

CONNECTING CUYAHOGA

Investment in Digital Inclusion Brings Big
Returns for Residents and Administration

Prepared by: Samantha Schartman-Cycyk, Karen Mossberger, Bill Callahan, Shawn Novak,
Amy Sheon, Angela Siefer, Erica Mancinas, Seong K. Cho

June 4, 2019



PREPARED BY:

Samantha Schartman-Cycyk
Karen Mossberger
Bill Callahan
Shawn Novak
Amy Sheon
Angela Siefer
Erica Mancinas

Connected Insights
18093 Heritage Trail
Strongsville, OH 44136
216.990.4267
www.connectedinsights.org

PREPARED FOR:

Catherine Tkachyk
Chief Innovation & Performance Officer
Cuyahoga County Office of Innovation & Performance
2079 E 9th St, Cleveland, OH 44115
216.698.2142

DISCLAIMER:

This work was prepared exclusively by Connected Insights and does not necessarily represent the views of the County of Cuyahoga, its employees, or the State of Ohio. Cuyahoga County, the State of Ohio, its employees, contractors, and subcontractors make no warranty, express or implied, and assume no legal liability for the contents of this report. This report has not been approved or disapproved by the County of Cuyahoga, nor has Cuyahoga County passed upon the accuracy or adequacy of the information in this report.

Acknowledgements

This work is dedicated to digital inclusion practitioners everywhere and the local governments, organizations, and foundations that support them. Together, we work to build a more connected and equitable society for all.

The authors would like to thank our editor, Jessica McGuinness, for her mastery of grammar and sentence construction.

Connected Insights extends a very special thanks to Jenni Juan for her aesthetic assistance.

The Connected Insights staff
Spring 2019

Preface

For inquiries related to this report, contact:

Connected Insights
Samantha Schartman-Cycyk
18093 Heritage Trail
Strongsville, OH 44136
samantha@connectedinsights.org
216.990.4267



Table of Contents

Acknowledgements	i
Preface	ii
Table of Contents	iii
List of Figures.....	vi
List of Tables	vi
Executive Summary	1
CHAPTER 1 Cuyahoga County's Digital Divide: Identifying the Problem.....	5
1.1 Low- and Lower-Income Households: More Likely to be Unconnected	8
1.2 Where Are They? Mapping Unconnected Cuyahoga County Residents.....	11
1.3 Comparing Cities: How do Cuyahoga County and the City of Cleveland Measure Up?	13
1.4 Connecting the Dots: Why Cuyahoga County Households Don't Have Internet Connections	16
1.5 Summary	17
CHAPTER 2 Digital Inclusion: Making It Work.....	18
2.1 Digital Inclusion: How Communities Take Action	18
2.1.1 Five elements of Digital Inclusion:	18
2.2 Digital Leaders: Examples of Digital Inclusion in Local Government	19
2.2.1 Digital Equity Plans in Local Government.....	19
2.2.2 Dedicated Digital Inclusion Agencies and Staff Positions.....	21
2.3 Three successful local digital inclusion initiatives: Boston, Chicago and Cleveland	23
2.3.1 Tech Goes Home (TGH): Boston, Massachusetts	23
2.3.2 TGH's Impact on Boston.....	25
2.3.3 Smart Communities Program: Chicago, Illinois	25
2.3.4 Smart Communities' Impact on Chicago	26
2.3.5 The Connect Your Community (CYC) Project: Cleveland, Ohio	28
2.3.6 CYC's Impact on Cleveland.....	30
2.4 Digital Inclusion Programs Create Change: The Evidence	31
CHAPTER 3 Digital Exclusion: Why Cuyahoga County Government Should Be Concerned	32
3.1 A County Perspective	32
3.1.1 Analyzing the Benefits of Digital Inclusion.....	32
3.1.2 ROI as Administrative, Client and Societal Returns.....	33
3.2 ROI in Cuyahoga County.....	33

3.2.1 Benefits: Cost Savings to Cuyahoga County	34
3.2.2 Benefits: Improved Processes.....	35
3.2.3 Benefits: Returns for Clients.....	36
3.2.4 Estimating Benefits: An Example.....	37
3.2.5 Cuyahoga County Strategic Goals: The Impact of Digital Inclusion	38
3.3 Regional Growth: Digital Inclusion as Human Capital.....	39
3.4 Economic Opportunity: Connecting Individuals and Neighborhoods	41
3.5 Individual Well-Being: Health and Aging in Place.....	42
3.5.1 Health and Health Care	42
3.5.2 Aging in Place	44
3.6 Cross-Sector Collaboration: Data-Smart Cities.....	45
3.6.1 Superior Services: Citizen Satisfaction and Trust.....	46
CHAPTER 4 Opportunity Knocks: Digital Improvements to County Outcomes and Operations.....	47
4.1 Reaching Residents.....	47
4.1.1 Cuyahoga County Programs and Services: Who Are the Users?.....	47
4.2 Cuyahoga County Job & Family Services (JFS).....	49
4.2.1 Supplemental Nutrition Assistance Program (SNAP)	49
4.2.2 Temporary Assistance for Needy Families (TANF)	50
4.2.3 Medicaid.....	51
4.2.4 Other Programs	51
4.2.5 Digitized Division: JFS and the State of Ohio.....	53
4.2.6 Networked Opportunities for JFS	53
4.3 Department of Senior and Adult Services (DSAS).....	54
4.3.1 Digital Challenges Faced by DSAS	55
4.3.2 Serving Seniors and Disabled Adults: Digital Opportunities	55
4.4 Department of Child and Family Services (CFS)	56
4.4.1 Digital Challenges Faced by CFS	57
4.4.2 Protecting Children and Families: Digital Opportunities	58
4.5 Department of Development (DOD)	58
4.5.1 Digital Challenges and Opportunities for DOD	59
4.6 Cuyahoga County Treasurer's Office	59
4.6.1 Digital Challenges Faced by the County Treasurer's Office	60
4.6.2 Treasury Efficiency: Digital Opportunities.....	60
4.7 Workforce Development	61

4.7.1 Digital Challenges Faced by SkillUp	62
4.7.2 Opportunities for a Connected Workforce.....	62
4.8 Improving Cuyahoga County Health Outcomes	63
4.8.1 Health Benefits of Connectivity.....	63
4.8.2 Health Outcomes: Digital Challenges and Opportunities	64
CHAPTER 5 Cuyahoga County's Digital Inclusion Strategy: Recommendations	65
5.1 Data and Evaluation	65
5.1.2 Data Collection: The Specifics	65
5.2 Digital Inclusion Leadership Position	66
5.3 Advisory Council on Digital Inclusion	68
5.4 Budget Overview: Cuyahoga County Digital Inclusion Program	68
5.5 Recommendations for County-Managed Digital Inclusion Initiatives	69
5.5.1 Competitive Grant Operational Leadership	69
5.5.2 Initial Process: Goals and Standards	69
5.5.3 Centralized Data and Reporting Process.....	70
5.5.4 Standards for an Effective Digital Inclusion Program.....	70
5.5.5 Participation Goals and Program Scale	70
5.5.6 Cost Modeling: Cuyahoga County's Digital Inclusion Program.....	70
Bibliography.....	73
Appendix A. Aspects of Digital Government: Efficiency and Efficacy.....	79
Appendix B. Cost Savings for Digital Transactions: Estimates from Prior Studies	81
Appendix C. From Brookings Report and Interactive Visualization Online	82
Appendix D. Internet Connectivity and Health.....	83
Appendix D: References.....	96
Appendix E. Digital Inclusion Grant Initiative Example Cost Detail.....	101

List of Figures

Figure 1: Map comparing connected versus unconnected households across Cuyahoga County's 433 resident-occupied census tracts

Figure 2: Percentage of households without Internet subscriptions by income cohort

Figure 3: Number of households without Internet subscriptions by income cohort

Figure 4: Cuyahoga County residents, aged 18 to 64 and aged 65 and older, without computers and/or internet subscriptions

Figure 5: Map showing census tracts in which the ACS reported lack of internet subscriptions in at least two hundred households with incomes below \$20,000

Figure 6: Map showing census tracts in which at least two hundred residents aged 65 and older lacked computing devices and/or internet subscriptions

Figure 7. Excerpt, 2017-2018 Cuyahoga County Strategic Plan

Figure 8. 2018 SNAP enrollment by census tract

Figure 9. 2018 TANF enrollment by census tract

Figure 10. 2018 Medicaid enrollment by census tract

Figure 11. City-by-City Comparison of One-Year Average Home Computer and Broadband Use by Unemployed Workers

Figure 12. Opportunity Industries

List of Tables

Table 1: Households with No Internet Subscription of Any Type by Community, Cuyahoga County

Table 2. Highest-Ranking MSAs for Household Internet Use

Table 3. Lowest-Ranking MSAs for Household Internet Use

Table 4: Percentages of Households Without Internet Subscriptions of Any Kind

Table 5: Lack of Home Internet Reported by Users of Services/Programs

Table 6: Sample Digital Inclusion Program Cost Summary

Table 7: Cost Ratio by Transaction Method

Table 8: Cost Savings by Area, U.K. Government Digital Service Estimates

Table 9: Health-promoting Opportunities That Support Cuyahoga County's Strategic Goals

Table 10: Example Annual Program Cost Detail: Year One

Table 11: Example Annual Program Cost Detail: Year Two

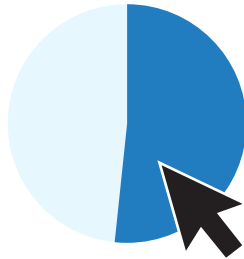
Table 12: Example Annual Program Cost Detail: Year Three

Executive Summary

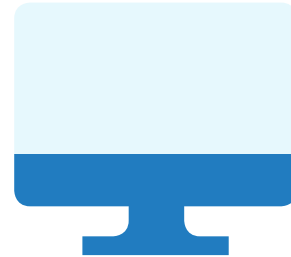
County investments in online platforms and public-facing systems hold great potential for improving County services. Yet such efforts will not yield their expected returns while roughly half of the potential users of these systems live without access to the internet or the skills to use it.



Nearly 1 in 4 (24.9%) of households in Cuyahoga County—133,978 in all—**have no internet access of any kind**—including no smartphone access.



More than one half (51.8%) of 121,762 households making less than \$20,000 in annual income **lack home internet access** of any kind.



More than 37% of seniors over the age of 65, 75,000 people, **have neither a home computer nor internet access** of any kind.

The county needs to address these inequities in order to increase regional competitiveness, economic mobility and social returns in addition to operational efficiencies. The most effective path forward is to operationalize digital inclusion efforts through the county framework.

According to the National Digital Inclusion Alliance, “Digital Inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communication Technologies (ICTs). This includes 5 elements: 1) affordable, robust broadband internet service; 2) internet-enabled devices that meet the needs of the user; 3) access to digital literacy training; 4) quality technical support; and 5) applications and online content designed to enable and encourage self-sufficiency, participation and collaboration.

This will require a significant effort. Internet access and adoption in Cuyahoga County trails similar communities across the country. Connectivity is especially lacking among low-income and older residents for whom this digital divide presents economic, health, and mobility challenges. This problem of nonconnection not only challenges the well-being of higher-need groups—resident nonconnection affects Cuyahoga County as a service provider to vulnerable populations.

This report will outline how investment in efforts to increase digital inclusion would improve Cuyahoga County service delivery in many ways. Especially notable is by improving opportunities for and the quality of online transactions. And by interweaving digital literacy training and support into existing departmental programming, the county can extend the effectiveness of existing initiatives while also catalyzing the creation of new offerings.

By assessing the digital skill level and connectivity status of clients during off-line (in-person or phone) interactions, case managers can direct their clients to opportunities to address digital gaps. By maintaining data on resident connectivity and communication preferences, service providers can communicate in the most effective, efficient, and preferred methods for clients. The addition of digital inclusion programming and support to existing departmental community services will not only lower service delivery costs but can increase resident engagement and improve program outcomes. Increasing digital readiness will also prepare clients and service providers for emerging opportunities in social service delivery such as telehealth, remote monitoring and reporting.

Cuyahoga County and the State of Ohio have made significant recent investments in online platforms to better facilitate social service delivery. This choice to increase support for online transactions *should* deliver substantial returns, considering that digital transactions have been found to cost between 1–23% of the cost of in-person, phone, and mail transactions. **However, these returns will not be realized if the current nonconnection rates among benefits recipients go unmitigated.**

The realization of comprehensive increases in county connectivity could serve not only to expand the efficiency and effectiveness of county operations but could enhance residents' well-being and economic opportunities as well.

Internet use delivers what scholars have referred to as “human capital-enhancing capabilities,” enabling individuals to access information for job searches, health, education, job training, and entrepreneurship.

Access to online information boosts human capital, driving the growth of a region. Recent research, described in chapter 3, finds that rates of home broadband adoption are causally related over time to regional economic prosperity and growth—having a “trickle-up” effect on local economic outcomes and population health.

For example, increases in broadband adoption over time is a significant and strong predictor of:



1. Economic growth (an index that includes change in the number of jobs, number of jobs in young firms, gross metropolitan product). These are benefits that position a community for the future
2. Prosperity (an index that includes change in average wage, productivity, standard of living). These are benefits that flow to workers and residents as well as businesses
3. Percentage of the population with full-time employment—benefits that can also affect the health of residents through access to insurance, as well as economic self-sufficiency.

National research also shows that, controlling for other factors, those who use the internet at work earn more—this is true even for workers with a high school education or less. Recent research on middle-skill jobs and from the Brookings Institution on opportunity industries demonstrate career paths for good jobs are available to non-college workers if they possess the needed digital skills.

Many benefits are associated with information technology use in communities, such as greater access to government information and services, more trust and confidence in government, better health outcomes, and increased social connections for isolated seniors. While smartphones have become common among low-income individuals, research shows that smartphone-dependent internet users engage in fewer activities related to government, community, and economic opportunity. Home broadband adoption remains important for full access to the internet.

But obstacles abound. Cost is one major barrier to connection for low-income populations, and low rates of adoption are concentrated in geographic areas that are poor and historically underserved by commercial providers. Factors beyond expense, such as skill and confidence using technology, must be considered as well. Less geographically concentrated are seniors, who have low rates of connectivity spread throughout the county.

Fortunately, digital inclusion training and connectivity assistance have been proven to increase the use of computers and online platforms for all resident groups. Such services also improve the county's ability to make the most effective use of its budget by generating additional internal efficiencies and cost-savings.

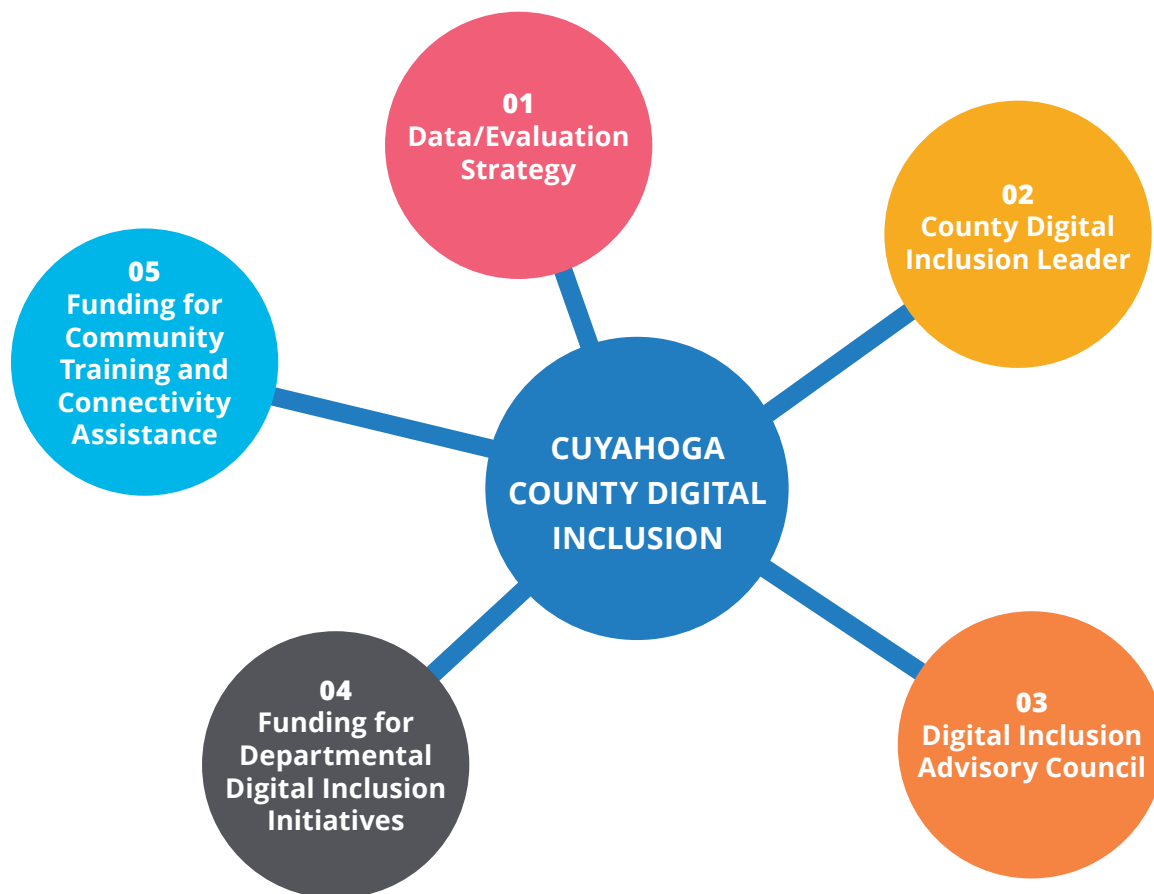
But the benefits of increased digital inclusion among residents are even more far-reaching. Being able to access and use computers to engage in digital transactions results in direct economic benefits to residents from time-savings and convenience. Digital inclusion programming can extend this benefit further yet by addressing barriers to employment and success pathways through skill development and home access support.

Hundreds of organizations and municipalities across the country have dedicated themselves to digital inclusion. While differences in local ecosystems result in different approaches being taken, **successful digital inclusion efforts typically include developing a digital strategy, designating leadership, and identifying financial resources.**

To address Cuyahoga County's digital divide, Connected Insights recommends that the county promote internet adoption through a variety of avenues including coordinated departmental outreach to county constituents for affordable and equitable access to connectivity and devices; and the provision of quality training to support resident use of online tools.

Just like a rising tide lifts all boats, the numerous gains offered by digital inclusion—increased service availability, ease of service access, improved quality of health and health care, increased transparency and across-the-board regional growth—improve outcomes for all.

As detailed in Chapter 5, Connected Insights recommends the following program elements:



CHAPTER 1

Cuyahoga County's Digital Divide: Identifying the Problem



According to the most recent data from the U.S. Census, the American Community Survey 2013–2017 Five Year Estimates, approximately 134,000 out of 537,621 Cuyahoga County households lacked home internet subscriptions of any type (see table 1)¹. Lack of internet access is not evenly distributed among communities and neighborhoods, amplifying the severity of Cuyahoga County's digital access divide, especially in vulnerable communities.

The American Community Survey (ACS) count of household “internet subscriptions” includes wireline connections (i.e., DSL, cable modem, and fiber) satellite internet, other broadband services like fixed 4G, dial-up modems, and mobile device data plans. According to ACS findings, approximately 134,000 Cuyahoga County households—one out of every four—had absolutely no means of accessing the internet at all.

¹ The 2013-2017 American Community Survey (Table B28002) provides several data points which can be used as measures of household digital access. These include independent wireline subscriptions (“Broadband such as cable, fiber optic or DSL”); subscriptions to “Broadband of any type,” including cellular data plans and satellite internet as well as wireline; and “With an internet subscription,” which includes all the broadband technologies as well as dial-up modem accounts. In this overview, we choose to use the latter, most inclusive data point as our consistent standard of comparison among groups and communities. This momentarily sidesteps the question (addressed in a later section) of whether smartphones and other cell-based mobile devices, along with satellite internet, should be considered true “home broadband”; they are included here, along with the handful of dial-up accounts still in use.

Households With No Internet Subscription Of Any Type By Community, Cuyahoga County, 2017

Source: Table B28002, 2013-2017 American Community Survey Five Year Estimates, 2017

Community	Total Households	Households Without An Internet Subscription Of Any Type		
		Number		Percentage
Countywide	537,621	133,978		24.9%
Bay Village City	6,062	398		6.6%
Beachwood City	4,598	809		17.6%
Bedford City	5,798	1,699		29.3%
Bedford Heights City	5,234	1,646		31.4%
Bentleyville Village	325	14		4.3%
Berea City	7,149	1,242		17.4%
Bratenahl Village	716	113		15.8%
Brecksville City	5,407	666		12.3%
Broadview Heights City	7,561	809		10.7%
Brook Park City	7,611	1,703		22.4%
Brooklyn City	4,914	1,303		26.5%
Brooklyn Heights Village	613	110		17.9%
Chagrin Falls Township	1,871	277		14.8%
Cleveland City	168,496	62,226		36.9%
Cleveland Heights City	19,041	3,561		18.7%
Cuyahoga Heights Village	247	45		18.2%
East Cleveland City	8,248	4,358		52.8%
Euclid City	22,723	7,144		31.4%
Fairview Park City	7,220	1,132		15.7%
Garfield Heights City	11,538	3,120		27.0%
Gates Mills Village	917	90		9.8%
Glenwillow Village	338	68		20.1%
Highland Heights City	3,167	389		12.3%
Highland Hills Village	281	120		42.7%
Hunting Valley Village	215	15		7.0%
Independence City	2,685	435		16.2%
Lakewood City	24,540	4,419		18.0%
Linndale Village	54	13		24.1%
Lyndhurst City	6,222	938		15.1%
Maple Heights City	9,358	2,311		24.7%
Mayfield Heights City	9,345	1,959		21.0%
Mayfield Village	1,493	202		13.5%
Middleburg Heights City	6,852	1,098		16.0%
Moreland Hills Village	1,305	85		6.5%
Newburgh Heights Village	899	241		26.8%
North Olmsted City	13,157	2,098		15.9%
North Randall Village	470	154		32.8%
North Royalton City	12,798	2,084		16.3%
Oakwood Village	1,586	356		22.4%
Olmsted Falls City	3,874	475		12.3%
Olmsted Township	5,339	804		15.1%
Orange Village	1,326	94		7.1%
Parma City	33,491	6,836		20.4%
Parma Heights City	9,124	2,419		26.5%
Pepper Pike City	2,172	100		4.6%
Richmond Heights City	4,763	961		20.2%
Rocky River City	8,965	1,402		15.6%
Seven Hills City	4,927	889		18.0%
Shaker Heights City	11,180	1,597		14.3%
Solon City	8,391	841		10.0%
South Euclid City	9,007	1,471		16.3%
Strongsville City	17,890	2,217		12.4%
University Heights City	4,388	537		12.2%
Valley View Village	746	130		17.4%
Walton Hills Village	939	164		17.5%
Warrensville Heights City	5,923	1,873		31.6%
Westlake City	13,751	1,675		12.2%
Woodmere Village	371	43		11.6%

Note: Survey data shows the number and percentage of unconnected households for each of Cuyahoga County's 58 cities, villages, and townships.

Cuyahoga County Census tracts: Households without home Internet subscriptions of any kind, 2017

Source: 2017 American Community Survey 5-Year Estimates, Table B28002

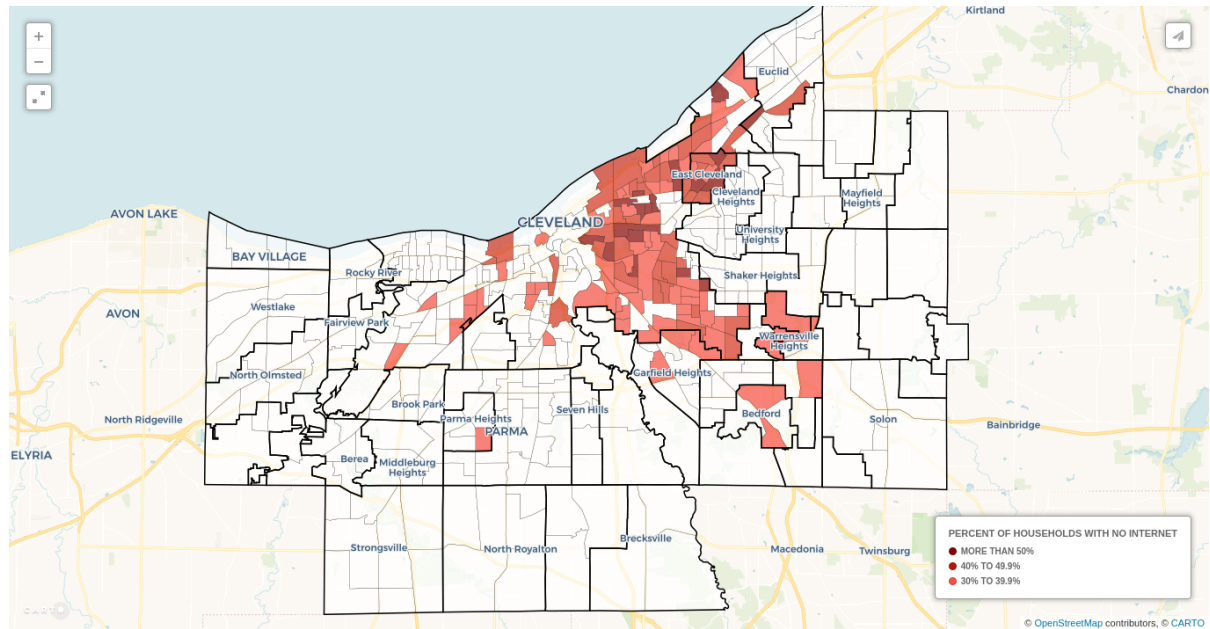


Figure 1. Map proportion of households by census tract lacking internet subscriptions households across Cuyahoga County's 433 resident-occupied census tracts. "Table B28002," 2013-2017 American Community Survey Five Year Estimates, 2017

Twelve communities show especially high percentages of households with no internet. They range from East Cleveland (52.8%) to Brooklyn and Parma Heights (tied at 26.5%). The city of Cleveland has just the third highest unconnected percentage at 36.9% but represents the largest number of disconnected households—62,226, nearly half of the 133,978 households in the county without Internet.

Cleveland's numerical dominance is partially due to its relative size, of course. But its high percentage of non-connectivity also reflects, as the 2017 ACS survey map shows, that many lower-income Cleveland neighborhoods—notably on the East Side and Near West Side—have much higher percentages of non-connectivity than the city as a whole.

Uneven geographic distribution of unconnected households throughout Cuyahoga County is related to two factors strongly associated with lack of home internet access, both of which are important to the county as a service provider: low household incomes and older age.

1.1 Low- and Lower-Income Households: More Likely to be Unconnected

Figures 2 and 3 show the concentration of households without home internet subscriptions among extremely low- and lower-income households. Figure 2 shows the percentage of the county's unconnected households by income cohort, whereas Figure 3 shows the actual number of unconnected households in each cohort.

Percentage Of Cuyahoga County Households With No Internet Subscriptions By Income Cohort, 2017

Source: 2013-2017 American Community Survey 5-Year Estimates, Table B28004

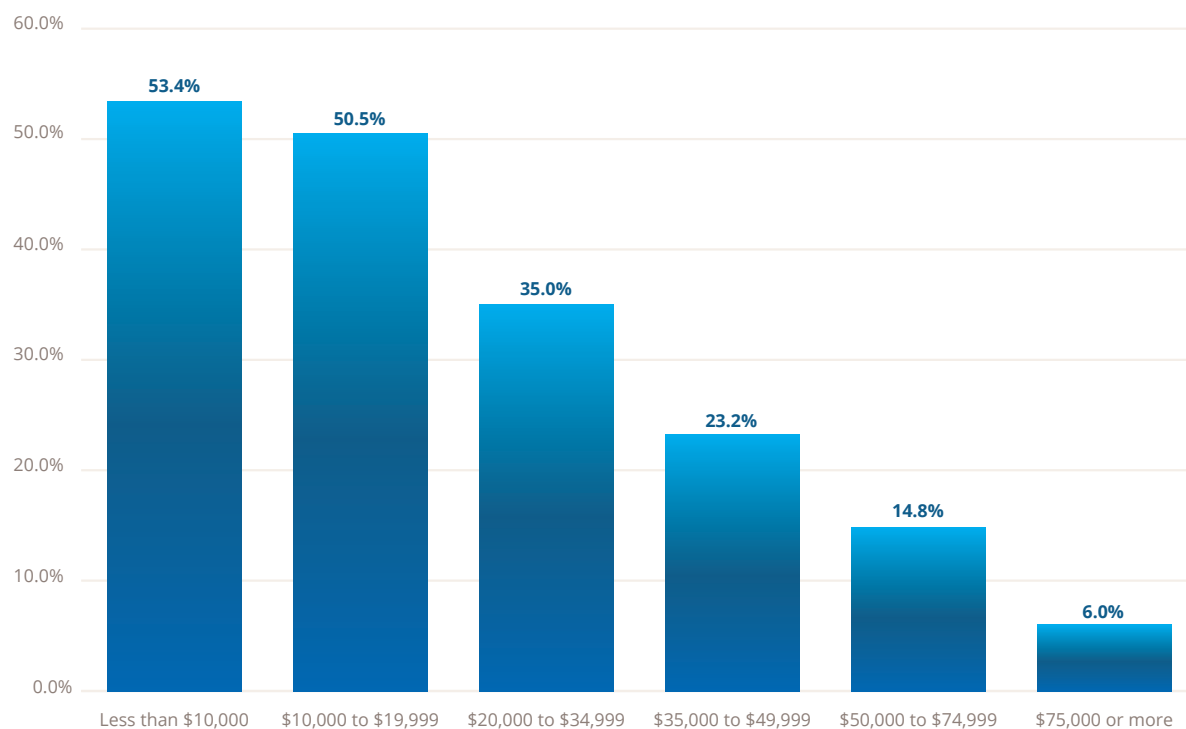


Figure 2. Percentage of households without Internet subscriptions by income cohort. "Table B28004," 2013-2017 American Community Survey Five-Year Estimates, 2017, accessed Month/Day/Year, <http://xx.pdf>.

