Find a Place to Live		Cuyahoga County Website	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	68.52 (864)	31.48 (397)	53.13 (670)	46.87 (591)
Broadband Access at Home (High Speed)	54.86 (474)	81.86 (325)	49.40 (331)	79.19 (468)
Mobile Internet	24.42 (211)	55.67 (221)	25.97 (174)	43.65 (258)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	68.95 (473)	31.05 (213)	55.39 (380)	44.61 (306)
Broadband Access at Home (High Speed)	45.45 (215)	74.65 (159)	39.47 (150)	73.20 (224)
Mobile Internet	22.41 (106)	59.15 (126)	26.84 (102)	42.48 (130)
<u>Balance Areas Count (N=575):</u>	68 (391)	32 (184)	50.43 (290)	49.57 (285)
Broadband Access at Home (High Speed)	66.24 (259)	90.22 (166)	62.41 (181)	85.61 (244)
Mobile Internet	26.85 (105)	51.63 (95)	24.83 (72)	44.91 (128)

Note: Entries are percentages with frequencies in parentheses.

Finally, we tracked use of the City of Cleveland website by type of access and geographic area. Nearly $\frac{3}{4}$ of Cleveland area broadband users – 74% - have looked up information on the city’s website, but only 45% of mobile users have. This is a 29 percentage point difference. Interestingly enough, more outer county residents say they have used the city’s website – 91% to 48%. Perhaps tourist information or information for businesses attract nonresidents to the website. In fact, outer county residents use the City of Cleveland website slightly more than the Cuyahoga County website.

Table 14: Internet Use by Online Activities (City of Cleveland Website/E-government) (Percent)

	City of Cleveland website	
	No	Yes
<u>Cuyahoga County (N=1261):</u>	63.36 (799)	36.64 (462)
Broadband Access at Home (High Speed)	53.44 (427)	80.52 (372)
Mobile Internet	27.28 (218)	46.32 (214)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	58.75 (403)	41.25 (283)
Broadband Access at Home (High Speed)	40.69 (164)	74.20 (210)
Mobile Internet	25.81 (104)	45.23 (128)
<u>Balance Areas Count (N=575):</u>	68.87 (396)	31.13 (179)
Broadband Access at Home (High Speed)	66.41 (263)	90.50 (162)
Mobile Internet	28.79 (114)	48.04 (86)

Note: Entries are percentages with frequencies in parentheses.

Without exception, broadband users are substantially more likely to engage in all of these activities online, in comparison with mobile Internet users and those without personal access (home broadband or mobile access). Still, smartphone users do all of these activities online more than those without smartphones, which include people who rely primarily upon public access. These data suggest home broadband is necessary for digital citizenship, defined as the ability to participate in a range of economic, political and social activities online.

SECTION IV: SOCIAL SERVICES

Can county and city governments save money in delivering social services by relying on communication through the Internet? Is there a digital divide in terms of access to the Internet among target populations receiving social services? In this section, we discuss how different modes of access are associated with the use of government services, and how this is patterned by place. We find a consistent pattern where those relying on government services are significantly less likely to have either home broadband or mobile Internet access. Geography also affects the patterns we report, with residents of the Cleveland area (and inner-ring suburbs) more likely to use social services and less likely to have access to the Internet.

Table 15 shows that 10% of county residents reported using the Ohio Direction Card (food stamps), compared to 15% of residents in the Cleveland area. Across the county, one in two recipients of the Ohio Direction Card had home broadband, compared to 65% of county residents that didn't use this service, a 15% difference. Those relying on mobile Internet were more likely to use the Ohio Direction Card; 4 in 10 users of the Ohio Direction Card had mobile Internet access on cell phones, compared to 34% of county residents not using this service. County wide patterns for WIC recipients were similar; only one in two WIC recipients had home broadband (compared to 64% of non-WIC users), but WIC recipients were more likely to have Internet on their cell phones in the county. In the Cleveland area, only 47% of food stamp recipients at high speed Internet at home, compared to 55% for non-users.

