Connecting Worcester

Digital Equity Charette

April 2024

MBI
MASSACHUSETTS
BROADBAND INSTITUTE

CMRPC
Central Massachusetts Regional Planning Commission

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Special thank you to the City of Worcester staff and residents for their time, resources, and invaluable knowledge, which has contributed to the development and success of this plan.

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Introduction

The National Digital Inclusion Alliance (NDIA) defines "Digital Equity" as "a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy."[1] Many elements contribute to digital equity, the most important being affordable high-speed internet access, access to internet-enabled devices, and digital literacy.[1]

These elements have become fundamental components of a person's right to health, education, and economic opportunity. Full participation in modern society involves online learning, remote work, virtual civic meetings, telemedicine, e-commerce, and many other services accessed through the Internet. This reality was made especially apparent by the COVID-19 pandemic, which rapidly drove many aspects of life online.

Yet too many people still find themselves without adequate internet, devices, and digital literacy skills. They have been left behind because of the digital divide, "the gap between those who have affordable access, skills, and support to effectively engage online and those who do not."[2]

Definitions:

Digital Equity: a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy.

Digital Literacy: the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.

Digital Divide: the gap between those who have affordable access, skills, and support to effectively engage online and those who do not.

In recognition of the importance of bridging the digital divide, the Massachusetts Broadband Institute (MBI) launched the Municipal Digital Equity Planning Program. According to MBI,

> *"The goal of the Municipal Digital Equity Planning Program is to enable municipalities, or other local bodies of government, to engage in planning activities related to digital equity and bridging the digital divide. These planning activities will result in strategic documents designed to identify the community's needs, interests, and key assets and provide a framework that will guide future municipal decision-making and potential investments and activities that will increase access and usage of the Internet for the populations most impacted by the COVID-19 pandemic."*[3]

The program offers two options to pursue digital equity planning activities, a short-term "planning charette" or a longer-term "digital equity plan." Under each option, municipalities are assigned a consultant to help execute the project. Municipalities that successfully complete a digital equity plan or charette are eligible to access a one-time grant of up to $100,000 to carry out a related project in their community.[4]

[1] Digital literacy definition sourced from the American Library Association.

In Fall 2023, the City of Worcester submitted an application to MBI to partake in the Municipal Digital Equity Planning Program. For its planning activity, the City chose to undertake a series of charettes, or public workshops, to engage municipal officials, community groups, residents, and other stakeholders about the status of digital equity in the community. The City selected the Central Massachusetts Regional Planning Commission (CMRPC) as its consultant.

Between December 2023 and March 2024, CMRPC facilitated three public charettes with the guidance of the City of Worcester and the Worcester Digital Equity Working Group, a collection of stakeholders from across the City who are focused on tackling the digital divide. This report analyzes the results of the charette process and recommends future steps that the City can take to promote digital equity.

The Worcester Digital Equity Working Group was coordinated by CMRPC and David Quiroa, Community & Intergovernmental Affairs Manager in the office of the Worcester City Manager. Working Group member organizations include:

- Worcester Regional Research Bureau
- Worcester Public Library
- Worcester Public Schools
- Quinsigamond Community College
- Main South CDC
- Greater Worcester Community Foundation
- The Southeast Asian Coalition
- City of Worcester Health and Human Services
- Edward Street
- The Village
- The Center for Health Impact
- UMass Memorial Health
- UMass Chan Medical School
- Worcester Community Action Council
- Worcester Interfaith
- Latino Education Institute

Prior Planning

Assessing prior planning efforts provided insight into the ongoing efforts to address digital equity in Worcester. The following plans all contain elements pertaining to digital equity. This plan's purpose is to build and expand on these past efforts and identify strategies to enhance digital equity throughout the Worcester community. The following points summarize major goals and themes from existing plans related to digital equity in Worcester.

City of Worcester Strategic Plan (2020)

- Enhance public safety services and emergency preparedness to maintain a sense of safety and security in Worcester's community.
- Promote opportunities for educational and employment growth for all residents.
- Support opportunities that lead to increased digital literacy skills.

Defining our Path, a Strategic Plan for Education in Worcester (2018-2023)

- Build the infrastructure to maintaining technology access and unity across the school district.
- Create policies and a course of action for technology use, access, and advancement that will assist in district-wide fulfillment and sustainability.
- Form a technology committee with representation from stakeholders to oversee implementation and ensure it aligns with community needs.
- Invest in the purchasing and support of a student information system.
- Create and maintain a wireless network within school buildings to support a 1:1 device system throughout the school district.
- Implement a district-wide approach to provide all educators with essential technology for instructional support.
- Ensure access to devices so that students are able to use technology for customized learning experiences.
- Develop funding to retain the maintenance and replacement of technology in a timely fashion.
- Work on improving after-school access to internet services and technology to further support student education.

Worcester Municipal Vulnerability Preparedness Plan (2019)

- Utilize effective communication avenues such as the City's website and social media to relay public information regarding preparedness.
- Develop social media use to communicate weather/climate-related emergencies.

Worcester Research Bureau, Boosting Broadband (2022)

- Research report highlighting sharp disparities in access to broadband across the City.
- Findings: 61% of low-income households had broadband internet connection in 2019, compared to 93.7% of households earning more than $75,000 annually.

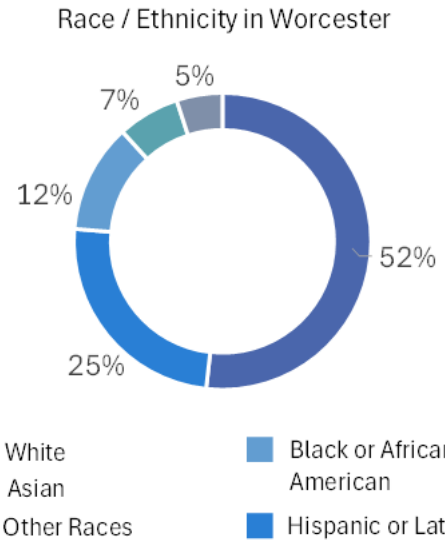
Community Health Improvement Plan (2021)

- For the current plan. The Worcester community expressed a need to categorize internet access as an essential service. This became evident during the COVID-19 pandemic, a crisis that exposed a disparity between those with continuous stable internet access, and those who do not.
- The intended impact is to ensure that every individual in the City and region may access high-quality internet to stay connected.

Existing Conditions & Community Profile

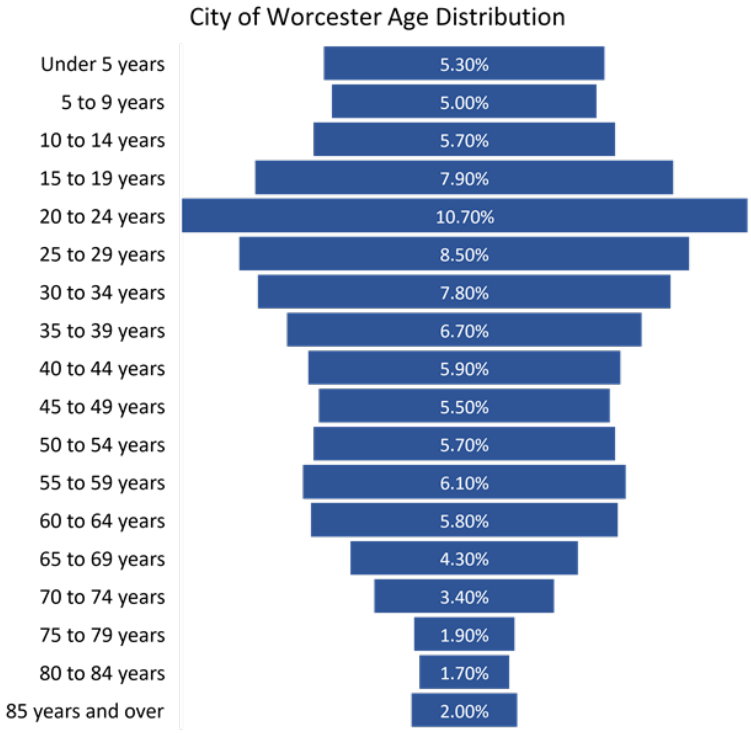
Demographics

The City of Worcester is an ethnically and racially diverse community. **Nearly half of Worcester residents identify as Latino or Hispanic or as a person of color**, compared with only 30% and 26% of Massachusetts and Worcester County residents respectively.[5] The City is also home to speakers of many different languages. More than a third of residents speak a language other than English.[6] While many of these individuals are also proficient in English, 12% of Worcester households have limited English-speaking skills; this is double the state and national averages.[7]



Source: ACS 2018-2022 5-Year Estimate, Table B03002
**Includes individuals of all races that identify as Hispanic or Latino.*

The City has a low median income relative to other communities in Massachusetts and Worcester County. **Worcester households earn a median income of $63,011 per year, far less than the state median household income of $96,505 and the Worcester County median household income of $88,524**.[8] Nearly a quarter of Worcester households earn less than $25,000 a year.[9] Individual earnings are often linked to educational attainment, and Worcester residents are less likely to have earned at least a high school degree than their counterparts elsewhere in Massachusetts and Worcester County.[10]

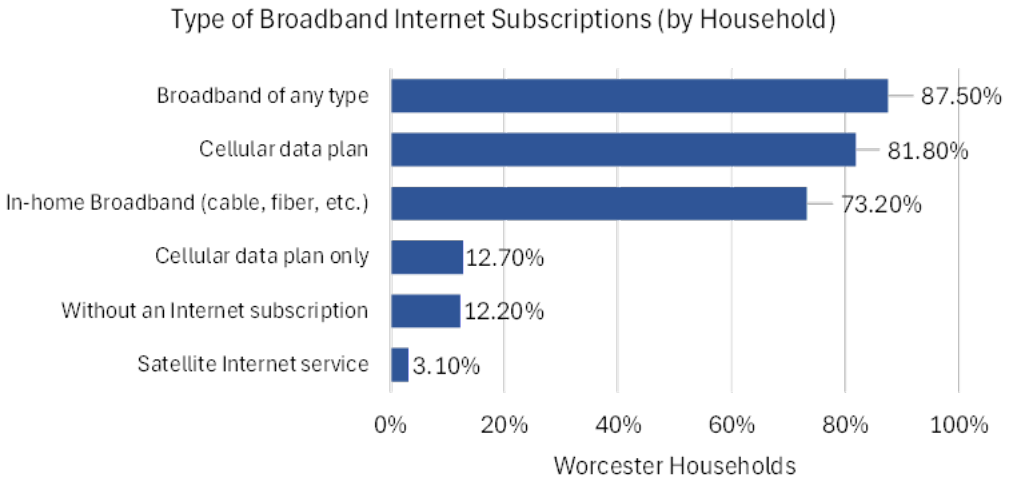


Source: ACS 2018-2022 5-Year Estimate, Table S0101

Finally, Worcester is also a young community. **At 34.3 years old, Worcester's median age is more than five years below the median ages of Massachusetts and Worcester County**.[11] This difference can be accounted for primarily in the City's higher share of adolescents and young adults (ages 15-34) and lower share of adults aged 60 and above.

Connection

According to the Massachusetts Broadband Institute (MBI), nearly every location in Worcester had physical access to at least one broadband internet provider as of 2022;[12] only 80 locations, or 0.18% of total serviceable locations, were "unserved." Service availability does not directly translate to service access, as residents must still subscribe to internet plans to gain access. 2018-2022 American Community Survey (ACS) data indicates that **12.2% of Worcester households, or 9,633 households, do not have an internet subscription of any kind.**[13] This is three percentage points higher than the share of households in Massachusetts and Worcester County that report having no Internet subscription. That said, this data point is lower than the percentage of non-subscribers in Springfield and Lowell, the second and third largest Gateway cities in Massachusetts behind Worcester.