Cuyahoga County Households With No Internet Subscriptions by Income Cohort, 2017

Source: 2013-2017 American Community Survey 5-Year Estimates, Table B28004

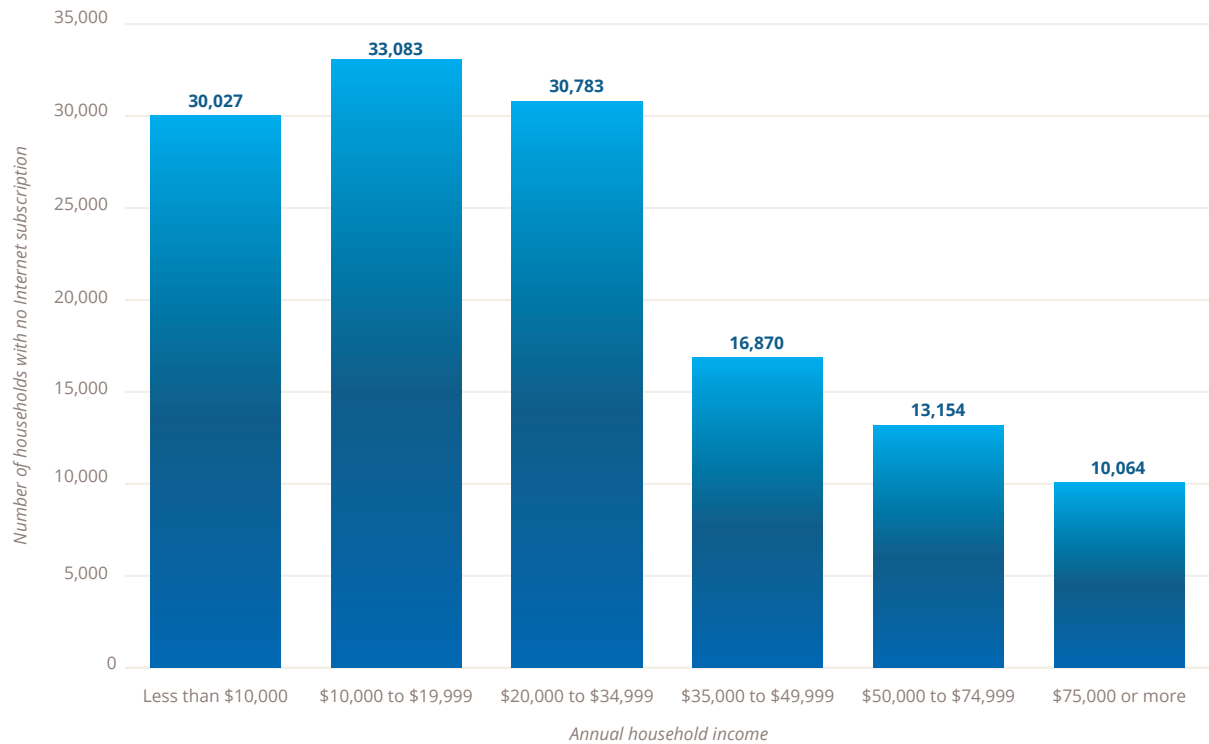


Figure 3. Number of households without Internet subscriptions by income cohort. "Table B28004," 2013-2017 American Community Survey Five-Year Estimates, 2017

According to survey data, just 23% of Cuyahoga County households showed incomes below \$20,000 in 2017, but that bottom 23% accounted for almost half (47%) of households without internet subscriptions. Seventy percent of households with no internet subscription have annual incomes below \$35,000.

In contrast, households with incomes above \$50,000 accounted for 47% of all the county's households but just 17% of those lacking home internet subscriptions.

Cuyahoga County residents aged 65 and older are more than twice as likely to be unconnected as younger adults.

About 37% of the county’s “population in households” aged 65 or older falls into one of two categories of non-connectivity: These residents either lack home computers—the ACS includes smartphones and other mobile devices in its definition of “computers”—or own computing devices but do not subscribe to internet services. Only 16% of younger adults in Cuyahoga County live in comparably unconnected households (see figure 4).

Percent of Age Cohort with no computers, or computers but no Internet Subscriptions

Populations in Households, Cuyahoga County (2017 ACS Five Year Estimates, Table B28005)

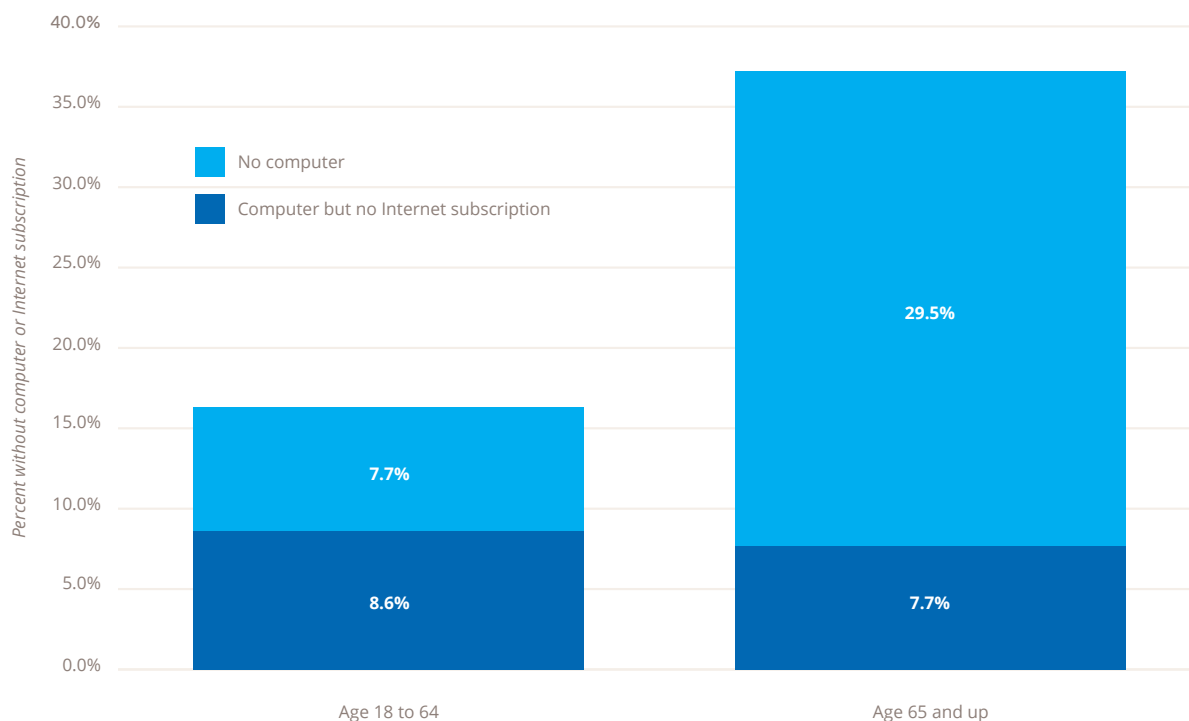


Figure 4. Cuyahoga County residents, aged 18 to 64 and aged 65 and older, without computers and/or internet subscriptions, “Table B28005,” 2013-2017 American Community Survey Five-Year Estimates, 2017

1.2 Where Are They? Mapping Unconnected Cuyahoga County Residents

As discussed below, the geographic distribution of Cuyahoga County residents aged 65 and older who lack computers and/or internet subscriptions is broader, and somewhat more suburban, than the distribution of unconnected low-income households. This reflects that low usage among seniors is not solely an economic matter.

Figures 5 and 6 show the census tracts in which the ACS reported at least two hundred households with incomes below \$20,000 (Figure 5) or 200 individuals above age 65 (Figure 6) lack internet subscriptions.

Cuyahoga County Census Tracts: Households that Have Cable, DSL or Fiber Broadband Internet Access, 2017

Source: 2017 American Community Survey 5-Year Estimates, Table B28002

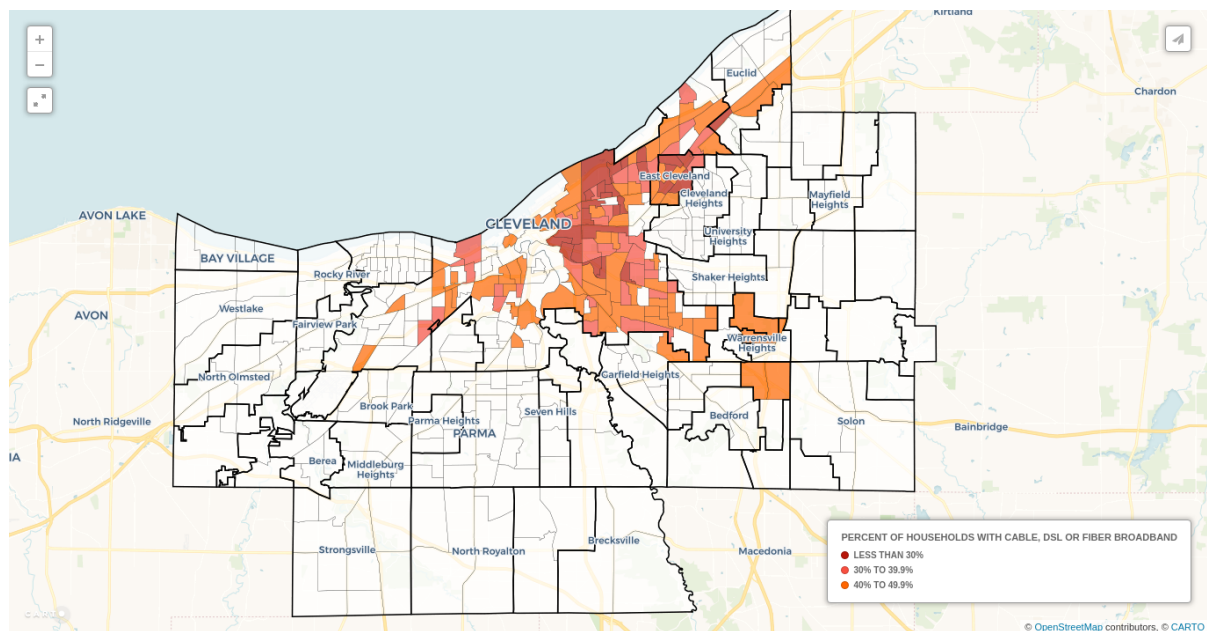


Figure 5. Map showing census tracts in which the ACS reported lack of internet subscriptions in at least two hundred households with incomes below \$20,000. "Table 28004," 2013-2017 American Community Survey Five-Year Estimates, 2017

Cuyahoga County Census Tracts: Households Aged 65 or Older that Had No Computer, or a Computer but No Internet Subscription, in 2017

Source: American Community Survey 2017 5-Year Estimates, Table B28005

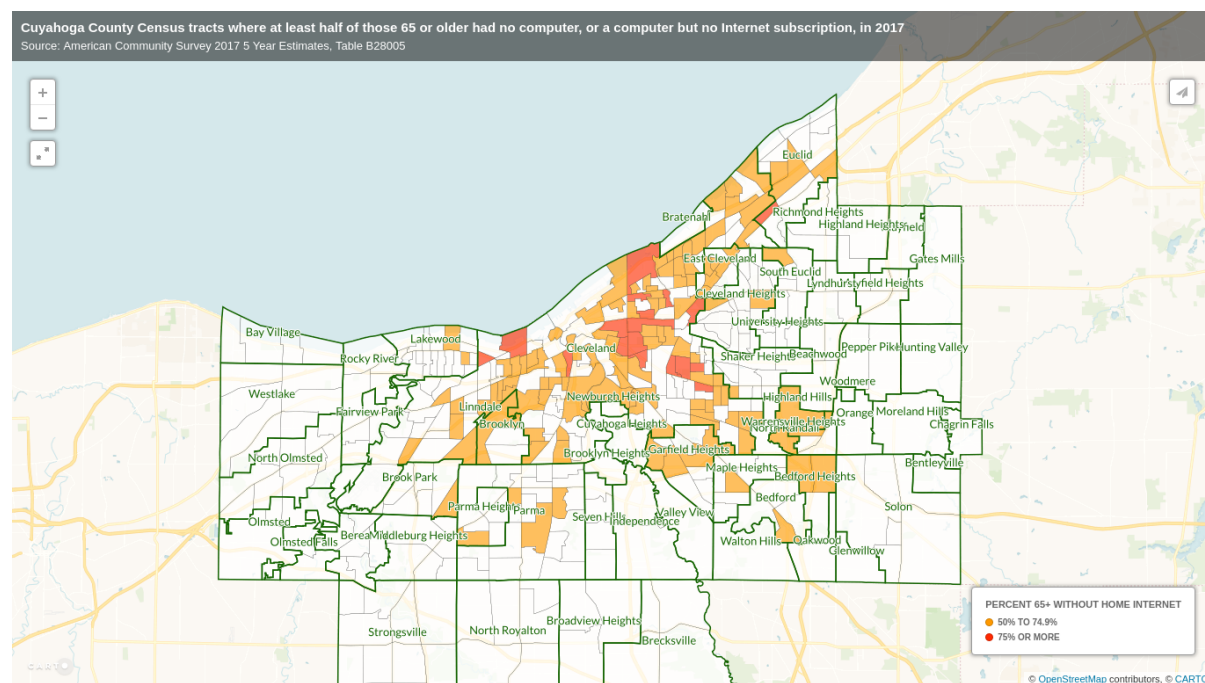


Figure 6. Map showing census tracts in which at least two hundred residents aged 65 and older lacked computing devices and/or internet subscriptions. "Table B28005," 2013-2017 American Community Survey Five-Year Estimates, 2017

Chapter 4 discusses the significance of these maps for potential digital inclusion initiatives involving Cuyahoga Jobs and Family Services (CJFS) and Cuyahoga County Division of Senior and Adult Services (DSAS). It is important to note the following:

- Unsurprisingly, low-income, unconnected households are concentrated in various neighborhoods located in Cleveland, East Cleveland, Euclid, and a limited number of census tracts in other suburbs
- Unconnected senior citizens can be found in significant numbers throughout Cuyahoga County, including many economically advantaged suburban areas

1.3 Comparing Cities: How do Cuyahoga County and the City of Cleveland Measure Up?

To facilitate use and understanding of publicly available data on internet and broadband use at the state, metro, county and community levels, Dr. Karen Mossberger (Arizona State University) and Dr. Caroline Tolbert (University of Iowa) created an online “Broadband Data Portal.”

The portal includes a time-series comparison of household internet use in the nation’s 50 largest Metropolitan Statistical Areas (MSAs) for the years 1996 through 2016. As the authors explain:

Measures of Internet use across metros convey a sense of the capacity of the region to participate in the digital economy, where many jobs beyond the information technology sector involve some level of Internet use. Disparities between metro regions are evident in the data, and such disparities may affect workforce development, economic development, education and regional strategies for sharing information online about mass transit, health issues, and more².

In this comparison, the Cleveland-Elyria MSA has consistently ranked near the bottom. In 2016, the Cleveland metro area ranked 45th out of the 50 largest U.S. MSAs in household internet use. A wider geographical comparison is instructive; tables 3 and 4 show eight highest- and lowest-ranking MSAs of 2016.

Highest-ranked MSAs for household Internet use

Source: Tolbert and Mossberger 2018, “U.S. Current Population Survey & American Community Survey Geographic Estimates of Internet Use, 1997-2016.” <https://policyinformatics.asu.edu/broadband-data-portal/dataaccess/metrodata>

Metro Area / Principal City	Percent of households using Internet, 2016	Rank among 50 largest US MSAs
San Jose-Sunnyvale-Santa Clara, CA	90.53%	1
Seattle-Tacoma-Bellevue, WA	89.34%	2
Washington-Arlington-Alexandria, DC-VA-MD-WV	88.74%	3
San Francisco-Oakland-Hayward, CA	88.57%	4
San Diego-Carlsbad, CA	88.16%	5
Denver-Aurora-Lakewood, CO	88.02%	6
Portland-Vancouver-Hillsboro, OR-WA	87.79%	7
Raleigh, NC	87.66%	8

Table 2. Highest-Ranking MSAs for Household Internet Use

² Caroline J. Tolbert and Karen Mossberger. “U.S. Current Population Survey & American Community Survey Geographic Estimates of Internet Use, 1997-2016.” 2018. <https://policyinformatics.asu.edu/broadband-data-portal/dataaccess/metrodata>.

Lowest-ranked MSAs for household Internet use

Source: Tolbert and Mossberger 2018, "U.S. Current Population Survey & American Community Survey Geographic Estimates of Internet Use, 1997-2016." <https://policyinformatics.asu.edu/broadband-data-portal/dataaccess/metrodata>

Metro Area / Principal City	Percent of households	Rank among 50 largest US
	using Internet, 2016	MSAs
Detroit-Warren-Dearborn, MI	80.45%	43
Las Vegas-Henderson-Paradise, NV	79.78%	44
Cleveland-Elyria, OH	79.48%	45
Buffalo-Cheektowaga-Niagara Falls, NY	79.29%	46
Miami-Fort Lauderdale-West Palm Beach, FL	79.14%	47
Birmingham-Hoover, AL	77.93%	48
New Orleans-Metairie, LA	76.06%	49
Memphis, TN-MS-AR	74.69%	50

Table 3. Lowest-Ranking MSAs for Household Internet Use

Of course, the Cleveland-Elyria MSA is more densely populated than Cuyahoga County, as are most of the MSAs above compared to their central counties and cities.

For perspective, table 4 shows the counties of principal cities of the sixteen metro areas listed in tables 2 and 3, along with corresponding percentages of households without internet subscriptions of any kind.

Percentages Of Households Without Internet Subscriptions Of Any Kind

Source: 2013-2017 American Community Survey 5-Year Estimates, Table B28002

	County Of Principal City		
Metro Area / Principal City	<i>(Italics mean county is coterminous with principal city)</i>	County	Principal City
Highest-adoption MSAs			
San Jose	Santa Clara County, California	10.2%	11.0%
Raleigh	Wake County, North Carolina	11.5%	13.7%
Seattle	King County, Washington	11.2%	12.5%
San Diego	San Diego County, California	12.7%	11.9%
San Francisco	<i>San Francisco County, California</i>	15.1%	15.1%
Portland	Multnomah County, Oregon	15.4%	14.8%
Denver	<i>Denver County, Colorado</i>	18.3%	18.3%
Washington	<i>District of Columbia</i>	22.0%	22.0%
Lowest-adoption MSAs			
Las Vegas	Clark County, Nevada	20.2%	22.5%
Buffalo	Erie County, New York	23.4%	33.2%
Cleveland	Cuyahoga County, Ohio	24.9%	36.9%
Miami	Miami-Dade County, Florida	26.4%	37.9%
Birmingham	Jefferson County, Alabama	26.6%	35.3%
Detroit	Wayne County, Michigan	30.6%	44.7%
Memphis	Shelby County, TN	29.1%	35.8%
New Orleans	<i>Orleans Parish, Louisiana</i>	33.6%	33.6%

Table 4. Percentages of households with no internet subscriptions of any kind

Cuyahoga County occupies roughly the same ranking among the least connected core counties of the 50 MSAs, as does Cleveland-Elyria in comparison to other MSAs.

Among the MSAs' central cities, Cleveland's position is even lower. The city of Cleveland ranks 49th (out of 50) of households with wireline connections and shows the third-worst percentage for households without internet of any kind³.

³ Rafi Goldberg. "Unplugged: NTIA Survey Finds Some Americans Still Avoid Home Internet Use." *National Telecommunications and Information Administration, United States Department of Commerce*. April 15, 2019. <https://www.ntia.doc.gov/blog/2019/unplugged-ntia-survey-finds-some-americans-still-avoid-home-internet-use>.

1.4 Connecting the Dots: Why Cuyahoga County Households Don't Have Internet Connections

National surveys of Americans without home broadband generally identify three main reasons for nonconnection: lack of physical network access (e.g. rural areas); cost of service; and/or disinterest (“don’t need/not interested”). For the population at large, disinterest is the most frequent reason cited. But for lower-income respondents, cost (“too expensive”) is a much bigger factor.

In Cuyahoga County, physical access to internet services is not an obstacle to connectivity. Each Cuyahoga County community showing a significant nonconnection rate boasts reasonably fast broadband service (i.e. at least 10 Mbps download speed) from at least one provider. Furthermore, broadband service in these areas is nothing new; internet services have been physically present and available to every Cuyahoga County household for a number of years.

The 2017 ACS data shows a very high correlation of household subscription rates with household incomes (see figures 2 and 3). Additionally, geographic concentrations of households without internet subscriptions of any kind can be found in some of Cuyahoga County’s lowest-income census tracts (see figures 1 and 5).

This data suggests that households’ ability to pay for retail broadband accounts is an important factor in home connection patterns. The least expensive internet service plans remain out of reach for many Cuyahoga County households⁴.

A second factor strongly associated with lack of home Internet access in Cuyahoga County is age. High nonconnection rates for residents aged 65 and older extend to communities that do not generally qualify as low- and lower-income (see figures 4 and 6). The 2017 ACS does not break out its Internet access data for age cohorts by income, so we can’t say whether unconnected persons 65 and older also tend to have lower incomes, or to what extent. There may exist other, non-economic reasons (i.e. factors which fall into the category of “don’t need/not interested”) to explain why many Cuyahoga County residents aged 65 and older lack home broadband.

What About Smartphones?

While the data on internet access contained in this report combines all types of Internet connectivity (wireline broadband and smartphone), broadband adoption at home supports a greater range of skills and activities online. Home internet access, along with larger device screens and keyboards, facilitate tasks such as filling out forms or reading text-heavy websites not formatted for mobile. This enables users to complete a host of tasks necessary for individual welfare including submission of applications and forms for employment, government services, college and financial aid, school coursework, and more. Data caps on many low-cost plans also present a barrier to internet use, and those who depend on smartphones as their primary means

⁴ The cost of Charter Spectrum’s most affordable plan is \$66/month and AT&T’s least expensive plan is more than \$60/month for any speed above 5 Mbps.

of internet access tend to be young, low-income, and African-American and/or Latino⁵.

Smartphone-reliant internet users who lack a fixed home connection engage in fewer economic, community, or government-related activities online than those who have home broadband (controlling for other factors)⁶. While Cuyahoga County can and should include smartphone-enabled internet access in its client interaction strategies, smartphone-only users remain urgently in need of assistance with affordable internet access and training due to the limited task capacity of smartphones. While smartphone-reliant residents have internet access, this access is limited by the nature of device functionality. Many low-income, smartphone-only users subscribe to limited data plans and rely heavily on public Wi-Fi to make use of internet functionality⁷.

Overall, smartphone users should be perceived as “less-connected” than home broadband users. As smartphone-dependent internet users connect less online, they engage less with economic, educational, and governmental opportunities and services available to them.

1.5 Summary

- Cuyahoga County’s digital divide is not related to broadband availability.
- Digital access directly corresponds to broadband affordability. Cuyahoga County households lacking internet are very likely to be lower-income (< \$35,000 total income) and/or the homes of residents aged 65 and older. While broadband access is available to lower-income households, monthly fees of \$60–\$70 prove to be unaffordable.
- For senior citizens—particularly those who are not economically disadvantaged—the issue of cost may be accompanied by other factors such as fear, lack of knowledge, or genuine disinterest.
- Mobile access/smartphones do not solve the problem of digital access. Smartphones do not necessarily provide a platform for meaningful tasks, and smartphone ownership does not equal data access. Many low-income, smartphone-only users operate with limited data plans and rely heavily on public Wi-Fi.

5 Karen Mossberger, Caroline J. Tolbert, and William F. Franko. *Digital Cities: The Internet and the Geography of Opportunity*. New York: Oxford University Press, 2013; Aaron Smith and Dana Page. “US Smartphone Use in 2015.” Pew Research Center, April 2015. <http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/>

6 Mossberger, Tolbert, and Franko, *Digital Cities*; Karen Mossberger, Caroline J. Tolbert, and Christopher Anderson. “The Mobile Internet and Digital Citizenship in African-American and Latino Communities.” *Information, Communication & Society* 20, no. 10 (2017): 1587-606. <https://doi.org/10.1080/1369118x.2016.1243142>.

7 Smith and Page, “US Smartphone Use”; Laleah Fernandez, Bianca C. Reisdorf, and William H. Dutton. “Urban Internet Myths and Realities: A Detroit Case Study.” *Information, Communication & Society* (2019): 1-22. <https://doi.org/10.1080/1369118x.2019.1622764>.

CHAPTER 2

Digital Inclusion: Making It Work

2.1 Digital Inclusion: How Communities Take Action

How do communities reduce the digital marginalization of their poorest, least educated, oldest, and most vulnerable members? Hundreds of engaged organizations and institutions across the U.S. and abroad now use the common framework of “digital inclusion” to describe the key elements of work done in service of technological equity.

The National Digital Inclusion Alliance (NDIA), affiliated with digital inclusion practitioners and advocates in thirty-eight states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands, has formulated this common definition of digital inclusion:

Digital Inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communication Technologies (ICTs).

2.1.1 Five elements of Digital Inclusion:

1. Affordable, robust broadband internet service
2. Internet-enabled devices that meet the needs of the user
3. Access to digital literacy training
4. Quality technical support
5. Applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration

As technology advances, digital Inclusion must evolve. Digital Inclusion requires intentional strategies and investments to reduce and eliminate historical, institutional, and structural barriers to access and use of technology.

In its recently published “Start-Up Manual” for community digital inclusion programs, NDIA discusses the practical meaning of its definition:

A community digital inclusion program is a local nonprofit, public, or private initiative aimed at making at least one of the “five elements”—affordable broadband, internet-enabled devices, digital literacy training, technical support, or empowering applications or content—more accessible to community members, especially the “most disadvantaged”⁸.

⁸ Angela Siefer, Bill Callahan, and Tianca Crocker, “The Digital Inclusion Startup Manual.” 2012. <https://www.startup.digitalinclusion.org>.

Public and nonprofit leaders have created practical, hands-on digital inclusion programs in communities throughout the U.S., including the formation of digital skills training centers, opening public computer labs, nonprofit computer refurbishing, community wireless broadband, and more.

Some of these programs have served their neighbors since the 1990s. Others have only recently joined digital inclusion efforts. Their sponsors and leaders include library systems, local governments, public housing authorities, secondary schools, and colleges. Sponsorship and leadership has also arrived from a wide variety of nonprofit groups including social service agencies, faith organizations, civil rights and neighborhood organizations, and a handful of “community technology” groups formed with the intention to make digital inclusion a primary mission.

Most community digital inclusion programs that serve disadvantaged, unconnected community members focus on some combination of the first four elements of digital inclusion: affordable internet access, affordable devices, digital literacy training, and/or tech support.

Most digital beginners require assistance with all four elements of digital inclusion. If novices are low-income, assistance fails to make an impact unless it is free or very affordable. This report includes guidance regarding the formation of community-based training, device, and network-access programs.

2.2 Digital Leaders: Examples of Digital Inclusion in Local Government

Throughout the U.S., strategic community efforts to advocate and implement digital inclusion on behalf of disadvantaged residents are increasingly led or strongly supported by local governments. The tier of government most often engaged in these initiatives is the city, not the county. But notable examples exist in which county executives take the lead on digital inclusion.

2.2.1 Digital Equity Plans in Local Government

Digital equity plans (also known as digital inclusion plans) typically set goals for the community that make the most of local government resources. Stakeholder engagement processes develop digital equity plans while identifying the digital inclusion ecosystems and helping members of that ecosystem develop relationships.

For the most part, local governments create digital equity plans in conversation with the communities those plans hope to serve.

The city of Austin, Texas created a Digital Inclusion Strategy with the following purpose:

Address access and adoption of digital technology, to serve as a guiding document for providing digital inclusion opportunities in effecting the City's goals to ensure all Austin residents are served.

In Austin, the Digital Inclusion Strategy creation process culminated in the Digital Empowerment Community of Austin (DECA). This novel entity initiated a planning process report, the DECA Phase 1: Roadmap Report and Business Plan. This report documented a digital inclusion planning process and identified DECA's priority goals:

- Provide Creative Opportunities, Skills, and Services that Benefit Clients
- Standardize Digital Curriculum & Client Needs Assessments
- Provide Training Resources for Program Trainers
- Conduct a Gaps Analysis on Available Community Services
- Develop a Client Outreach Plan That Achieves Greater Diversity

The city of Portland, Oregon created a Digital Equity Action Plan (DEAP) that:

Outlines a series of operational and policy proposals for public and private agencies, along with nonprofits, in Portland/Multnomah County to advance the cause of digital equity

Portland's digital inclusion plan creation process led to the development of the Digital Inclusion Network (DIN), a coalition of community organizations interested in raising awareness about digital equity barriers and developing solutions to bridging the digital divide. The city of Portland coordinates the meetings and activities of DIN.

The city of Kansas City, Missouri created a Digital Equity Strategic Plan focused on what the city itself could do to increase digital equity. Significantly, the plan notes:

After the adoption of this Plan, the City must continue to work with the Coalition for Digital Inclusion and other individuals and organizations focused—the practitioners and “boots on the ground”—on Digital Equity to advance these policy priorities.

The city of Seattle, Washington established a digital inclusion process report that indicates:

Digital equity initiatives are closely aligned with and further the city of Seattle's broadband efforts, Race and Social Justice Initiative, and other education, neighborhood, equitable development, technology, cultural and human service goals.

In an effort to establish an architecture for digital inclusion work, the city of Portland's Smart City PDX created a Guiding Principles and Priorities Framework. Smart City PDX prioritizes projects that "reduce inequities for people who have been left behind in our city, specifically people of color and people with disabilities."

2.2.2 Dedicated Digital Inclusion Agencies and Staff Positions

In an effort to promote digital equity, some local governments in the U.S. have chosen to create one or more full-time staff positions exclusively dedicated to digital inclusion. More commonly, cities assign the work of digital inclusion to staff within the context of other responsibilities. Broadband infrastructure and smart cities/innovation are most commonly paired with digital inclusion.

- **Austin, Texas:** agency title: Community Technology Access and Training Service
- **Boston, Massachusetts:** position title: broadband and digital equity advocate
- **Detroit, Michigan:** position title: digital inclusion policy fellow
- **Long Beach, Florida:** position title: project lead, Economic and Digital Inclusion
- **Louisville, Kentucky:** positions within the Office of Performance Improvement and Innovation
- **New Orleans, Louisiana:** position title: program manager, Internet Access & Digital Equity
- **Portland, Oregon:** position title: broadband and digital equity program coordinator
- **San Jose, California:** position title: director, Civic Innovation and Digital Strategy
- **Seattle, Washington:** agency title: Broadband and Community Technology Group
- **Washington, DC:** agency title: Connect DC

The city of Seattle's Broadband and Community Technology (BCT) Group, located within the Seattle's Department of Information Technology, is the oldest local government entity devoted to digital inclusion. The BCT Group works to achieve digital equity through improvements to the city's website and online services, quantitative and qualitative data research, and by supporting community capacity building. This team manages the Technology Matching Fund and other targeted grants to further digital equity while also promoting free and low-cost internet for

individuals and organizations, along with free and discounted computers and other devices. The BCT Group makes the connection between digital equity and smart cities, as well as other social equity and justice work.

In the city of Louisville, Kentucky, digital inclusion work began with the civic technology manager in the Office of Performance Improvement and Innovation. The civic technology manager oversees both smart city and digital inclusion. Recently, the Office of Performance Improvement and Innovation hired an innovation programs manager responsible for the following:

- Manage digital inclusion strategy
- Supervise AmeriCorps VISTA staff
- Oversee digital inclusion programs:
 - Computer Reimaging Program with Louisville Metro Housing Authority
 - Digital skills pathway with community partners
 - Low-cost internet sign-up program and promotion with school system and community partners
- Fundraise for the digital inclusion fund
- Generate general public awareness about digital inclusion in Louisville area

The Detroit digital inclusion policy fellow is the most recently launched municipal position dedicated to digital inclusion. This position is a joint appointment with the city of Detroit and the University of Michigan. Detroit's digital inclusion policy fellow holds responsibilities in a number of areas, including:

- Development of knowledge about Detroit's access to broadband internet
- Convening stakeholders to identify and align assets
- Identifying opportunities and best practices to improve digital equity and inclusion
- Using data to track, analyze, and evaluate impacts over time
- Dissemination

The Detroit digital inclusion policy fellow is a two-year appointment. As Detroit does not have a digital equity plan nor a digital inclusion ecosystem in which stakeholders have established relationships, immediate implementation of digital inclusion practices will not be possible.

The Long Beach, California internet access and digital equity program manager position is another recently launched municipal staff position, created less than one year ago. This position oversees management of the governance, planning, development, and implementation of the Digital Inclusion Roadmap. This position is also responsible for engagement of stakeholders in the Roadmap while acting as a key point of connection between stakeholders. Notably, the position is expected to identify funding opportunities and write project-related grants.

The city of New Orleans hired a contractor in 2014 holding the position title of program manager, Internet Access & Digital Equity. This contractor's job description includes:

- Design, construction, and eventual operation of a citywide institutional fiber network to serve city-owned and operated sites only
- Develop pilot projects to improve high-speed internet access for low-income residents
- Create programming to increase digital literacy among residents

2.3 Three successful local digital inclusion initiatives: Boston, Chicago and Cleveland

2.3.1 Tech Goes Home (TGH): Boston, Massachusetts

Founded in 2000, Tech Goes Home (TGH), an award-winning 501(c)(3) nonprofit, partners with local schools and community organizations in Greater Boston by offering free digital skills training, discounted new computers, and assistance with low-cost, high-quality internet.