Table 15: Internet Access by Participation in Social Services Programs (Percent)

	Q12A		Q12B	
	Ohio Direction Card		WIC	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	90.01 (1,135)	9.99 (126)	96.35 (1,215)	3.65 (46)
Broadband Access at Home (High Speed)	64.67 (734)	51.59 (65)	63.87 (776)	50.00 (23)
Mobile Internet	33.74 (383)	38.89 (49)	33.66 (409)	50.00 (23)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	85.42 (586)	14.58 (100)	95.04 (652)	4.96 (34)
Broadband Access at Home (High Speed)	55.80 (327)	47.00 (47)	55.06 (359)	44.12 (15)
Mobile Internet	32.59 (191)	41.00 (41)	32.52 (212)	58.82 (20)

Note: Entries are percentages with frequencies in parentheses.

Medicaid recipients accounted for 17% of respondents in the county sample and 23% of respondents in the Cleveland area. The digital divide among this population is stark. Among Medicaid recipients countywide, only 42% had broadband Internet at home, compared to 68% of non-recipients; the parallel numbers for mobile Internet was 25% of Medicaid recipients versus 36% those not using Medicaid. In the Cleveland area, the gaps were equally wide. Among Cleveland area Medicaid recipients only 38% have broadband Internet at home, and just over one in four had Internet on their smartphones.

The survey found seven percent of county residents use Healthy Start, compared to 9% for the Cleveland area. Rates of home broadband are comparable for those using Healthy Start and not using the program countywide. But Healthy Start recipients are much more likely to rely on mobile Internet. In the Cleveland area, home broadband is slightly more prevalent among Healthy Start recipients, but mobile access is more than 25% more likely among this group. This may reflect that parents with children eligible for Healthy Start are younger, and are more likely to use the Internet.

Table 16: Internet Access by Participation in Medical Services (Percent)

	Q12C		Q12D	
	Medicaid		Healthy Start (Medical Children)	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	82.87 (1,045)	17.13 (216)	92.78 (1,170)	7.22 (91)
Broadband Access at Home (High Speed)	67.75 (708)	42.13 (91)	63.42 (742)	62.64 (57)
Mobile Internet	36.08 (377)	25.46 (55)	33.16 (388)	48.35 (44)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	77.26 (530)	22.74 (156)	90.82 (623)	9.18 (63)
Broadband Access at Home (High Speed)	59.43 (315)	37.82 (59)	54.09 (337)	58.73 (37)
Mobile Internet	35.85 (190)	26.92 (42)	31.46 (196)	57.14 (36)

Note: Entries are percentages with frequencies in parentheses.

Table 17 reports Internet access rate for recipients of federal programs providing income. The survey shows fourteen percent of Cuyahoga county residents received social security disability payments and 8.5% were recipients of Supplemental Security Insurance (SSI). These rates rose to almost 18 and 11%, respectively, for the Cleveland area. Again, geography matters with higher enrollment in income insurance programs in the Cleveland area than countywide. Across the county, only 42% of recipients of Social Security Disability insurance had broadband Internet at home compared to 67% of county residents in general. Among SSI recipients we find a similar pattern, where only 40% have home broadband, compared to county overall rates of 65%. Mobile Internet is also lower among these poor populations. Only 20% had Internet on their cell phones compared to one in three county residents who were not enrolled in these programs.

The disparities in Internet access were even larger among Cleveland area residents. Recipients of SSD or SSI are almost 25% less likely to have high speed Internet at home compared to non-recipients, and they are 15% less likely to have Internet on their cell phones. These individuals are clearly less connected.

Table 17: Internet Access by Participation in Social Services Programs (Percent)

	Q12E		Q12F Supplemental Security Insurance	
	Social Security Disability		No	Yes
	No	Yes		
<u>Cuyahoga County (N=1261):</u>	85.73 (1,081)	14.27 (180)	91.59 (1,155)	8.41 (106)
Broadband Access at Home (High Speed)	66.88 (723)	42.22 (76)	65.45 (756)	40.57 (43)
Mobile Internet	36.45 (394)	21.11 (38)	35.50 (410)	20.75 (22)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	82.36 (565)	17.64 (121)	88.63 (608)	11.37 (78)
Broadband Access at Home (High Speed)	58.58 (331)	35.54 (43)	57.24 (348)	33.33 (26)
Mobile Internet	36.46 (206)	21.49 (26)	35.86 (218)	17.95 (14)

Note: Entries are percentages with frequencies in parentheses.