Source: ACS 2018-2022, 5 Year Estimate, Table S2801

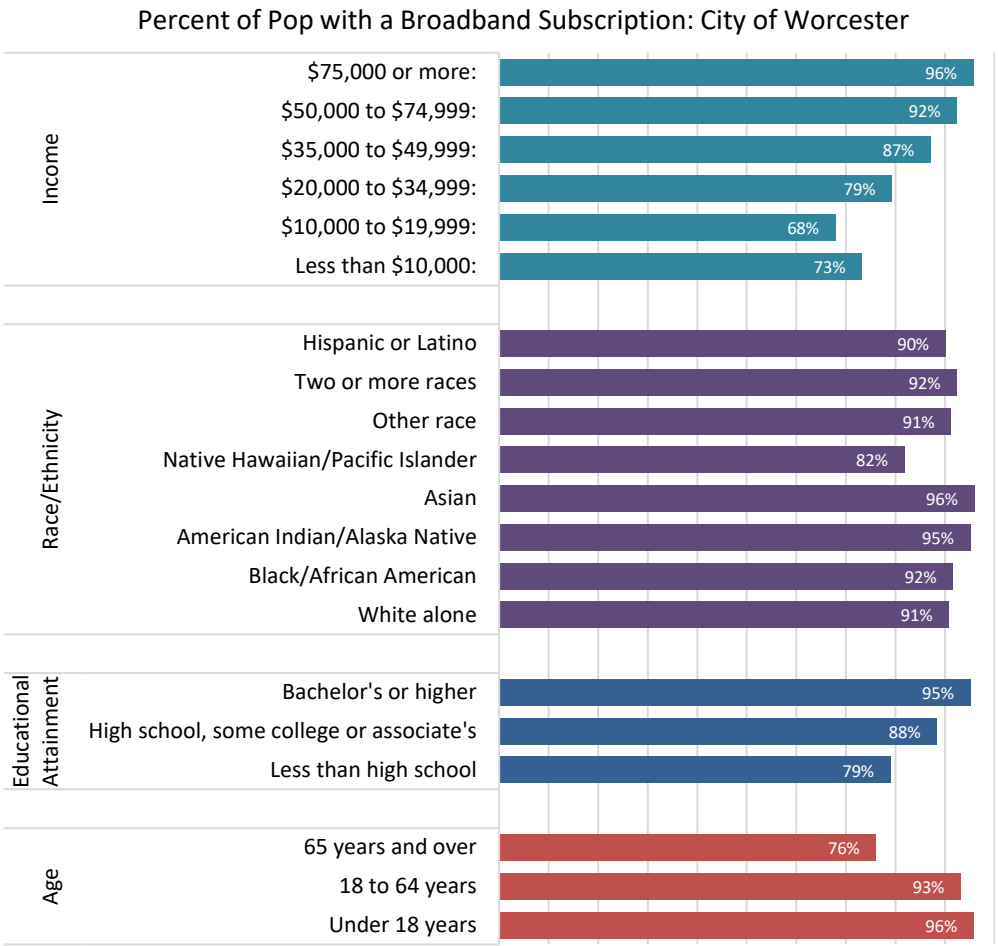
Among Worcester households with a broadband internet subscription, many exclusively rely on their mobile data plans and smartphones to access the Internet. **10,067, or 12.7% of Worcester households, report having only a cellular data plan and no other type of internet subscription**.[14]

Accessing the Internet by smartphone comes with many limitations. First, cheaper mobile plans often come with monthly data caps, the lowest of which can be 2-5 GBs. When users surpass their cap, they may encounter slower speeds and extra charges.[15] This is a real possibility considering that a one-hour Zoom call on just standard-definition video consumes 540 MBs, more than 10% of a user's monthly data allotment at 5 GBs.[16] Even many unlimited plans come with thresholds that trigger lower speeds.[17] By comparison, fixed, in-home internet subscriptions offer far higher—if not unlimited—quantities of data.[18] Mobile connections also operate at slower download and upload speeds than in-home connections, limiting the kind and quantity of activities that users may engage in.[19] Finally, there are numerous applications that are either unavailable for smartphone users or very difficult for them to use. Many of these, such as word processing and graphic design programs, are important for remote work.

Data Use Per Hour of:

Video Streaming	Music Streaming	Web Browsing
1.5 to 3GB	144MB	60-150MB

More than 9,633 Worcester households that lack internet subscriptions disproportionately belong to specific demographic and socioeconomic groups. **Being older, having a lower household income, and having a lower educational attainment all correlate to a reduced likelihood that a Worcester resident has an in-home broadband internet subscription.**[20] For instance, nearly 20% fewer Worcester residents aged 65 and over have a computer and a broadband internet subscription compared to residents under 18 years of age. The 2018-2022 ACS data does not reveal significant differences in access to computers and broadband internet subscriptions between different racial and ethnic groups. However, inequities may still exist in terms of cost burden, number of provider options, internet quality, and reliability.



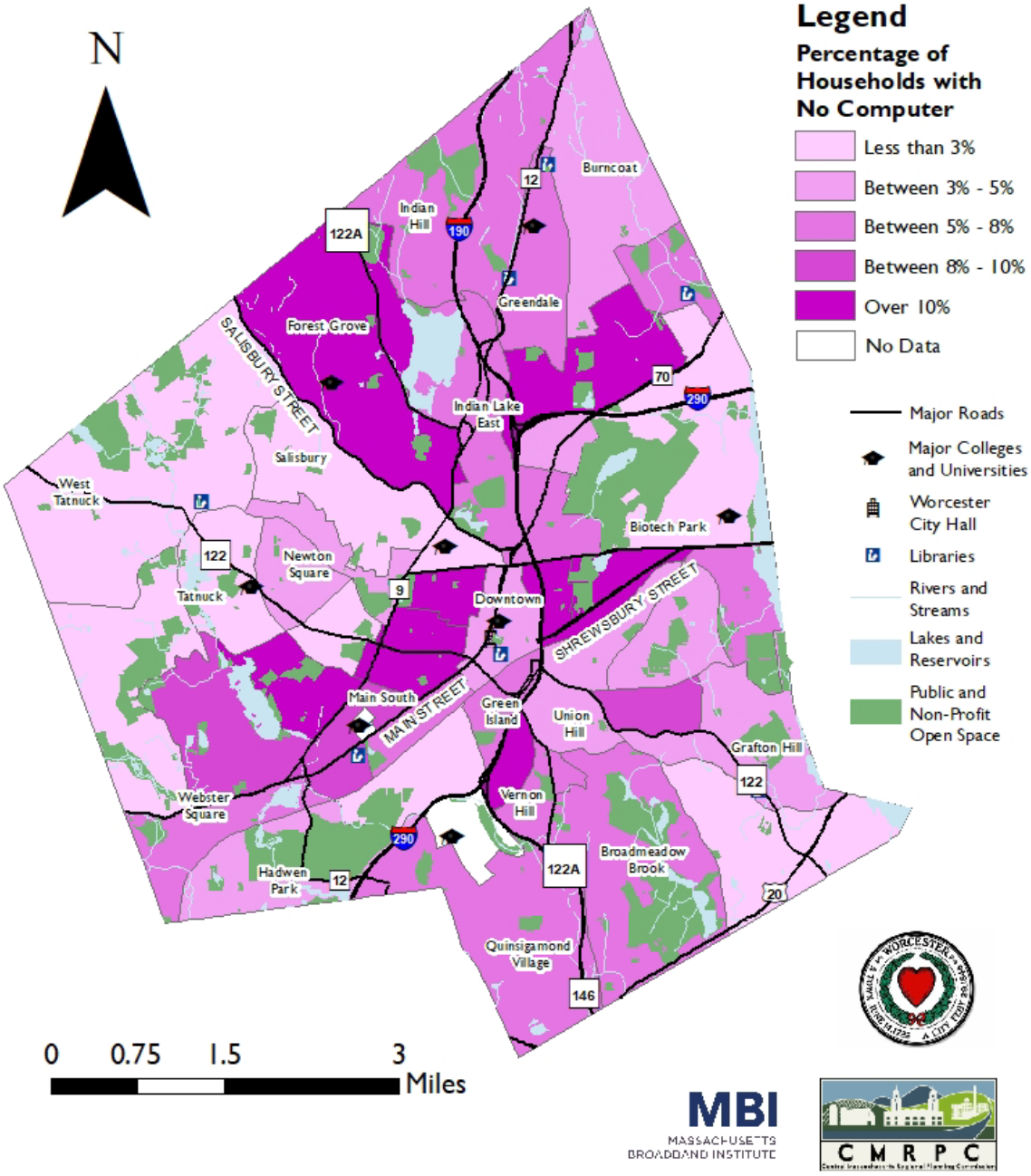
Source: ACS 2018-2022 5-Year Estimate, Tables B28004 & S2802 ***Note: The low Native Hawaiian/Pacific Islander population results in a very high margin of error, and the resulting estimate should not be viewed as statistically significant.***

Device Access

Computers and phones have become integral parts of our daily lives, but many Worcester households still lack access to computing devices like smartphones and laptops. **More than 5,600 Worcester households (7.1% of total households) own no computing device at all.**[21] This leaves them greatly disadvantaged when it comes to accessing the many public and private services that are predominantly or exclusively available online.

For those households that do possess a computing device, smartphones are the most widely adopted technology. Almost 87% of Worcester households report having a smartphone, compared to three-quarters of households (74.7%) reporting having desktop or laptop computers.[22] **8,738 households, or 11.10% of households in the City, have no other computing device other than a smartphone.**

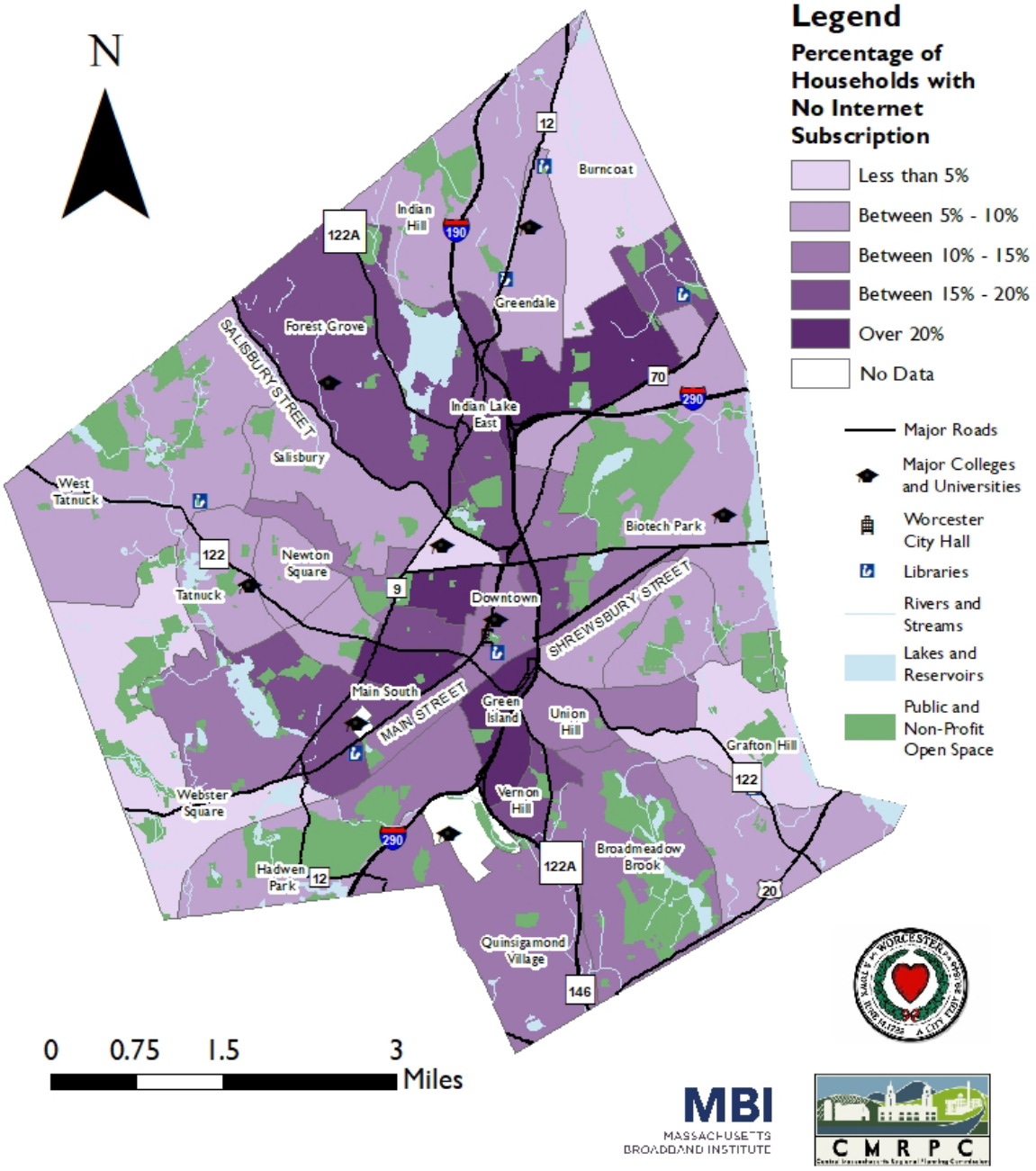
Worcester Percentage of Households with No Computer by Census Tract



Source: U.S. Census Bureau, American Community Survey, 2022 5-Year Estimates, Table S2801.