TGH provides fifteen hours of digital skills training, new computers for course graduates at a cost of \$50, and assistance with securing low-cost, high-quality internet from providers such as Comcast Internet Essentials and PCs for People.

TGH's work is organized into four programs:

- TGH Community serves adult and senior learners;
- TGH Small Business serves micro-entrepreneurs;
- TGH School serves K-12 students and their caregivers; and
- TGH Early Childhood serves children aged 3 to 6 and their caregivers.

In 2018, these programs provided training to approximately 5,000 individuals representing 4,000 Boston-area households. TGH has trained more than 30,000 people and distributed more than 20,000 computers since 2010.

TGH's model differs from many community digital inclusion programs in three important ways:

- **Parent-child training:** The TGH school and early childhood programs train students together with their caregivers.

- **Train the trainers:** All TGH classes are sponsored by partner schools or community organizations, and all training is conducted by personnel or volunteers from the sponsoring sites. TGH's small central staff "trains the trainers" and maintains curriculum resources.
- **New computers:** The computers that graduates can acquire for \$50 are new Chromebooks, not refurbished PCs or laptops.

TGH is unique in another significant way: Most of its funding is provided by a local government. The City of Boston is TGH's major funder, accounting for almost \$2.7 million of the organization's \$3.7 million in grant revenue between 2016 and 2018.

To Connected Insights' knowledge, Boston is the only community in the U.S. that has advanced and maintained a commitment of this magnitude to digital equity while securing local government funding over an extensive period of time for that purpose.

The current TGH model was developed in 2005 at the Frederick Middle School in Boston's Dorchester neighborhood. Understanding the necessity of incorporating the most up-to-date and powerful technology in the education of low-income, urban youth, Frederick school leadership transformed the school into one of the nation's first urban one-to-one laptop middle schools. Working to achieve technological equity, the school formed a partnership with TGH to educate and equip families with digital literacy training and refurbished home computers.

The Frederick program pioneered TGH's two signature training strategies: It conducted basic computer skills classes on a parent-child basis, and it used school personnel as trainers. These approaches rooted the program firmly in the school-family community and engaged the school and TGH in a genuine operational and financial partnership.

In 2010, the city of Boston won a Federal Broadband Technology Opportunities Program (BTOP) grant to expand TGH's "Frederick Model" citywide, in collaboration with the Boston Public Schools, Boston Public Library, Boston Centers for Youth & Families, and the Boston Housing Authority. The BTOP funding enabled TGH to expand to 52 public middle and high schools (as well as a number of community sites), redesign its curriculum, formalize its train-the-trainer system, and move from refurbished desktops to new netbooks.

Between the end of 2010 and the beginning of 2013, TGH's school-based and community classes served more than 9,000 trainees and helped 1,700 households secure home broadband accounts.

TGH's federal grant funding ended in 2013, but the city continued to provide major support to TGH, allowing the organization to continue its programs at scale for more than eight years. TGH leveraged this consistent, significant city funding to secure major support from corporate sources, including Google, Comcast, Verizon, and Capital One Bank.

In 2018, TGH School held classes in fifty schools with about 2,000 children and caregivers; TGH Community trained another 2,000 adults and seniors in about 100 community sites, and

another one thousand participants were reached through the organization's early childhood and entrepreneur classes.

TGH points to its train-the-trainer program model, as well as efficiencies associated with providing new—rather than refurbished—computers, as reasons for its success in training over 4,000 participants each year while depending on only five full-time employees. Of course, these advantages come with some offsetting costs. In 2018, TGH spent more than \$700,000—about 40% of its total budget—on its share of the cost of new computers for its graduates. And while TGH does not directly “own” its trainers or training sites, it pays stipends to school personnel who conduct training for TGH School and TGH Early Childhood partners; these stipends amounted to more than \$250,000 in 2018.

TGH incurs no costs for participants' home internet accounts. A large number of TGH's school-based trainees carry household internet services, and those who do not have home internet services are likely to qualify for Comcast's \$10-per-month Internet Essentials service, which covers school lunch households. TGH assists other participants with sign-up for heavily discounted Sprint Wireless accounts offered by PCs for People and Mobile Beacon.

2.3.2 TGH's Impact on Boston

In an effort to comprehend the efficacy of its services, TGH conducts Post-Training Surveys for all participants. The organization reported the following findings based on this survey and other sources of data⁹:

- More than 75% of TGH participants report annual household incomes under \$30,000.
- 35% of community participants are unemployed and 17% are retired.
- 50% of adult learners reported the TGH program helped them at their current job or with finding a new job.
- 85% of student-trainees report using their TGH computer for homework.
- 80% of families reported that TGH School is their first time participating in an activity at their child's school. Ninety-five percent of participants report they plan to participate in a future activity at the school. Sixty-four percent of participants reported that they remained in touch with their TGH Trainer.

2.3.3 Smart Communities Program: Chicago, Illinois

Chicago's “Smart Communities Program” was funded between 2010 and 2012 through a \$7 million federal Sustainable Broadband Adoption grant as part of the Broadband Technology Opportunities Program (BTOP). Though the city of Chicago was the grantee, the program was implemented by five community-based organizations in nine Chicago neighborhoods and coordinated by the Chicago Local Initiatives Support Corporation (LISC). Although some

⁹ Links: <http://www.techgoeshome.org/>, <http://www.techgoeshome.org/tghconnect>, <https://www.internetessentials.com/>, <http://www.techgoeshome.org/impact>

organizations involved in executing the program did not have previous experience working in digital inclusion (i.e., they were dedicated primarily to affordable housing, education, or other programs), each organization boasted a network of relationships within their communities that eased program outreach and implementation¹⁰.

The founding goal of the Smart Communities Program aimed to create a culture of “digital excellence” or technology use through a critical mass of neighborhood activities¹¹. This included integration of technology in activities undertaken by the five lead organizations as well as the following goals: internet training for residents (through the FamilyNet Centers); public access; digital media programs for youth; technical assistance and training for neighborhood businesses; internet classes for neighborhood civic organizations and community leadership (Civic 2.0); neighborhood portals; ad campaigns featuring the photos and stories of participants; and “tech organizers” to conduct outreach and work with block clubs, schools and other neighborhood groups.

By the time the program reached the end of its funding, over 2,000 neighborhood residents had participated in EveryDay Digital training at the FamilyNet Centers and more than 800 community leaders had been trained in Civic 2.0 classes and activities. The treatment consisted primarily of training and outreach. Only a few hundred laptops and tablets were provided. In the second year of the program, Comcast launched Internet Essentials, and associated discount promotions were advertised to eligible Smart Communities participants.

The Smart Communities program aimed to create neighborhood-level change reaching beyond training participants through word-of-mouth, sharing in the community, and outreach.

2.3.4 Smart Communities’ Impact on Chicago

The Brookings Institution cited the evaluation of Chicago’s Smart Communities program as evidence that digital inclusion programs have impact¹².

Program evaluation and follow-up surveys with EveryDay Digital and Civic 2.0 participants tracked the extent of implementation and neighborhood-level change. The John D. and Catherine T. MacArthur Foundation and the state of Illinois funded three citywide surveys in 2008, 2011, and 2013 along with formative and summative evaluations of the Smart Communities Program. Each random sample survey included around 2,000 or more participants and was conducted in English and Spanish. Responses were geo-coded and researchers used multilevel modeling to estimate neighborhood-level data for Chicago’s 77 community areas from the three citywide surveys.

10 Karen Mossberger. *Smart Communities – Formative Evaluation*. University of Illinois at Chicago, Department of Public Administration. January, 2012. <https://policyinformatics.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunitiesformativeevaluation.pdf>; Karen Mossberger, Caroline J. Tolbert, and Mary K. Feeney. *Overview and Highlights: Smart Communities Evaluation*. Smart Communities, April, 2014. https://policyinformatics.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunities_overviewhighlights_4.pdf.

11 LISC Chicago. *A Platform for Participation and Innovation: Smart Communities in Chicago Master Plan*. December, 2009. <http://www.lisc-chicago.org/uploads/lisc-chicago/documents/scpmasterplan.pdf>.

12 Adie Tomer, Elizabeth Kneebone, and Ranjitha Shivaram. “Signs of Digital Distress: Mapping Broadband Availability and Subscription in American Neighborhoods.” *Brookings Institution*, September 12, 2017. <https://www.brookings.edu/research/signs-of-digital-distress-mapping-broadband-availability/>.

Uniquely, Chicago was able to present neighborhood-level data during this time period. Tract-level data, available since December 2018 in the American Community Survey, would make this kind of evaluation feasible for other communities moving forward.

Chicago's citywide survey information included data on internet use, online activities, and usage barriers for each community area. The methods used to track neighborhood-level change included comparisons of estimates for the nine Smart Communities to Chicago's other community areas, controlling for demographic change (e.g., poverty, race/ethnicity, education, age). Between 2008–2011, midway through implementation, the Smart Communities showed statistically significant, higher rates of change in internet use (at any location) compared to other Chicago community areas. But there existed no significant differences in broadband adoption at home or for any online activities in 2011.

By 2013, however, the nine Smart Communities neighborhoods showed statistically significant, higher increases in:

- General internet use
- Broadband adoption at home
- Use of the internet for job search
- Care information
- Mass transit information

(There existed no significant differences for other online activities, such as internet use for e-government, political information, news, education, etc.) **These differences were also substantively large—between 9 and 11 percentage points higher than the other Chicago community areas, controlling for demographic change between 2008–2013. Thus, the comparisons eliminated rival explanations such as gentrification¹³.**

In addition to Chicago's early, unique, neighborhood-level comparison, researchers gathered outcome data from community organizations through participant surveys and interviews¹⁴. This information provided a view of the processes and experiences underlying the community-level results.

¹³ Karen Mossberger, Caroline J. Tolbert, and Christopher Anderson. "The Mobile Internet and Digital Citizenship in African-American and Latino Communities." *Information, Communication & Society* 20, no. 10 (2017): 1587-606. <https://doi.org/10.1080/1369118x.2016.1243142>.

¹⁴ https://live-policyinformatics.ws.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunities_measuringinternetchangeinchicago.pdf

https://live-policyinformatics.ws.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunities_familynetcenters.pdf

The follow-up survey for FamilyNet Center training participants provided several notable findings:¹⁵

- Eighty-seven percent reported internet usage in the past 30 days, and 43% used the internet at least on a daily basis.
- Over half of all respondents—53%—had home broadband.
- One-third of internet users reported that they assisted someone else with Internet usage in the past 30 days; about half of individuals receiving such assistance lived in the same neighborhood as surveyed participants.
- Respondents were asked if internet usage after program completion helped with a variety of tasks: 30% of respondents indicated that classes helped them procure employment; 40% reported that internet usage assisted them with following along with their children's school assignments; 57% indicated that internet usage assisted with health management; and 69% reported greater access to government services as the direct result of increased internet usage.

Upon completion of federal funding, the city of Chicago, the MacArthur Foundation, and Chicago Community Trust continued support for certain FamilyNet Centers and other digital inclusion activities through the SmartChicago collaborative. In 2017, SmartChicago became City Tech; this organization is currently housed at the Chicago Community Trust.¹⁶

2.3.5 The Connect Your Community (CYC) Project: Cleveland, Ohio

Our third example of a successful local digital inclusion initiative is similar to the Boston and Chicago initiatives in important ways. It received funding from the Federal Broadband Technology Opportunities Program between 2010 and 2013. It was a large-scale program, reaching more than 5,000 low income households with basic digital skills training, free computers and home connectivity assistance. It was implemented at dozens of varied community sites; and both its operations and its impact were thoroughly documented.

But unlike our earlier examples, Cleveland's Connect Your Community Project was an entirely nonprofit-sector effort with no local government sponsorship or support. Partly as a consequence, the Project ended when its Federal support ended.

Connect Your Community (CYC) Project was the name chosen for a \$19 million BTOP Sustainable Broadband Adoption project anchored by Cleveland's OneCommunity, in partnership with experienced nonprofit community trainers in eight localities in five states: Cleveland, Lorain County, Akron, central Appalachian Ohio, Detroit, Lexington (KY), Winston-Salem, and Bradenton (FL). OneCommunity served as the overall Project grant manager, and subcontracted CYC implementation to a Lead Community Agency in each locality.

¹⁵ Karen Mossberger, Mary K. Feeney, and Meng-Hao Li. *Smart Communities Evaluation: FamilyNet Centers*. Arizona State University. April, 2014. https://live-policyinformatics.ws.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunities_familynetcenters.pdf.

¹⁶ For further information about City Tech, visit https://cct.org/about/partnerships_initiatives/smart-chicago-collaborative/

The Lead Community Agencies in Cleveland and Detroit further subcontracted part of the implementation in their respective communities to other nonprofit partners.

The overall strategy of the CYC Project was to use BTOP funds to hire full-time digital inclusion workers (the “Connect Your Community Corps”), organized in teams of six, to carry out community-designed campaigns to “engage, train, equip and connect” low income adults who lacked home computers and broadband access. Participants received 20-24 hours of free training, including a standardized basic digital skills curriculum plus a menu of “meaningful use” options. Funds were also budgeted to subsidize computers and/or home internet accounts for participants, and for local program overhead and management. The program’s basic success metric was “sustainable broadband adopters” (SBAs)—i.e. previously unconnected households that had gained basic digital skills, computers and affordable broadband connections.

The Lead Community Agency for the program in Cuyahoga County was the Cleveland Housing Network, working with five partners: Cuyahoga Community College (Tri-C) Library’s Technology and Information Literacy Initiative (TILI), the Ashbury Computer Community Center (ASC3), Fairfax Renaissance Development Corporation, the Famicos Foundation, and Esperanza. All six had existing computer training programs and facilities.

CHN and its partners received a \$3 million subgrant to implement the CYC Project in Cleveland and East Cleveland, with a goal of recruiting, training and connecting 5,250 new broadband adopter households over two years.

Cleveland’s CYC training operations began in October 2010 and ran through December 2012. Three CYC Corps teams – fifteen full time staff slots—were distributed among the six partners, with three team leaders based at CHN. Each partner received funding to upgrade its training lab facilities and cover overhead for its CYC staff. CHN also purchased equipment for mobile “laptop labs”, which enabled CYC classes to be scheduled in temporary sites such as church halls and senior centers. (Ultimately the six Cleveland CYC partners held classes in more than three dozen sites throughout Cleveland and East Cleveland.)

CHN contracted with nonprofit electronics refurbishers RET3 to provide refurbished computer systems for \$45 each, enabling the program to pass them on to CYC training graduates at no cost—with a one year warranty—and still have funds available for connectivity support.

After a brief, unsuccessful attempt early in the program to sign participants up for a special AT&T DSL rate, the Cleveland CYC partners agreed that their SBAs would have no choice but to use some variety of commercial ISP service. But In the project’s second year, OneCommunity and CHN began a reseller relationship with nonprofit 4G reseller Mobile Citizen, enabling CYC participants to purchase a year of “fixed 4G” Internet access for just \$120. Some adopter assistance funds were used to subsidize the cost of special modems needed for this service. By the end of the program, more than 1,700 SBAs had Mobile Citizen accounts. (When the CYC Project ended, ASC3 took over the local Mobile Citizen reseller role, and currently serves approximately 400 users.) Here are the basic outcomes produced by CHN, ASC3, TILI,

Esperanza, Famicos and FRDC between Fall 2010, when the CYC Project began, and January 2013, when it ended:

- Approximately 8,500 low-income Cleveland and East Cleveland residents participated in CYC training.
- Approximately 6,000 CYC “Sustainable Broadband Adopters” were verified for the primary target area, i.e., Cleveland and East Cleveland.
- More than four-fifths of these SBAs received free refurbished computer systems.
- More than 1,700 residents signed up for affordable home 4G connections through Mobile Citizen.

2.3.6 CYC’s Impact on Cleveland

In 2017, the Ashbury Senior Computer Community Center received a Cleveland Foundation grant to conduct a retrospective survey of local CYC Project SBAs¹⁷. The telephone survey of a sample of 429 program graduates, five to six years after their participation, yielded the following results among others¹⁸:

- 76% of all respondents maintained a home internet subscription 5–6 years after program completion.
- 22% of the connected respondents obtained voting information online, placing them 9% above of the national average (13%), as of the 2016 elections.
- 44% of respondents use their county’s website and 39% use their city’s website.
- 47% of connected respondents utilize online banking to manage personal finances.
- 43% of connected respondents use patient health record (PHR) portals to manage their health online.
- 69% of connected and 60% of unconnected respondents report that they use a computer for their job.
- 82% report that their participation in the Connect Your Community project resulted in a positive workforce-related impact.

¹⁷ Samantha Schartman-Cyck and Valdis Krebs. *Adoption Persistence: A Longitudinal Study of the Digital Inclusion Impact of Connect Your Community Project*. August 28, 2017. http://www.asc3.org/uploads/2/4/9/8/24980903/adoption_persistence_study.pdf.

¹⁸ This sample audience comprised telephone survey participants who participated in a similar survey in 2012.

2.4 Digital Inclusion Programs Create Change: The Evidence

Program evaluation has been an important component of the projects discussed in this section. This research has demonstrated that digital inclusion programs in Cuyahoga County, Boston, Chicago and elsewhere lead to increased internet usage, including activities related to county services and goals. The Cleveland study by Schartman-Cyck and Krebs (2017) noted that:

Many new activities on government websites were reported, including increases by respondents in the following activities—accessing property tax information; paying taxes, parking tickets, and license fees; accessing voter information; and looking up information from city and county websites¹⁹.

By offering training and additional resources to previously underserved groups, digital inclusion efforts can assist individuals to participate in digital government and other opportunity-enhancing activities.

¹⁹ Schartman-Cyck and Krebs, *Adoption Persistence*

CHAPTER 3

Digital Exclusion: Why Cuyahoga County Government Should Be Concerned

3.1 A County Perspective

County government is in a unique position to influence economic opportunity, well-being and quality of life for the region. Because it spans municipal boundaries, county government can foster solutions that require regional cooperation. Economic and workforce development is a good example of the type of change that can be effected at the county level. County government also has a special responsibility for the region's health, social safety net, and justice. The county is responsible for the care of vulnerable citizens and the promotion of equitable access to services throughout residents' life cycle, from pre-natal to senior services. As chapter 1 shows, many low-income and older populations served by county programs are less likely to have internet access and skills. Through the promotion of digital inclusion, Cuyahoga County can advance its priorities while simultaneously promoting excellence in public service and meeting the needs of all Cuyahoga County residents.

3.1.1 Analyzing the Benefits of Digital Inclusion

To the extent that more Cuyahoga County residents have the ability to go online for information and services, the County will be able to more fully realize the potential of its investments in new digital systems and programs such as Cuyahoga Performance. Such programs have connected more citizens to resources and innovations made possible by technology. Higher rates of connectivity mean higher rates of residents' resource and innovation utilization, increased numbers of citizens who conduct less-expensive transactions online, increased volume of data captured digitally for planning and analysis, and increased numbers of citizens who enjoy more convenient, speedier, and more transparent electronic processes.

The "return on investment" (ROI) for digital inclusion is twofold:

1. Digital inclusion offers the ability to expand the efficiency and efficacy of Cuyahoga County operations through digital government; and
2. Digital inclusion provides the opportunity to generate gains for the community. Internet use has network externalities: expanding the pool of people who participate in a network increases its ability to provide benefits.

The return on investment (ROI) for Cuyahoga County requires a more holistic view than returns in the private sector, where ROI is used more narrowly to calculate the dollar value of discrete investments (e.g., a new software program).

It is possible to view digital inclusion in this light, as the evidence Connected Insights has gathered from other studies indicates. But reliance upon that approach alone misses important

benefits that greater digital inclusion could create for both Cuyahoga County government and its residents.

Widely-accepted public sector approaches to policy analysis supplement consideration of budgetary costs with costs and benefits for society, even if they are not visible in the short term or easily quantified in dollars and cents. In the case of digital inclusion, the broader social benefits are important to consider in relation to Cuyahoga County's strategic goals and responsibilities.

3.1.2 ROI as Administrative, Client and Societal Returns

By raising the percentage of residents who are fully connected and possess digital skills, a wide variety of programs in Cuyahoga County are affected in different ways.

An increase in online registration for social services would be expected to:

- Reduce direct costs associated with document processing and handling
- Reduce personnel time required for application processing, freeing caseworkers to provide other client services while shifting public resources to more productive uses
- Reduce client costs associated with uncompensated time away from work, transportation, and child care
- Increase client satisfaction and trust
- Produce better outcomes for clients (such as health or economic self-sufficiency) through faster access to needed benefits and more efficient customer service
- Create spillover effects for the region, promoting health, prosperity, and other positive outcomes in the community

3.2 ROI in Cuyahoga County

Insufficient data was available to afford an estimation of immediate, short-term expected savings for key activities in Cuyahoga County. A variety of reasons exist to explain this lack of data, including access to data in state-owned systems and the time constraints presented by the study.

Yet, findings from other studies (discussed throughout chapter 3 and in Appendix B) demonstrate that costs decrease significantly as numbers of digital transactions increase. While savings will vary for different activities, studies have estimated that digital transactions cost between 1% and 23% of transactions conducted in-person or through mail.

Digital transactions cost between 1% and 23% of transactions conducted in-person or through mail.

The development of mechanisms to estimate cost savings as new systems go online will prove beneficial to Cuyahoga County as the impacts of increased digital inclusion (as well as

these systems) can be measured. One useful metric to include in impact evaluation would be increases in online transactions over time, particularly for participants in county digital inclusion programs.

The tracking of cost savings in specific programs (e.g., TANF, Medicaid or SNAP) will require systematic data on the numbers of clients served, the number and nature of services provided, and the processes and resources (such as personnel hours) required to provide these services digitally and otherwise.

Data collected from the period before new public-facing systems become operational or before inclusion efforts begin can serve as the baseline from which the effects of the digital improvements can be determined.

To prioritize data collection, direct effects for county administration are most likely for services where there is:

- A high amount of interaction with individual residents (volume and public-facing systems)
- County provision (rather than delivery through contractors)
- Clients who are concentrated in low-income or older populations (where internet use is less common or intermittent)

Cost savings and other gains, such as larger social benefits, need to be carefully examined within key programs, such as the Department of Job and Family Services and Senior and Adult Services. Although workforce development and health programs are delivered through contracting, these areas may be important to examine for more effective collaboration with partners and the larger social benefits for digital inclusion. Specific issues and recommendations for these programs are discussed in chapter 4.

The remainder of chapter 3 examines research evidence as well as the experience of other governments regarding the administrative, client, and societal returns of digital inclusion such as:

- Cost savings for digital transactions
- Potential process improvements
- Benefits for clients
- Social benefits related to Cuyahoga County's goals for regional growth, economic opportunity, individual well-being, cross-sector collaboration, and superior services

3.2.1 Benefits: Cost Savings to Cuyahoga County

Government investments in public-facing digital services carry the potential of substantial reduction to costs incurred by government agencies for provision of services.

When more residents have the ability to apply for services online there will be direct savings associated with the reduction in physical document processing such as the costs of forms, postage and transferring information from forms into computer systems. Evidence from other governments demonstrates significant benefits from greater online engagement with residents. Increasing the ability of service recipients to conduct more transactions online leverages the investments the county is already making to improve its systems.

The Center for Public Policy and Administration at the University of Utah found considerably lower online transaction costs for nine of the thirteen services examined:

- The average cost per transaction was estimated at \$17.11 for offline transactions and only \$3.91 for online transactions.
- While data was not available for other state programs, the Center of Public Policy and Administration study estimated that the State of Utah would save nearly \$46,000,000 in costs over five years after transitioning these nine transactions to an online platform.

Other studies comparing the cost of digital government transactions to alternative transaction methods produced results consistent with University of Utah's study, indicating online costs at only 1–4% of postal or in-person transactions²⁰.

The UK government has made digitizing government services a high priority and has created a government agency within the Cabinet Office. Government Digital Services (GDS) defined distinct areas of government cost savings that result from digitizing government processes and estimated the approximate percentage of total cost savings associated with each.

- The estimated total cost savings for reduced staff time was largest, with a 77% expected reduction in costs for staff time, compared with in-person and telephone transactions.
- Another significant source of savings was for space, which accounted for 12% of the cost savings for digital transactions.

3.2.2 Benefits: Improved Processes

When citizens engage with government agencies through digital platforms, it allows those agencies to run more effectively. For example, personnel can be shifted from routine interactions to more high-value tasks.

Digital applications also reduce data collection efforts and recording errors while facilitating data sharing. As more clients apply for services online, the ability to capture performance data is enhanced. And as more routine transactions are automated, Cuyahoga County will realize greater benefit from the efficiencies and improvements offered by online systems.

²⁰ For a full summary of these results, see Appendix B. Center for Public Policy and Administration. "Smarter eGovernment: The Economics of Online Services in Utah." The University of Utah. 2012. https://gardner.utah.edu/_documents/publications/e-gov/Smarter%20eGovernment%20Economics%20Final.pdf.

A more digitized government can improve information management and other government processes in several areas: cataloging of Information, service transactions, vertical and horizontal integration of information, online citizen engagement, and data collection²¹. Appendix A discusses in detail how digital inclusion enhances government's ability to transform processes.

An example relevant to Cuyahoga County's social service delivery can be found in the state of Colorado. At the county level, Colorado dramatically reshaped social services management through the Program Eligibility and Application Kit (PEAK).

This online system has the ability to accept, screen, and approve applications for a wide array of social services in real time. Before PEAK was implemented, manual application processes involving state determination of a citizen's eligibility for specific social services extended up to 45 days.

Digital streamlining improvements showed significant returns for counties in Colorado. Today, more than 80% of social service applications submitted through PEAK (including Medicaid) are approved in real time. PEAK has enabled the state of Colorado to more than double the number of social service applications it processes monthly without the need for additional resources.

3.2.3 Benefits: Returns for Clients

Public-facing digital services allow government availability for citizens 24 hours a day, every day of the year. With digital service platforms, residents can engage with their government at their convenience.

Low-income citizens, who are most likely to be offline or to have limited internet access or skills, can be especially disadvantaged when they are forced to engage with government at an office location during normal business hours.

- In addition to direct transportation and parking costs, visiting a government office is likely to require uncompensated time off from work.
- Additional hardship is imposed in cases where the person seeking services cares for children, elderly or disabled family members.
- Persons reliant on public transportation are likely to require considerable transportation time to visit a government office.

Online access offers particular benefits to individuals who do not speak English (by offering translated versions of forms for example) or who have difficulty speaking on the phone due to hearing problems. Assistive technology can even overcome vision problems. When the value of citizen time is included, the return on investment in digital government services can increase

²¹ Jasper B. Berger, Morten Hertzum, and Trine Schreber. "Does Local Government Staff Perceive Digital Communications with Citizens as Improved Service?" *Government Information Quarterly* 33 (2016): 258-269. <https://doi.org/10.1016/j.giq.2016.03.003>; Alfred Tat-Kei Ho. "Reinventing Local Governments and the E-Government Initiative." *Public Administration Review* 62, no. 4 (2002): 434-444. <https://doi.org/10.1016/j.giq.2016.03.003>; Karen Layne and Jungwoo Lee. "Developing Fully Functional E-government: A Four Stage Model." *Government Information Quarterly* 18, no. 2 (2001): 122-36. [https://doi.org/10.1016/S0740-624X\(01\)00066-1](https://doi.org/10.1016/S0740-624X(01)00066-1); Ines Mergel. "A Framework for Interpreting Social Media Interactions in the Public Sector." *Government Information Quarterly* 30, no. 4 (2013): 327-34. <https://doi.org/10.1016/j.giq.2013.05.015>.

considerably. Relatively small economic benefits that accrue to a large segment of the public can have a large value in the aggregate.

3.2.4 Estimating Benefits: An Example

The hypothetical example below illustrates elements to be considered for estimating cost savings for both the county and clients.

Suppose that a county government recently made significant investments in digital infrastructure. This government now has the capacity to provide residents with online enrollment in federally-funded health and human service benefit programs.

Furthermore, this investment also allows the county to verify resident eligibility for services, provides clients with the ability to manage benefits, and offers a platform for the provision of proof of continuing eligibility. The county has collected data demonstrating that clients managing benefits online sidestep 20 hours of lost work annually relative to those clients who visited government offices during normal business hours for the purpose of managing their benefits.

Using the federal minimum wage of \$7.25/hour as a baseline for evaluation, the minimum annual client savings is \$145²². As potential child care and transportation costs are factored in, the savings for clients rises even higher.

The benefits not only apply to residents—the county enjoys a direct cost savings when clients manage benefits online. Continuing with the hypothetical example, the Cuyahoga County Department of Health and Human Services might estimate that employee labor and supplies associated with client contact cost \$60 for each in-person contact. If four of these client contacts can be eliminated annually, when a client manages benefits online, the annual estimated county savings would be \$240 per client.

Ideally, the cost of county digital inclusion efforts should be weighed against the expected value that digital government provides to both the county and its residents. In this example, an estimated annual direct financial benefit of \$385 to the county and client is identified for each digitally enabled Department of Health and Human Services client. Moreover, the cost benefits of digital inclusion are ongoing while the cost associated with assisting households to go online are likely to be front-loaded due to equipment and training.

The ongoing cost savings for governments and households can be substantial. If, for example, a community non-profit organization provides equipment and training to enable a household to go online—at a one-time cost of \$500—a clear, expanding financial benefit is realized. Over a two-year period, the savings per household reach \$770 and continue to expand moving forward²³.

Data collection estimating the true value of a digitally enabled population serves Cuyahoga

²² Estimate for annual minimum client savings was achieved by multiplying 20 x \$7.25.

²³ If the one-time cost (including equipment and training) equals \$500, the total two-year benefit is \$770.

County's overall strategic vision. To track future cost savings, the county should consider collecting the following data:

- Purpose of each client contact
- An answer to the question Could this contact be avoided if the client were digitally enabled?
- Client opportunity expenses associated with contact (e.g., lost hours of compensated work, transportation costs, etc.)
- Data identifying cause for client household lack of connectivity
- Feasibility assessment regarding digital assistance for the client's household

Additionally, internal studies identifying resources (e.g., labor, supplies, postage, etc.) for which Cuyahoga County expends on various non-digital transactions will prove useful to an analysis of digitization's cost benefit. Such information is necessary if Cuyahoga County plans to estimate cost savings associated with conversion of in-person transactions to digital transactions.

3.2.5 Cuyahoga County Strategic Goals: The Impact of Digital Inclusion

Evidence from research discussed in the remainder of chapter 3 demonstrates that digital inclusion provides meaningful benefits to citizens, private enterprise, and society as a whole. These broader societal benefits address needs such as regional growth and core public values such as economic opportunity, community well-being, and accountability to citizens (see figure 7).

Additionally, they can advance Cuyahoga County's vision and priorities as outlined in 2017–2022 Cuyahoga County Strategic Plan.