An exception to the patterns found in this section are shown in Table 18 regarding enrollment in the Ohio Work First program. Countywide roughly similar percentages of respondents in the program and not in the program have broadband at home (64%). In the Cleveland area, participation in the employment program is associated with slightly higher rates of home broadband access (58%) compared to those not in the program. Countywide individuals using this program are 11% more likely to have mobile Internet; in the Cleveland area, they are 20% more likely to have Internet on their phones than non-participants. A similar pattern was found by Mossberger, Tolbert and Hamilton (2012) in a survey of Chicago residents. These findings may reflect that young people, most likely to be online, are also more likely to be underemployed or unemployed. It may also reveal an important motivation to be online – to look for work.

Countywide recipients of the Homestead property tax exemption are five percentage points less likely to have home broadband, but among Cleveland area residents, access rates are similar.

Table 18: Internet Access by Participation in Social Services Programs (Percent)

	Q12G		Q12H Homestead Property Tax Exemption	
	Ohio Work First		No	Yes
	No	Yes		
<u>Cuyahoga County (N=1261):</u>	96.43 (1,216)	3.57 (45)	85.01 (1,072)	14.99 (189)
Broadband Access at Home (High Speed)	63.32 (770)	64.44 (29)	64.09 (687)	59.26 (112)
Mobile Internet	33.88 (412)	44.44 (20)	36.38 (390)	22.22 (42)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	95.77 (657)	4.23 (29)	84.55 (580)	15.45 (106)
Broadband Access at Home (High Speed)	54.34 (357)	58.62 (17)	54.14 (314)	56.60 (60)
Mobile Internet	32.88 (216)	55.17 (16)	35.17 (204)	26.42 (28)

Note: Entries are percentages with frequencies in parentheses.

In the Cleveland area, one in five residents participates in the Home Energy Assistance Program, and in the county participation is almost 15% (as shown in Table 19). Those receiving assistance in paying their heating and electrical bills are roughly fifteen percent less likely to have home broadband among the county sample, and 10 percent less likely to have this form of access in the Cleveland area. These recipient populations are also less likely to have Internet on their smartphones, whether they live in the county or the Cleveland area. Participation in the Employment Connection program is lower (10 percent countywide and 12% in the Cleveland area). As we saw with the Ohio Works program recipients in Table 18, this group is actually somewhat more likely to have broadband at home and mobile Internet, likely reflecting a more youthful population.

Table 19: Internet Access by Participation in Social Services Programs (Percent)

	Q12I		Q12J	
	Home Energy Assistance Program		Employment Connection	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	86.28 (1,088)	13.72 (173)	89.69 (1,131)	10.31 (130)
Broadband Access at Home (High Speed)	65.35 (711)	50.87 (88)	62.69 (709)	69.23 (90)
Mobile Internet	34.83 (379)	30.64 (53)	33.86 (383)	37.69 (49)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	79.74 (547)	20.26 (139)	87.90 (603)	12.10 (83)
Broadband Access at Home (High Speed)	56.67 (310)	46.04 (64)	54.23 (327)	56.63 (47)
Mobile Internet	34.19 (187)	32.37 (45)	32.34 (195)	44.58 (37)

Note: Entries are percentages with frequencies in parentheses.

The final tables in this section use a number of other questions directly or indirectly related to participation in social services to explore patterns of Internet access. Individuals with children in a free or reduced-price lunch program in the county are 11% less likely to have home broadband, and those paying child support payments are 17% less likely to have Internet at home. Rates of mobile Internet are variable, with participants in free lunch programs less likely to have mobile Internet, but those paying child support payments more likely to have access.

Military veterans comprise 30% of the population in our sample of the county and 30% of the sample for the Cleveland area. Veterans in the county are 7 percent less likely to have broadband a home, and in the Cleveland area they are roughly 5 percent less likely to have high speed access at home. This population is also 10 percent less likely to have mobile Internet countywide and 5 percent less likely to have Internet on cell phones in the Cleveland area.