*Table S2801 does not specify where or for what purpose (e.g., work, school, etc.) respondents secured or received their computers.

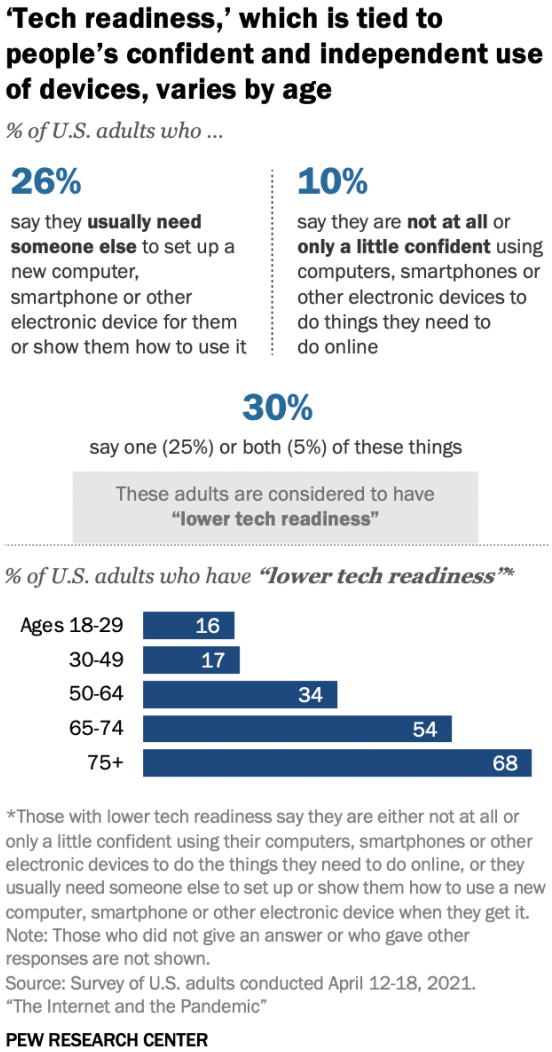
Worcester Percentage of Households with No Internet Subscription by Census Tract



Source: U.S. Census Bureau, American Community Survey, 2022 5-Year Estimates, Table S2801.

Digital Skills and Literacy

Being able to afford an adequate device and a good/reliable connection to the Internet is essential. Equally important is the ability to use them effectively. Difficulty in leveraging digital technology has major implications for a person's access to opportunity and overall welfare. For example, a recent report from the National Skills Coalition and Federal Reserve Bank of Atlanta that evaluated the demand for digital skills in the labor market found that **92 percent of job ads in the state of Massachusetts required digital skills**.[23] Similarly, a 2021 Pew Research Center report that looked at internet and device access and use during the pandemic found that 90% of US adults viewed the Internet as essential or important for them during the pandemic. Data on the other essential ways in which people use the internet is limited but several studies indicate that rates of internet and device use for education and telehealth have increased dramatically in recent years.[24]



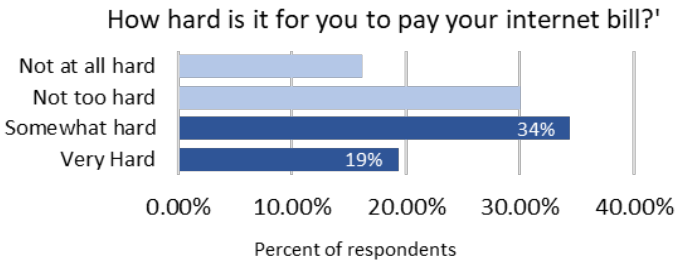
Although there is no data available that examines digital literacy in the City of Worcester, national research shows stark disparities in digital literacy across demographic groups. The aforementioned Pew Research report, for example, showed that 25% of adults usually need someone else to set up a new computer and 10% say they are not very confident using digital devices.[25] These numbers differ greatly by age group, with 68% of adults over 75 years of age saying one or both are true versus only 16% and 17% of those between 18-29 and 30-49 years of age, respectively, saying one or both are true. A 2023 study by the Organization for Economic Cooperation and Development (OECD) found that one-third of Americans lack basic digital skills that are needed to engage successfully in the modern economy and that Black and Hispanic workers are overrepresented in this group.[26]

Telehealth – An Opportunity to Advance Health Equity

Disparities in access to healthcare and health outcomes are well documented. Research has consistently shown that healthcare access is more limited for lower income households, people of color, and rural households - contributing to worse health outcomes across the same groups. While many barriers to health equity remain, physical access to care is one of the most substantial and pervasive obstacles that could be alleviated with the increased use of telehealth. Additionally, telehealth could provide access to culturally competent care that may not otherwise be accessible.

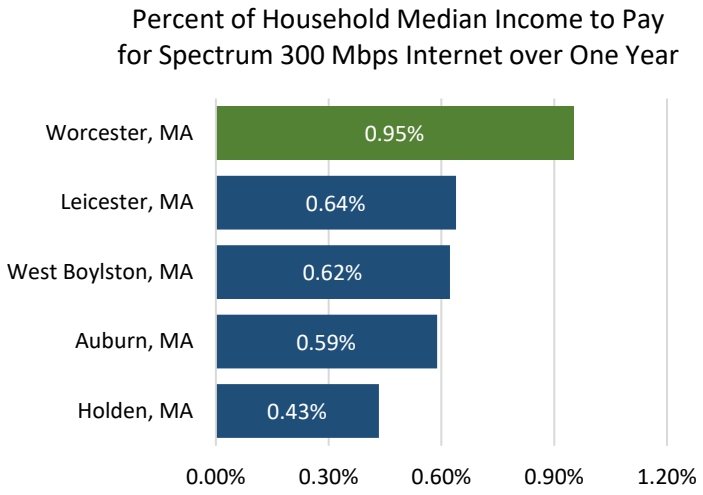
Affordability

In its 2021 report, "Bridging the Broadband Affordability Gap," the nonprofit Education Superhighway estimated that nearly two-thirds of unconnected U.S. households are offline because they cannot afford an internet subscription.[27] Given the near universal availability of broadband infrastructure throughout Worcester, it is likely that affordability plays a critical role in explaining why so many of the City's households go without internet. Survey responses to MBI's digital equity survey indicate that even among those households with internet, many Worcester residents struggle to pay for their internet, **with over 50% of respondents with an internet subscription saying it is either somewhat hard or very hard to pay their internet bill.**



Source: MBI Digital Equity Survey (Results for City of Worcester)

As previously mentioned, Worcester has a low median income compared to the rest of Massachusetts and Worcester County. The result is that Worcester households must spend a higher relative share of their income on internet plans. The following case study illustrates this point. Per BroadBandNow, Charter Communications' Spectrum service offers 300 Mbps Internet[2] packages that start at $49.99 per month in both Worcester and the neighboring municipality of Holden.[28] A plan at this advertised price would cost approximately $600 annually. To afford the plan, a median-income Worcester household would have to spend 0.95% of its annual income[3], whereas a median-income household in Holden[4] would need to spend only 0.43% of its annual income.[29]



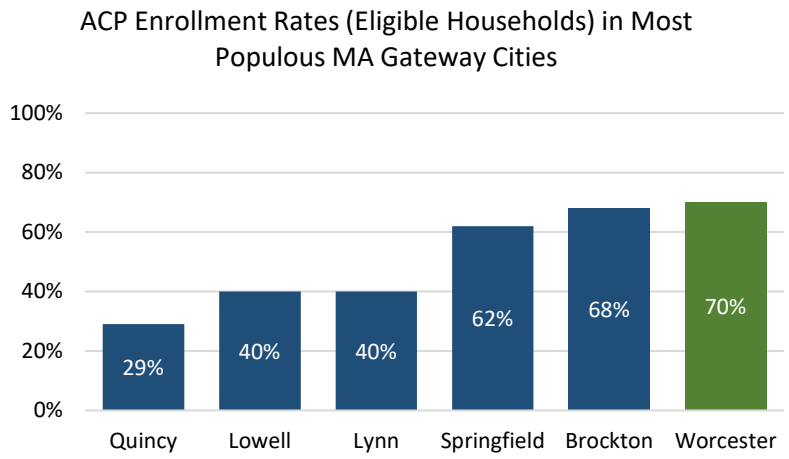
Source: ACS 2018-2022 5-Year Estimates, Table S1903

Internet affordability challenges in Worcester are also exacerbated by the high proportion of their incomes that Worcester residents spend on housing costs - **41% of owner-occupied housing units and 50% of renter-occupied housing units in Worcester spend greater than 30% of their income on housing costs**[30], making them cost-burdened according to the U.S. Department of Housing and Urban Development.[31] A closer examination of the data also reveals that a concerning quarter **(25.18%) of Worcester renter households, or 11,515 households, devote 50% or more of their income to rent each year.** This is

[2] Per Spectrum, 300 Mbps internet is suitable for 2-3 users per household.
[3] Median household income in Worcester is $63,011.
[4] Median household income in Holden is $138,241.

significant because spending so much on housing leaves these households with less to spend on computing devices and internet plans, not to mention other essentials like food.

A strong indicator of the appetite for more affordable internet service in Worcester can be seen in city residents' widespread adoption of the Affordable Connectivity Program (ACP). In May 2021, the FCC launched the Emergency Broadband Benefit (EBB) Program to offer eligible low-income households a monthly discount off the cost of broadband internet service.[32] The ACP replaced the EBB in 2022, and since then it has provided $30 monthly subsidies to subscriber households.



Source: Education Superhighway ACP Enrollment Dashboard. Nov. 2023 Data.

According to the Education Superhighway, with 70% of eligible households subscribed, Worcester has one of the highest ACP adoption rates in the Commonwealth.[33] ACP adoption in Worcester is higher than or comparable to adoption rates in each of the five other most populous Gateway cities in Massachusetts. These numbers point to the effectiveness of local ACP awareness campaigns, such as the partnership between the Education Superhighway and Worcester Public Schools. More importantly, they also reveal the considerable need for cheaper internet solutions in the City. The ACP is expected to be phased out upon the exhaustion of its funds in April 2024, which will increase the financial burden of internet subscriptions for many Worcester households.[34]

Internet Service Providers

The lack of competition among internet service providers in Worcester poses another obstacle to internet affordability. **According to the Massachusetts Broadband Institute, more than 72% of serviceable locations in Worcester had only one broadband provider as of 2022 (not including satellite internet providers).**[35] [5] In most cases, that provider is Charter Communications' Spectrum service, which offers coverage to nearly every location throughout the City. Charter Spectrum has faced criticism from Worcester residents in the past for poor quality of service and high prices.[36] The only other broadband provider available to Worcester residents in 2022 was T-Mobile in-home wireless, albeit at limited locations and speeds.[37] Fortunately, more options are emerging; Verizon announced in late 2022 that it would be bringing Verizon Fios fiber internet to Worcester.[38] As the network is built out, more Worcester households will have access to an alternative source of wired high-speed internet. Verizon and T-Mobile

[5] Excludes satellite internet providers. Satellite internet providers typically offer slow speeds and high prices compared to non-satellite competitors.

are also expanding their fixed wireless, or 5G-based internet service, in Worcester.[39] However, it may take time for residents to discover these new options.