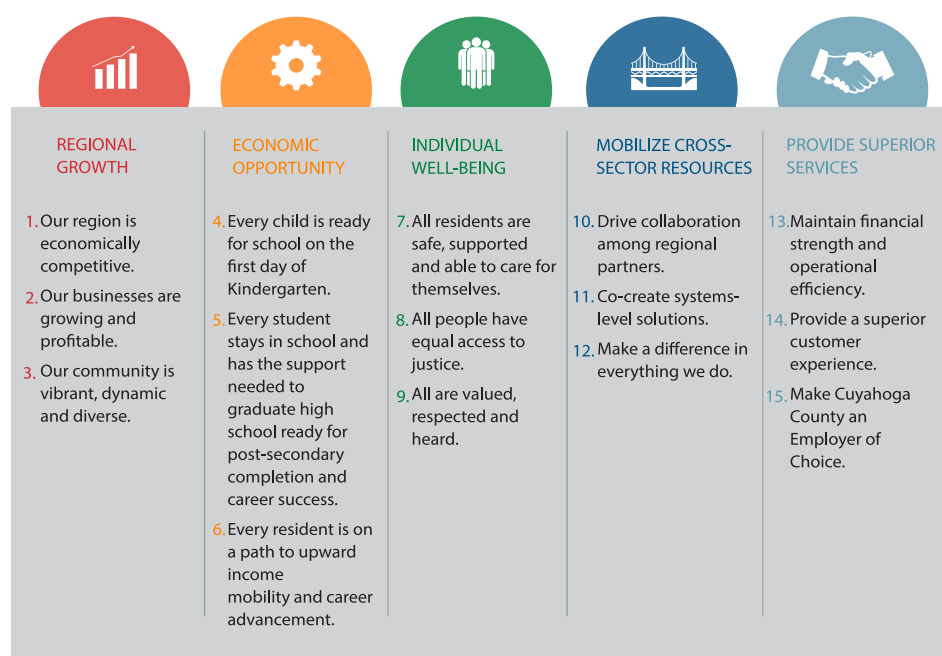


Figure 7. Excerpt, 2017-2022 Cuyahoga County Strategic Plan, 2018, 2017, accessed 11/3/2018, https://cuyahogacounty.us/docs/default-source/default-document-library/2018strategicplan.pdf?sfvrsn=38743c84_4.

3.3 Regional Growth: Digital Inclusion as Human Capital

Digital skills and information contribute to human capital and can generate benefits for the region's economy. Cleveland and the metropolitan region currently lag behind most of the other 50 largest metros in broadband adoption. Despite efforts such as Blockland²⁴, the Global Center for Health Innovation²⁵ and the Mid-Town Tech Corridor²⁶, low levels of broadband adoption undermine the image of the region as an innovator in biotechnology and smart cities.

More than Cleveland's image as a tech innovator is at stake. As recent national research has shown, rates of home broadband adoption are causally related over time to local economic outcomes²⁷. In a study examining relationships between broadband subscriptions in the 50 largest metros from 2000–2017 and economic measures from the Brookings Institution's metropolitan monitor²⁸, researchers found that **change in broadband adoption over time is a significant and strong predictor of:**

- Economic growth (an index including change in number of jobs, number of jobs in young firms, gross metropolitan product) - benefits that position a community for the future
- Prosperity (and index including change in average wage, productivity, standard of living)—benefits that flow to workers and residents as well as businesses
- Percentage of the population with full-time employment - benefits that can also affect economic opportunity for residents

These outcomes are statistically significant, reaching across all the 50 metros, and controlling for other factors that are known to influence economic growth and prosperity, such as educational attainment of the population, and the share of employment in the information technology industry or knowledge-intensive industries, etc. Analyzing outcomes over time (nearly two decades) addresses the issue of cause-and-effect, showing that overall, broadband adoption is a cause of growth (rather than the alternative explanation that communities with growth and prosperity simply have more broadband adoption because of higher incomes). While IT employment and millennial populations boost economic outcomes, so does a more inclusive community where a higher percentage of the population has broadband at home.

²⁴ <https://www.blocklandcleveland.com/>

²⁵ <https://www.crainscleveland.com/impact-global-center-health-innovation-and-convention-center>

²⁶ <https://www.news5cleveland.com/news/local-news/cleveland-metro/midtown-neighborhood-drives-cleveland-to-the-head-of-the-high-tech-class>

²⁷ Caroline J. Tolbert, Karen Mossberger, and Kellen Gracey. "Smart Cities and Broadband Adoption: The Geography of Economic Opportunity and Inequality." Paper prepared for delivery at the annual meeting of the American Political Science Association, Boston, MA. August 30-September 2, 2018; Caroline J. Tolbert, Karen Mossberger, and Kellen Gracey. "Digital Human Capital and Broadband Subscriptions: The Geography of Economic Opportunity, Prosperity, and Growth." Under Review (2019).

²⁸ Richard Shearer, Alec Friedhoff, Isha Shah, and Alan Berube. "Metro Monitor 2018." Washington, DC: The Brookings Institution, 2018. <https://www.brookings.edu/research/metro-monitor-2018/>

These findings are consistent with other studies²⁹ on the benefits of broadband infrastructure or advanced internet uses in firms, but they demonstrate—for the first time—that a larger percentage of local populations online (i.e., digital inclusion) matters for economic outcomes in urban areas of the U.S.

Research conducted by economist Enrico Moretti, work by Erik Brynjolfsson and Adam Saunders, information contained in the Brookings report on Digitalization and the American Workforce and the Rand Europe Report, Digital Learning³⁰ suggest why broadband adoption and digital inclusion matter for community prosperity and growth:

- Digital inclusion prepares residents for an economy where internet use is integrated into many occupations, not exclusively high tech positions. Usage of technology is required for many jobs (e.g., manufacturing, retail, logistics, hospitality and more). This integration of technology across occupations has boosted productivity and is increasingly important to future economies³¹.
- Digital skills and information are needed in an age when regional economic development is driven by skills and education—what economist Moretti (2013)³² has called the human capital century.
- General tech skills—strategic skills that enable decision-making vis-à-vis technology use and online information literacy (i.e., the ability to search for, evaluate, and apply information online)—are “eternal” skills that equip a workforce with adaptability in a changing economy while allowing for lifelong learning. For this reason, general tech skills are more important than specific skills for specific technologies, according to a Rand Europe Report³³.
- Internet use has what scholars have called human capital-enhancing capabilities, enabling individuals to access information for job search, health, education, job training, and entrepreneurship³⁴. Access to online information enhances human capital, which is a driver of growth.

29 Chris Forman, Avi Goldfarb, and Shane Greenstein. “The Internet and Local Wages: A Puzzle.” *American Economic Review* 102, no. 1 (2012): 556-75. <https://doi.org/10.1257/aer.102.1.556>; Jed Kolko. *Does Broadband Boost Local Economic Development?* San Francisco: Public Policy Institute of California, 2010. http://www.pplic.org/content/pubs/report/R_110JKR.pdf; William Herndon Lehr, Carlos Osorio, Sharon E. Gillett, and Marvin A. Sirbu. *Measuring Broadband's Economic Impact*. National Technical Assistance, Training, Research and Evaluation Project No. 99-07-13829. Prepared for the U.S. Department of Commerce, Economic Development Administration, 2006. http://cfp.mit.edu/publications/CFP_Papers/Measuring_bb_econ_impact-final.pdf; Brian Whitacre, Roberto Gallardo, and Sharon Strover. “Broadband's Contribution to Economic Growth in Rural Areas: Moving towards a Causal Relationship.” *Telecommunications Policy* 38, no. 11 (2014): 1011-023. <https://doi.org/10.1016/j.telpol.2014.05.005>.

30 Sarah Grand-Clement. *Digital Learning: Education and Skills in the Digital Age*. RAND Europe, 2017. https://www.rand.org/content/dam/rand/pubs/conf_proceedings/CF300/CF369/RAND_CF369.pdf.

31 Erik Brynjolfsson and Adam Saunders. *Wired for Innovation: How Information Technology is Reshaping the Economy*. Cambridge: MIT Press, 2010; Mark Muro, Sifan Liu, Jacob Whiton, and Siddarth Kulkarni. “Digitalization and the American Workforce.” *The Brookings Institution*, November 2017. <https://www.brookings.edu/research/digitalization-and-the-american-workforce/>.

32 Enrico Moretti. *The New Geography of Jobs*. Boston: Mariner Books/Houghton Mifflin Harcourt, 2013, 215.

33 Grand-Clement, *Digital Learning*, 4-5. https://www.rand.org/content/dam/rand/pubs/conf_proceedings/CF300/CF369/RAND_CF369.pdf.

34 Paul DiMaggio, Eszter Hargittai, W. Russell Neuman, and John P. Robinson. “Social Implications of the Internet.” *Annual Review of Sociology* 27, no. 1 (2001): 307-36. <https://doi.org/10.1146/annurev.soc.27.1.307>; Eszter Hargittai. “Second-Level Digital Divide: Differences in People's Online Skills.” *First Monday* 7, no. 4 (2002): 1-20.

3.4 Economic Opportunity: Connecting Individuals and Neighborhoods

Digital inclusion is an essential component of reaching Cuyahoga County's strategic goals as it strives to "connect residents of underserved and disadvantaged communities and neighborhoods to economic opportunities."³⁵

The benefits of a digitally connected county population are manifold:

- Internet use is increasingly necessary to apply for a job of any type³⁶.
- Internet use, including home adoption, predicts higher wages over time in U.S. panel studies³⁷. Other national research shows that, controlling for other factors, those who use the internet at work earn more—this is true even for workers with a high school education or less³⁸.
- A comparison of 19 countries using new data from the Organization of Economic Cooperation and Development (OECD) Programme for the International Assessment of Adult Competencies (PIAAC) focused on digital inclusion and basic internet skills in the workforce rather than highly technical IT skills. The study estimated that "if an average worker in the U.S. increased their ICT skills to the level of an average worker in Japan, their wages would increase by about 8%; this is close to the well-identified estimates on the returns to one additional year of schooling in developed countries."³⁹
- The Brookings Institution has identified "promising" jobs that can lead to greater opportunity over time for less-educated workers, but this requires changing jobs and pursuing a career ladder. Internet use is a resource for advanced job education and training, job information, and job searches on the path to opportunity⁴⁰.
- Middle-skill jobs with good wages often go unfilled because of a need for digital skills, and this is an issue requiring more careful attention in the U.S. workforce system⁴¹. Digital inclusion programs in several cities have stepped up to provide job-related

³⁵ Cuyahoga County. "Five- Year Economic Development Plan, 2018-2022." 2018, 4. <https://cuyahogacounty.us/docs/default-source/development/economicdevelopmentplan.pdf>.

³⁶ American Library Association. "Job-seeking in U.S. Public Libraries." Last updated June 2011. http://www.ala.org/tools/sites/ala.org.tools/files/content/initiatives/plfias/2010_2011/jobsbrief11.pdf.

³⁷ Paul DiMaggio and Bart Bonikowski. "Make Money Surfing the Web? The Impact of Internet Use on the Earnings of U.S. Workers." *American Sociological Review* 73, no. 2 (2008): 227-50. <https://doi.org/10.1177/000312240807300203>.

³⁸ Muro, Liu, Whiton, and Kulkarni, "Digitalization and the American Workforce"; Karen Mossberger, Caroline J. Tolbert, and Ramona S. McNeal. *Digital Citizenship: The Internet, Society, and Participation*. Cambridge: MIT Press, 2008.

³⁹ Oliver Falck. "Does Broadband Infrastructure Boost Employment?" *IZA World of Labor*. 2017, 6. <https://wol.iza.org/uploads/articles/341/pdfs/does-broadband-infrastructure-boost-employment.pdf>.

⁴⁰ Muro, Liu, Whiton, and Kulkarni, "Digitalization and the American Workforce"; Richard Shearer and Isha Shah. "Opportunity Industries: Exploring the Industries that Concentrate Good and Promising Jobs in Metropolitan America." Brookings Institution, December 18, 2018. <https://www.brookings.edu/research/opportunity-industries/>.

⁴¹ John Horrigan. "Digital Skills and Job Training: Community-driven Initiatives are Leading the Way in Preparing Americans for Today's Jobs." Benton Foundation, October 29, 2018. <https://www.benton.org/publications/digital-skills-and-job-training-community-driven-initiatives-are-leading-way-preparing>.

training, including Digital Works in Ohio, workforce training that accompanied community efforts for gigabit broadband in Maryland, and Google Fiber in Kansas City and Louisville⁴².

These studies on the individual benefits of internet use are consistent with recent research on the larger community-wide benefits of broadband adoption cited in section 3.3. Existing research on middle-skill and opportunity jobs presenting a path to advancement for less-educated workers indicates that these positions require digital proficiency.

The targeting of digital resources at low-income communities is also crucial for inclusive opportunity:

- Residents of low-income neighborhoods often lack informal networks for information about jobs⁴³. Online information may overcome challenges presented by these barriers.
- “Spatial mismatch”⁴⁴ refers to the challenge faced by residents of poor neighborhoods who may not live near jobs that match their skills. Internet usage⁴⁵ provides information on jobs outside residents’ neighborhoods as well as details regarding transportation.
- Prior research on Northeast Ohio identified East Cleveland as an area in which residents were less likely to find jobs involving internet usage. Digital inclusion can break this cycle of disadvantage.

3.5 Individual Well-Being: Health and Aging in Place

3.5.1 Health and Health Care

Residents of Cuyahoga County live 76.4 years on average, well below the national average of 78.7 years⁴⁶. Survival of residents of the city of Cleveland is even more dismal—an average of only 72.2 years. However, these dismal statistics belie the truly shocking disparities that are evident when looking at smaller geographic areas. The range in life expectancy across the County varies by census tract an astonishing 24 years, from a high of 88.6 years to 64.5 years. As detailed more fully in Table 9 Appendix D, Cuyahoga County residents have elevated rates of chronic disease and premature death that affect the overall economic strength of the county. Ill residents cannot work and require greater use of social services. Those helping to care for ill residents also experience stress and reduced productivity.

42 Horrigan, “Digital Skills”

43 Mark S. Granovetter. “The Strength of Weak Ties.” *American Journal of Sociology* 78, no. 6 (1973): 1360-1380. <https://doi.org/10.1016/j.giq.2016.03.003>.

44 John F. Kain. “Housing Segregation, Negro Employment, and Metropolitan Decentralization.” *Quarterly Journal of Economics* 82, no. 2 (1968): 175-197. <https://doi.org/10.2307/1885893>

45 David Kaplan and Karen Mossberger. “Prospects for Poor Neighborhoods in the Broadband Era.” *Economic Development Quarterly* 26, no. 1 (2011): 95-105. <https://doi.org/10.1177/0891242411431450>.

46 Cuyahoga County. “2018 Cuyahoga County Community Health Assessment.” Accessed November 15, 2018. <http://hipcuyahoga.org/2018cha/>.

Individuals suffering from elevated rates of poor health are not randomly distributed in the population. Rather, these individuals live in areas characterized by poor social determinants of health (SDOH). Lack of economic stability, education, transportation, housing, healthy food access, unsafe neighborhoods, and social disconnectedness exert a significant influence upon the ability of individuals to obtain health care, manage chronic illness and maintain good health (see table 8).

The internet holds transformational potential for improvements in health-care efficiencies, an individual's ability to manage their health, and social conditions affecting health.

Sutter Health now saves \$3–4 for each appointment that patients schedule themselves, totaling \$5 million per year⁴⁷. Locally, MetroHealth estimated savings of \$1 for each averted phone call from patients checking laboratory results⁴⁸. Visits conducted by telehealth minimize the need for clerical staff, waiting rooms, and janitorial personnel. Instead of losing revenue each time a patient fails to show for an in-person visit, providers can simply move forward in the online queue to the next patient waiting for a telehealth visit.

The financial and health benefits connectivity offers to individual patients are more difficult to quantify than savings to health institutions. Patients experience connectivity benefits over time, with cost and health gains accruing over the course of many years. Nevertheless, in the shortest term, opportunities to consult health care professionals by video saves patients from costs associated with transportation (e.g., bus fare, parking, etc.) and missed work. These immediate benefits are especially valuable for low-income populations. Internet access also offers patients the opportunity to engage in online health information searches and comparison shopping (e.g., identify the most affordable price possible for medication, locate a pharmacy with desired hours of operation, etc.)

Although more difficult to measure, the benefits of connectivity are likely to have the greatest impact on vulnerable populations through changing social determinants of health. Improving neighborhood conditions for disadvantaged populations could prevent 500,000 hospitalizations per year nationwide. Health care only explains 20% of the differences in health outcomes. For that reason, Centers for Medicare & Medicaid Services is investing more than \$157 million into the creation of “Accountable Health Communities” that connect health systems to community organizations to help patients address their SDOH.

The Federal Communications Commission has proposed an investment of \$100 million to develop pilot studies aimed at improving health by increasing internet access for vulnerable populations⁴⁹. This suggests considerable bullishness on the value of the internet for health and health care.

47 Ming Tai-Seale, N. Lance Downing, Veena Goel Jones, Richard V. Milani, Beiqun Zhao, Brian Clay, Christopher Demuth Sharp, Albert Solomon Chan, and Christopher A. Longhurst. “Technology-Enabled Consumer Engagement: Promising Practices at Four Health Care Delivery Organizations.” *Health Affairs* 38, no. 3 (2019): 383-90. <https://doi.org/10.1377/hlthaff.2018.05027>.

48 David Kaelber. *MetroHealth Core Case Study: Return on Investment*. Healthcare Information and Management Systems Society. Accessed May 27, 2019. [https://www.himss.org/sites/himssorg/files/FileDownloads/MetroHealth ROI.pdf](https://www.himss.org/sites/himssorg/files/FileDownloads/MetroHealth%20ROI.pdf).

49 Federal Communications Commission. “FCC Seeks Comment on Launching Connected Care Pilot Program.” August 3, 2018. <https://www.fcc.gov/document/fcc-seeks-comment-launching-connected-care-pilot-program>.

3.5.2 Aging in Place

As more and more baby boomers reach retirement age, “aging in place” has become a common goal for communities. The Centers for Disease Control and Prevention defines aging in place as “the ability to live in one’s own home and community safely, independently, and comfortably, regardless of age, income, or ability level.”⁵⁰

Digital literacy skills and home connectivity represent a means for people to manage their needs through online interactions: online banking and bill pay can be more convenient than trips to the bank or post office; virtual doctor’s visits may be easier for some residents than in-person visits to a health-care provider’s office; online ordering and/or delivery of groceries and household erase residents’ need to carry heavy bags or travel by public transportation in inclement weather. For low-income seniors, digital connections offer safety, security, and continued independence.

- As the economic state of a region directly relates to population health and homeownership, state and local governments have a vested interest in forestalling the need for state-funded elder care while supporting homeownership for as long as possible.
- The Robert Wood Johnson Foundation estimates that the need for services for the aging will reach crisis proportions by 2030 (at the peak of retirement for baby boomers)⁵¹. To offset the additional burden to state and local social services, an increase in digital skills and internet adoption will be imperative to maintain independent living statuses for this population.

New applications of technology (e.g., sensors, connected IoT devices, and artificial intelligence), energy-saving smart meters and home monitors, and other devices offer additional assistance as older individuals look to age in place.

Without the necessary attention paid to broadband access, older (and low-income individuals) will not experience benefits from energy-saving solutions (e.g., smart grids and smart meters) or from connected health devices. Less-experienced and less-educated residents will lack the skills to manage new technologies (including appropriate privacy and security measures)⁵².

⁵⁰ <https://www.cdc.gov/healthyplaces/terminology.htm>

⁵¹ RWJ Foundation, “United States in Search of Nurses with Geriatrics Training.” February 27, 2012. <https://www.rwjf.org/en/library/articles-and-news/2012/02/united-states-in-search-of-nurses-with-geriatrics-training.html>.

⁵² Alexander J.A.M. Van Deursen and Karen Mossberger. “Any Thing for Anyone? A New Digital Divide in Internet-of-Things Skills.” *Policy & Internet* 10, no. 2 (2018): 122-40. <https://doi.org/10.1002/poi3.171>.

3.6 Cross-Sector Collaboration: Data-Smart Cities

Predictive analytics, the use of large administrative datasets, open data portals, and dashboards are all public sector developments that invite cross-sectoral collaboration. Data sharing across governments and between governments and private and nonprofit partners can promote more efficient collaboration on economic development, workforce development, community health, and more.

As Cuyahoga County serves low-income, older, and other vulnerable populations who are less likely to be online, data collection efforts can cost Cuyahoga County (and its partners) time and resources. Additionally, data may be difficult to collect on some populations.

The city of Seattle, honored by Bloomberg Philanthropies' "What Works Cities" initiative for data-driven solutions, provides an example of how data collection efforts might benefit from digital inclusion for Seattle's homeless population:

Residents of Seattle shelters and transitional housing with smartphones or other internet connectivity helped the city and nonprofit providers to collect more accurate data on how long they were homeless and when they obtained permanent housing or became homeless again. This focus on the experiences of the homeless population has enabled the city to use a results-based contracting approach, to identify successful practices, and to troubleshoot problems with providers⁵³. While the focus of this effort was primarily on results-based management with contractors, this example highlights the need for digital inclusion. Contractors provided internet access in their offices for clients to report outcomes, but more widespread digital inclusion could have made this effort even more effective. The City of Seattle has conducted a pilot program for youth transitioning from homelessness, giving them a choice of either a laptop or a smartphone with internet service. Most young people chose the laptop, which afforded greater convenience for job search and education. The results from this pilot are not yet available, but greater connectivity could promote data-driven collaboration across agencies as well as benefits for transitional youth⁵⁴.

⁵³ <https://whatworkscities.bloomberg.org/works-city-feature-seattle-wa/>

⁵⁴ Personal interview with Seattle official.

3.6.1 Superior Services: Citizen Satisfaction and Trust

Greater digital engagement provides new opportunities for improved decision-making, planning, performance measurement, and coordination within Cuyahoga County.

With increased online participation, the county's systems can provide more complete and accurate data on clients and their needs, enabling information-sharing across programs and departments while providing "one-stop" services for citizens.

Digital services empower clients to access their own data; for example, applicants for governmental services/assistance can track applications or service requests in the system or receive alerts about renewal deadlines for benefits.

As e-government has been shown to influence citizens' attitudes toward their government as a whole, ensuring that a larger portion of the Cuyahoga County population receives online information and services can contribute to citizens' satisfaction with government. Digital government promotes integrated, citizen-centric systems that improve services and relationships with residents⁵⁵. Research supports the notion that e-government changes are positive for both governments and citizens⁵⁶:

- Digital government users have more positive attitudes about government, from local to federal levels⁵⁷.
- Citizens accessing services and information online may perceive government as more responsive, accessible, transparent, efficient, effective, and open to input⁵⁸.
- Users of local government websites are more likely to express trust and confidence in government, controlling for other factors⁵⁹.

The specific tasks enabled by digital access offer higher degrees of agency and transparency for citizens; unfortunately, many Cuyahoga County residents do not experience the benefits of digitally-enabled services. In the following section, we examine how digital inclusion can affect administrative efficiency and effectiveness in key departments and programs promising greatest return on investment.

55 Yu-Che Chen. *Managing Digital Governance: Issues, Challenges, and Solutions*. New York: Routledge, 2017.

56 Berger, Hertzum, and Schreiber, "Does Local Government Staff"

57 Seung-Hwan Myeong and Michael J. Ahn. "E-government and Citizen Trust in Government: The Role of Citizen Characteristics in the Relationship between E-Government Use and Citizen Trust in Government." In *Routledge Handbook on Information Technology in Government*, 153-167. New York: Routledge, 2017; Eric W. Welch, Christopher C. Hinnant, and M. Jae. Moon. "Linking Citizen Satisfaction with E-Government and Trust in Government." *Journal of Public Administration Research and Theory* 15, no. 3 (2005): 371-391. <https://doi.org/10.1093/jopart/mui021>; Darrell M. West. "E-Government and the Transformation of Service Delivery and Citizen Attitudes." *Public Administration Review* 64, no. 1 (2004): 15-27. <https://doi.org/10.1111/j.1540-6210.2004.00343.x>.

58 Caroline J. Tolbert and Karen Mossberger. "The Effects of E-Government on Trust and Confidence in Government." *Public Administration Review* 66, no. 3 (2006): 354-69. <https://doi.org/10.1111/j.1540-6210.2006.00594.x>.

59 Tolbert and Mossberger, "The Effects of E-Government"

CHAPTER 4: Opportunity Knocks: Digital Improvements to County Outcomes and Operations

4.1 Reaching Residents

Digital inclusion programs present clear opportunities in several programs, particularly those programs exhibiting high volumes of interaction between government and low-income and/or older residents.

Chapter 4 addresses three governmental divisions engaged with provision of services directly to residents; these divisions are areas in which administrative benefits are most likely to develop:

The **Cuyahoga County Job & Family Services** comprises the largest number of social service programs, including SNAP, TANF, and Medicaid; the **Cuyahoga County Division of Senior and Adult Services** serves members of the population who are least-connected; and the **Cuyahoga County Treasurer's Office**, which would deliver savings to Cuyahoga County through increased online payments while providing digitally empowered senior homeowners with access to increased information on assessments and greater convenience and safety in payment submission.

While most workforce development and health programs are delivered through contractors, these divisions represent areas in which substantial social benefits can be generated through digital inclusion. This chapter identifies divisional opportunities for county leadership in e-government.

4.1.1 Cuyahoga County Programs and Services: Who Are the Users?

We were unable to obtain robust data from the County on visitors to county websites. However, it's safe to assume that usage patterns somewhat reflect overall digital connectivity patterns, with utilization lacking among residents of low-income households and among residents who are 65 and older. These very same populations represent high proportions of those served by county social service programs.

A 2012 survey of adult Cuyahoga County residents, commissioned by the Connect Your Community Project and conducted by Dr. Karen Mossberger and Dr. Caroline Tolbert, provides the most direct data available on the subject in that respondents were asked about their use of various services as well as their home broadband internet access (see table 5).

Lack of Home Internet Reported by Users of Services/Programs

Source: 2012 Cuyahoga County Survey, Tolbert and Mossberger 2012

All County households Without broadband* at home	37%
Users of:	
SNAP	48%
WIC	50%
Medicaid	58%
Healthy Start	37%
SS Disability	58%
SSI	59%
Ohio Work First	36%
Homestead Property Tax Exemption	41%
Home Energy Assistance	49%
Employment Connection	31%
Veterans' services	42%
Foster Parent	51%
Senior Center Visitor	42%
Senior/Disabled Bus Pass	66%

Table 5. Lack of Home Internet Reported by Users of Services/Programs

*"Broadband" here means wireline broadband internet such as cable or DSL. Note that the 2017 ACS shows a nearly identical rate of reported deficiency in wireline connectivity for all Cuyahoga County households in 2017⁶⁰.

This 2012 survey showed that users of social services such as county benefit programs were less likely than the overall population to have home broadband: Between 48%–60% of low-income programs users (SNAP, TANF, Medicaid) lacked home broadband services; between 60%–70% of low income senior services (e.g., SSI and bus passes) program users lacked home broadband; just over 40% of users of senior services programs not tied to income (homestead exemption and senior centers) as well as users of veterans' services⁶¹.

The connection rates for users of workforce programs and Healthy Start were the only rates close to Cuyahoga County's average for all adult residents. Although the number and proportion of households without broadband has declined considerably since 2012 (reaching just 24.9% in 2017), connectivity remains considerably lower for vulnerable low income and elderly populations.

60 Caroline J. Tolbert and Karen Mossberger. *Cuyahoga County Survey of Internet Access and Use*. Accessed June 30, 2019. <http://connectyourcommunity.org/wp-content/uploads/2015/11/Cuyahoga-County-Survey-of-Internet-Access-and-Use.pdf>.

61 "Programs users" refers to users of low-income social services with the exception of Healthy Start.

4.2 Cuyahoga County Job & Family Services (JFS)

From a staffing and infrastructure perspective, the Cuyahoga County Job & Family Services (JFS) is one of the county's largest departments.

The JFS oversees a number of program services, including large operations such as SNAP, TANF, and Medicaid (see figures 8, 9, and 10) as well as a host of other programs.

4.2.1 Supplemental Nutrition Assistance Program (SNAP)

The Supplemental Nutrition Assistance Program (SNAP) provided assistance to 197,836 unduplicated county residents in 2018, including 20,852 residents over the age of 65 and 75,403 residents under the age of 18. To receive benefits, able-bodied adults without dependents must undergo an appraisal of their employability and participate in an employment & training program. Although Ohio's SNAP work requirements are waived for Cuyahoga County residents, eligibility recertifications are periodically required (see figure 8)⁶².

Supplemental Nutrition Assistance Program (SNAP) Recipients

Cuyahoga County

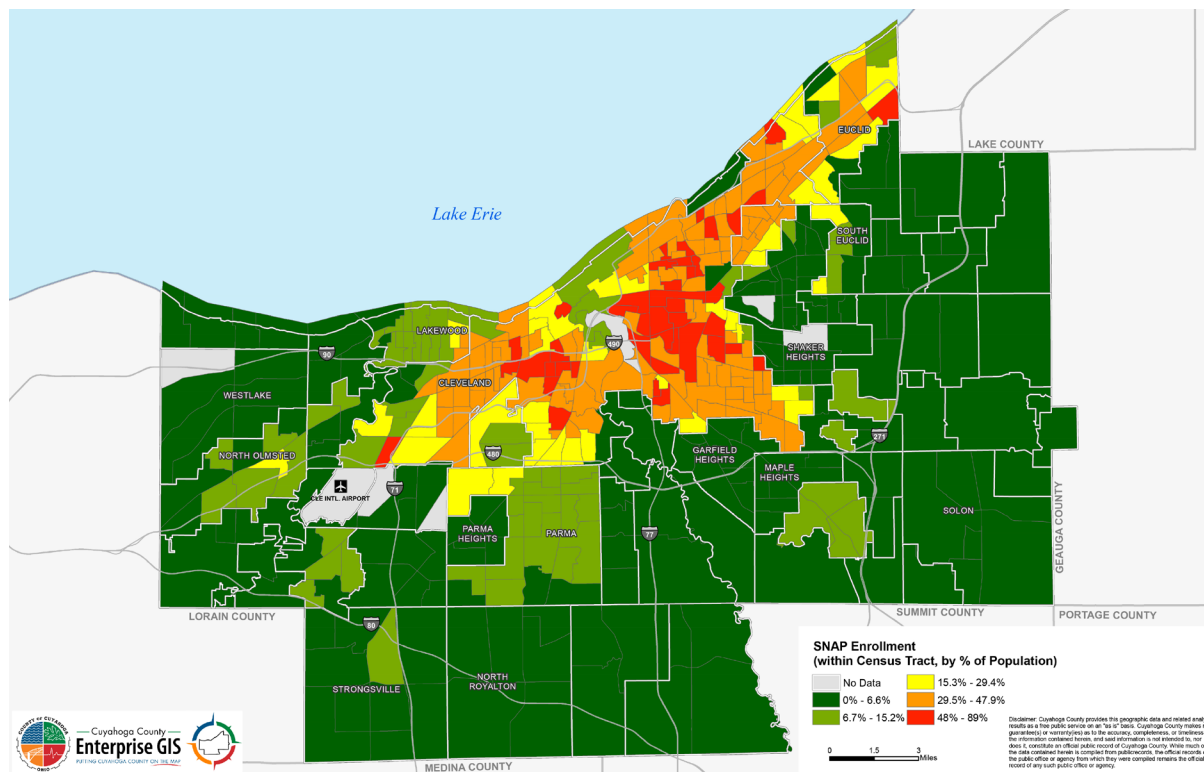


Figure 8. 2018 SNAP enrollment by census tract (Map provided by Cuyahoga County).

62 <https://cjfs.cuyahogacounty.us/en-US/WorkRequirements.aspx>

Based on findings from the 2012 county resident survey (see table 5), we estimate that more than 90,000 county residents are precluded from utilizing electronic services to manage their SNAP benefits due to lack of internet access⁶³. The neighborhoods with the highest fraction of residents receiving SNAP benefits have significant overlap with the geographic pattern seen in Figure 1 for lack of internet connectivity.