Table 20: Internet Use & School Lunch Programs, Child Support, Veterans and Foster Parents (Percent)

	School Lunch (Q17)		Child Support (Q20)	
	No	Yes	No	Yes
<u>Cuyahoga County (N=272):</u>	70.22 (191)	29.78 (81)	82.42 (225)	17.58 (48)
Broadband Access at Home (High Speed)	83.77 (160)	71.60 (58)	82.67 (186)	66.67 (32)
Mobile Internet	54.97 (105)	50.62 (41)	52.44 (118)	60.42 (29)

Note: Entries are percentages with frequencies in parentheses.

	Veteran (Q21)		Foster Parent (Q22)	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	69.31 (874)	30.69 (387)	97.54 (1230)	2.46 (31)
Broadband Access at Home (High Speed)	65.68 (574)	58.14 (225)	63.74 (784)	48.39 (15)
Mobile Internet	37.41 (327)	27.13 (105)	34.47 (424)	25.81 (8)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	68.66 (471)	31.34 (215)	96.36 (661)	3.64 (25)
Broadband Access at Home (High Speed)	56.05 (264)	51.16 (110)	54.92 (363)	44.00 (11)
Mobile Internet	35.67 (168)	29.77 (64)	33.89 (224)	32.00 (8)

Note: Entries are percentages with frequencies in parentheses.

Table 21 reports similar patterns for visitors to senior centers and users of senior or disabled bus passes. Our sample found 3 in 10 respondents had visited a senior center county wide or in the Cleveland area. In this population, Internet access rates at home were 7% lower than the county overall, and mobile Internet was almost 10 percent lower. There were similar disparities for the Cleveland area, but rates of mobile Internet were higher. Users of senior/disabled bus passes were 30% less likely to have home broadband countywide or in the Cleveland area.

Table 21: Internet Use by Senior Center and Senior/Disabled Buss Pass

	Visit Senior Center (Q23)		Senior or Disabled Bus Pass (Q24)	
	No	Yes	No	Yes
<u>Cuyahoga County (N=1261):</u>	71.53 (902)	28.47 (359)	91.59 (1,155)	8.41 (106)
Broadband Access at Home (High Speed)	65.41 (590)	58.22 (209)	66.06 (763)	33.96 (36)
Mobile Internet	36.81 (332)	27.86 (100)	36.02 (416)	15.09 (16)
<u>Cleveland and Inner Ring Suburbs (N=686):</u>	70.26 (482)	29.74 (204)	88.48 (607)	11.52 (79)
Broadband Access at Home (High Speed)	57.26 (276)	48.04 (98)	57.83 (351)	29.11 (23)
Mobile Internet	35.68 (172)	29.41 (60)	36.41 (221)	13.92 (11)
<u>Balance Areas Count (N=575):</u>	73.04 (420)	26.96 (155)	95.30 (548)	4.70 (27)
Broadband Access at Home (High Speed)	74.76 (314)	71.61 (111)	75.18 (412)	48.15 (13)
Mobile Internet	38.10 (160)	25.81 (40)	35.58 (195)	18.52 (5)

Note: Entries are percentages with frequencies in parentheses.

SECTION V: SCHOOL ACTIVITIES ONLINE

The final section discusses result for online school activities for the 273 respondents that reported having children at home. While we don't report these findings in table form, the results are available the Appendix document. Respondents with children at home were asked the following questions:

SCHSERV For each of the following school services, just tell me whether you use them or not. Yes or no.

- Q20A School website
- Q20B Before-afterschool daycare
- Q20C School's parent portal (to check grades, attendance)
- Q20D Email with teachers
- Q20E School's social media (Facebook, Twitter)
- Q20F Food payment system
- Q20G Homework or instruction sites

- Q20H Online courses
- Q20J College, career or scholarship assistance

Sixty-eight percent of parents had used their child's school website, or nearly 7 in 10. Of those who had done this, 88% had home broadband.

In our sample one in two parents had used the school's parent portal to check grade, attendance, etc. Again, 88% of the parents who had checked this information online had broadband at home.

Emailing with teachers was a very common activity, with 62% of parents having done this activity. A full 90% of those who had done this had home broadband.

Nearly one in four (or 26%) had used the school's social media pages (Facebook or Twitter) and rates were much higher among those with home broadband connections.

Finally, one in two parents had used a homework or instruction website in our sample, and 85% of these parents had broadband Internet at home. Just one in five had used the Internet for college, career or scholarship assistance, but 90% of these had high-speed Internet at home.