The table below provides a look into the internet subscription options presently available to Worcester households (including satellite internet providers). Because options vary by location across the City, the chart displays the internet subscription plans available at a sample address in Worcester's Main South neighborhood. Providers offering service to the location were sourced from the Federal Communications Commission's (FCC) National Broadband Map.[40] Advertised prices were collected from provider websites and therefore may reflect discounted prices for new customers.

Speed and Price of Internet Providers in Worcester

Type	Provider	Download Speed (Up to - Mbps)	Price/Month	Price/Mbps
Wireless	T-Mobile 5G Wireless	245	$60.00	$0.24
Wired	Charter Spectrum Internet	30	$19.99	$0.67
Wired	Charter Spectrum Internet	100	$29.99	$0.30
Wired	Charter Spectrum Internet	300	$49.99	$0.17
Wired	Charter Spectrum Internet	500	$69.99	$0.14
Wired	Charter Spectrum Internet	1000	$89.99	$0.09
Wired	Verizon Fios**	300	$49.99	$0.17
Wired	Verizon Fios**	500	$69.99	$0.14
Wired	Verizon Fios**	1000	$89.99	$0.09
Satellite	Hughesnet (Select)	50	$49.99	$1.00
Satellite	Hughesnet (Elite)	100	$64.99	$0.65
Satellite	Hughesnet (Fusion)	100	$94.99	$0.95
Satellite	Starlink	175	$90.00	$0.51
Satellite	Viasat*	40	$69.99	$1.75

Source: Advertised speed and prices for sample Worcester Address

** Verizon is only available in select locations

* Plan states up to 100Mbps with 40Mbps typical download speeds

Satellite Internet Overview

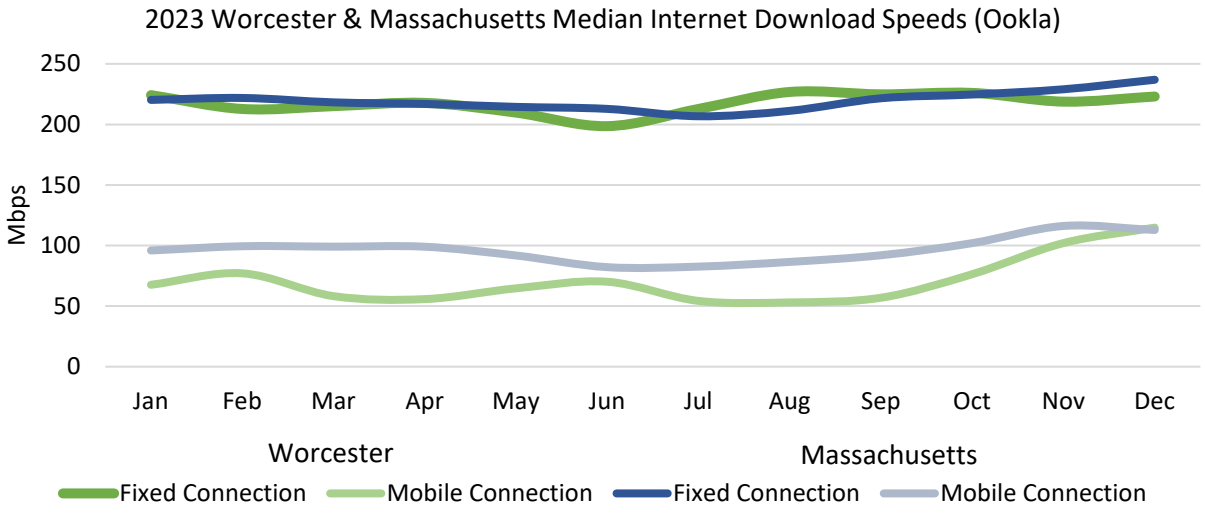
Unlike wired and wireless in-home internet that relies on physical local infrastructure, satellite internet (as the name implies) relies on satellites circling the earth in space. Although satellite internet is available throughout the City of Worcester from three providers (Hughesnet, Starlink, and Viasat), there are several cons to the service that makes it a less desirable option for residents:

- When comparing similar speeds, satellite is about 3x as expensive
- It can suffer from higher latency variation than wired
- It can be vulnerable to bad weather
- Equipment can incur significant additional setup and monthly costs

However, satellite internet can be a viable service in rural areas where other options are not available.

Performance & Infrastructure

Quality access to the Internet and the many activities that it enables is also contingent upon the speed of a user's connection. Internet speed is a measurement of "how much time it takes a certain amount of data to transfer from a server to your device and vice versa."[41] It is most common to see internet speeds measured in megabits per second (Mbps). The chart below compares the median fixed and mobile download speeds of Worcester to those of Massachusetts. The data is based on the results of consumer-initiated internet speed tests on Ookla's Speedtest platform. In December 2023, Worcester had a median download speed of 223 Mbps, slightly below Massachusetts' median download speed of 237 Mbps.[42]



The Worcester and Massachusetts median download speeds fit right in between two tiers of internet service that Charter Spectrum offers in Worcester: "Internet 100" and "Internet." For context, Charter Spectrum provides the following information on how much activity each plan can support.[43]

Internet 100 (100 Mbps)	Internet (300 Mbps)
Users per household: 1-2	Users per household: 2-3
Light streaming, browse the web, social networking, uploading and downloading small files.	Streaming on multiple devices, gaming on a single device, uploading and downloading medium files.

Besides download speeds, upload speeds are also important for activities such as uploading videos, videoconferencing, and online gaming. In terms of upload speeds, Worcester falls significantly behind the state of Massachusetts.[44] **In December 2023, Worcester's median upload speed was 11.36 Mbps, which is less than half the state's median upload speed of 25.7 Mbps during the same month.** Worcester fares better when it comes to mobile upload speeds. In December 2023, Worcester's median mobile upload speed was more than 3 Mbps faster than the median mobile upload speed in Massachusetts.

Internet connections can be established using a number of different technologies. The following is a list of Worcester's internet service providers and the technologies that they use to connect Worcester households to the Internet.

Internet Service Provider	Technology				
	DSL	Cable	Fiber	Fixed Wireless	Satellite
Charter Communications (Spectrum)		X	X		
Verizon Communications	X		X	X	
T-Mobile, USA				X	
Hughes Network Systems (Hughesnet)					X
Viasat					X
Space Exploration Technologies Corp. (Starlink)					X

Source: FCC National Broadband Map.

Cable: Cable uses existing cable TV infrastructure (coaxial cables) to connect users to the Internet.[45] Cable internet is generally reliable and offers high speeds.[46] It is not as fast as fiber but offers speeds that should be sufficient for the average household. Cable internet does not offer symmetrical download and upload speeds.

DSL (Digital Subscriber Line): "A digital subscriber line is an older form of internet that utilizes phone lines."[47] DSL is slower and less reliable than cable and fiber.[48]

Fiber: Fiber "uses fiber optic cables to quickly transfer large amounts of data."[49] Fiber internet offers the fastest speeds than cable and, more importantly, symmetrical upload and download speeds.[50]

Fixed Wireless: Fixed wireless uses mobile networks to provide internet access via radio or other wireless links.[51] Towers used for fixed wireless service need a line-of-sight connection to perform well.[52] Fixed wireless speeds are usually slower than cable internet speeds.[53]

Satellite: Satellite internet uses satellites to transfer internet signals between your home and a network hub.[54] Compared to cable and fiber, satellite internet has low speeds, high prices, and strict data caps.[55]

Community Outreach Process

Community outreach was central to the charette process. Between January and April 2024, CMRPC staff met with over 15 community groups, stakeholders, and non-profits and held 3 public workshops to gain insight into the digital divide in Worcester. These community partners offered invaluable perspectives on the challenges and needs of the Worcester community and helped to identify actions and recommendations that the City of Worcester can undertake to positively impact its residents.

Meetings with Worcester's Digital Equity Working Group: CMRPC staff met with Worcester's Digital Equity Working Group throughout the charette process. The working group consists of 16 stakeholders from Worcester organizations working in the fields of social services, health, education, and philanthropy. The group's purpose is to host a conversation about the status of digital equity in Worcester and what future steps can be taken to address the digital divide. The working group aided the charette process by brainstorming events for outreach, charette locations and materials, and data sources. Boasting strong community connections, the working group was also a major asset in helping spread the word about the digital equity charettes and survey.

Survey Distribution & Tabling: Survey distribution was key in capturing information from Worcester community members. The working group distributed the MBI/statewide survey through their networks and CMRPC staff tabled at events such as International Women's Day at the local YWCA and events at the Worcester Community Action Council. Community partners, including the Main South Businesses Association and Quinsigamond Community College, also distributed the survey to their respective networks of businesses, patrons, and students. Tabling also allowed CMRPC to promote the community charettes.

Social Media: CMRPC promoted the charettes through its social media accounts on Facebook, LinkedIn, and Twitter as well as through its monthly newsletter. Stakeholders in the working group also publicized the charettes through their social media and personal networks.

Meeting Takeover: CMRPC was allowed to conduct a meeting takeover with the Main South Business Bureau. This meeting takeover allowed CMMRPC staff to discuss the charette process with prominent stakeholders in Worcester's community and bring them up to speed on the initiatives of the Mass Broadband Institute.

Worcester Public Library Tour: CMRPC toured the Worcester Public Library (WPL) and learned about the library's many programs and resources geared towards advancing digital equity in the community. Speaking with the library's staff provided insight on potential ways to grow and improve the library's impressive catalog of services.

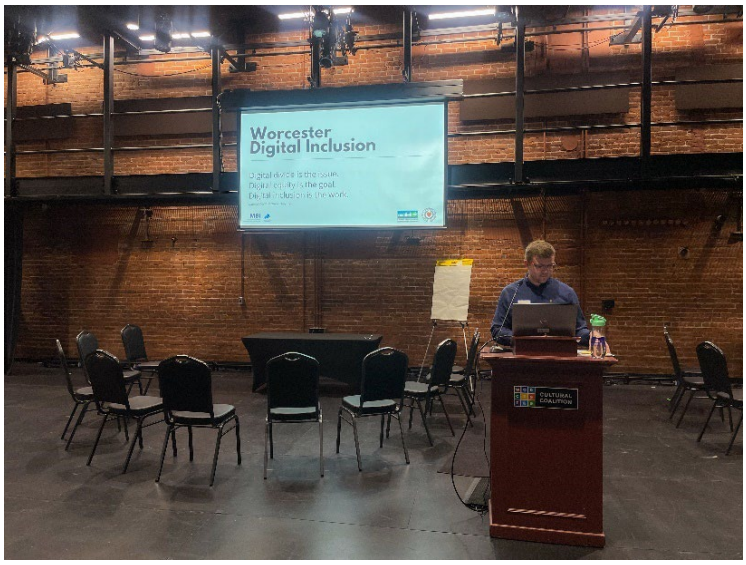
The Worcester Public Library offers a wide range of services and classes to the Worcester community, many of which are designed to help community members build digital skills and access digital technology. One such set of beginner skill courses provides training in computer basics, digitizing family photos and VHS tapes, device safety training, and social media basics. Advanced skills courses are also offered for those seeking training in the Library's digital studio, which is equipped with Adobe Creative Cloud, photo scanning services, and computer programming such as Python and Introduction to SQL. Other courses and digital technology services include, robotics, and an Innovation Center with access to

VR equipment, 3D printing, and vinyl-cutting technology. WPL also supports designated computer labs/spaces in its Children's Center and Teen Room, and career computers for library-goers seeking to focus on schoolwork, job searching, and other career-related activities. Genealogy computers are available for those seeking to research family history. Books and digital media can be borrowed and live e-tutoring takes place from 2:00 pm to 11:00 pm from Monday to Saturday.