4.2.2 Temporary Assistance for Needy Families (TANF)

Temporary Assistance for Needy Families (TANF) provided assistance to 12,382 residents in 2018 throughout Cuyahoga County (see figure 9). More than 75% (9,383) of TANF recipients are under the age of 18, including 6,253 school-aged residents (over the age of 6)⁶⁴.

Of the adults served by this program, only 18 were over the age of 65. For those who are able (i.e., of working age and not disabled), TANF has work requirements.

Temporary Assistance for Needy Families (TANF) Recipients

Cuyahoga County

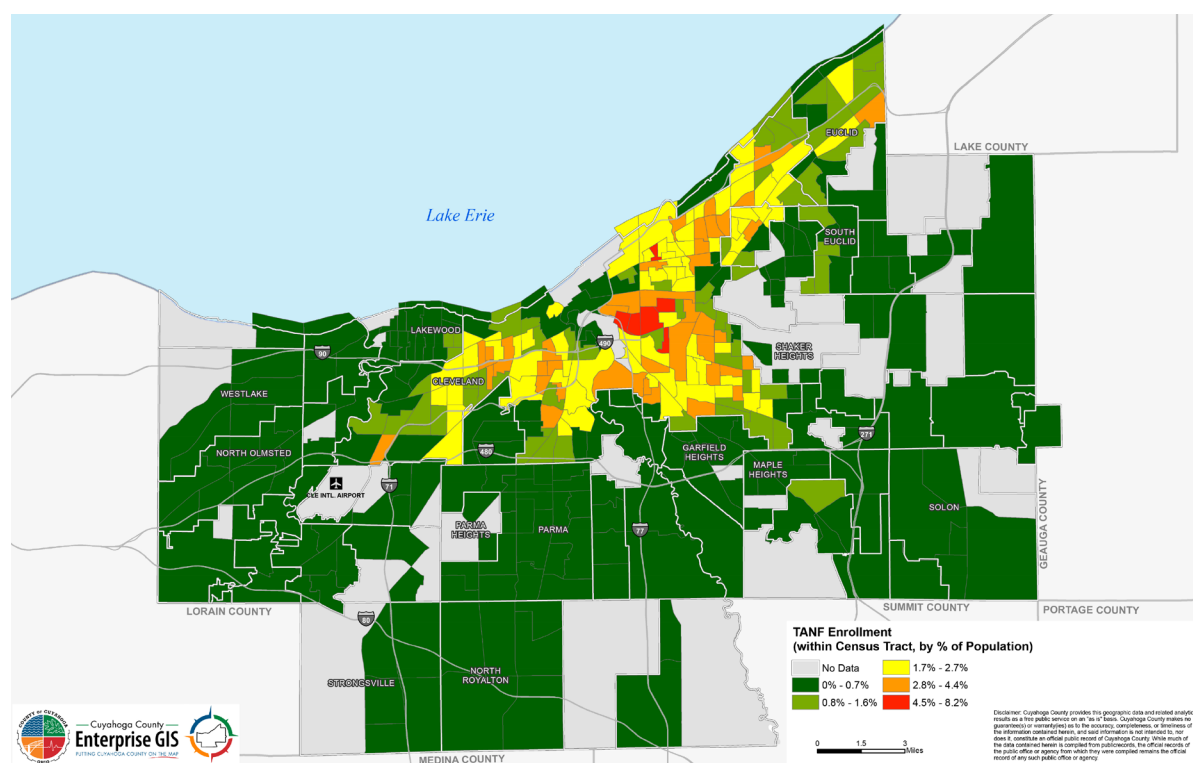


Figure 9. 2018 TANF enrollment by census tract (Map provided by Cuyahoga County).

⁶³ Table 5 indicates that 48% of SNAP recipients lack home internet connectivity, Tolbert and Mossberger, Cuyahoga County Survey

⁶⁴ Number of recipients receiving benefits by level of education, data provided by Cuyahoga County Jobs and Family Services 4/26/19.

4.2.3 Medicaid

Medicaid served 355,976 residents in 2018 (93% of all social services recipients received Medicaid), including 32,337 adults over the age of 65 and 128,906 children and youth under the age of 18. Services were distributed in varying degrees throughout the county (see figure 10).

Medicaid Recipients

Cuyahoga County

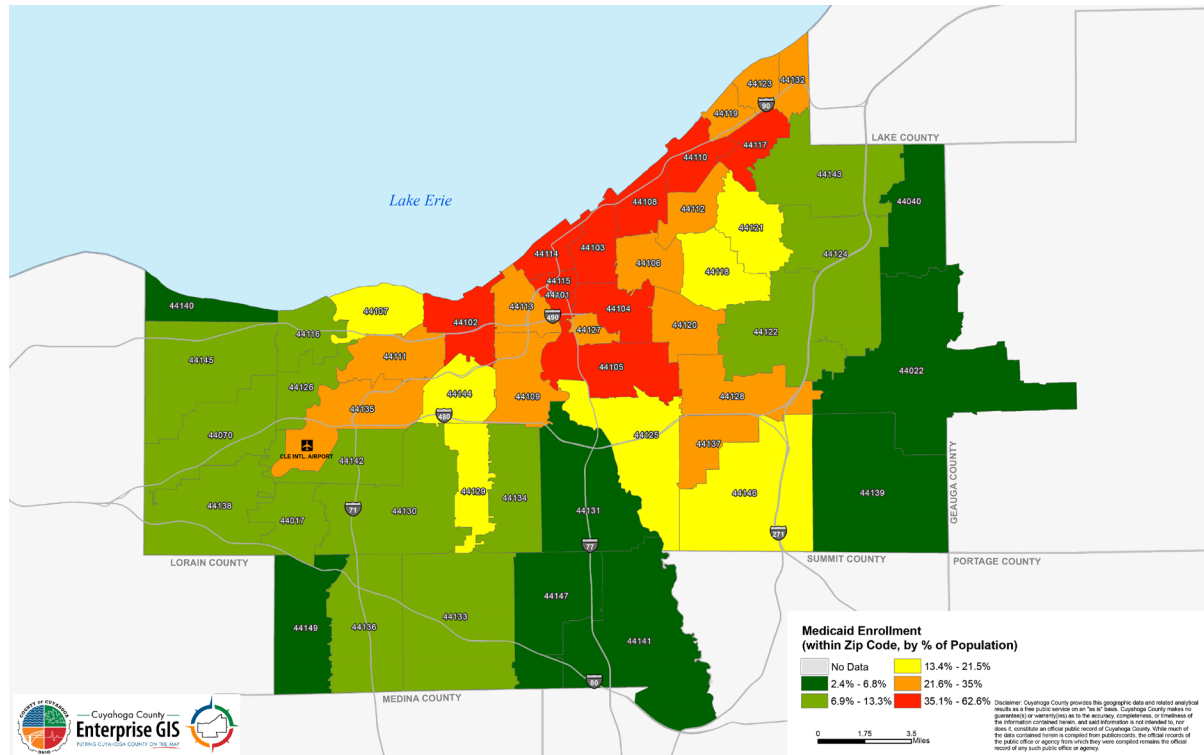


Figure 10. 2018 Medicaid enrollment by census tract (Map provided by Cuyahoga County)

Based on findings from the 2012 county resident survey (see table 5) we estimate that approximately 200,000 of Cuyahoga County Medicaid recipients lack home internet connectivity⁶⁵. Medicaid is most prevalent in areas with low broadband adoption although many areas with high internet use have 10-30% of residents receiving Medicaid benefits.

4.2.4 Other Programs

The Child Care Assistance Program supports families by paying a portion of childcare expenses each month. This program provides residents with the flexibility to choose a child care center, child care home, or care by a relative or other adult based on the family's individual needs. However, starting in 2020, these benefits may only be used at facilities that have received at least one star in the five-star quality rating program. Internet access is invaluable for searching

⁶⁵ Table 5 indicates that 58% of Medicaid recipients lacked home internet connectivity, Tolbert and Mossberger, Cuyahoga County Survey

for such programs that meet parents' needs.

The Prevention, Retention and Contingency (PRC) program provides aid and services in response to unexpected emergencies experienced by resident families at or below 200% of the federal poverty level.

Due to departmental oversight of these social programs, JFS serves as a central point of contact between the county administration and its residents. In 2018, JFS provided benefits to 251,901 unduplicated residents or roughly 20% of the county's overall population (1,248,514)⁶⁶. The scale of services provided, and the number of unconnected, low-income clients mean that changes in digital inclusion carry the potential to impact overall program efficiency and efficacy. Residents can enroll in and manage their benefits online, over the phone, in-person at the county administrative building, or through a community benefits navigator.

In an effort to adequately respond to the number of client phone calls regarding benefits, Cuyahoga County manages a call center. Originally, the county's call center served only Medicaid recipients and received an average of 10,000 calls per month. More recently, the call center expanded to serve recipients of SNAP, TANF, PRC, and other programs services. The JFS call center now receives an average of 60,000–70,000 calls every month, reaching as many as 87,000 calls during busier months. At a recent community forum, county officials indicated that only 75% of calls were answered in June of 2018, with abandoned calls likely reflecting long wait times⁶⁷. Digital inclusion presents a substantial opportunity to transition more call center interactions to an online format.

Findings from the 2012 Cuyahoga County survey indicate that a majority or near-majority of participants in Medicaid and the Ohio Directions Card/SNAP programs lacked home broadband⁶⁸—at rates of 58% and 48%, respectively. Work First recipients were closer to the county population average, but the rate of nonconnection was still high—36% did not show home connectivity.

Cuyahoga County residents interested in receiving benefits are encouraged to begin the application process online by setting up a user account and initiating eligibility screening through the state of Ohio's online portal⁶⁹. As of 2014, Medicaid applications can be fully determined online, but other program benefits (e.g., SNAP and TANF) currently require an in-person or mail application.

Once an application for benefits has been received by the county and processed (at which time, it is given a case number), a resident may link their case to their online benefits profile ensuring that further interactions (e.g., required document submissions and status updates) may be viewed and managed online.

⁶⁶ 2017 ACS

⁶⁷ <https://www.communitysolutions.com/cuyahoga-job-family-services-demonstrates-transparency-commitment-improving-customer-service-community-forums/>

⁶⁸ 2017 ACS

⁶⁹ Ohio's benefits portal can be found at <https://benefits.ohio.gov>.

4.2.5 Digitized Division: JFS and the State of Ohio

A statewide overhaul of systems used for application eligibility determination, and management of caseloads and benefits for JFS benefits is underway⁷⁰. While growing pains were evident, meetings of Connected Insights team members with JFS staff identified some opportunities for improvement.

1. Residents do not yet completely trust online systems. Residents are more comfortable managing their benefits by speaking to a person. As residents apply for benefits online, county staff experience the value of increased automation and data entry reduction.
2. Applications can be submitted through multiple streams (online, over the phone, in-person) which creates the potential for application duplication which slows down processing.
3. Digitized benefit sign-up not only increases the speed of benefits approval and delivery but also improves ease of case management—it is easier and faster to assign online applications to the appropriate case manager.

4.2.6 Networked Opportunities for JFS

Connected Insights believes that every challenge presents an opportunity for meaningful, life-impacting change. The online barriers to governmental efficiency faced by JFS, as outlined in section 4.2.5, offer several opportunities for improvement:

1. Expand the benefits navigator working group, currently comprising libraries, to include digital inclusion program/training providers. The short list of organizations that provide digital literacy training also serves libraries' resident constituency; these digital literacy organizations also directly serve the least-connected group of residents—those least likely to use the online portal on their own without initial support. Unlike most libraries, digital inclusion programs often assist residents with obtaining low-cost home connectivity and affordable equipment (i.e., computers, laptops, etc.). Development of a partner program between libraries and digital inclusion trainers would likely increase the percentage of online applications and recertification processes while reducing time spent on data entry and waiting for required document submission.
2. Have case managers screen all clients for connectivity access and refer to community support resources when needed.
3. Increase the marketing of and community support network for assisting residents to use the benefits portal for the purpose of online services application and management of services.
4. Provide free, secure WIFI in all public areas of county operated buildings.

⁷⁰ <https://www.communitysolutions.com/cuyahoga-job-family-services-demonstrates-transparency-commitment-improving-customer-service-community-forums/>

5. Make a request to all JFS department staff regarding submission of details about how state-mandated data silos have impacted them or their clients.
6. Continue conversations with the State about integration of online systems and data sharing. Discuss data streamlining processes and enhancing collaboration, performance measurement, and planning through analysis of departmental data.

4.3 Department of Senior and Adult Services (DSAS)

The Department of Senior and Adult Services (DSAS) provides support and in-home care to seniors (aged 60 and older) and adults with disabilities over the age of 18 in an effort to empower these residents and preserve their independence. This department manages five main program areas including:

1. Adult Protective Services (APS)
2. Home Support Services
3. Information Outreach (IOU)
4. Options for Independent Living
5. Community Social Services Program (CSSP)

With the exception of the APS program (a state-mandated and state-funded program that investigates allegations of elder abuse, neglect and exploitation), the majority (90%) of funding for DSAS programs flows from levy dollars. According to the 2017 ACS, approximately 25% (308,283) of the current total Cuyahoga County population (1,248,514) comprises adults over the age of 60. Additionally, as the baby boomer generation continues to age, this age group is projected to grow exponentially over the next ten years. As Susan Althans, director of philanthropy and secretary to the board for the McGregor Foundation, said, "It has been projected that in 2030, adults 65 and over will outnumber children under age 20."⁷¹

Increasing numbers of older residents present a mounting challenge for the Department of Senior and Adult Services (DSAS).

Constrained funding paired with a steady increase of demands by seniors for independent living services illuminates the tie between the economic health of the county and the health of its citizens as they attempt to age in place, preserving their status as homeowners. It is therefore in the interest of both county and state government to assist aging populations with access to resources that postpone the need for state-funded elder care and prolong homeownership for as long as possible.

71 <https://clevelandmagazine.com/cleader/community/articles/addressing-the-growth-of-cuyahoga-county's-aging-population>

4.3.1 Digital Challenges Faced by DSAS

During 2018–2019, Connected Insights met with DSAS staff and identified the following opportunities for improvement in the department’s online systems:

1. Aware of the coming “silver tsunami,” DSAS is actively working to identify new ways to support independent living for the county’s seniors.
2. 75% of seniors receiving services through DSAS fall under the federal poverty guidelines.
3. Funds have been earmarked for future support of emerging trends in adult care, such as telehealth initiatives and telehealth mental health services. However, digital skills are not currently integrated into service offerings, suggesting that adoption will be suboptimal.
4. Adult Protective Services case managers indicate concern regarding awareness-raising around reporting abuse. Only one in ten abuse cases are reported. Currently, staff provides community trainings on identification of signs of elderly abuse.
5. The department staff provides assessments/screening questionnaires to clients of two programs (the Information Services program and the Option program) in an effort to learn more about clients’ unique needs.
6. DSAS funds 39 senior centers throughout the county.
7. DSAS recently partnered with the Cleveland Clergy Alliance in an effort to raise awareness of the department’s services through outreach to seniors in their communities.
8. Currently, DSAS is working on obtaining additional credentials to bill for Buckeye, United Healthcare, and CareSource with the intention of expanding services offered through home services programs. Home services offer an excellent opportunity for helping residents get connected.

4.3.2 Serving Seniors and Disabled Adults: Digital Opportunities

Cuyahoga County is uniquely positioned to assist seniors and adults with disabilities via increased connectivity and service efficiencies. Connected Insights places value on the welfare of each member of the population served by DSAS and has identified the following opportunities for growth based on challenges outlined in section 4.3.1:

1. In an effort to better position the department as it works to address a future lack of connectivity among older and disabled adults, Connected Insights suggests the addition of 1–3 questions to assessments (those administered by Information Services and the Options program) related to clients’ level of home connectivity and digital skills. These additional questions would provide a baseline upon which the county could begin to place smart home tools and telemedicine resources while simultaneously increasing online communications.

2. Digital literacy programming support (e.g., skills training and connectivity assessment) at DSAS's 39 senior centers presents a unique opportunity to serve seniors in myriad ways:
 - a. Digital skills can combat seniors' feelings of social isolation through instruction of social media and email usage.
 - b. Digital literacy facilitates engagement in higher-level learning (when someone begins to learn something new) and can increase cognitive function.
 - c. Digital skills can prepare adults for doctor's visits, enable them to access online health records, and (where applicable) make use of telehealth technologies.
 - d. Training for online banking (which can save branch trips for less mobile seniors), self-protection (e.g., information theft), online ordering of groceries and other goods (which can save trips to the grocery store), and online bill payment (which saves a trip to the post office).
3. Online platforms can be used in service of awareness-raising on recognition of signs of abuse. Some ideas include the creation of online trainings and short video tutorials; leveraging of social media; and the broadcast of embedded videos to community leaders and any family members who are connected to current clients and listed on file

4.4 Department of Child and Family Services (CFS)

The Department of Child and Family Services (CFS) works to keep children safe from abuse and neglect while safely stabilizing and reuniting families facing poverty, illness or crisis.

As of April 2019, CFS has 2,675 children in protective custody⁷². According to the department's 2018 Statistical Report, protective services for children in the county has increased by 5% in the past 2 years⁷³. CFS's flagship program supports the 24/7, staffed 216-696-KIDS hotline (open on holidays). Through this hotline, the county screens referrals of suspected child abuse and neglect and makes recommendations for next steps if necessary.

Additionally, Cuyahoga County conducts child abuse and neglect investigations and provides short-term and extended family services such as medical care, mental health services, addiction treatment, behavioral intervention, parenting classes, and trauma therapy and counseling.

Finally, the CFS operates the county's foster care and adoption services programs.

⁷² <http://cfs.cuyahogacounty.us/en-US/Reports-Data.aspx>

⁷³ http://cfs.cuyahogacounty.us/pdf_cfs/en-US/reports/2018StatisticalReport.pdf

4.4.1 Digital Challenges Faced by CFS

During 2018–2019, Connected Insights met with Department of Child and Family Services (CFS) staff and identified the following opportunities for improvement in the department's online systems:

1. The first challenge raised by staff concerned the connection of poverty to the underlying issue facing the department; living in poverty greatly increases the likelihood that a parent or family would come in contact with the department. This assertion aligns directly with a 2019 working paper published by the National Bureau of Economic Research (NBER) entitled "Poverty and Mistreatment of Children go Hand in Hand."⁷⁴ In this paper, NBER research associates Christina Paxson and Jane Waldfogel find that "increases in the fraction of children in extreme poverty result in increases in maltreatment. For example, if the fraction of children below 75% of the poverty line rises from 10%–15% in a state, the number of total victims of maltreatment is estimated to rise by 22%."⁷⁵
2. Upon initiation of a CFS investigation, each person related to a case receives a letter mailed through the U.S. Postal Service at prescribed times indicating the status of their case. The department tracks this mail activity closely (the state requires documentation of notification) and acknowledges that a major departmental challenge is the large amount of unopened and undelivered mail. Currently, while CFS uses multiple means of contact (phone, SMS, email) when available, the rationale behind the current mail system policy is that the mail system is less dependent on individuals' internet skills and access as a means of communication with the department. This point is well taken. As the majority of families dealing with custody issues are low-income (as chapter 2 shows), the current rate of nonconnection among families making \$20,000 or less annually is 52%.
3. Recruitment of foster parents is a top priority for CFS. As more children enter protective care every year, CFS experiences increasingly short numbers of safe, screened, and certified fosters. Currently, fostering requires a minimum of thirty hours of training and certification. Only a portion of this instruction can be accomplished online, requiring stable working families to accommodate training scheduled during work hours in order to be eligible. Most adoptive parents begin by fostering, but they require additional in-person training beyond that required of foster parents.

⁷⁴ National Bureau of Economic Research. "Poverty and Mistreatment of Children Go Hand in Hand." Accessed May 28, 2019. <https://www.nber.org/digest/jan00/w7343.html>.

⁷⁵ Christina Paxson and Jane Waldfogel. "Work, welfare, and child maltreatment." *Journal of Labor Economics* 20, no. 3 (2002): 435-474. <https://doi.org/10.3386/w7343>.

4.4.2 Protecting Children and Families: Digital Opportunities

Cuyahoga County is uniquely positioned to improve its ability to protect children and families through digital efficiency. Connected Insights has identified the following opportunities for program improvements based on challenges outlined in section 4.4.1:

1. Considering the large percentage of low-income families that qualify for and receive assistance from multiple governmental programs (e.g., SNAP, TANF, Medicaid, etc.), it follows that many CFS clients would also qualify for and receive one or more social services. Therefore, if the county works to bring internet connectivity to all social services recipients (including skills training if needed), that all social service recipients were provided a connection to the internet (and skills training if needed), CFS would be positioned to management monthly communications in an online platform, reducing communications cost while improving communications development and response rate. This, in turn, has the capacity to improve customer service while reducing timeline pressures when multiple departments simultaneously address the concerns of a case.
2. In addition to an online presence—CFS communicates with the public about foster opportunities and raises awareness about child abuse and neglect via Facebook and a dedicated website—CFS would benefit from the following:
 - a. An increase in the number of online opportunities available to residents regarding the foster and adoption process and certification
 - b. An online presence for all available CFS training modules—offered via video tutorials or through distance-learning classes offered by local community colleges
 - c. Creation of avenues for online public charitable contribution (e.g., an Amazon Wish List) dedicated to children in the county’s care, broadcast particularly during holidays

4.5 Department of Development (DOD)

The Department of Development (DOD) administers programs that support Cuyahoga County charter’s mandate to provide “job creation and economic growth as a fundamental government purpose” by developing and directing creative, innovative services in community development, economic development, and housing.

While DOD’s efforts serve improved economic conditions for all Cuyahoga County residents, this department works directly with vendors, businesses, nonprofits, and universities instead of residents. Increased digital connectivity among residents impacts this department indirectly as a digitally skilled local workforce can draw prospective businesses to the county. Although higher degrees of resident connectivity do not directly affect the DOD, benefits enjoyed by the county as the result of increased online interaction with residents also benefits the DOD.

4.5.1 Digital Challenges and Opportunities for DOD

During 2018–2019, Connected Insights met with DOD staff and identified the following opportunities for improvement in the department’s use of online systems:

1. The department is considering future use of vendors in the management of its housing rehab program. Currently, the Request for Proposal (RFP) process is long—often taking 6–9 months—and remains a paper-based endeavor. If the home rehab program moves in the direction of a vendor model, financial pressure may ensue as bidding prices become “stale” by the time an RFP is awarded; a lengthy approval process, drawn out by a paper-based system, may prove bid prices inaccurate by the time of RFP award. DOD leadership feels that a transition to online processing would accelerate the RFP process, shortening the time between RFP submission (when bids are originally submitted) and RFP award, thus preserving the accuracy of bid prices.
2. DOD’s development activities and workforce program (SkillUp) both provide reimbursements to vendors and businesses, respectively. However, Cuyahoga County cannot currently accept ACH payments. Instead, County Records performs a double-check of ledgers in two (separate) divisions in order to provide accuracy. While exact measurements of time spent checking accuracy in each of these transactions could not be provided, DOD leadership feels the addition of ACH capability could eliminate one of these transactions, saving staff time and money. Staff noted, “This would also be time-saving from the perspective of when payments are recorded in our system; we wouldn’t have to wait for a check to ‘clear.’ Ideally, we’d also be able to make disbursements via ACH. Finally, it would be a tremendous service to our borrowers.”

4.6 Cuyahoga County Treasurer’s Office

Connected Insights’ conversations with the Cuyahoga County Treasurer’s Office illuminated challenges presented by paper. Connected Insights learned that approximately two-thirds of the total volume of property tax receipts (apart from those received through mortgage escrows), are received by paper check.

These paper checks can be received in several offline ways: in person at the Treasurer’s Office, through the mail, and at various bank locations.

The county, however, very much prefers digital receipt of property tax payments rather than paper. Digital payments provide a more timely cash receipt; lower incidences of failed transactions; immediate county record systems updates; and lower processing costs overall.

4.6.1 Digital Challenges Faced by the County Treasurer's Office

During 2018–2019, Connected Insights met with staff from Cuyahoga County's Treasurer's Office and identified the following challenges presented by the department's use of online systems:

1. The county incurs bank fees for the high volume of property tax payments submitted in the form of paper checks.
2. A high portion of residents choosing to make property tax payments in person are elderly, one of the least digitally connected demographics in Cuyahoga County.
3. The Treasurer's Office operates only one physical office location at which property owners can appear in person to pay property taxes.
4. This office experiences a high volume of customer visits resulting in substantial wait times in advance of semi-annual property tax payment deadlines.

4.6.2 Treasury Efficiency: Digital Opportunities

Cuyahoga County is uniquely positioned to improve its ability to improve Treasury operations through digital efficiencies. Connected Insights has identified the following opportunities for program improvements based on challenges outlined in section 4.6.1:

1. The Treasurer's Office has the opportunity to reduce bank fees associated with paper check processing by increasing the number of property owners who make online property tax payments.
2. The Treasurer's Office can improve customer service and reduce customer waiting times by increasing the proportion of property owners who make online property tax payments, reducing in-person payment visits to the Treasurer's Office. Fewer in-person tax payments leaves more room for staff to address immediate customer needs; the shift of resources from payment receipt and processing puts the focus on serious housing needs like the avoidance of foreclosure proceedings.
3. Collection of information from in-person office visitors would help the Treasurer's Office better understand the purpose behind such visits; this feedback would help the Office of the Treasury determine if customer needs can better be served through digital inclusion efforts or other digital service improvements.
4. Planned improvements to public-facing digital services offered by the Treasurer's Office can provide a more user-friendly customer experience. Active promotion of these improvements can offer cost savings to the county as paper checks are replaced by digital property tax payments.
5. It is advantageous for the Treasurer's Office to work with community partners in the training of staff with the intention of instructing property owners in digital tax payments to the (improved) system; this training would be most effective at libraries, senior centers, and other strategically targeted locations.

4.7 Workforce Development

Two aspects of digital inclusion can be viewed as crucial for workforce programs:

- Digital skills necessary for jobs and
- Access to information that helps workers find jobs and sustain employment.

With the exception of SkillUp, a customized workforce training program described in section 4.5, workforce development is delivered through contractors. Cuyahoga County has the unique opportunity to promote digital inclusion through these programs.

Research by the Brookings Institution⁷⁶ has identified, for each metropolitan area, occupations more likely to provide “good” jobs (i.e., middle-class wages and benefits) and promising jobs that provide pathways to better jobs in the future. Appendix C includes the profile for such jobs in the Cleveland metropolitan area.

These occupations, spanning industries, require use of new technologies, a point echoed by research on digital skills and middle-skill jobs⁷⁷. Workers also benefit from the ability to adapt to changing markets and desired workplace skills. Job market adaptability may require further on-the-job training over time along with digital skills support options (e.g., online training). Finally, workers who switch jobs frequently (e.g., those who move from promising jobs to “good” jobs) enjoy better wages and opportunities⁷⁸; information technology is critical for search.

Online information can extend the geographic boundaries of job seekers’ networks while providing information regarding mass transit and ridesharing. Spatial mismatch between skills and job opportunities along with limited information on jobs within personal networks present well-known barriers to employment for residents of high-poverty neighborhoods⁷⁹.

Home internet access is virtually essential for economic mobility and opportunity. As described in section 1.4, job searches are far more difficult to conduct on small smartphone screens and without keyboards. The need to constantly monitor email to check progress on applications puts a drain on capped mobile data plans. Libraries are not a good option due to the need to monitor and respond promptly to opportunities. More and more interviews are conducted by video calling which would be impossible in a public setting. Unemployed Cleveland adults show a lower rate of broadband subscription, 74.2% compared with 85.8% of unemployed adults in the US. Use in Cleveland also trails that in six diverse cities (see figure 11)⁸⁰.

⁷⁶ Shearer and Shah, “Opportunity Industries”

⁷⁷ Horrigan, “Digital Skills”

⁷⁸ Shearer and Shah, “Opportunity Industries”

⁷⁹ Granovetter, “The Strength”; Kain, “Housing Segregation”

⁸⁰ American Community Survey 2013–2017

Of Unemployed Adults, % with Home Computer & Broadband, ACS Table S2802

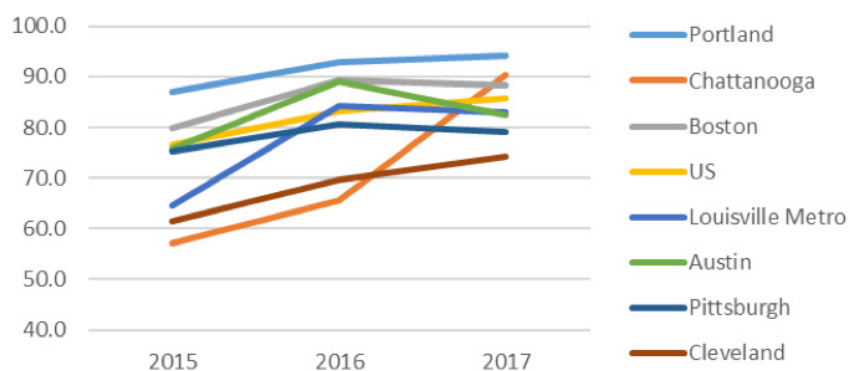


Figure 11. Home Computer and Broadband Use by Unemployed Adults, Derived from Table S2802, 2015–2017 American Community Survey One Year Estimates; in, Sheon, Computers and Broadband in the Home: Trends and City Comparisons. , accessed May 22, 2019; <https://insight.livestories.com/s/v2/home-computers-and-broadband-subscriptions/4b88e51e-662e-4fd8-82ce-f234c5bc423>.

Digital inclusion programs can address employment and success pathway barriers thorough skill development and home access support.

4.7.1 Digital Challenges Faced by SkillUp

During 2018–2019, Connected Insights met with SkillUp staff and identified the following opportunities for improvement in the department’s online systems:

1. More online engagement is needed for process management, as workforce development depends on collaboration with employers and contractors. There is a need to streamline processes and reduce the burden of reporting for employers, in particular.
2. Measuring economic impact for workforce development programs is needed. Currently data is collected mostly on contracting and outputs rather than impact.
3. There is a priority to address economic mobility/good jobs rather than simply employment, and to prepare for changes in the workforce such as the displacement of routine jobs through artificial intelligence.

4.7.2 Opportunities for a Connected Workforce

1. There is room to include general and workplace-specific digital skills development in the customized plans developed by SkillUp and employers (e.g., coding, logistics, spreadsheet creation and management, etc.) Advanced digital skills assist workers’ economic mobility as they can be useful to many different employers across multiple industries.
2. Workforce development programs offered by Ohio Means Jobs provide opportunities for the development of skills online through job search, resume preparation, and

online training programs. Attention paid by these programs to digital skills as well as resume preparation supports sustainable employment.

3. The individualized training accounts offered through Ohio Means Jobs might provide an avenue for residents to learn advanced digital skills (e.g., certifications) along with the basic computer skills furnished by digital inclusion programs.
4. Upon learning basic and advanced digital skills, home broadband provides a platform for job seekers to practice skills and conduct independent employment searches. Workforce development programs provide the perfect opportunity to link nonconnected individuals to community-based organizations that offer information on low-cost options for computers and home broadband.
5. Residents are motivated to join digital inclusion programs when they are engaged in job searches and attempting to maintain employment⁸¹. In turn, community-based digital inclusion programs will find partnership with county workforce development programs beneficial to their interests as they support residents' job search and employment-relevant skill building.
6. When more job-seeking clients possess adequate internet access and skills, all county programs experience higher degrees of coordination and accountability, including collaborative services involving employers and contractors. Online program registration and data sharing can streamline and enhance all providers' data collection, reporting, and coordination. Improved data collection leads to enhanced outcomes tracking.

4.8 Improving Cuyahoga County Health Outcomes

4.8.1 Health Benefits of Connectivity

Although Cuyahoga County does not directly provide health care to residents, the county supports residents' health through partnership with MetroHealth, the county's public hospital, and through services provided by the Cuyahoga County Board of Health and the Cleveland Department of Public Health.