Mirroring the patterns for online activities in terms of politics and economics, home broadband is associated with much higher use of school related services online.

CONCLUSION

While mobile use is changing the ecology of Internet access in Cuyahoga County, bringing more disadvantaged groups online, it is clearly not facilitating equal access for activities online. Mobile users are less likely to perform any of the activities online that were measured, including using the Internet for health, jobs, education, banking, and access to a variety of government services. Parents are clearly highly motivated to go online, but those who do not have broadband at home are much less likely to follow and participate in their children's education online. Even more disadvantaged are individuals who have no personal access, who are truly less-connected. This may affect e-government strategies in particular, since the target populations for many social services are among the least likely to have broadband, or even mobile access. Broadband adoption matters for important societal outcomes.

In light of these findings, policy attention to encourage broadband adoption and full connectivity is warranted, through programs that provide training and affordable broadband. Efforts may be targeted to groups that are more likely to offline, including older and low-income populations. Mobile access among African-Americans and Latinos may provide a bridge to going more fully online. Given the geographic disparities in Cuyahoga County, special attention may be concentrated on Cleveland and inner-ring suburbs.

VARIABLE CODING

Dependent variables:

Use Internet Anywhere

Q2

INTUSER OK, thanks! First, do you ever use the Internet in any place (home, work, school, anywhere else)?

Don't know (8) and Refused (9) were both coded as No (0). Yes coded 1 and no 0.

Broadband Access at Home

Q4

HCONTYP Does the computer you use at HOME connect to the Internet through a dial-up telephone line, or do you have some type of high speed connection?

Don't know (8) and Refused (9) were both coded as not having broadband (0). Home broadband coded 1, and no 0.

Mobile Internet Access

Q5

MOBILE Do you regularly access the Internet on your cell phone or smartphone?

Don't know (8) and Refused (9) were both coded as No (0). Yes coded 1 and no 0.

Only Mobile Access

This variable was generated by taking only those individuals that said they had mobile Internet access but lacked broadband. It was created by combining responses to Q4 and Q5. Individuals without home broadband but with mobile Internet were coded 1 and all others coded 0.

Mobile and Broadband Access

This variable codes as a one all individuals who said that had access to both broadband and mobile internet. It was created by combining responses to Q4 and Q5. Individuals with both mobile and home broadband were coded 1 and all others coded 0.

Demographic variables:

Race

Q28

RACE What is your race or ethnicity? Are you white, black, Asian, or some other or multiracial?

Four dummy variables were coded: white, black and Asian (as well as “other” which included people who declared as “mixed race” (4) or who refused to answer the question (9).

Q27

HISP Are you, yourself, of Hispanic origin or descent, such as Mexican, Puerto Rican, Cuban, or some other Spanish background?

This variable was recoded as a binary variable. Those who refused to answer (9) were coded as No (0)

English Language

Q29

ENGLISH Is English your native language?

This variable takes a one if English was the respondent’s native language. Those who refused to answer (9) were coded as a No (0)

Income

Q31

INCOME Last year, that is in 2011, what was your total family income from all sources, before taxes? Just stop me when I get to the right category.

This variable uses imputation to estimate the missing income values for 229 individuals. After imputating the missing, the variable was recoded into 5 categories

1. Less than 20k (1 and 2)
2. 20-49K (3,4 and 5)
3. 50-75K (6)
4. 75-100K (7)
5. 100K+ (8 and 9)

Education

Q26

EDUC Now, just a few last questions for statistical purposes only. We’re almost done. I appreciate the time you’ve given me.

What is the last grade or class that you completed in school?

This variable was recoded into 4 categories. The 10 individuals who refused to answer were coded as missing.

1. Less than high school (1 and 2)
2. High school graduate (3)
3. Some college (4 and 5)
4. Bachelors or greater (4 and 5)

Age

S2

AGE Next, I need to make sure we are reaching people of all ages 18 or over. Would you tell me your age?

Age was recoded into 4 value categorical variable.

1. 18 – 29 year olds
2. 30-49 year olds
3. 50-64 years olds
4. 65+ years old

Children at Home

Q15

CHILD Are you the parent or guardian of any children under 18 now living in your household?

This binary variable was recoded as a 1 if the respondent answered positively. Those who refused to answer were coded as No (0)