Abby's House: Abby's House is a non-profit organization based in the Crown Hill area of Worcester, MA. Abby's House provides women and children shelter, affordable housing, and support to get back on their feet during times of hardship. Abby's House supports many individuals by troubleshooting government and personal phones, has hosted classes on internet safety, and currently supports two computers for those seeking Internet services at the non-profit.

Worcester Public Schools: Born out of the COVID-19 pandemic, Worcester Public Schools (WPS) sought to make sure students were well-connected when remote learning was the only option for education. Since then, all students in the WPS system have been provided a Chromebook. 'Remind' is an application used via phone to keep parents and students up to date on WPS news, and Information Technology technicians are able to meet with students when they are at home to set up hotspots and assist with connecting to the Internet.

JMAC Charette (January 5, 2024)



Worcester Public Library Tour (January 9, 2024)

Main South Business Association Take Over (January 11, 2024)

Quinsigamond Community College Charette (February 5, 2024)

Worcester Public Library Charette, March 6, 2024

YWCA International Women's Day Tabling March 6, 2024

Community Findings & Needs Assessment

CMRPC engaged Worcester residents, community organizations, non-profits, and other stakeholders to assess the City's digital divide and understand the current needs of the community.

One-on-one Stakeholder Interviews

To augment the public charette process, CMRPC interviewed staff from 15 local and regional organizations working in the spheres of education, social services, and advocacy.

Questions that CMRPC staff used to guide stakeholder conversations:

- What are your clients'/community members' preferred digital devices?
- Are there digital services that people in your network struggle to access?
- Who in your network and organization lacks access to and/or struggles to afford Internet service?
- What does your organization have in place/ what is your organization doing to bridge the digital divide?
- What is the greatest barrier to digital access that you have noticed?
- What is the easiest barrier to digital access for your community to overcome?

Interviewees unanimously stated that the COVID-19 pandemic placed a spotlight on the digital inequities present in the Worcester community. With in-person contact unavailable, it was suddenly critical that households had adequate internet service and computer devices to access work, education, social services, and more. Rolling out new technology and simultaneously teaching individuals how to use it was a considerable undertaking.

Internet Access and Affordability

Interviewees acknowledged that a lack of affordable internet is a major obstacle facing the clients they serve. Groups especially burdened by the cost of internet access include low-income and immigrant families/households, single parents, and senior citizens. The Affordable Connectivity Program has been an invaluable resource to these groups, although interviewees noted that the ACP enrollment process was onerous and could have benefited from being streamlined. Already living on fixed or limited incomes, these groups will face a difficult choice over whether to continue their home internet subscriptions after the ACP ends

Most of the staff interviewed belonged to the Worcester Digital Equity Working Group, seen above meeting in December 2023.

in Spring 2024. Interviewed stakeholders observed that internet service was indispensable to their clients, meaning that many will likely opt to shoulder increased internet costs and make sacrifices elsewhere.

Language barriers also pose an obstacle to households trying to secure affordable and quality home internet. Interviewees disclosed that individuals who do not speak English as their primary language often face greater difficulty when attempting to communicate with Internet service providers. For instance, navigating automated voice operators can be frustrating and time-consuming for those who speak languages other than English. According to an interview with an employee from Worcester Public Schools, to tackle the challenge of disseminating information in many different languages, the school district uses "Remind." Remind is a program that provides phone-based messaging with automatic translation into 90+ languages.[56] Sharing knowledge about services like Remind among educational and social service organizations in Worcester can help these organizations adopt best practices for how to serve the City's diverse population.

Device Access and Affordability

Interviewees were in consensus that the primary devices that their clients/constituents use to access the Internet are cell phones. Thanks to the federal Lifeline Program, cell phones are accessible for free or at a discount to even those with very low incomes. However, staff revealed that phones obtained through Lifeline Program service providers are often unreliable and do not work correctly. Due to the high turnover of Lifeline Program phones, one nonprofit reported that they must regularly help their clients pay for replacement devices. Communicating with populations that rely on cell phones also demands special consideration from organizations. As an interviewee stated, texts cannot always be written the same as emails, which have traditionally been the dominant medium of communication. The smaller size of cellphone screens also requires organizations to tailor their websites to be smartphone-friendly.

However, cell phones are not suited to perform every task. Actions like filling out forms or typing documents are easiest done on a laptop or desktop computer. Interviewees acknowledged that there is currently an undersupply of laptops and desktops available in the City. Therefore, some clients rely on the Worcester Public Library to access computers. Some organizations have also begun providing computer access at their places of business. However, not all individuals enjoy sufficient mobility to travel the distance necessary to access laptops and desktops at a library or social service organization. Senior citizens and disabled persons with limited mobility could benefit from laptops and desktops being located closer to their place of living.

The main branch of the Worcester Public Library at 3 Salem Square, Worcester, MA 01608. (Image Source: Worcester Public Library Foundation.)

Digital Literacy

Interviewees discussed how many of their clients still struggle with digital literacy. This is particularly the case for senior citizens. Stakeholders recounted that seniors are more likely to struggle to independently troubleshoot problems encountered on their devices. They are also more disposed to be resistant to adopting technology in the first place, as interviewees cited that digital literacy courses can be intimidating and overwhelming for seniors to participate in. Interviewees thought that addressing these dynamics would require a more consistent, repetitive approach to teaching digital literacy, perhaps beyond one-time training sessions and courses. An effective alternative could be office hours featuring a one-on-one approach to education.

Language barriers were another impediment that stakeholders discussed. Teaching digital skills is complicated, especially when there is a language disconnect. Interviewees shared that Spanish and Haitian Creole are the languages that they most commonly encounter besides English. Recruiting digital literacy teachers who can provide instruction in these, as well as other, languages will make a significant impact on the advancement of digital literacy in Worcester.

Digital literacy is also important in the realm of youth education. Stakeholders from Worcester Public Schools noted that children were faced with unrealistic expectations in navigating devices during the COVID-19 Pandemic. Troubleshooting technology issues at home often falls on parents and guardians, which can be challenging if adults themselves are not familiar with the technology. For this reason, it is important that schools make ample resources available to students and parents alike to navigate school computer devices and online portals/information systems outside of the classroom.

As education increasingly transitions to digital platforms, schools must also address the possibility that teachers and instructional aides need digital literacy training on the use of certain technologies in the classroom. This can ensure that students have access to age-appropriate technological support to maximize their learning.

Finally, the great potential that computer devices provide also comes with drawbacks. Some interviewees were concerned that devices, particularly phones, have become an unwelcome distraction for youth inside and outside of the classroom. These comments highlight the importance of simultaneously promoting device access and healthy device use habits.

Charettes – Key takeaways

CMRPC hosted three charettes in the City of Worcester between December 2023 and March 2024. There was a total of 45 attendees at the charettes. Participants shared many observations concerning the status of internet access, device access, and digital literacy in the City.

Activities for which charette participants use the Internet (Image Source: WordArt.com).

Internet Access and Affordability

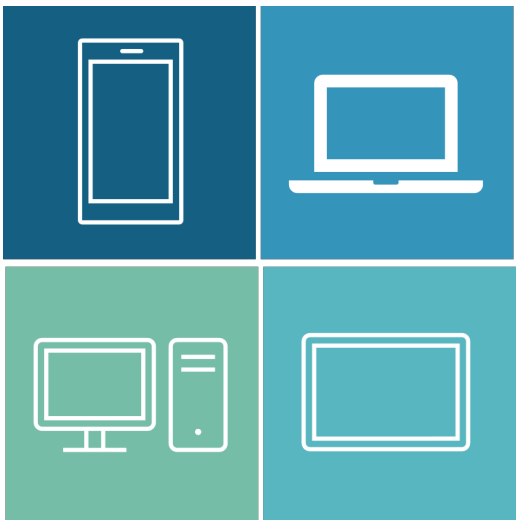
It was clear from participants' feedback that the Internet and computer devices have become an integral part of Worcester community members' daily lives and routines. Participants disclosed that they rely on these assets for work, education, communication, telehealth, entertainment, and many other regular activities, as detailed in the word collage to the right. For many participants, the extent of this dependence was laid bare by the COVID-19 Pandemic. Changes brought on by the pandemic have resulted in people being more dependent on access to the Internet and devices than ever before. An example of such a change is the transition of Worcester Public Schools assignments and records to online portals, as described by a parent in attendance at one of the charettes.

When it came to internet access and affordability, the concern most communicated by participants was the high cost of home internet subscriptions, especially once bundled with cable and mobile phone plans. Some participants also voiced concerns about the quality of their internet. However, by far, most frustration was focused on the cost of internet access. For this reason, attendees expressed a desire for more competition among internet service providers. At present, the only option that many households have to lower their internet bills is negotiating directly with Spectrum. It was noted that this can be uncomfortable for many individuals, not to mention challenging for those with language barriers.

Considering the high costs associated with internet access, participants were also concerned about the pending termination of the Affordable Connectivity Program (ACP). It was recognized that many Worcester households rely upon the ACP to help cover the cost of their monthly internet bills. Without the ACP, many households may no longer be able to afford home internet subscriptions.

Device Access and Affordability

Charette participants identified cell phones as the most essential devices for accessing the Internet. Cell phones offer many of the capabilities of a laptop or desktop computer with the added benefit of portability. Using cell towers, cell phones can make calls or texts and access the Internet when people are not connected to a local Wi-Fi network. Participants observed that children and young adults are especially deferential to cell phones over alternative devices. Staff from adult education programs and social service organizations also found that many recent refugees and immigrants are not familiar with any computer devices besides cell phones.



However, attendees acknowledged that cell phones are still inadequate to support certain activities, such as work, education, and applying for jobs. These tasks require either laptop or desktop computers. Unfortunately, these types of devices are too costly for many individuals to afford. Adult education programs and social service organizations also reported that the need for such devices among vulnerable populations is currently greater than they can fill. As a result, many Worcester residents depend on organizations like the Worcester Public Library and the MassHire Central Region Workforce Board for access to computers.

Thanks to significant investments made by the Worcester Public Schools, the same barriers to computer access do not extend to Worcester's K-12 student population. Worcester Public Schools currently provides all its students with Chromebooks, granting students access to a computer device in the classroom and at home. It should be noted however that these devices are not suited nor equipped to allow students to engage in many non-school related activities.

Participants also highlighted 'planned obsolescence' as a concern for many community members - "Planned obsolescence is the practice of deliberately designing products to limit their life span to encourage replacement."[57] This phenomenon exists for several reasons. First, devices can become obsolete through ongoing technological innovation – as systems and devices improve, older hardware and software may no longer be able to support apps, websites, etc. Second, manufacturers often limit the number of system updates that they support for a particular device – this is particularly common in mobile devices, however the update timeframe has been increasing with many devices currently coming with 7 years of updates. This process of needing to update devices and learn new systems can place stress on people's budgets and digital literacy skills.

Lastly, charette attendees proposed numerous ideas as to how to expand device access in the City. There was discussion about stimulating a more robust supply chain of used/refurbished computers, which could reduce cost barriers for low-income households. This could be coupled with broader policy conversations centered on device longevity and the right to repair. Another idea that participants supported is placing more computers in community settings (e.g., nonprofit or religious institutions) where they would be more readily accessible to local residents.