These safety net facilities provide vital services for vulnerable families including immunizations, family planning, sexually transmitted disease testing and treatment. They also serve all residents by providing information about new and emerging health threats such as the Zika and West Nile viruses, and through messaging to prevent chronic disease and improve its management. Influenza immunizations can dramatically lower the risk of hospitalization and death, especially among older adults. In Cuyahoga County, only 48.9% of Medicare recipients had received a flu vaccine, compared with the national benchmark of 70%⁸². Outreach by health care systems through text and electronic health record portals has been shown to improve

⁸¹ Mossberger, Feeney, and Li, *Smart Communities Evaluation*; Schartman-Cyck and Krebs, *Adoption Persistence*

⁸² Mossberger, Feeney, and Li, *Smart Communities Evaluation*; Schartman-Cyck and Krebs, *Adoption Persistence*

immunization rates⁸³.

The benefits of connectivity to other county-supported or county-administered health-related programs (e.g., SNAP and WIC) have been described in chapter 3 and in earlier sections of this chapter.

4.8.2 Health Outcomes: Digital Challenges and Opportunities

Table 9 provides a comprehensive review of opportunities for improved health outcomes offered by digital inclusion. Because health represents such a significant fraction of the economy and has a complex relationship with digital inclusion, Appendix D contains an extensive review of relevant perspectives.

Improved connectivity greatly improves seniors and low-income populations' access to health-related information and resources. Health-focused internet usage empowers seniors and low-income residents as they can better follow advice provided by health providers, exercise health-management autonomy, and initiate engagement with health-care providers when assistance is needed. In general, connectivity offers seniors and low-income residents' higher feelings of agency concerning their health.

Based on the analysis in Appendix D, Connected Insights has identified some key opportunities to promote health support goals outlined in Cuyahoga County's 2017–2022 strategic plan⁸⁴:

1. Digital inclusion can reduce costs and increase the efficacy of health-care programs. Studies have shown that digital skill training can improve overall health literacy, increasing the effectiveness of health care. Improvements in health literacy as the result of digital inclusion can be seen in higher numbers of preventative care screenings and reduced numbers of emergency room visits, hospital admissions, and medication errors.
2. Electronic health record systems have transformed health-care administration while creating tools carrying significant potential value for patients.
3. However, patients require both connectivity and digital skill training to make use of patient portals for a variety of health-related tasks like appointment scheduling, electronic communication with doctors, and monitoring of lab test results.
4. Cleveland is currently pioneering a model to train community health workers to screen patients for digital skills and connectivity. This model refers nonconnected, digitally untrained patients to community partners that can then provide them with basic digital skills training. The community health workers can then train patients to use digitally enabled tools to monitor and manage their health. Examples include wearable activity-tracking devices, remote glucose and blood pressure monitors, and telehealth.

83 Sarah L. Cutrona, Jessica G. Golden, Sarah L. Goff, Jessica Ogarek, Bruce Barton, Lloyd Fisher, Peggy Preusse, Devi Sundaresan, Lawrence Garber, and Kathleen M. Mazor. "Improving Rates of Outpatient Influenza Vaccination Through EHR Portal Messages and Interactive Automated Calls: A Randomized Controlled Trial." *Journal of General Internal Medicine* 33, no. 5 (2018): 659-67. <https://doi.org/10.1007/s11606-017-4266-9>.

84 For a more detailed description of digital opportunities for health-care improvements in programs serving children, foster youth, the homeless, seniors, and more, see table 8.

CHAPTER 5: Cuyahoga County's Digital Inclusion Strategy: Recommendations

5.1 Data and Evaluation

Mechanisms for the estimation of cost savings would serve Cuyahoga County as it strives to measure positive impacts of increased digital inclusion. Tracking of high-volume programs that serve low-income clients (e.g., TANF, Medicaid, and SNAP) and programs assisting elderly clients will provide particularly important information.

Information tracking of these program services requires systematic data on the numbers of clients served, processes, and resources (e.g., personnel hours) required for provision of these services (digital or otherwise).

Cuyahoga County agencies would benefit from conducting internal studies identifying resources (e.g., labor, supplies, postage, etc.) expended by the county as it carries out various non-digital transactions. This information will enable the county to estimate the cost savings associated with the conversion of in-person transactions to digital transactions.

5.1.2 Data Collection: The Specifics

Connected Insights identifies the following data as useful to the county's efforts to measure cost savings:

- Purpose of each client contact
- Information ascertaining whether contact could have been avoided if the client were digitally enabled
- Client opportunity cost associated with contact (i.e. estimates of averages for lost hours of compensated work, transportation costs)
- Data to identify why a client household is not digitally-enabled to assess the feasibility of enabling that client's household.

Data collected from the period prior to inclusion efforts can serve as the baseline from which the effects of the digital improvements can be determined. Internal data collection will help Cuyahoga County measure its budget savings; additionally, data collection will reveal the estimated cost savings that clients realize as higher percentages interact with the county online.

The immediate return from investing in digital inclusion is significant for both the county and its residents. But as this report shows, outcomes for clients and the associated benefits to society may be of even more importance in the long run.

Outcomes assessment requires program evaluation, and it is critical to plan for evaluation prior to program launch. Especially important is the collection of appropriate baseline data on participants in digital inclusion activities—for example, basic questions about current internet use and computer skills. Participant evaluation prior to participation is necessary for a before-and-after comparison.

Development of overall program design is also needed before implementation. Randomized selection could be utilized in the creation of treatment and control groups. This method is considered the gold standard for evaluation, similar to the approach used in clinical trials. If it is not possible to randomize the treatment, a quasi-experimental design can be developed that compares digital inclusion program participants to similar clients in areas in which such programs do not exist; this design is based on the likelihood that pilots will launch in certain neighborhoods before others.

Cuyahoga County already possesses client background information relevant to the design of a comparable control group, but evaluation design needs to account for exactly how program rollout will occur before that rollout happens. Formative evaluation can also assist Cuyahoga County with an assessment of initial efforts, followed by a later impact evaluation of participant outcomes.

Cuyahoga County has a unique opportunity to measure the effects of digital inclusion by leveraging its own social services data with participant surveys; this information can be used to track meaningful outcomes over time for program participants, illuminating precisely how digital inclusion can benefit residents and the county.

5.2 Digital Inclusion Leadership Position

Cuyahoga County will benefit from the creation of permanent leadership positions within the Office of Innovation and Performance (OIP), responsible for overall policy, program design, and management in the area of digital inclusion.

For greatest impact, the following responsibilities can be divided among two or more staff positions:

- Act as a central home for information and understanding of Cuyahoga County's digital inclusion ecosystem, including resources related to connectivity, devices, and training; develop an easy-reference "grid" of available digital inclusion resources
- Strengthen the capacity of the digital inclusion ecosystem by:
 - Facilitating partnerships
 - Convening stakeholders
 - Facilitating communication between stakeholders through a coalition or peer-to-peer network

- Identifying best practices from the NDIA network and elsewhere; ensure those practices are understood and, where appropriate, implemented in Cuyahoga County
- Provide capacity-building support to community organizations interested in integrating digital inclusion initiatives into their programs
- Connect with county departments in an effort to identify opportunities for integration of internet connectivity components into ongoing service provision and projects
- Research local and national regulatory and policy barriers limiting access to and use of broadband
- Research local opportunities for increasing access to and use of broadband
- Convene all partners invested in Cuyahoga County's digital inclusion efforts; work in concert with partners to effectively connect and efficiently grow current digital inclusion resources
- Identify, develop, or contract with appropriate digital inclusion expert to approve a standardized curriculum
- Provide training support for selected vendors
- Develop methodology to track and evaluate Cuyahoga County's digital inclusion efforts and the impact of these efforts over time
- Communicate and share openly about progression of work on an ongoing basis
- Convene and manage a Digital Inclusion Advisory Council
- Supported by the Digital Inclusion Advisory Council, recommend digital equity goals to the county executive; update recommended goals every two years
- Supported by the Digital Inclusion Advisory Council, use RFP process to award contracts in support of Cuyahoga County's digital inclusion goals
- Manage contract-awarded vendors
- Ensure collection of longitudinal impact data by vendors working to provide digital inclusion services
- Recommend community benefits identified by the county's technology vendor contracts
- Produce a yearly report for submission to the Cuyahoga County Council on the status of Cuyahoga County's digital equity

5.3 Advisory Council on Digital Inclusion

Working in concert with the director of the Office of Innovation and Performance, the county's digital inclusion team leader can create and convene an advisory council comprising both county department staff and community stakeholders. This advisory council should consider the following duties:

- Collaborate with IT and department staff on recommendations for the development of systems and processes for making recommendations about obtaining and managing data useful to an assessment of digital inclusion's public benefit and financial returns
- Identify new or existing data from county and state sources that can inform an assessment of the public benefit and financial returns of digital inclusion
- Support implementation of the county's digital inclusion initiatives
- Provide a sounding board for the chief innovation officer as well as digital inclusion staff on digital inclusion policies and plans
- Increase community engagement with and awareness and discussion of county digital inclusion initiatives
- Provide input on the alignment of community interests with county initiatives

5.4 Budget Overview: Cuyahoga County Digital Inclusion Program

Connected Insights identifies the following four areas of need for fund allocation in support of the Digital Inclusion Program and Office of Digital Inclusion:

1. Central staff costs, overhead, and program materials
2. Departmental innovations and community partnerships to promote digital inclusion for nonconnected departmental clients; e.g., funds to support DSAS-sponsored training by existing staff at county-managed senior centers
3. A competitive grant process to support not-for-profit entities assisting nonconnected, low-income county clients with training and support
4. Direct support for each program participant of internet support for one year (approximate cost of \$200 per year)

5.5 Recommendations for County-Managed Digital Inclusion Initiatives

5.5.1 Competitive Grant Operational Leadership

Connected Insights recommends that Cuyahoga County take operational leadership of an ongoing Competitive Grant Initiative supporting digital inclusion. Best results for digital inclusion will be met by this initiative.

The value of county leadership of this role is that it ensures a level playing field whereby the many resources and contributors available throughout the county may be strategically implemented for the good of all residents.

5.5.2 Initial Process: Goals and Standards

Upon Cuyahoga County's hire of a digital inclusion team and assembly of the advisory council, the team will develop goals and standards for this program in consultation with the advisory council, including:

- Identify target populations
- Identify number of participants trained per year
- Identify content of training, including content specific to the county's interest moving service recipients to online benefits management
- Standard pre- and post-assessments
- Program management and reporting requirements
- Address paths to affordable equipment
- Any other requirements by county law and policy

From these goals and standards, digital inclusion leadership will create an open RFP process and determine the mix and size of awards in response to submissions. The goal of this initial process is to enter the county into a set of contracts with qualifying providers that will collectively provide training and digital inclusion support.

5.5.3 Centralized Data and Reporting Process

Necessary for the overall mission of the program is the establishment of a system for collecting and evaluating data through which progress and accountability are assessed in an ongoing way. Useful data includes:

- Collection of standard intake data from participants
- Participation/attendance tracking
- Skill assessments
- Home connectivity and computer/device ownership status

5.5.4 Standards for an Effective Digital Inclusion Program

- Class sizes should be manageable—ideally containing 8–12 computer stations; classes should permit personalized instruction transferrable to community locations that may not have large labs
- 24 hours of training including:
 - A basic skills curriculum that follows the NorthStar Assessment protocol or a similar platform
 - A specialized training on the online management of county services and benefits.

5.5.5 Participation Goals and Program Scale

Connected Insights' extensive experience working in the county and its knowledge of existing resources and stakeholders lead it to recommend an initial three-year training goal of 7,500 trainees.

This number was selected to provide high impact while setting realistic production expectations, given experienced leadership. An additional description and rationale for Connected Insights' recommendations are provided in the following section.

5.5.6 Cost Modeling: Cuyahoga County's Digital Inclusion Program

What would it cost for the county to implement a large-scale program as described above?

Here provided are Connected Insights' cost estimates for two of the four proposed program components: the Competitive Digital Inclusion Grant initiative and direct internet cost support for Cuyahoga County social service programs who participate in digital inclusion programs.

The other two components—central administration of the overall Digital Inclusion initiative by county personnel and funding for innovative departmental initiatives—are not included in this estimate. (These programs involve county staffing, overhead policies, and other internal factors beyond the expertise of Connected Insights.)

But it is possible to describe, from direct experience in this community and others, the components and likely costs of a large-scale, community-based digital inclusion training program of the kind Connected Insights recommends be funded by the county through the proposed Competitive Grant initiative.

As participation targets are identified for this estimate, Connected Insights can easily add in the cost of home internet subsidies for those participants.

The model presented by Connected Insights incorporates the following key assumptions:

1. In an effort to provide significant impact for Cuyahoga County, Connected Insights projects an annual trainee participation between 3,000 and 4,000. It is assumed this level of participation will be achieved in stages over a three-year period. Using this base-level projection, annual participation estimates are:

First year: 1,500
Second year: 2,500
Third year: 3,500

2. The projected numbers of “community contractors” (i.e. recipients of competitive grant funding) are necessarily arbitrary:

First year: 2
Second year: 3
Third year: 4

The actual number of grantees and their approved budgets for marketing and training support activities is dependent upon the results of the proposed open RFP process. The county might decide, for example, to divide its funding and associated training deliverables among a larger number of applicant organizations; such division tends to raise total program organizational support costs, but it might result in better community penetration and marketing. Connected Insights’ estimate here is conservative.

3. For each trainee, Connected Insights assumes a \$200, one-year direct internet cost subsidy. This number obviously depends on program design, negotiations with providers, etc. It is important to note that this cost assumes that 100% of the estimated participants will complete the training and then go on to use the subsidy—an unlikely scenario; it also assumes the subsidy will only be offered to those county clients who participate in training. Some clients who need help with connection costs might, in actuality, have no need for basic digital skills training. To some extent, these variables (non-

completers and those with the potential to “test out” of training) could offset each other.

4. We assume no county computer equipment subsidies for trainees because:

- Very affordable refurbished computer systems are now readily available to lower-income households through PCs for People and other sources.
- Donated computers present a relatively easy “ask” from corporate sources for participating nonprofits that want to provide them at no cost (i.e. as an in-kind contribution adding value).
- Free or heavily subsidized internet service is anticipated to be a “more than adequate” participation incentive.

Connected Insights assumes that residents will fulfill their own device needs according to their preferences. It is anticipated that the program will act as a reference, referring clients to community resources such as RET3 (a computer refurbishing nonprofit) and PCs for People. At these community resources, residents may purchase a desktop computer for \$50 if so desired.

Based on this set of cost assumptions, Connected Insights offers the following, bottom-line estimates for the proposed Competitive Digital Inclusion Grant Initiative and Internet Cost Subsidy:

Sample Digital Inclusion Program Cost Summary

Note: This cost summary is based on figures calculated in detail in Appendix E.

Year	# Of Participants	# Of Contractors	Total Training Cost	Per Participant Training Cost	Total Yearly Internet Subsidy Costs @ \$200/ Participant	Total Yearly Program Cost
Year 1	1,500	2	\$449,500	\$300	\$300,000	\$749,500
Year 2	2,500	3	\$680,500	\$272	\$500,000	\$1,180,500
Year 3	3,500	4	\$911,500	\$260	\$700,000	\$1,611,500
TOTALS	7,500		\$2,041,500		\$1,500,000	\$3,541,500

Table 6. Sample Digital Inclusion Program Cost Summary

Bibliography

- American Library Association. "Job-seeking in U.S. Public Libraries." Last updated June 2011. http://www.ala.org/tools/sites/ala.org.tools/files/content/initiatives/plftas/2010_2011/jobsbrief11.pdf.
- Berger, Jasper B., Morten Hertzum, and Trine Schreber. "Does Local Government Staff Perceive Digital Communications with Citizens as Improved Service?" *Government Information Quarterly* 33 (2016): 258-269. <https://doi.org/10.1016/j.giq.2016.03.003>.
- Brynjolfsson, Erik and Adam Saunders. *Wired for Innovation: How Information Technology is Reshaping the Economy*. Cambridge: MIT Press, 2010.
- Center for Public Policy and Administration. "Smarter eGovernment: The Economics of Online Services in Utah." The University of Utah. 2012. https://gardner.utah.edu/_documents/publications/e-gov/Smarter%20eGovernment%20Economics%20Final.pdf.
- Chen, Yu-Che. *Managing Digital Governance: Issues, Challenges, and Solutions*. New York: Routledge, 2017.
- Cutrona, Sarah L., Jessica G. Golden, Sarah L. Goff, Jessica Ogarek, Bruce Barton, Lloyd Fisher, Peggy Preusse, Devi Sundaresan, Lawrence Garber, and Kathleen M. Mazor. "Improving Rates of Outpatient Influenza Vaccination Through EHR Portal Messages and Interactive Automated Calls: A Randomized Controlled Trial." *Journal of General Internal Medicine* 33, no. 5 (2018): 659-67. <https://doi.org/10.1007/s11606-017-4266-9>.
- Cuyahoga County. "Five- Year Economic Development Plan, 2018-2022." 2018. <https://cuyahogacounty.us/docs/default-source/development/economicdevelopmentplan.pdf>.
- Cuyahoga County. "2018 Cuyahoga County Community Health Assessment." Accessed November 15, 2018. <http://hipcuyahoga.org/2018cha/>.
- Digital Agenda Norway. *Digitizing Public Sector Services: Norwegian eGovernment Program*. Ministry of Government Administration, Reform and Church Affairs. 2012. Accessed June 28, 2019. https://www.regjeringen.no/globalassets/upload/fad/kampanje/dan/regjeringensdigitaliseringsprogram/digit_prg_eng.pdf.
- DiMaggio, Paul and Bart Bonikowski. "Make Money Surfing the Web? The Impact of Internet Use on the Earnings of U.S. Workers." *American Sociological Review* 73, no. 2 (2008): 227-50. <https://doi.org/10.1177/000312240807300203>.
- DiMaggio, Paul, Eszter Hargittai, W. Russell Neuman, and John P. Robinson. "Social Implications of the Internet." *Annual Review of Sociology* 27, no. 1 (2001): 307-36. <https://doi.org/10.1146/annurev.soc.27.1.307>.

- Falck, Oliver. "Does Broadband Infrastructure Boost Employment?" IZA World of Labor. 2017. <https://wol.iza.org/uploads/articles/341/pdfs/does-broadband-infrastructure-boost-employment.pdf>.
- Falco, Enzo and Reinout Kleinhans. "Digital Participatory Platforms for Co-Production in Urban Development: A Systematic Review." *International Journal of E-Planning Research* 7, no. 3 (2018): 1-27. <https://doi.org/10.4018/IJEPR.2018070105>.
- Federal Communications Commission. "FCC Seeks Comment on Launching Connected Care Pilot Program." August 3, 2018. <https://www.fcc.gov/document/fcc-seeks-comment-launching-connected-care-pilot-program>.
- Fernandez, Laleah, Bianca C. Reisdorf, and William H. Dutton. "Urban Internet Myths and Realities: A Detroit Case Study." *Information, Communication & Society* (2019): 1-22. <https://doi.org/10.1080/1369118x.2019.1622764>.
- Forman, Chris, Avi Goldfarb, and Shane Greenstein. "The Internet and Local Wages: A Puzzle." *American Economic Review* 102, no. 1 (2012): 556-75. <https://doi.org/10.1257/aer.102.1.556>.
- Goldberg, Rafi. "Unplugged: NTIA Survey Finds Some Americans Still Avoid Home Internet Use." National Telecommunications and Information Administration, United States Department of Commerce. April 15, 2019. <https://www.ntia.doc.gov/blog/2019/unplugged-ntia-survey-finds-some-americans-still-avoid-home-internet-use>.
- Grand-Clement, Sarah. *Digital Learning: Education and Skills in the Digital Age*. RAND Europe, 2017. https://www.rand.org/content/dam/rand/pubs/conf_proceedings/CF300/CF369/RAND_CF369.pdf.
- Granovetter, Mark S. "The Strength of Weak Ties." *American Journal of Sociology* 78, no. 6 (1973): 1360-1380. <https://doi.org/10.1016/j.giq.2016.03.003>.
- Hargittai, Eszter. "Second-Level Digital Divide: Differences in People's Online Skills." *First Monday* 7, no. 4 (2002): 1-20.
- Ho, Alfred Tat-Kei. "Reinventing Local Governments and the E-Government Initiative." *Public Administration Review* 62, no. 4 (2002): 434-444. <https://doi.org/10.1016/j.giq.2016.03.003>.
- Horrigan, John. "Digital Skills and Job Training: Community-driven Initiatives are Leading the Way in Preparing Americans for Today's Jobs." Benton Foundation, October 29, 2018. <https://www.benton.org/publications/digital-skills-and-job-training-community-driven-initiatives-are-leading-way-preparing>.
- Huang, Wan-Ling and Mary K. Feeney. "Citizen Participation in Local Government Decision Making." *Review of Public Personnel Administration* 36, no. 2 (2016): 188-209. <https://doi.org/10.1177/0734371x15576410>.
- Kaelber, David. *MetroHealth Core Case Study: Return on Investment*. Healthcare Information and Management Systems Society. Accessed May 27, 2019. <https://www.himss.org/sites/himssorg/files/FileDownloads/MetroHealth ROI.pdf>.

- Kain, John F. "Housing Segregation, Negro Employment, and Metropolitan Decentralization." *Quarterly Journal of Economics* 82, no. 2 (1968): 175-197. <https://doi.org/10.2307/1885893>.
- Kaplan, David and Karen Mossberger. "Prospects for Poor Neighborhoods in the Broadband Era." *Economic Development Quarterly* 26, no. 1 (2011): 95-105. <https://doi.org/10.1177/0891242411431450>.
- Kolko, Jed. *Does Broadband Boost Local Economic Development?* San Francisco: Public Policy Institute of California, 2010. http://www.ppic.org/content/pubs/report/R_110JKR.pdf.
- Layne, Karen and Jungwoo Lee. "Developing Fully Functional E-government: A Four Stage Model." *Government Information Quarterly* 18, no. 2 (2001): 122-36. [https://doi.org/10.1016/s0740-624x\(01\)00066-1](https://doi.org/10.1016/s0740-624x(01)00066-1).
- Lehr, William Herndon, Carlos Osorio, Sharon E. Gillett, and Marvin A. Sirbu. *Measuring Broadband's Economic Impact*. National Technical Assistance, Training, Research and Evaluation Project No. 99-07-13829. Prepared for the U.S. Department of Commerce, Economic Development Administration, 2006. http://cfp.mit.edu/publications/CFP_Papers/Measuring_bb_econ_impact-final.pdf.
- LISC Chicago. *A Platform for Participation and Innovation: Smart Communities in Chicago Master Plan*. December, 2009. <http://www.lisc-chicago.org/uploads/lisc-chicago/documents/scpmasterplan.pdf>.
- Longo, Justin, Evan Kuras, Holly Smith, David M. Hondula, and Erik Johnston. "Technology Use, Exposure to Natural Hazards, and Being Digitally Invisible: Implications for Policy Analytics." *Policy & Internet* 9, no. 1 (2017): 76-108. <https://doi.org/10.1002/poi3.144>.
- Mergel, Ines. "A Framework for Interpreting Social Media Interactions in the Public Sector." *Government Information Quarterly* 30, no. 4 (2013): 327-34. <https://doi.org/10.1016/j.giq.2013.05.015>.
- Moretti, Enrico. *The New Geography of Jobs*. Boston: Mariner Books/Houghton Mifflin Harcourt, 2013.
- Mossberger, Karen. *Smart Communities – Formative Evaluation*. University of Illinois at Chicago, Department of Public Administration. January, 2012. <https://policyinformatics.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunitiesformativeevaluation.pdf>.
- Mossberger, Karen, Mary K. Feeney, and Meng-Hao Li. *Smart Communities Evaluation: FamilyNet Centers*. Arizona State University. April, 2014. https://live-policyinformatics.ws.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunities_familynetcenters.pdf.

- Mossberger, Karen, Caroline J. Tolbert, and Christopher Anderson. Measuring Change in Internet Use and Broadband Adoption: Comparing BTOP Smart Communities and Other Chicago Neighborhoods. Arizona State University, 2014. https://live-policyinformatics.ws.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunities_measuringinternetchangeinchicago.pdf.
- Mossberger, Karen, Caroline J. Tolbert, and Christopher Anderson. "The Mobile Internet and Digital Citizenship in African-American and Latino Communities." *Information, Communication & Society* 20, no. 10 (2017): 1587-606. <https://doi.org/10.1080/1369118x.2016.1243142>.
- Mossberger, Karen, Caroline J. Tolbert, and Mary K. Feeney. Overview and Highlights: Smart Communities Evaluation. Smart Communities, April, 2014. https://policyinformatics.asu.edu/sites/default/files/%5Bterm%3Aname%5D/%5Bnode%3Acreate%3Acustom%3AYm%5D/smartcommunities_overviewhighlights_4.pdf.
- Mossberger, Karen, Caroline J. Tolbert, and William F. Franko. *Digital Cities: The Internet and the Geography of Opportunity*. New York: Oxford University Press, 2013.
- Mossberger, Karen, Caroline J. Tolbert, and Ramona S. McNeal. *Digital Citizenship: The Internet, Society, and Participation*. Cambridge: MIT Press, 2008.
- Mossberger, Karen, Yonghong Wu, and Benedict S. Jimenez. "Catching On and Catching Up: Developments and Challenges in E-Participation in Major US Cities." In *Routledge Handbook on Information Technology in Government*, 219-238. New York: Routledge, 2017.
- Muro, Mark, Sifan Liu, Jacob Whiton, and Siddarth Kulkarni. "Digitalization and the American Workforce." The Brookings Institution, November 2017. <https://www.brookings.edu/research/digitalization-and-the-american-workforce/>.
- Myeong, Seung-Hwan and Michael J. Ahn. "E-government and Citizen Trust in Government: The Role of Citizen Characteristics in the Relationship between E-Government Use and Citizen Trust in Government." In *Routledge Handbook on Information Technology in Government*, 153-167. New York: Routledge, 2017.
- National Bureau of Economic Research. "Poverty and Mistreatment of Children Go Hand in Hand." Accessed May 28, 2019. <https://www.nber.org/digest/jan00/w7343.html>.
- Paxson, Christina and Jane Waldfogel. "Work, welfare, and child maltreatment." *Journal of Labor Economics* 20, no. 3 (2002): 435-474. <https://doi.org/10.3386/w7343>.
- RWJ Foundation, "United States in Search of Nurses with Geriatrics Training." February 27, 2012. <https://www.rwjf.org/en/library/articles-and-news/2012/02/united-states-in-search-of-nurses-with-geriatrics-training.html>.
- Schartman-Cyck, Samantha and Valdis Krebs. *Adoption Persistence: A Longitudinal Study of*

- the Digital Inclusion Impact of Connect Your Community Project. August 28, 2017. http://www.asc3.org/uploads/2/4/9/8/24980903/adoption_persistence_study.pdf.
- Shearer, Richard, Alec Friedhoff, Isha Shah, and Alan Berube. "Metro Monitor 2018." Washington, DC: The Brookings Institution, 2018. <https://www.brookings.edu/research/metro-monitor-2018/>.
- Shearer, Richard and Isha Shah. "Opportunity Industries: Exploring the Industries that Concentrate Good and Promising Jobs in Metropolitan America." Brookings Institution, December 18, 2018. <https://www.brookings.edu/research/opportunity-industries/>.
- Siefer, Angela, Bill Callahan, and Tianca Crocker, "The Digital Inclusion Startup Manual." 2012. <https://www.startup.digitalinclusion.org>.
- Smith, Aaron and Dana Page. "US Smartphone Use in 2015." Pew Research Center, April 2015. <http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/>.
- Tai-Seale, Ming, N. Lance Downing, Veena Goel Jones, Richard V. Milani, Beiqun Zhao, Brian Clay, Christopher Demuth Sharp, Albert Solomon Chan, and Christopher A. Longhurst. "Technology-Enabled Consumer Engagement: Promising Practices at Four Health Care Delivery Organizations." *Health Affairs* 38, no. 3 (2019): 383-90. <https://doi.org/10.1377/hlthaff.2018.05027>.
- Tolbert, Caroline J. and Karen Mossberger. "The Effects of E-Government on Trust and Confidence in Government." *Public Administration Review* 66, no. 3 (2006): 354-69. <https://doi.org/10.1111/j.1540-6210.2006.00594.x>.
- Tolbert, Caroline J. and Karen Mossberger. Cuyahoga County Survey of Internet Access and Use. Accessed June 30, 2019. <http://connectyourcommunity.org/wp-content/uploads/2015/11/Cuyahoga-County-Survey-of-Internet-Access-and-Use.pdf>.
- Tolbert, Caroline J. and Karen Mossberger. "U.S. Current Population Survey & American Community Survey Geographic Estimates of Internet Use, 1997-2016." 2018. <https://policyinformatics.asu.edu/broadband-data-portal/dataaccess/metrodata>.
- Tolbert, Caroline J., Karen Mossberger, and Kellen Gracey. "Smart Cities and Broadband Adoption: The Geography of Economic Opportunity and Inequality." Paper prepared for delivery at the annual meeting of the American Political Science Association, Boston, MA. August 30-September 2, 2018.
- Tolbert, Caroline J., Karen Mossberger, and Kellen Gracey. "Digital Human Capital and Broadband Subscriptions: The Geography of Economic Opportunity, Prosperity, and Growth." Under Review (2019).
- Tomer, Adie, Elizabeth Kneebone, and Ranjitha Shivaram. "Signs of Digital Distress: Mapping Broadband Availability and Subscription in American Neighborhoods." Brookings Institution, September 12, 2017. <https://www.brookings.edu/research/signs-of-digital-distress-mapping-broadband-availability/>.

UK Government Digital Service. "Digital Efficiency Report." November 6, 2012. <https://www.gov.uk/government/publications/digital-efficiency-report/digital-efficiency-report>.

Van Deursen, Alexander J.A.M. and Karen Mossberger. "Any Thing for Anyone? A New Digital Divide in Internet-of-Things Skills." *Policy & Internet* 10, no. 2 (2018): 122-40. <https://doi.org/10.1002/poi3.171>.

Welch, Eric W., Christopher C. Hinnant, and M. Jae. Moon. "Linking Citizen Satisfaction with E-Government and Trust in Government." *Journal of Public Administration Research and Theory* 15, no. 3 (2005): 371-391. <https://doi.org/10.1093/jopart/mui021>.

West, Darrell M. "E-Government and the Transformation of Service Delivery and Citizen Attitudes." *Public Administration Review* 64, no. 1 (2004): 15-27. <https://doi.org/10.1111/j.1540-6210.2004.00343.x>.

Whitacre, Brian, Roberto Gallardo, and Sharon Strover. "Broadband's Contribution to Economic Growth in Rural Areas: Moving towards a Causal Relationship." *Telecommunications Policy* 38, no. 11 (2014): 1011-023. <https://doi.org/10.1016/j.telpol.2014.05.005>.

Appendix A.

Aspects of Digital Government: Efficiency and Efficacy

Governments have a vested interest in promoting greater inclusion as they seek to more fully realize the potential benefits of digital government.