Breakout group at the January 5, 2024, charette at the Jean McDonough Art Center (JMAC).

Digital Literacy

There was consensus among participants that access to the Internet and computer devices alone is not sufficient to support digital equity. individuals must also develop the skills to use these assets to their greatest potential. Attendees thought that this could only be

achieved with a continuum of education, one that stretches beyond computer basics. More advanced subjects that charette participants identified as priorities for digital literacy education in the City included internet safety, troubleshooting, and program-specific tutorials (e.g., for Microsoft Word and Excel).

Participants specifically called attention to two groups that are more likely to struggle with digital literacy. The first of these groups is senior citizens. Charette attendees observed that operating computer devices did not come as naturally to their family and friends of older age. This is exacerbated by the constantly evolving state of technology, which can feel disorienting to some seniors. Stakeholders also highlighted recently arrived refugees and other immigrants as a population that could benefit from greater digital literacy skills. Adult education programs and social service organizations noted that some members of this group are not familiar with operating traditional computers, nor programs such as email. However, a lack of training opportunities in the City in languages other than English presently poses an obstacle to getting refugees and other immigrants the help they need.

Participants also viewed promoting healthy internet and device use practices as a priority. Many attendees were concerned about internet safety, such as exposure to phishing scams and other types of online fraud. With little formal education in the City currently being devoted to internet safety, they felt that people have been unfairly left to navigate these challenges alone. Another concern that emerged among adults was the seeming unbreakable attachment of today's children and teenagers to their phones. Participants felt that youth need to develop healthier habits when it comes to device use, otherwise they may be at risk of suffering adverse mental health effects or not developing adequate social skills.

To better address these issues surrounding digital literacy, participants shared several ideas. First, they recommended leveraging community connections. People often feel more comfortable when they are being guided by friends, family, or other trusted persons. Tapping into existing networks and relationships in the community—such as public schools, nonprofits, and religious institutions—may be an effective way to provide people with the digital literacy resources which they need.

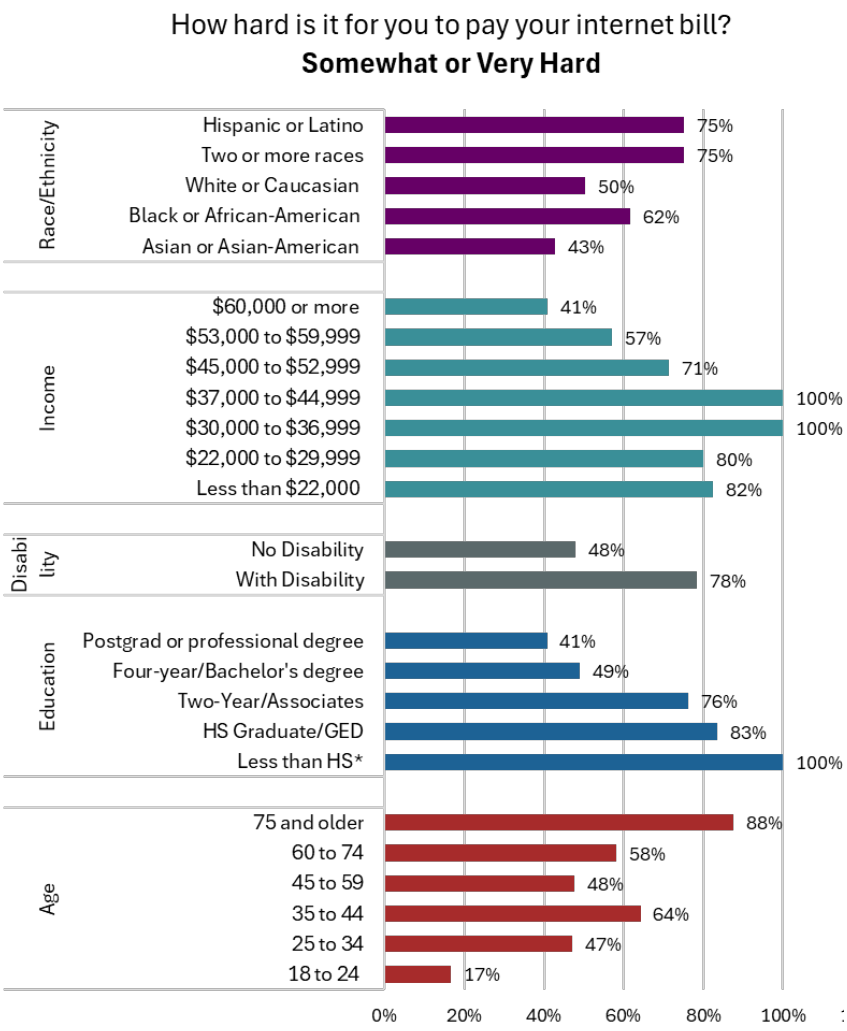
In fact, a central takeaway of the charette series was that Worcester already has a lot of organizations working in the sphere of digital equity. This was demonstrated by the strong attendance of staff from educational, social services, and health organizations at the charette series. That said, the valuable work of these organizations to advance digital literacy, along with internet and device access, is currently not being strategically coordinated. Charette participants were supportive of the idea of forming a digital equity coalition to fill this void.

Survey Analysis

As part of a data collection effort for the Massachusetts Statewide Digital Equity Plan, the Massachusetts Broadband Institute launched a digital equity survey in June 2023. The survey featured nearly 40 questions gauging respondents needs and priorities concerning internet access, device access, and digital literacy. Between December 2023 and March 2024, CMRPC and the Worcester Digital Equity Working Group distributed this survey throughout the Worcester community. In total, 233 survey responses were collected from Worcester residents.

Internet Access and Affordability

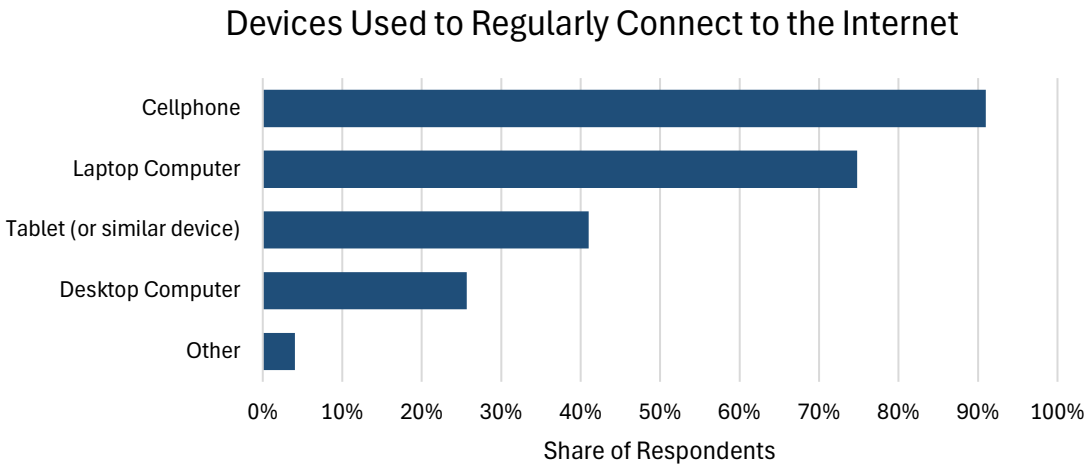
The survey included several questions focused on the theme of internet access and affordability. Results from the first of these questions, "Do you have internet service in your home?", suggest that home internet subscriptions are widespread but not universal among Worcester households. While 95% of respondents reported having internet service in their home, 5% of respondents (or 11 people) said they do not. The survey further shows that among respondents in households with home internet service, there is considerable struggle to afford the cost of Internet. **More than half of respondents acknowledged that it is "somewhat hard" or "very hard" to pay their internet bill.** This coincides with many respondents being dissatisfied with the quality of their internet service. More than a third of respondents said their home internet service is not good enough to meet their household's needs. The financial burden of internet service also differs starkly by demographic groups. Lower income, older, less educated, those that identify as a race other than White or Asian, identify as Hispanic or Latino, or identify as having a disability, all report higher levels of difficulty paying for internet.

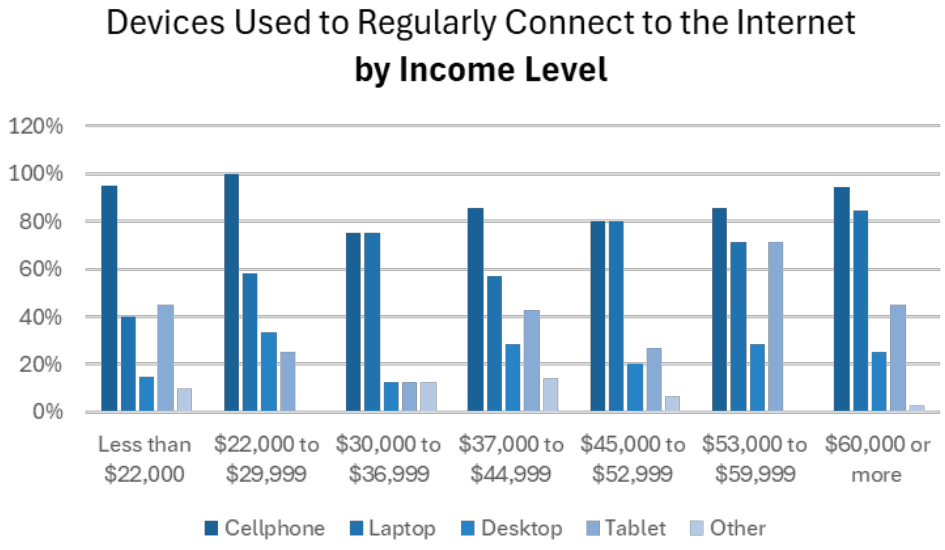


Note: Some of the group and response pairings represent a small number of responses and may impact whether observed differences are statistically significant.

Device Access and Affordability

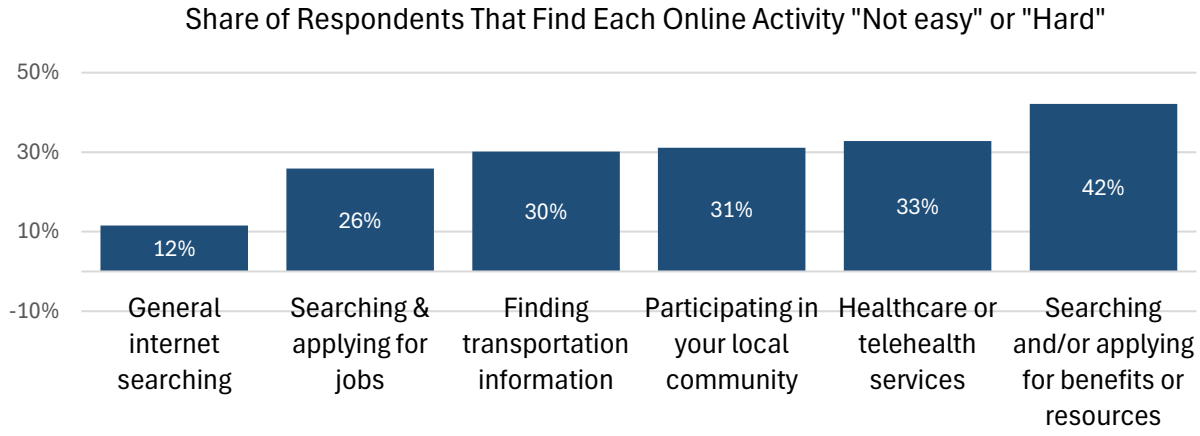
The survey also gauged the level of device access in the Worcester community. Most survey respondents (86%) said that everyone in their household has access to the computer devices that they need. Only 14% of respondents (or 31 people) reported otherwise. Results show that respondents most commonly use cell phones to connect to the Internet, followed by laptop computers, tablets, and desktop computers. Although all income levels used cellphones at a high rate, **the lowest-income respondents noted relying on cellphones at the highest rates**. This mirrors the information provided by charette participants and stakeholders. Besides convenience, the survey suggests that the predominance of cellphones over laptop and desktop computers might also have to do with cost. When asked "How much could you pay for a laptop or desktop computer?", half of respondents answered that they could only pay somewhere between the range of $0-250. For context, the technology review magazine *PCMag* has a list of the best cheap laptops and desktops in 2024. The most budget friendly laptop options sell for a minimum of $300, while the lowest priced desktops sell for no less than $400.[58] Meanwhile, some budget phones sell for less than $200.[59]

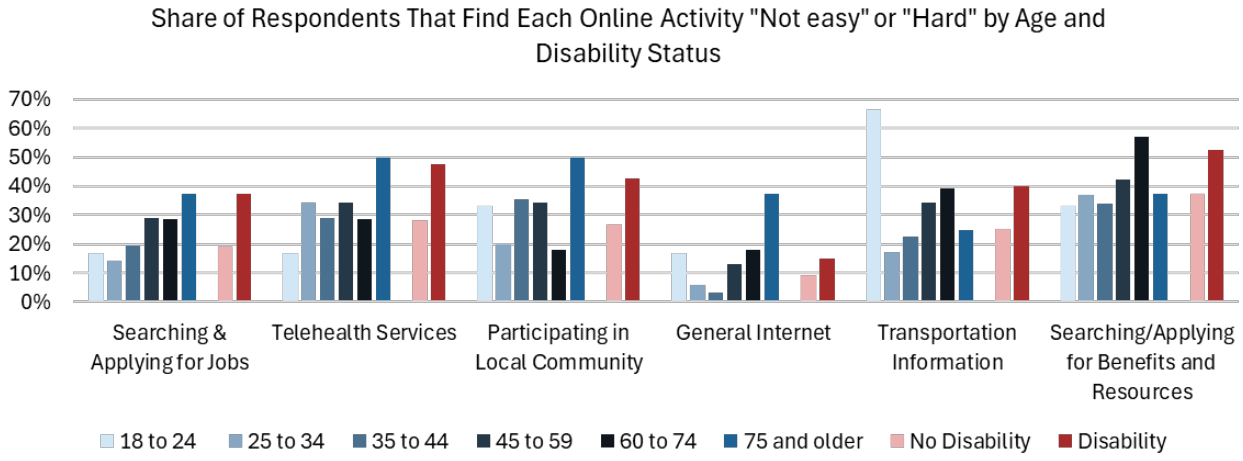




Digital Literacy

Finally, multiple survey questions sought to understand respondents' concerns pertaining to digital literacy. A series of questions asked respondents to disclose the difficulty level they faced when attempting certain activities on the Internet (see the chart below). For each category but "General internet searching," more than a quarter of respondents said that the activity was either "not easy" or "hard" for them. Although a relatively small sample of respondents, **for those 75 years of age or older, 50% stated that they had trouble accessing telehealth and participating in community online. Similarly, those that identified as having a disability, disproportionately noted having difficulty accessing telehealth services and using the internet to apply for benefits and resources.** Young respondents (18-24) noted the most difficulty accessing transportation information online.





The survey also uncovered widespread concerns among respondents regarding internet safety. Nearly 90% of respondents relayed that they were either "somewhat concerned" or "very concerned" about internet safety. Respondents were most worried about data theft and online scams, with well over two-thirds of respondents identifying these issues as specific concerns.

Strengths, Weaknesses, Vulnerabilities

During the charette public outreach process, CMRPC sought to identify the Worcester community's digital equity strengths and weaknesses, evaluate future opportunities to further digital equity, and identify potential threats/challenges to achieving digital equity. The following graphic summarizes what we heard.

Strengths

- Colleges and Universities
- Community-based health and social service organizations
- Worcester Public Library
- Worcester Public Schools
- Engaged City leadership

Weaknesses

- Strategic coordination between the City and other entities
- Language and age barriers to internet / device access and digital literacy
- Low competition among ISPs
- Digital skills programming capacity

Opportunities

- Forthcoming state and federal digital equity funding
- Expansion of Verizon and T-Mobile internet services in the City
- Expanding digital equity organizations (ex: Tech Goes Home)

Threats/ Challenges

- End of ACP
- High cost of internet plans and computer devices
- Unpredictability of migration flows and subsequent community needs

Limitations

CMRPC, the City of Worcester, and the Worcester Digital Equity Working Group invested a great amount of time and energy into community outreach for this project. That said, these efforts were not without limitations. Addressing shortcomings in the charette process is key to identifying potential gaps and weaknesses of the current study. With a 90-day window to conduct the charette process, the primary constraint on the project's outreach effort was time. As a result, there was minimal time for the project's stakeholders to introduce the concept of digital equity to the Worcester community, much less build the familiarity and trust necessary to authentically capture all of the community's diverse needs. This may have posed an obstacle to securing more broad community engagement.

Strategic Recommendations

1 Create a Digital Equity Coalition to coordinate efforts, make recommendations, and implement programs.

Implementation Time Frame: Near Term (12-18 Months) **Cost:** $ **Effort Level**: Medium

Description: The City of Worcester is well-positioned to implement certain digital equity programs and solutions, especially those related to infrastructure and city resources (such as the library) that are already connected to the community. However, the City cannot work or solve digital equity alone. Numerous community-based organizations noted during the charette process that they are already working on the various elements of digital equity but are not always aware of the resources or help that other organizations offer.

To ensure better coordination and information sharing across the organizations already working toward digital equity, the City should convene a coalition of these community partners. As the predominant city department providing digital access and inclusion resources, the Worcester Public Library could be the convener of such a group. Additionally, the City's digital equity working group, which is already convening key community partners, could be an existing resource from which a coalition could form.

A coalition should be more than just a group that meets to discuss community needs and provide recommendations to the City. It should consist of community partners that are actively pursuing ways to improve access, affordability, and literacy. The goal of the group should be to bolster existing efforts and build clear lines of communication between organizations, creating a broad ecosystem of community assistance.

Some Key Organizations Identified during the Charette Process:

- Quinsigamond Community College
- Worcester Housing Authority
- Worcester Community Action Council
- Worcester Regional Research Bureau
- Worcester Public Schools
- Tech Goes Home
- Massachusetts Healthy Aging Collaborative
- Worcester Public Library
- Refugee & Immigrant Assistance Center
- Greater Worcester Community Foundation
- Worcester Elder Affairs & Senior Center
- Latino Education Institute
- Southeast Asian Coalition
- Coalition for a Healthy Greater Worcester

2 Create a Digital Navigator program/position that works with community members to ensure a continuum of help with access, affordability, and literacy.

Implementation Time Frame: Near Term (12-18 Months) **Cost:** $$$ **Effort Level**: Medium
Funding avenues & Resources: Municipal Digital Equity Implementation, Lead for America

Description: Throughout the public charette process, CBOs, community members, and city staff all indicated the need for people who can work with community members across a range of technology issues. The National Digital Inclusion Alliance (NDIA) has created a model for people who can serve in this capacity called digital navigators. Digital Navigators are individuals who address the whole digital inclusion process — home connectivity, devices, and digital skills — with community members through repeated interactions. The City of Worcester should consider using NDIA's model in the creation of a digital navigator program or position.[60] Given Worcester's diverse population, there is also a need for multi-lingual navigators.

Current needs in the community that digital navigators could address include:

- Augment the digital skills training for work, life, and learning that the Worcester Public Library currently provides.
- Coordinate with social service providers in Worcester to ensure clients can access and use their resources.
- Assist community members in applying for government subsidy programs and internet service provider programs for low-income users.
- Form a network of volunteers or paid digital navigators through community partners such as CBOs, religious institutions, and educational institutions, so that access to help is spread geographically throughout the community.

Digital navigators could assist with these community needs at the Worcester Public Library, the Worcester Housing Authority, and potentially other key community sites. The Digital Equity Coalition could assist in determining the scope of the navigator position and the evolving needs of the community. Worcester should also coordinate with other municipalities in the region regarding digital equity planning and should identify opportunities for collaboration. Given the numerous towns pursuing digital equity initiatives in Worcester County, there is an opportunity to develop a regional network of digital navigators and training instructors. There is also an opportunity to explore models that leverage existing programs, such as AmeriCorps, to create a broader system of navigators statewide.

Digital Navigator Case Study: Colorado AmeriCorps

The State of Colorado created a Digital Navigator program through its Serve Colorado AmeriCorps service commission. The program began March 2023 with $1.7 million in funding from state legislation and a match from Serve Colorado/ AmeriCorps. Additionally, Comcast has contributed $600,000 for the two-year period of this program. The first cohort of navigators includes 30 individuals that will work across 9 counties. Digital Navigators will work primarily one on one with community members to identify needs and provide personalized assistance but may also create opportunities for group events should individual's needs overlap.

3 Consider hiring a broadband/digital equity manager or identify existing staff to stay apprised of funding opportunities, ISPs, and community needs.

Implementation Time Frame: Medium Term (2 -3 Years) **Cost:** $ - $$$ (Depending on new hire or existing staff) **Effort Level**: Medium
Funding avenues & Resources: Lead for America, Efficiency & Regionalization

Description: In recent years, the federal government has made significant funds available to improve digital access and affordability. At the state level, MBI and the Healey Administration have also implemented significant funding opportunities. Both state and federal agencies have indicated that additional funding opportunities will be available in the future. Other communities across the US have been successful in leveraging these types of funding opportunities by hiring or identifying dedicated staff who can stay on the pulse in an evolving funding landscape.

Whereas digital navigators would focus on direct assistance to the public, a broadband manager, dedicated staff person, or department within the City government would be responsible for ongoing community engagement and technical analysis related to digital needs. Their role would include tapping into federal and state funding opportunities (grant writing and administration), encouraging internet competition and additional ISPs, and working with community partners. They would also be responsible for tracking the local broadband market and directly communicating with service providers about the community's needs, concerns, and opportunities. Through this type of position or department, many cities have been able to access more funding, develop impactful programs, and further digital equity.

Broadband Manager/Department Case Study: City of Boston

Many City, County, and regional governments are increasingly recognizing the importance of proactively planning for and investing in the full digital inclusion of their communities instead of responding and reacting to community needs and new technology. For example, the City of Boston has incorporated broadband policy and initiatives into its department of Broadband and Cable. The department's broadband work includes:

- Expanding the City's fiber network
- Running studies and reports on companies
- Finding the City a good mix of competitive cable services
- Researching how technology affects residents and businesses
- Working with departments to develop a technology plan for the City
- Work with the industry to expand cable access
- Promoting and enforcing regulations

Boston's Innovation and Technology Department has also overseen the creation and deployment of a digital equity fund. The fund has supported organizations that:

- Help people use the Internet, digital skills, and digital tools
- Get residents enrolled in the Affordable Connectivity Program
- Improve Telehealth Programming

4 Consider creating a modest grant program to fill the gap left by the discontinuation of the ACP and leverage upcoming state and federal funding opportunities.

Implementation Time Frame: Near Term (12-18 Months) **Cost:** $$$ **Effort Level**: Medium

Description: Over 30,000 households in Worcester have benefited from the Affordable Connectivity Program. When the program ends in April 2024, these households will begin feeling the burden of device and internet costs. Fortunately, the landscape for federal and state digital equity funding is dynamic and evolving, with indications that funding sources may become more prevalent in the next few years. With the recent release of MBI's state Digital Equity Plan, and the federal government's upcoming $2.75 billion Digital Equity Act funding opportunities, the City of Worcester is well-positioned to serve as a both a program implementor and conduit for distributing future state and federal grant funds to local organizations. Given the high level of Affordable Connectivity Program enrollment in Worcester, the City should consider leveraging these funding sources to provide direct assistance to residents in the form of connection and device subsidies. However, it should be noted that rules and application guidelines for these funds have not been released and could contain restrictions on fund usage.