As identified below⁸⁵, there are a variety of ways to leverage existing uses of technology to promote more efficient and effective digital government:

- Setting up digital government as a catalogue creates an appealing, informative online presence. Government sites can include contact information, downloadable forms, and a wealth of information about services, policies, and procedures. As much of frontline government employees' time is consumed by questions residents may have about basic government services, the benefits of adopting the catalogue function include the convenience provided to citizens. Such sites allow for quick and efficient information location regarding their government while reducing the workload of frontline employees⁸⁶.
- In the transaction function, government provides live databases and online interfaces so that citizens may, for example, renew their licenses or pay fines online. Benefits for the transaction function include making service delivery more efficient and increasing savings for both government and citizens⁸⁷.
- Vertical government integration connects systems within a single domain (e.g., Medicaid); local, state, and federal government databases are able to "talk" to each other or transfer information. An example of vertical integration is a registration system for public benefits that might be connected to federal or state agencies for eligibility cross-checking. This is one of the features of the PEAK system in Colorado. One of the biggest benefits of vertical integration may be ease of access and increased efficiency for citizens, businesses, and government-to-government transactions.
- Horizontal integration links systems across domains, possibly enabling cross-departmental collaboration or even database sharing with partner organizations. In horizontal integration, both agencies "talk" to each other or work from the same database⁸⁸. Citizens often require assistance from multiple (or overlapping) programs or services from their government; a benefit from horizontal integration is the provision of a "one-stop shop."
- Citizen engagement online is facilitated through comment forms, surveys, email,

⁸⁵ Berger, Hertzum, and Schreber, "Does Local Government Staff"; Ho, "Reinventing Local Governments"; Layne and Lee, "Developing Fully Functional E-government"; Mergel, "A Framework"

⁸⁶ Layne and Lee, "Developing Fully Functional E-government"

⁸⁷ Layne and Lee, "Developing Fully Functional E-government"

⁸⁸ Layne and Lee, "Developing Fully Functional E-government"

social media, and dedicated platforms or apps that solicit ideas and discussion of policy issues⁸⁹. Social media, for example, facilitates two-way information flows enhancing the potential for citizen involvement and greater responsiveness by county services⁹⁰.

- Advances in digital technologies promote data collection on new scales, predictive analytics, and open data sharing. Online transactions and electronic records can be analyzed to improve services, target needs, facilitate collaboration with partners, and promote transparency. But, to the extent that some recipients remain offline, data collection will be less efficient or complete as the needs of some users are less visible in the system⁹¹.

89 Enzo Falco and Reinout Kleinhans. "Digital Participatory Platforms for Co-Production in Urban Development: A Systematic Review." *International Journal of E-Planning Research* 7, no. 3 (2018): 1-27. <https://doi.org/10.4018/IJEPR.2018070105>; Wan-Ling Huang and Mary K. Feeney. "Citizen Participation in Local Government Decision Making." *Review of Public Personnel Administration* 36, no. 2 (2016): 188-209. <https://doi.org/10.1177/0734371x15576410>; Karen Mossberger, Yonghong Wu, and Benedict S. Jimenez. "Catching On and Catching Up: Developments and Challenges in E-Participation in Major US Cities." In *Routledge Handbook on Information Technology in Government*, 219-238. New York: Routledge, 2017.

90 Mergel, "A Framework"

91 Justin Longo, Evan Kuras, Holly Smith, David M. Hondula, and Erik Johnston. "Technology Use, Exposure to Natural Hazards, and Being Digitally Invisible: Implications for Policy Analytics." *Policy & Internet* 9, no. 1 (2017): 76-108. <https://doi.org/10.1002/poi3.144>.

Appendix B. Cost Savings for Digital Transactions: Estimates from Prior Studies

Cost Ratio by Transaction Method

Source: Data adapted from various texts.

*Cited In UK Government Digital Service, 2012—original reports not available online

Cost Ratio by Transaction Method		Source
In-person	100%	Potential for Channel Shift in Local Government, SOCTIM, 2012.*
Phone	33%	
Digital / Online	2%	
In-person	100%	“Digitizing Public Sector Services Norwegian eGovernment Program,” Digital Agenda Norway, 2012, page 8.
Phone	50%	
Digital / Online	4%	
Postal	100%	Customer Contact Profiling Report-ESD Toolkit, Aston Campbell Associates, 2008.*
In-person	87%	
Phone	28%	
Digital / Online	1%	
Postal	100%	Champion for Digital Inclusion - The Economic Case for Digital Inclusion, Price Waterhouse Coopers, October 2009, page 47.*
In-person	87%	
Phone	28%	
Digital / Online	1%	
Offline	100%	Smarter eGovernment The Economics of Online Services in Utah, Fall 2012. University of Utah - Center for Public Policy & Administration, page 3.
Digital / Online	23%	

Table 7. Cost Ratio by Transaction Method

Cost Savings by Area, U.K. Government Digital Service Estimates

Source: Digital Efficiency Report, 06 November 2012, UK Government Digital Service, <https://www.gov.uk/government/publications/digital-efficiency-report/digital-efficiency-report>

Cost Savings Area Description	Percentage of total expected cost savings
1. Reduced staff time devoted to processing transactions with the public and within government in-person or by telephone	77%
2. Reduced government need for office and public space associated with lower public demand for in-person and phone transactions with government	12%
3. Reduced government demand for postage, paper and other materials resulting from less reliance on physical documents	7%
4. Lower costs of supporting office IT systems and equipment. Reduced in-person and telephone transactions reduces the need for IT and office equipment infrastructure that supports these activities	4%
Total	100%

Table 8. Cost Savings by Area, U.K. Government Digital Service Estimates

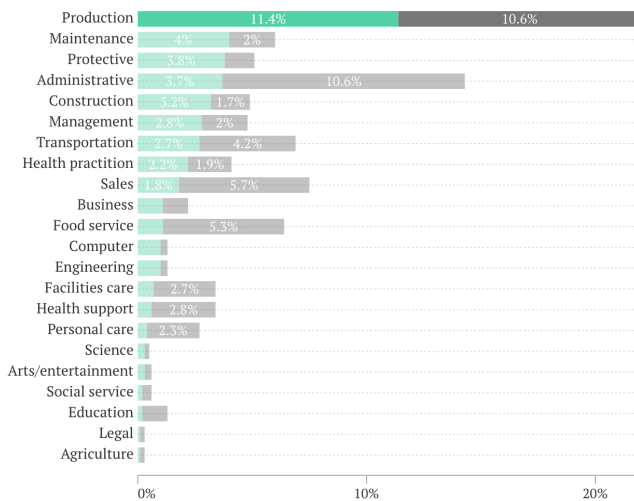
Appendix C. From Brookings Report and Interactive Visualization Online

Cleveland-Elyria, OH

Share of all metro area workers without a bachelor's degree

By occupation

Good and promising jobs Other jobs



Share of workers without a bachelor's degree that started in production occupations

By the occupations they switched to

Example: 5.8% switched to good construction jobs

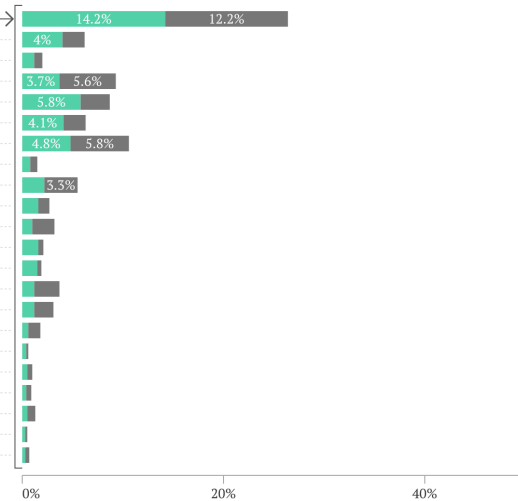


Figure 12. Opportunity Industries (Shearer and Shah, 2018). <https://www.brookings.edu/research/opportunity-industries/>

Appendix D. Internet Connectivity and Health

Health of a population is inextricably intertwined with that population's economic competitiveness. Life expectancy differences across the county as shown in Figure 13 represent a complex interplay of many factors affecting health including genes, behavior, the social and physical environment, and health care¹.

In Cleveland, as in many other urban areas, highly concentrated poverty, segregation, and lack of capital investment contribute to living conditions that result in poor health. Figure 14 shows the magnitude of segregation in the county. In census tracts shown in the darkest red, at least 97% of residents are Black. These census tracts form a contiguous crescent running from the Northeast Side to Central Cleveland to the southeast parts of the city. By contrast, areas surrounding the city on all three sides show fewer than 2% of residents are Black.

The prevalence of serious health conditions closely follows the residential segregation pattern shown in Figure 13. The prevalence of diabetes, shown in Figure 15, for example, varies more than six-fold across Cleveland, with the highest rates seen in the areas that are most highly segregated. Two key drivers of health are obesity and smoking, both of which have significant implications for the economic vitality of the county. The prevalence of obesity, a strong risk factor for diabetes, ranges from 23.5 to 54.2% across the city of Cleveland; again, the highest prevalence is seen in the highly segregated communities on the East Side of Cleveland (see Figure 16). As of 2014, 30.0% of Cuyahoga County adults were obese, as were 35.0% of Cleveland residents. The obesity prevalence among Cleveland residents aged 35–64 exceeded 40%. Rates were also elevated for Black and Hispanic adults². The cost of obesity to the economy is enormous. Obese men generate \$1,152 more in health costs than men of normal weight. For women, the excess cost is even more striking at \$3,613 per year³.

¹ McGinnis and Foege, *Actual Causes of Death in the United States.*"

² "2018 Cuyahoga County Community Health Assessment."

³ Zellner and Bowdish, *"The ROI of Health and Well-Being."*

Life Expectancy by Census Tract 2010–2015

Source: Life Expectancy 2010-2015 by Census Tract

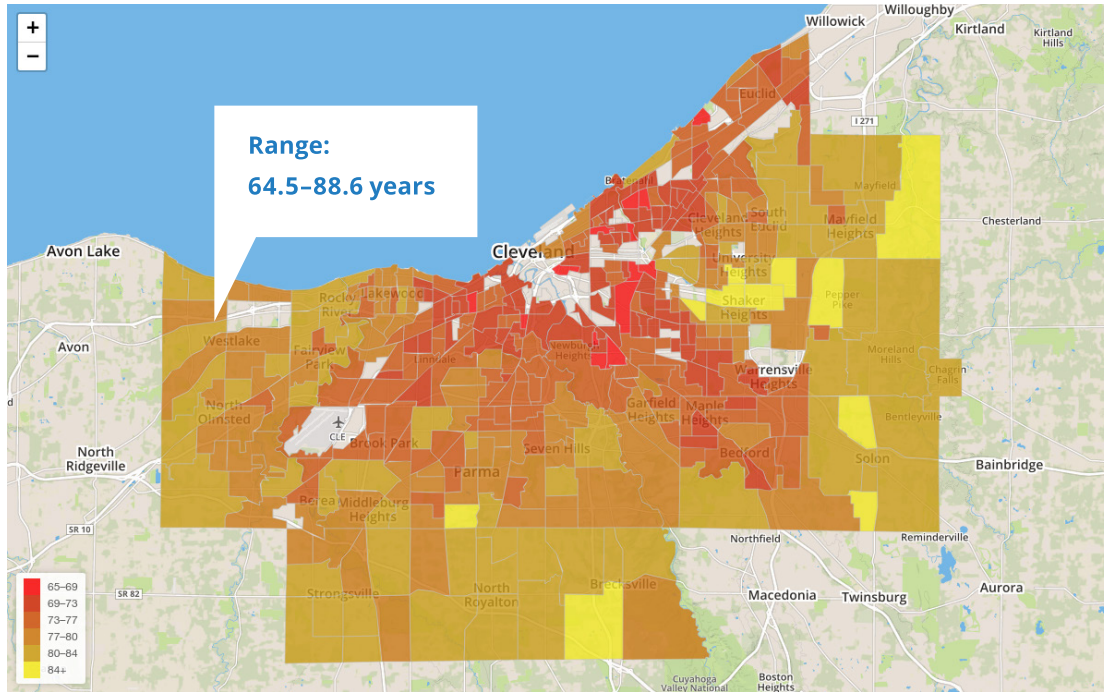


Figure 13. Map showing life expectancy by census tract. Source: Health Data Matters & Cuyahoga County Board of Health <https://insight.livestories.com/guest/chart?datasetId=5c1d4f3075f1d4001331926b&dashId=5c731a43ed9273001358d603>

Black % by Census Tract

Source: NEOCANDO Profile data by Census Tract_BG

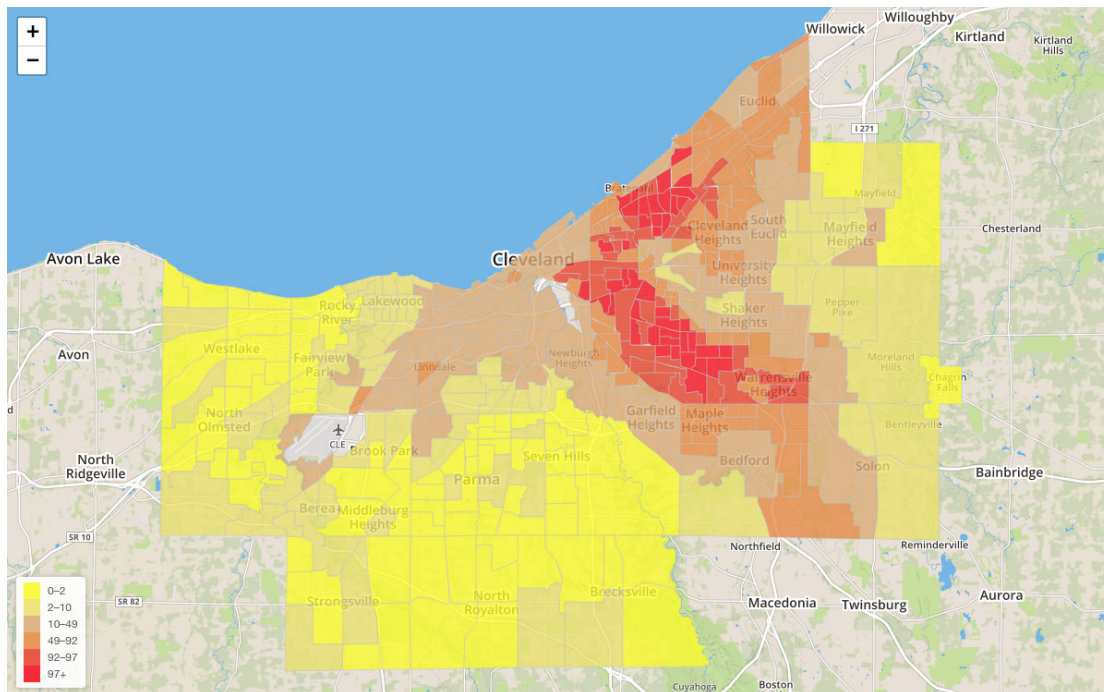


Figure 14. <https://insight.livestories.com/guest/chart?datasetId=5804ec5c64768400171d0d2b&dashId=5c732a6bcb46020017f377f6>

Diabetes Prevalence

Source: 500 Cities 2015

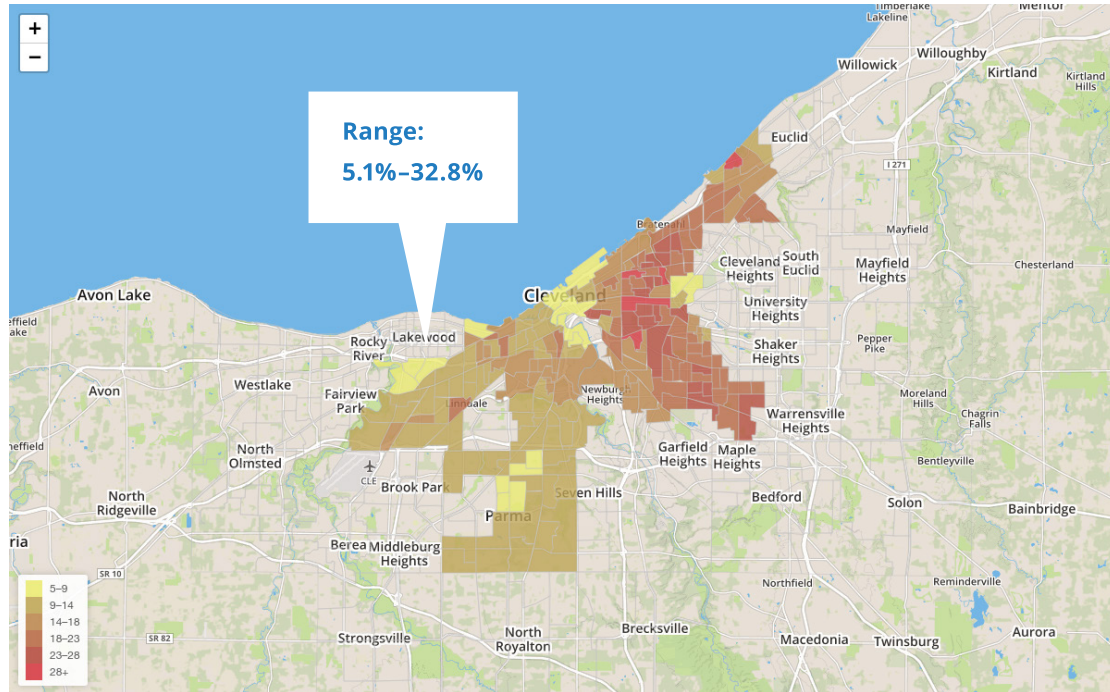


Figure 15. <https://insight.livestories.com/guest/chart?datasetId=5bc73d3cb8ccca0013cdebb2&dashId=5cd0a898c5010e001296a48b>

Obesity Prevalence by Census Tract

Source: 500 Cities 2015 BRFSS Data OH Cleve and Parma by Census Tract

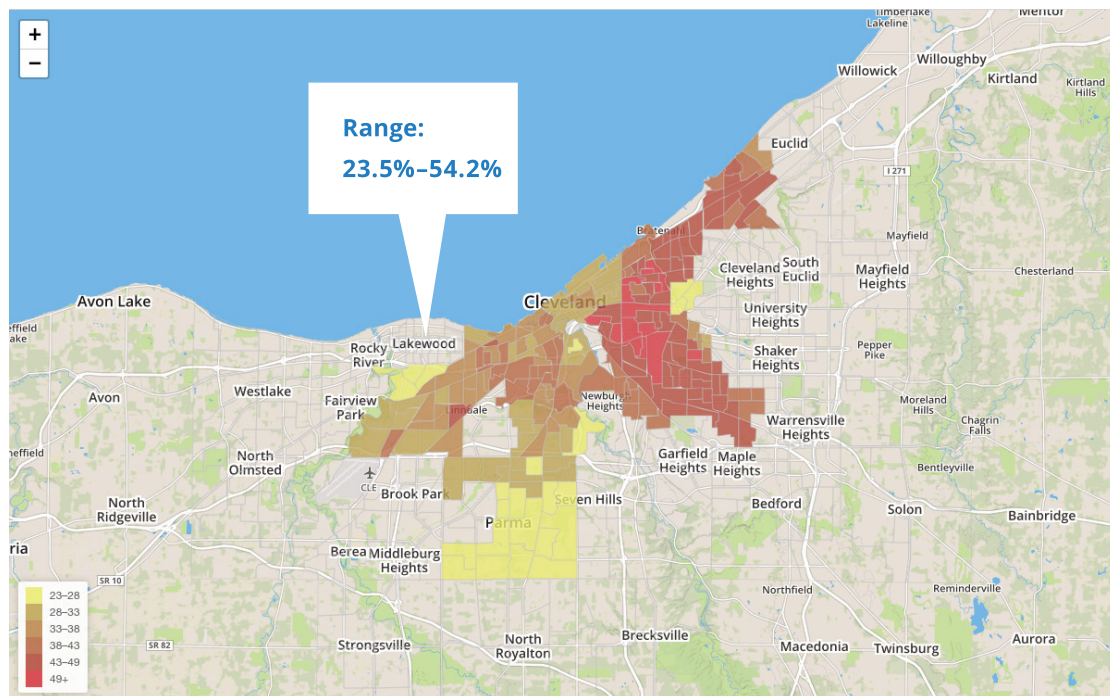


Figure 16. <https://insight.livestories.com/guest/chart?datasetId=5bc73d3cb8ccca0013cdebb2&dashId=5c732084cb46020017f37713>

Asthma, a major cause of school absenteeism for children, also shows a more than twofold variation across the city of Cleveland, ranging from 8.9% to 21.4%, with the highest rates seen in the “Cleveland Crescent” (see figure 17). Secondhand smoke is just one trigger for asthma—others can be environmental conditions, household mold, and animal dander. Smoking, of course, affects many other health conditions. In 2016, 35.2% of all Cleveland adults used tobacco as did 21.0 % of all county residents. The percentage is far in excess of the 15.5% rate seen nationwide and the 12.0% national benchmark established by Healthy People 2020⁴. Smoking prevalence across Cleveland varies nearly three-fold, from 16.6% to 42.6% (see figure 18). In addition to high prevalence in some East Side neighborhoods, prevalence is also elevated in West Side neighborhoods inhabited by young, White residents. Research suggests that excess health-care costs for smoking run \$2,056 per year, plus the \$3,077 annual cost of partial absenteeism due to smoke breaks⁵. Once again, geographic differences reflect underlying demographic differences.

Current asthma among adults aged >=18 Years, 2014 Census Tract

Source: NEOCANDO Profile data by Census Tract_LE Stroke+500

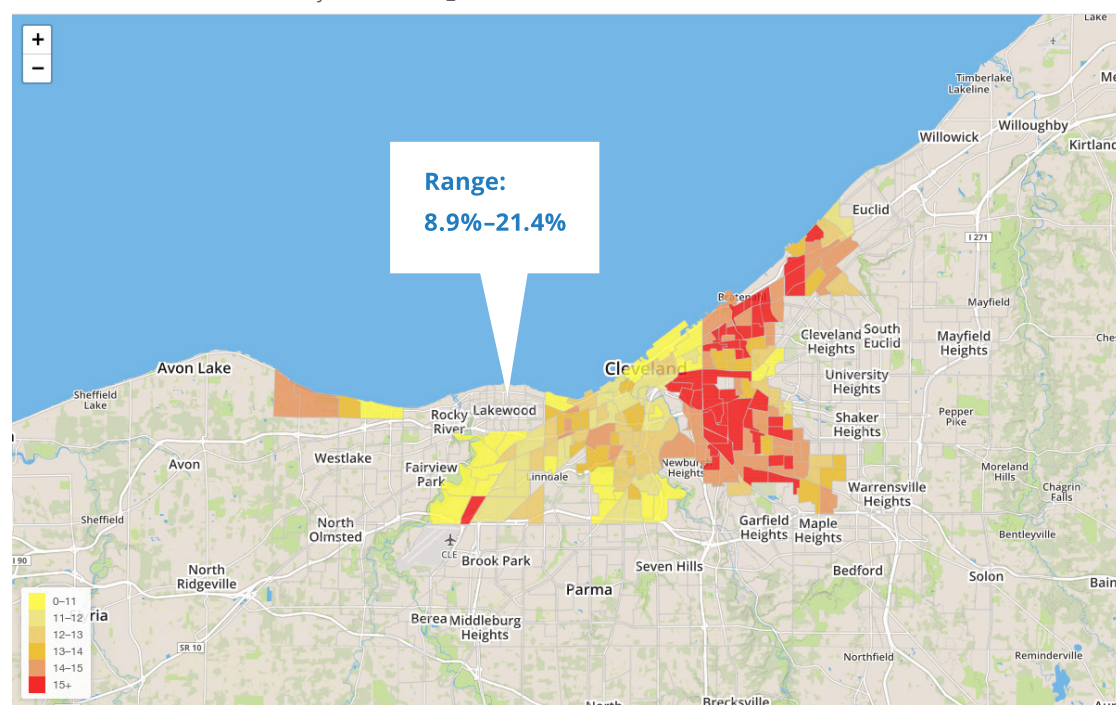


Figure 17. <https://insight.livestories.com/guest/chart?datasetId=59c5a69eb0bd5d0013927b69&dashId=5c735c19ed9273001358e97d>

⁴ 2018 Cuyahoga County Community Health Assessment [Internet]. Health Improvement Partnership-Cuyahoga; 2018 Jan [cited 2018 Nov 15]. Available from: <http://hipcuyahoga.org/2018cha/>

⁵ Zellner S, Bowdish L. The ROI of Health and Well-Being: Business Investment in Healthier Communities.

Smoking Prevalence

Source: 500 Cities 2015 BRFSS Data, Cleveland & Parma by Census Tract

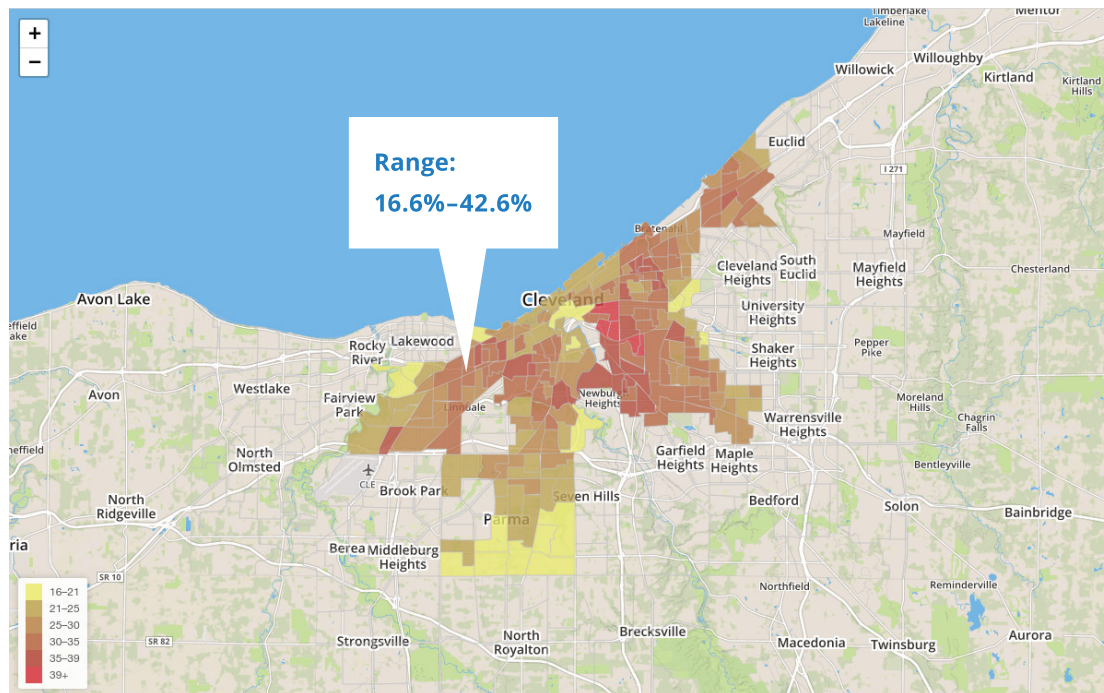


Figure 18. <https://insight.livestories.com/guest/chart?datasetId=5bc73d3cb8cca0013cdebb2&dashId=5cd0a898c5010e001296a486>

The internet offers many possibilities for transcending these barriers by bypassing seemingly intractable problems like racism, poor schools, lack of jobs, transportation and healthy food⁶.

Health Disparities

Differences in the burden of illness and death in different populations are increasingly recognized as exacerbating and reflective of broader divisions in society such as access to health care, exposure to health risks, and health behaviors. In the U.S., these disparities are most strongly associated with race, ethnicity, socioeconomic status, and age⁷.

⁶ Gibbons MC. A historical overview of health disparities and the potential of eHealth solutions. In: *Encyclopedia of Healthcare Information Systems*. IGI Global; 2008. p. 678–685;

⁷ Gibbons MC. A historical overview of health disparities and the potential of eHealth solutions.

Health disparities tracking internet access/use disparities

Until recently, disparities in internet use mirrored health disparity populations quite closely as use in African American and Hispanic populations significantly trailed that in White adults. Other populations in which health disparities mirror digital disparities include immigrants and individuals with limited English literacy, poor, disabled, older adults, rural residents, and the un- and under-insured⁸. While racial gaps in internet use declined significantly, internet use gaps by age, education, and income persist⁹. Racial disparities in internet access have declined, but disparities in use of technology for health purposes remain significant for certain populations including seniors. Examples include receipt of electronic communications from health care providers, use of websites to manage health, web searches for health information and game playing to support brain health¹⁰.

Why Does Internet Matter for Health?

Internet use in service of one's health can be empowering, affording digitally proficient users more autonomy in health management¹¹. As documented in the 2012 Cuyahoga County Survey, health is one of the main reasons that county residents use the internet—64% of residents use the internet for this purpose.

Nevertheless, important disparities persist in use of digital tools for health. In a seminal paper, Perzynski and others studied use of the electronic health record portal among 243,248 patients visiting MetroHealth System ambulatory care facilities between 2012 and 2015¹². Despite its status as one of the nation's leaders in adoption of electronic health record systems, only 29.1% of patients initiated portal use¹³. Use rates were dramatically higher for commercially insured patients (39.4%) than for Medicaid (26.5%), Medicare (23.4%), and uninsured patients (17.4%). The strongest predictor of portal use and of electronic communication with providers was the level of internet access available at the neighborhood level¹⁴.

Connecting Digital Needs to County Priorities and Services

Table 8 highlights ways in which digital inclusion's health promotion efforts support goals contained in the current Cuyahoga County Strategic Plan 2017–2022.

8 NORC at the University of Chicago, "Understanding the Impact of Health IT in Underserved Communities and Those with Health Disparities."

9 Perzynski et al., "Patient Portals and Broadband Internet Inequality."

10 Mitchell et al., "The Digital Divide in Health-Related Technology Use."

11 Lemire, Sicotte, and Paré, "Internet Use and the Logics of Personal Empowerment in Health."

12 Perzynski et al., "Patient Portals and Broadband Internet Inequality."

13 Kaelber, "Exploiting Health Information Technology to Improve Health: The MetroHealth 2015 Davies Award Enterprise Application."

14 Perzynski et al., "Patient Portals and Broadband Internet Inequality."

Health-promoting Digital Inclusion Opportunities That Support Cuyahoga County Strategic Plan Goals

Source: Data adapted from Cuyahoga County's Strategic Plan 2017–2022.

Goal	Strategy	Health-Related Digital Inclusion Opportunity
Economic Opportunity		
Goal 4: Every child is ready for school on the first day of Kindergarten.	4.1: Significantly reduce infant mortality	Better connect moms with health care and social support
	4.2: Align services to help residents live in healthy, lead-safe homes	Increase ability to search for lead-safe homes and find information about resources for remediation
Goal 5. Every student stays in school and has the support needed to graduate high school ready for post-secondary completion and career success.	5.1: Provide opportunities and needed support to children throughout their academic careers	Nationally, 10% of children have asthma and 20% have at least one untreated decayed tooth. These two conditions account for more than one half of all school absences¹⁵. Digital connectivity can help parents obtain treatment for both conditions for their children. In addition, apps and connected devices for asthma are among the most effective digital health technologies yet seen¹⁶. The AsthmaMD app helps doctors identify and treat asthma exacerbations before symptoms are even evident to the patient¹⁷. Patients whose use of connected inhalers was tracked by the Propeller Health app in relation to environmental triggers showed improved symptom control and reduced medication use in a clinical trial¹⁸.
6. Every resident is on a path to upward income mobility and career advancement	6.4 Partner to expand internet access throughout the county	Cleveland is currently pioneering a model for community health worker training that involves the screening of patients for digital skills and connectivity. This model refers nonconnected, digitally untrained patients to community partners that can then provide them with digital skills training. To date, more than 80 CHW students have been trained at Tri-C's Health Professions Training Program, and as part of the Americorps Corps for Rural Success and Health (CRUSH) program. The "digital CHW" represents a new type of workforce that can augment resident skills, generating direct and indirect benefits¹⁹.

¹⁵ "Chronic Absenteeism."

¹⁶ IQVIA Institute, "The Growing Value of Digital Health."

¹⁷ Ghose, "New Tech Boosts Science."

¹⁸ Barrett et al., "Effect of a Mobile Health, Sensor-Driven Asthma Management Platform on Asthma Control."

¹⁹ Sheon and Carroll, "Voices of Innovation."

Goal	Strategy	Health-Related Digital Inclusion Opportunity
Individual Well-Being		
7. All residents are safe, supported, and able to care for themselves	7.2: End chronic homelessness for veterans, families, and youth	Homeless persons in the U.S. are estimated to die 28–38 years earlier than individuals with stable housing ²⁰ . A local study of 163 homeless families documented high rates of mental health problems, drug abuse and chronic health conditions ²¹ . MetroHealth provides health care to children in foster care, approximately 10 of whom become emancipated per month ²² . For all of these populations, mobile devices are invaluable for ensuring that individuals can reach and be reached by health care providers despite inconsistent housing arrangements.
	7.3: Decrease the number of youth aging out of foster care without a permanent family	
	7.5: Empower and support older persons to preserve their independence and help them age successfully	While internet use among those over age 65 lags behind that of younger adults, those over age 65 nationally have been adopting technology at faster rates than younger populations who have near universal adoption. A growing body of evidence shows that use of computers and tablets improve the cognitive, social and emotional well-being of older adults ²³ .
	7.6: Drive collaborative efforts to prevent and treat opioid addiction	Digital interventions such as smartphone apps are beginning to show efficacy in supporting clinical treatment for substance abuse ²⁴ . Apps can alert users to potential triggers, connect them with supportive resources, and provide information about treatment.
	7.8: Partner to build safer communities	Apps such as Next Door can connect residents of communities to rapidly disseminate information about risks. Other apps such as bSafe can sound an audible alarm or summon help based on simple actions by users. One member of Connected Insights' team, Dr. Sheon, is part of a team developing VirA, a smart speaker-based Virtual Advocate to protect individuals who are at risk of domestic violence, sexual assault, or sexual harassment. One particular benefit of these apps is the automated collection of video and/or audio evidence, stored in the cloud that could be used to support prosecution of perpetrators.
8. All people have equal access to justice	8.3: Provide re-entry and employment services to residents in county jails to reduce recidivism	Individuals leaving prison may lack relationships with health care providers. Digital connectivity can help such individuals find health care providers, schedule appointments, and keep track of their medical information during what may be extended periods of residential dislocation.

²⁰ O'Connell, "Premature Mortality in Homeless Populations."

²¹ Bai et al., "Cuyahoga Partnering for Family Success Process Evaluation 2017."

²² Weiskittel, "Cuyahoga County Division of Children and Family Services 2018 Statistical Report."

²³ Mitzner et al., "Technology Adoption by Older Adults."

²⁴ Nesvåg and McKay, "Feasibility and Effects of Digital Interventions to Support People in Recovery From Substance Use Disorders."

Goal	Strategy	Health-Related Digital Inclusion Opportunity
Provide Superior Services		
14. Provide a superior customer service experience	14.1: Consistently provide an excellent customer experience	Numerous programs offered by Cuyahoga County Health and Human Services have the potential to improve resident health. From Moms First to Senior and Adult Services, these programs provide support from cradle to grave. In all such domains, resident connectivity helps people find and utilize services. Many specific examples are discussed elsewhere in this report.
	14.2: Expand omni-channel access to services through the smart and effective use of technology	
	14.3: Provide easier access to services through targeted neighborhood partnerships and outreach	

Table 9. Health-promoting Digital Inclusion Opportunities That Support Cuyahoga County Strategic Plan Goals

Broader Context

The health of residents both affects and is fundamentally affected by the Cuyahoga County's economic viability. The internet's value to health is becoming increasingly evident. In addition to finding information about one's own conditions (or the conditions of those they care for), internet users can find information that helps them lead healthy lives (e.g., find the most inexpensive healthy foods available), connect with their health care providers, and manage their chronic illnesses. A recent study found that more than 10% of urban residents used the internet to save money on health insurance and health care, some as much as \$5,000 per year. Additional savings were obtained from avoiding travel for procurement of health care and other services²⁵. However, the relationship of digital connectivity and health should be understood in three broader contexts—the social determinants of health, the digital health revolution, and value-based care.

Social Determinants of Health

Over the last decade, there has been growing recognition that “conditions in the environments in which people live, learn, work, play, worship and age”²⁶ wield tremendous effect on health outcomes and quality of life.^{27 28 29} In fact, these ‘social determinants of health’—including economic stability, education, transportation, housing, food access and social circumstances are thought to exert a much more significant effect on health outcomes than does the provision of health care.^{30 31} Using national estimates in which health care only explains 20%

²⁵ Gallardo and Wiltse, “Gauging Household Digital Readiness.”

²⁶ U.S. Department of Health and Human Services, “Healthy People 2020.”

²⁷ Commission to Build a Healthier America, “Breaking Through on the Social Determinants of Health and Health Disparities: An Approach to Message Translation.”

²⁸ Koh et al., “Translating Research Evidence Into Practice to Reduce Health Disparities.”

²⁹ Robert Wood Johnson Foundation, “A New Way to Talk about the Social Determinants of Health.”

³⁰ Link and Phelan, “Social Conditions As Fundamental Causes of Disease.”

³¹ Marmot, “Achieving Health Equity.”

of health outcomes³², one could conclude that approximately 19 years of 24-year difference in life expectancy in our county is accounted for by social, behavioral, environmental and genetic factors.

A healthy workforce can work, generating tax revenue, and also attract business. The internet is obviously crucial for finding work, whether or not the work itself requires digital skills³³. Nevertheless, the ability to use digital technology is increasingly necessary for the performance of job duties. According to one recent estimate, “two-thirds of jobs generated between 2010 and 2016 required medium to high digital skills.” Digital technology can increase the ability of individuals to utilize transportation, improving both their employability and ability to access health care.^{34 35 36 37 38 39}

At a recent national conference, a group of panelists was asked to consider digital skills and connectivity as a social determinant of health. Insofar as digital skills and access enable individuals to address all of their SDOH (e.g., housing, employment, education and more), panelist Chris Gibbons, member of the Federal Communications Commission’s Connect2Health Task Force stated, “They are not a social determinant of health. They are meta social determinants of health” because they enable direct address of all other SDOH⁴⁰.

Digital Health Revolution

Driven by \$25 billion in investment by the federal government, health systems and providers began the adoption of electronic health records that included incentives to encourage meaningful use. This movement began in 2009 in conjunction with the American Recovery and Reinvestment Act.

As of 2017, nearly 80% of office-based physicians had started the process of using certified electronic health record systems⁴¹. Among the direct and indirect results of this investment have been a proliferation of patient-facing tools, including portals to electronic health records, remote monitors, apps, wearables, etc. Included in the list of new incentives encouraging providers to promote patient use of such tools are physician reimbursements for the review of electronic communication and data from patients (e.g., emails, photos and videos).⁴² The result of these efforts? A greater push to grow digital engagement with patients.

32 Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, “County Health Rankings & Roadmaps.”

33 Gallardo and Wiltse, “Gauging Household Digital Readiness.”

34 Anthes, “From Point A to Point B.”

35 “Ride-Hailing Platforms Could Solve The Problems of Transportation in Healthcare.”

36 “Hitch Health and Lyft Demonstrate Significant Reduction in Missed Medical Appointments.”

37 Chaiyachati et al., “Association of Rideshare-Based Transportation Services and Missed Primary Care Appointments.”

38 Powers, Rinefort, and Jain, “Shifting Non-Emergency Medical Transportation To Lyft Improves Patient Experience And Lowers Costs.”

39 Rao and Koebler, “Uber and Lyft Are Officially Part of the Healthcare System.”

40 Sheon, “Digital Skills and Connectivity as Social Determinants of Health.”

41 Office of the National Coordinator for Health Information Technology, “Office-Based Physician Electronic Health Record Adoption: Health IT Quick-Stat #50.”

42 Monroe, “Final Policy, Payment, and Quality Provisions Changes to the Medicare Physician Fee Schedule for Calendar Year 2019 | CMS.”

Recognizing the powerful, potential health improvement benefits offered by the internet⁴³, the U.S. Department of Health and Human Services established Healthy People 2020. Goals of this initiative include encouraging adults to use the internet for tracking personal health information and communicating with their healthcare providers⁴⁴.

These health uses of the internet have grown rapidly over the past decade. According to a 2017 national survey, 40–42% of American adults indicated that they had completed each of the following activities online: looked for a health care provider; scheduled doctor appointments; and completed paperwork. More than one-third of adults (35%) reported having communicated with health care providers via email or the internet⁴⁵. However, disparities in use by age, education, and income are concerning. Whereas 28-31% of those in age groups below 65 tracked their health information online, only 22.1% of those ages 65-74 years did so. Of adults with advanced degrees, 40.4% tracked personal health information via the internet, more than double the rate (18.2%) for individuals with only a high school degree. Disparities by family income were similar (36.7% for those with an annual income greater than \$75,000 versus 19.9% for those with an annual income below \$20,000). Disparities in communicating with providers were even more pronounced, showing a more than threefold difference by education (15.9% vs 48.7%) and 2.25-fold difference by income (18.3% vs. 41.1%).⁴⁶

Electronic health records are just one component of the digital health revolution and but one component of the larger Internet of Things (IoT) phenomenon. Connected traditional appliances, plus devices such as “surroundables” (smart speakers and sensors), will increasingly permeate our homes, vehicles, workplaces, and environments while wearables, implantables, and ingestibles, will enable monitoring of activity, bodily functions, and mental state⁴⁷.

Since 2015, evidence has rapidly grown documenting the value of apps, wearables, and sensors addressing common and expensive conditions: diabetes, depression, and anxiety. Apps that have been proven to reduce the cost of care for just five conditions (diabetes prevention and treatment, asthma, cardiac rehabiliatee and pulmonary rehabiliatee) could save \$7 billion per year in health care costs across the U.S.⁴⁸. However, insofar as evidence for the value of digital health grows, disparities in e-health technology use will further accentuate health disparities. Therefore, advantages to those who are digitally empowered will continue to accumulate.

Value-based Care

A third trend supporting the need for attention to digital connectivity and health disparities is the rapid change in how health care is paid for, arising from the 2010 Affordable Care Act⁴⁹. Increasingly, Medicare and Medicaid are shifting payment structures to reimburse providers

⁴³ Lyles, Schillinger, and Sarkar, “Connecting the Dots.”

⁴⁴ Greenberg et al., “Public Use of Electronic Personal Health Information.”

⁴⁵ Office of the National Coordinator for Health Information Technology, “Individuals Use of Technology to Track Health Care Charges and Costs.”

⁴⁶ Healthy People 2020, “Health Communication and Health Information Technology HC/HIT-5.1.”

⁴⁷ Kraft, “12 Innovations That Will Revolutionize the Future of Medicine.”

⁴⁸ IQVIA Institute, “The Growing Value of Digital Health.”

⁴⁹ “Public Law 111-148, The Patient Protection and Affordable Care Act of 2010.”

for improving patient health outcomes rather than for providing care regardless of the impact. For example, the Medicare Shared Savings Program rewards Accountable Care Organizations for reducing the cost of care provided to patients while improving care quality and outcomes⁵⁰. As a result, providers can be reimbursed for provision of services that keep people out of emergency rooms while incurring penalties when patients are readmitted for conditions recently treated at a hospital.

As a result of these measures, providers are increasingly screening patients to identify and address non-health factors that affect health such as food insecurity, housing, transportation, and employment. Providers then refer patients to community or government services to address identified needs. Increasingly, these referrals are made electronically. The assumption is that patients will have the means and skills to access services electronically. Providers may be disincentivized from caring for patients whose social circumstances or illnesses are likely to require more health care services if reimbursement rates are perceived as inadequate to compensate for these circumstances.^{51 52 53}

The Way Forward

If the potential benefits of digital connectivity are to be realized, individuals require digital skills to find content online, develop confidence in their ability to determine the trustworthiness of online information, and keep their personal information safe, and use digital skills to complete online tasks.⁵⁴

Community-based digital skill training programs have demonstrated durable effects in terms of continuing internet use⁵⁵. Expanded access to uncapped data programs have shown transformational results in terms of enabling household members to pursue education⁵⁶.

A local model currently in development that enables such strategies to make an impact at scale, one that has received considerable national attention, is the identification and training of an appropriate workforce that can comprehensively screen clients seeking social services or health care for digital skill training, equipment, and internet access needs.^{57 58 59}

Community health workers (CHWs) are recognized as an optimal workforce for such screenings; the skills needed to screen and refer clients to community digital inclusion resources are

50 Centers for Medicare & Medicaid Services, "Medicare Shared Savings Program."

51 Andrulis and Siddiqui, "Health Reform Holds Both Risks And Rewards For Safety-Net Providers And Racially And Ethnically Diverse Patients."

52 "Public Law 111-148, The Patient Protection and Affordable Care Act of 2010."

53 Chen et al., "Association of Practice-Level Social and Medical Risk With Performance in the Medicare Physician Value-Based Payment Modifier Program."

54 Horrigan, "Digital Readiness Gaps."

55 Schartman-Cyck and Meissier, "Bridging the Gap."

56 Schartman-Cyck and Meissier.

57 Sheon and Carroll, "Voices of Innovation."

58 Berg, "Strategies for Addressing Digital Literacy and Internet Access as Social Determinants of Health."

59 Sheon, "Digital Inclusion for Health; Panelist; What Every WIC Program Should Know about Promises and Pitfalls of Technology for WIC Participants Session."

well-aligned with their scope of practice.^{60 61} Once individuals have obtained basic skill training, obtain secure and ongoing internet access, CHWs can then train them to use digital health-related tools such as online portals to their electronic health records, communicate electronically with providers, and use apps and devices such as remote glucose or blood pressure monitors.

It must be noted that capturing evidence of the ROI resulting from adoption of health information technology, especially for use with underserved populations, is not likely to be fruitful in the short term. According to a recent analysis, “most of the significant savings and productivity gains which arise from application of health IT do not occur immediately with implementation, but rather accrue over a period of months and even years.”⁶² Nevertheless, evidence for the ROI from digital health technologies was sufficiently compelling for the Federal Communications Commission to propose a \$100 million pilot program to expand adoption of digital health tools.⁶³

⁶⁰ Sheon and Carroll, “Voices of Innovation.”

⁶¹ Sheon, “CHWs: Advocates for Improved Digital Access and Skills.”

⁶² NORC at the University of Chicago, “Understanding the Impact of Health IT in Underserved Communities and Those with Health Disparities.”

⁶³ Federal Communications Commission, “Notice of Inquiry: In the Matter of Promoting Telehealth for Low-Income Consumers.”

Appendix D: References

- "2018 Cuyahoga County Community Health Assessment." Health Improvement Partnership-Cuyahoga, January 2018. <http://hipcuyahoga.org/2018cha/>.
- Andrulis, Dennis P., and Nadia J. Siddiqui. "Health Reform Holds Both Risks And Rewards For Safety-Net Providers And Racially And Ethnically Diverse Patients." *Health Affairs* 30, no. 10 (October 1, 2011): 1830–36. <https://doi.org/10.1377/hlthaff.2011.0661>.
- Anthes, Loren. "From Point A to Point B: Transportation as a Social Determinant in Medicaid." The Center for Community Solutions (blog). Accessed October 25, 2018. <https://www.communitysolutions.com/research/point-point-b-transportation-social-determinant-medicaid/>.
- Bai, Rong, Cyleste Collins, David Crampton, Chun Liu, and Rob Fischer. "Cuyahoga Partnering for Family Success Process Evaluation 2017." Briefly Stated. Cleveland, OH: Case Western Reserve University, July 2017. https://case.edu/socialwork/povertycenter/sites/case.edu.povertycenter/files/2018-09/Briefly_Stated_No_17-01_Cuyahoga_Partnering_for_Family_Success.pdf.
- Barrett, Meredith A., Olivier Humblet, Justine E. Marcus, Kelly Henderson, Ted Smith, Nemr Eid, J. Wesley Sublett, et al. "Effect of a Mobile Health, Sensor-Driven Asthma Management Platform on Asthma Control." *Annals of Allergy, Asthma & Immunology* 119, no. 5 (November 1, 2017): 415-421.e1. <https://doi.org/10.1016/j.anai.2017.08.002>.
- Berg, Kristen. "Strategies for Addressing Digital Literacy and Internet Access as Social Determinants of Health." presented at the Gerontological Society of America 2018 Scientific Meeting, Boston, MA, November 14, 2018. <https://www.geron.org/meetings-events/gsa-2018-annual-scientific-meeting>.
- Centers for Medicare & Medicaid Services, Centers for. "Medicare Shared Savings Program." CMS.gov, December 27, 2018. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharesavingsprogram/about.html>.
- Chaiyachati, Krisda H., Rebecca A. Hubbard, Alyssa Yeager, Brian Mugo, Stephanie Lopez, Elizabeth Asch, Catherine Shi, Judy A. Shea, Roy Rosin, and David Grande. "Association of Rideshare-Based Transportation Services and Missed Primary Care Appointments: A Clinical Trial." *JAMA Internal Medicine* 178, no. 3 (March 1, 2018): 383–89. <https://doi.org/10.1001/jamainternmed.2017.8336>.
- Chen, Lena M., Arnold M. Epstein, E. John Orav, Clara E. Filice, Lok Wong Samson, and Karen E. Joynt Maddox. "Association of Practice-Level Social and Medical Risk With Performance in the Medicare Physician Value-Based Payment Modifier Program." *JAMA* 318, no. 5 (August 1, 2017): 453–61. <https://doi.org/10.1001/jama.2017.9643>.

"Chronic Absenteeism." Healthy Schools Campaign (blog). Accessed February 26, 2019. <https://healthyschoolscampaign.org/chronic-absenteeism/>.

Commission to Build a Healthier America. "Breaking Through on the Social Determinants of Health and Health Disparities: An Approach to Message Translation." Robert Wood Johnson Foundation, 2009. <http://commissiononhealth.org/Home.aspx>.

Federal Communications Commission. "Notice of Inquiry: In the Matter of Promoting Telehealth for Low-Income Consumers." Washington DC: Federal Communications Commission, August 3, 2018. <https://docs.fcc.gov/public/attachments/FCC-18-112A1.pdf>.

Gallardo, Roberto, and Maria Wiltse. "Gauging Household Digital Readiness." Perdue University, December 2018. <https://pcrd.purdue.edu/files/media/gauging-household-digital-readiness.pdf>.

Ghose, Tia. "New Tech Boosts Science." The Scientist Magazine®, October 1, 2011. <https://www.the-scientist.com/bio-business/new-tech-boosts-science-41856>.

Greenberg, Alexandra J., Katrina J. Serrano, Chan L. Thai, Kelly D. Blake, Richard P. Moser, Bradford W. Hesse, and David K. Ahern. "Public Use of Electronic Personal Health Information: Measuring Progress of the Healthy People 2020 Objectives." Health Policy and Technology 6, no. 1 (March 2017): 33–39. <https://doi.org/10.1016/j.hlpt.2016.08.003>.

Healthy People 2020. "Health Communication and Health Information Technology HC/HIT-5.1." Healthy People 2020 Data Search, 2019. <https://www.healthypeople.gov/2020/data-search/Search-the-Data#topic-area=3508>;

"Hitch Health and Lyft Demonstrate Significant Reduction in Missed Medical Appointments," July 23, 2018. <https://www.businesswire.com/news/home/20180723005141/en/Hitch-Health-Lyft-Demonstrate-Significant-Reduction-Missed>.

Horrigan, John B. "Digital Readiness Gaps." Pew Research Center, September 20, 2016. <http://www.pewinternet.org/2016/09/20/digital-readiness-gaps/>.

IQVIA Institute. "The Growing Value of Digital Health," November 2017. <https://www.iqvia.com/institute/reports/the-growing-value-of-digital-health>.

Kaelber, David. "Exploiting Health Information Technology to Improve Health: The MetroHealth 2015 Davies Award Enterprise Application." Healthcare Information and Management Systems Society (HIMSS), August 14, 2015. <http://www.himss.org/metrohealth-cleveland-davies-enterprise-award?ItemNumber=46432>.

Koh, H. K., S. C. Oppenheimer, S. B. Massin-Short, K. M. Emmons, A. C. Geller, and K. Viswanath. "Translating Research Evidence Into Practice to Reduce Health Disparities: A Social Determinants Approach." American Journal of Public Health 100, no. S1 (February 2010): S72–80. <https://doi.org/10.2105/AJPH.2009.167353>.

- Kraft, Daniel. "12 Innovations That Will Revolutionize the Future of Medicine." National Geographic, The Future of Medicine, January 2019. <https://www.nationalgeographic.com/magazine/2019/01/12-innovations-technology-revolutionize-future-medicine/>.
- Lemire, Marc, Claude Sicotte, and Guy Paré. "Internet Use and the Logics of Personal Empowerment in Health." *Health Policy* 88, no. 1 (October 2008): 130–40. <https://doi.org/10.1016/j.healthpol.2008.03.006>.
- Link, Bruce G., and Jo Phelan. "Social Conditions As Fundamental Causes of Disease." *Journal of Health and Social Behavior*, 1995, 80–94. <https://doi.org/10.2307/2626958>.
- Lyles, Courtney, Dean Schillinger, and Urmimala Sarkar. "Connecting the Dots: Health Information Technology Expansion and Health Disparities." *PLOS Medicine* 12, no. 7 (July 14, 2015): e1001852. <https://doi.org/10.1371/journal.pmed.1001852>.
- Marmot, Michael. "Achieving Health Equity: From Root Causes to Fair Outcomes." *The Lancet* 370, no. 9593 (September 29, 2007): 1153–63. [https://doi.org/10.1016/S0140-6736\(07\)61385-3](https://doi.org/10.1016/S0140-6736(07)61385-3).
- McGinnis, J M, and W H Foege. "Actual Causes of Death in the United States." *JAMA: The Journal of the American Medical Association* 270, no. 18 (November 10, 1993): 2207–12.
- Mitchell, Uchechi A, Perla G Chebli, Laurie Ruggiero, and Naoko Muramatsu. "The Digital Divide in Health-Related Technology Use: The Significance of Race/Ethnicity." *The Gerontologist* 59, no. 1 (January 9, 2019): 6–14. <https://doi.org/10.1093/geront/gny138>.
- Mitzner, Tracy L., Jyoti Savla, Walter R. Boot, Joseph Sharit, Neil Charness, Sara J. Czaja, and Wendy A. Rogers. "Technology Adoption by Older Adults: Findings From the PRISM Trial." *The Gerontologist* 59, no. 1 (January 9, 2019): 34–44. <https://doi.org/10.1093/geront/gny113>.
- Monroe, Johnathan. "Final Policy, Payment, and Quality Provisions Changes to the Medicare Physician Fee Schedule for Calendar Year 2019 | CMS." Centers for Medicare & Medicaid Services Newsroom. CMS News (blog), November 1, 2018. <https://www.cms.gov/newsroom/fact-sheets/final-policy-payment-and-quality-provisions-changes-medicare-physician-fee-schedule-calendar-year>.
- Nesvåg, Sverre, and James R. McKay. "Feasibility and Effects of Digital Interventions to Support People in Recovery From Substance Use Disorders: Systematic Review." *Journal of Medical Internet Research* 20, no. 8 (2018): e255. <https://doi.org/10.2196/jmir.9873>.
- NORC at the University of Chicago. "Understanding the Impact of Health IT in Underserved Communities and Those with Health Disparities." Briefing Paper Presented to the United States Department of Health and Human Services. Bethesda, MD: NORC at the University of Chicago, October 29, 2010. <https://www.healthit.gov/sites/default/files/pdf/hit-underserved-communities-health-disparities.pdf>.

- O'Connell, James. "Premature Mortality in Homeless Populations." National Health Care for the Homeless Council, December 2005. <https://www.nhchc.org/wp-content/uploads/2011/10/Premature-Mortality.pdf>.
- Office of the National Coordinator for Health Information Technology. "Individuals Use of Technology to Track Health Care Charges and Costs." Health IT Quickstat, April 2018. / [quickstats/pages/consumers-health-care-charges-costs-online.php](https://www.healthit.gov/quickstats/pages/consumers-health-care-charges-costs-online.php).
- . "Office-Based Physician Electronic Health Record Adoption: Health IT Quick-Stat #50," January 2019. <https://dashboard.healthit.gov/quickstats/pages/physician-ehr-adoption-trends.php>.
- Perzynski, Adam T., Mary Joan Roach, Sarah Shick, Bill Callahan, Douglas Gunzler, Randall Cebul, David C. Kaelber, Anne Huml, John Daryl Thornton, and Douglas Einstadter. "Patient Portals and Broadband Internet Inequality." Journal of the American Medical Informatics Association, March 23, 2017. <https://doi.org/10.1093/jamia/ocx020>.
- Powers, Brian, Scott Rinefort, and Sachin H. Jain. "Shifting Non-Emergency Medical Transportation To Lyft Improves Patient Experience And Lowers Costs." Health Affairs Blog (blog), September 13, 2018. <https://www.healthaffairs.org/doi/10.1377/hblog20180907.685440/full/>.
- "Public Law 111-148, The Patient Protection and Affordable Care Act of 2010." Accessed January 18, 2017. <https://www.gpo.gov/fdsys/pkg/PLAW-111publ148/content-detail.html>.
- Rao, Ankita, and Jason Koebler. "Uber and Lyft Are Officially Part of the Healthcare System." Motherboard (blog), February 25, 2019. https://motherboard.vice.com/en_us/article/d3m4ax/uber-and-lyft-are-officially-part-of-the-health-system.
- "Ride-Hailing Platforms Could Solve The Problems of Transportation in Healthcare." The Medical Futurist, April 17, 2018. <https://medicalfuturist.com/ride-hailing-platforms-solve-problems-transportation-healthcare>.
- Robert Wood Johnson Foundation. "A New Way to Talk about the Social Determinants of Health." Vulnerable Populations Portfolio, January 1, 2010. <https://www.rwjf.org/en/library/research/2010/01/a-new-way-to-talk-about-the-social-determinants-of-health.html>.
- Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. "County Health Rankings & Roadmaps." Accessed November 12, 2013. <http://www.countyhealthrankings.org/>.
- Schartman-Cyck, Samantha, and Katherine Meissier. "Bridging the Gap: What Affordable, Uncapped Internet Means for Digital Inclusion." Mobile Beacon, May 2017. http://www.mobilebeacon.org/wp-content/uploads/2017/05/MB_ResearchPaper_FINAL_WEB.pdf.

- Sheon, Amy. "CHWs: Advocates for Improved Digital Access and Skills." presented at the First Annual Community Health Worker Forum, Cuyahoga Community College, October 11, 2018. <http://www.tri-c.edu/workforce/health-care-training/health-forums/agenda.html>.
- . "Digital Inclusion for Health; Panelist; What Every WIC Program Should Know about Promises and Pitfalls of Technology for WIC Participants Session." presented at the 2018 Using technology to improve the WIC participant experience virtual conference, December 5, 2018. <https://www.nwica.org/events/info/using-technology-to-improve-the-wic-participant-experience-virtual-conference#eid-51-agenda>.
- . "Digital Skills and Connectivity as Social Determinants of Health." Panel Discussion presented at the Interdisciplinary Association for Population Health Science, Washington, D.C., October 5, 2018. <https://iaphs.org/conference/interactive-agenda/interactive-agenda-session-date-time/>.
- Sheon, Amy R, and Leslie Carroll. "How Can Health Systems Leverage Technology to Engage Patients? Edward W. Marx, Editor." In *Voices of Innovation: Fulfilling the Promise of Information Technology in Healthcare*, 1st ed., 270. HIMSS Book Series. Taylor & Francis, 2019. <https://www.crcpress.com/Voices-of-Innovation-Fulfilling-the-Promise-of-Information-Technology-in/Marx/p/book/9781498769686>.
- U.S. Department of Health and Human Services. "Healthy People 2020 Topics & Objectives." Social Determinants of Health, 2011. <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>.
- Weiskittel, Cynthia. "Cuyahoga County Division of Children and Family Services 2018 Statistical Report." Cleveland, OH: Cuyahoga County Division of Children and Family Services, 2019. http://cfs.cuyahogacounty.us/pdf_cfs/en-US/reports/2018StatisticalReport.pdf.
- Zellner, Sara, and Lawrence Bowdish. "The ROI of Health and Well-Being: Business Investment in Healthier Communities." *NAM Perspectives*, November 6, 2017. <https://doi.org/10.31478/201711b>.

Appendix E. Digital Inclusion Grant Initiative Example Cost Detail

Estimated Annual Cost of County Digital Inclusion Program (With Instructors as Full-time W2 Employees)

Source: Data estimated by Connected Insights staff.

Year 1			Annual
Direct training and support costs			
Target population		1,500	
Average course size		8	
Number of courses		188	
Hours per course		24	
Total class hours (teaching hours)		4,500	
Estimated hours/staff in actual classes	50 weeks @ 25 hrs	1,250	
Number of staff instructors needed (FTE)		4.0	
Instructor pay	\$40K, 20% fringe	\$48,000	
Instructor compensation, all in			\$192,000
Training supervisors (FTE)		2.0	
Supervisor pay	\$50K, 20% fringe	\$60,000	\$120,000
Estimated other costs/course (facilities, materials, etc.)		\$200	\$37,500
Community contractors	2		
Program coordination		25,000	
Marketing		25,000	
Community contractors total			\$100,000
Total Training/Support			\$449,500
Connection Subsidies		\$200	\$300,000
Device Subsidies		\$0	\$0
Total			\$749,500

Table 10. Example Annual Program Cost Detail: Year One

Estimated Annual Cost of County Digital Inclusion Program (With Instructors as Full-time W2 Employees)

Source: Data estimated by Connected Insights staff.

Year 2			Annual
Direct training and support costs			
Target population		2,500	
Average course size		8	
Number of courses		313	
Hours per course		24	
Total class hours (teaching hours)		7,500	
Estimated hours/staff in actual classes	50 weeks @ 25 hrs	1,250	
Number of staff instructors needed (FTE)		6.0	
Instructor pay	\$40K, 20% fringe	\$48,000	
Instructor compensation, all in			\$288,000
Training supervisors (FTE)		3.0	
Supervisor pay	\$50K, 20% fringe	\$60,000	\$180,000
Estimated other costs/course (facilities, materials, etc.)		\$200	\$62,500
Community contractors	3		
Program coordination		25,000	
Marketing		25,000	
Community contractors total			\$150,000
Total Training/Support			\$680,500
Connection Subsidies		\$200	\$500,000
Device Subsidies		\$0	\$0
Total			\$1,180,500

Table 11. Example Annual Program Cost Detail: Year Two

Estimated Annual Cost of County Digital Inclusion Program (With Instructors as Full-time W2 Employees)

Source: Data estimated by Connected Insights staff.

Year 3			Annual
Direct training and support costs			
Target population		3,500	
Average course size		8	
Number of courses		438	
Hours per course		24	
Total class hours (teaching hours)		10,500	
Estimated hours/staff in actual classes	50 weeks @ 25 hrs	1,250	
Number of staff instructors needed (FTE)		8.0	
Instructor pay	\$40K, 20% fringe	\$48,000	
Instructor compensation, all in			\$384,000
Training supervisors (FTE)		4.0	
Supervisor pay	\$50K, 20% fringe	\$60,000	\$240,000
Estimated other costs/course (facilities, materials, etc.)		\$200	\$87,500
Community contractors			4
Program coordination		25,000	
Marketing		25,000	
Community contractors total			\$200,000
Total Training/Support			\$911,500
Connection Subsidies		\$200	\$700,000
Device Subsidies		\$0	\$0
Total			\$1,611,500

Table 12. Example Annual Program Cost Detail: Year Three