Because there will likely be a lag between when the ACP ends and additional funds are made available, the City should consider providing gap subsidies or directing additional funds to existing programs, such as computer and hot spot lending at the Worcester public library. In the event that upcoming funds are not able to financially support or provide direct internet access to households, the City should explore more permanent means-tested subsidy programs.

Worcester should also consider establishing a broader digital equity fund that can be used to support a broader set of digital equity programs. For example, Boston's digital equity fund has been used to support both ACP enrollment and device refurbishment, among other programs.

ACP Bridge Funding Case Study: Albemarle County, VA

The Albemarle County, Virginia, Broadband Accessibility and Affordability Office (BAAO) was recognized by the National Digital Inclusion Alliance (NDIA) in 2023 as a Digital Inclusion Trailblazer. Recognizing the high cost of broadband in many of the County's lower income areas, the BAAO created an ACP Bridge program that provided ACP recipients with a supplemental $20 per month. The program was realized through thoughtful collaboration between county departments, local stakeholders, and internet service providers.

More about the program and the county's efforts to keep the program going post ACP can be found here: https://www.albemarle.org/home/showpublisheddocument/21259/638452234534300000

5 Bolster existing digital skill training and device lending programs through the library.

Implementation Time Frame: Medium Term (2 -3 Years) **Cost:** $$ **Effort Level**: Medium
Funding avenues & Resources: Digital Equity Partnerships (ie. Tech Goes Home)

Description: The Worcester Public Library currently provides a wide range of classes and other assistance regarding the use of digital tools, ranging from how to digitize family photos to how to avoid digital scams and more. Library staff are also available to assist patrons on library computers, and the library offers a lending program through its "library of things" for computers and hot spots. Library staff indicated throughout the engagement process that each of the services and lending programs they offer are frequently used by the public and that they could use additional funds to purchase more hot spots and computers. The City should explore dedicating more financial resources to bolster the library's programming and collection of digital items that can be loaned.

A need that the library identified was the ability to provide services in various languages. The hiring of multi-lingual digital navigators could be one potential avenue for multi-language support, but the City should explore other opportunities as well.

6 Partner with educational institutions throughout the City to provide additional learning and assistance resources.

Implementation Time Frame: Medium Term (2 -3 Years) **Cost:** $ **Effort Level**: Low

Description: The City should explore the opportunity to partner with educational institutions in Worcester that may be looking for ways to contribute to the broader Worcester community. In particular, the Quinsigamond Community College (QCC) Center for Workforce Development and Continuing Education is an affordable option for community members seeking workforce skills training. There may be opportunities for better coordination between the services offered by the library and the complimentary training opportunities offered by QCC.

Given their experiences navigating the pandemic, identifying barriers and strategies, developing trusted relationships in communities, and helping build digital skills among people, QCC and the other educational institutions in Worcester - Clark University, Worcester Polytechnic Institute, Worcester State, Assumption University, College of the Holy Cross, UMass Chan Medical School, and the Massachusetts College of Pharmacy and Health Sciences - may be well-positioned to offer invaluable insights and resources to the Worcester community as it works toward closing the digital divide. These institutions may also have opportunities for student practicums, digital equity research, and digital navigation services for patrons of their libraries.

7 Explore new digital literacy and communication programs directly targeted at improving cybersecurity and online safety.

Implementation Time Frame: Medium Term (2 -3 Years) **Cost:** $ **Effort Level**: Low/Medium

Description: Members of the Worcester community continue to express concerns about online safety and privacy. Although, historically, cybersecurity has been most often discussed as a critical concern for older adults, the increasing sophistication of cyber-scams and security concerns means that susceptibility to them is widespread across all demographics. As cybersecurity is one of the critical safety concerns for communities, the City of Worcester should explore how it can best lead the community in accessing the digital world safely. Relatively simple steps could include adding or bolstering programing at the library to include more robust cybersecurity information, as well as training and working with schools to assess gaps in educational curricula related to staying safe online. Both a digital navigator program and/or a broadband manager would be critical for this type of initiative.

Another avenue that the City could take with the help of dedicated staff could be to produce timely and frequent PSAs on current cybersecurity threats and scams. These could be sent out to the community through social media platforms which the City has been increasingly active on and has wide reach with.

8 Promote healthy device and internet use for all age groups but particularly in children, adolescents, and young adults.

Implementation Time Frame: Near Term (12-18 Months) **Cost:** $ **Effort Level**: Low

Description: Research is starting to indicate that there may be a negative relationship between excessive digital device use and physical and mental health.[61] Specifically, excessive smartphone use is associated with difficulties in cognitive-emotion regulation, impulsivity, impaired cognitive function, addiction to social networking, shyness and low self-esteem. Medical problems resulting from excessive smartphone use include sleep problems, reduced physical fitness, unhealthy eating habits, pain and migraines, reduced cognitive control, and changes in the brain's gray matter volume.

Given the evolving research on screen time and health, many Worcester residents expressed a desire for this report to recognize that although digital inclusion is the ultimate goal, we should also recognize the potential for equity implications of excessive digital device use. Some of the priorities raised during the charette process include:

- Ensuring that families have the resources and information to understand the health implications of excessive device use.
- Ensuring that households have the resources/knowledge to implement safety measures on digital devices.
- Promoting access to mental and physical health assistance for children and adolescents experiencing the abovementioned issues.

We also heard from numerous community members that there may be stark disparities between families that are and are not prepared to discern healthy device use. Specifically, some raised concerns that lower income, immigrant, and limited-English households may experience constraints/barriers in accessing the resources needed for healthy device use. The City should work with the Worcester Public Schools to ensure that pertinent information regarding healthy device use is being relayed to parents.

9 Explore device recycling and reuse as a cost-effective strategy to increase access to affordable devices.

Implementation Time Frame: Medium/Long Term (2-5 Years) **Cost:** $$ **Effort Level**: High

Description: Reusing or refurbishing electronics is a cost-effective method of increasing access to affordable digital devices. The City of Worcester should examine whether there is potential to create a Worcester refurbishment program through partnerships with local electronic businesses and educational institutions. QCC and WPI both have applicable educational programs – the City should inquire about opportunities for student practicums or courses to contribute to a refurbishment program.

Case Study: Some organizations across the US have recognized that promoting cost-effective refurbished products can help bridge the digital divide. Non-profit organizations such as Free Geek in Portland, OR work towards bridging the digital divide by leveraging the responsible reuse of technology. Their model is refurbishing and selling donated devices from government, business, and community sources. By repurposing unwanted devices, they lower the cost of digital access and curb the environmental impact of e-waste. After being tested and refurbished, devices are made available at a low cost in a community store, given to volunteers in exchange for community service, granted to community nonprofits, or provided to students through an education program.

10 Explore opportunities to increase the number of internet service providers operating in Worcester.

Implementation Time Frame: Near/Medium Term (1 – 2 Years) **Cost:** $ **Effort Level**: Medium
Funding avenues & Resources: Municipal Digital Equity Implementation

Description: Like many municipalities around the country, Worcester residents have few internet service provider (ISP) options. Charter Spectrum is by far the most widely available ISP in the City, and it offers a range of cable internet plans priced based on maximum download speeds. Their only cable-based competitor to date is Verizon, which has recently expanded its Fios fiber service into Worcester. More recently, both Verizon and T-Mobile have expanded their fixed wireless services in Worcester, which offer high-speed internet in homes using cellular 5G networks. Although fixed wireless has been a welcome addition to many markets, many Worcester residents would like to see additional cable and fiber providers as well.

Although market competition is generally a cost moderator, a 2019 Information Technology & Innovation Foundation guide to broadband competition suggests that a policy goal of simply maximizing the

number of competitors is unlikely to produce the lowest consumer costs.[62] The optimal level of competition depends in large part on the characteristics of the geographic locale. The ITIF summarizes the general broadband market as "Too little broadband competition drives up prices and restricts investment. Too much competition drives up cost and wastes resources." The ITIF suggests that in most cases, an approach that seeks to enable competition but does not actively promote the addition of specific providers is likely to be the most effective one. A strategic approach in Worcester should start with a review of the City's current policies and permitting procedures (if applicable) for internet providers to identify any barriers to increased competition which are currently in place.

Funding Opportunities and Resources

Broadband Equity, Access, and Deployment Program

The BEAD program has a primary focus of "deploying broadband service to unserved locations … and underserved locations." Following planning efforts by the Massachusetts Broadband Institute (MBI) and statewide partners, this federal funding may be available to resolve lack of service availability for locations in Worcester as well as to support uses related to access, adoption, and equity that align with program goals.

https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf

Municipal Digital Equity Implementation Program

This grant opportunity, funded through the MBI, offers a one-time award of up to $100,000 to Massachusetts municipalities with existing (or in-progress) digital equity plans. Funding may be used to implement initiatives across one or more digital equity projects.

This could be a valuable opportunity for Worcester to quickly execute recommendations put forth in this report. *See Digital Equity Partnerships Program below.*

https://broadband.masstech.org/digital-equity-implementation

Digital Equity Partnerships Program

MBI established the Digital Equity Partnerships Program as part of the $50 million Broadband Innovation Fund, established following the MA ARPA 1.0 legislation. While the program solicitation has closed, a number of funding recipients are available as resources, vendors, or collaborators in the following program areas:

- Wi-Fi Access Initiative: Wi-Fi systems in affordable multi-unit buildings or in low-income neighborhoods will provide free, in unit, broadband use.
- Public Space Internet Modernization Initiative: Improvements to inadequate broadband infrastructure and digital use in public spaces to increase daily use and services.
- Connectivity Initiative for Economic Hardship: The provision of Wi-Fi cellular hotspots to individuals lacking stable housing and unable to have a fixed broadband internet subscription.
- Digital Literacy Initiative: Establish and implement digital literacy training programs to ensure that target populations have the requisite skills to use devices, online resources, and digital tools to needed effect.
- Device Distribution and Refurbishment: Secure new or used internet-connected devices to distribute to target populations.
- Education, Outreach, and Adoption: Support outreach and engagement activities designed to increase the success of digital equity programming, including ACP adoption, digital literacy programs, device access, and Wi-Fi or hotspot connectivity.

https://broadband.masstech.org/partnerships

Efficiency & Regionalization Grants

The Efficiency and Regionalization (E&R) competitive grant program, offered through the Community Compact Cabinet, provides financial support of $100-200k for governmental entities interested in implementing regionalization and other efficiency initiatives to achieve long-term sustainability. One-time awards can assist in the planning and implementation of regionalization and other efficiency initiatives.

Eligible regionalization efforts include: shared services, joint or regional facilities, intergovernmental agreements, consolidations, mergers, and other collaborative efforts.

Worcester could consider using this source of funding to initiate or augment any number of regional or shared digital equity initiatives, which could bridge local communities and strengthen the greater Worcester area.

https://www.mass.gov/efficiency-regionalization-grant-program

Massachusetts Community Health and Healthy Aging Funds

The Massachusetts Executive Office of Elder Affairs, Massachusetts Department of Public Health, and Health Resources in Action award funds that focus on projects addressing heath and racial inequities. Funding seeks to address social determinants of health, structural and institutional inequities, and policies, systems, and social/physical environments which are historically based in structural and institutional racism and other forms of oppression. Digital equity plays a key role in individual and community health; it allows for access to health services, transportation to appointments, and provides education and information necessary for health living.

https://mahealthfunds.org

Lead for America – American Connection Corps

The American Connection Corp is a program of Lead for America. When placed with a local public institution, ACC Members offer critical capacity enhancement, attract resources, and activate community engagement for the host community. This program is a learning and training experience for members, and supports sustained interest and employment in the digital equity space while adding to economic development through workforce growth.

https://www.americanconnectioncorps.org

Tech Goes Home

Tech Goes Home “empowers communities to access and use digital tools to overcome barriers and advance lives. The organization brings computers, internet, and training to those without so that students can do homework, adults can find jobs and manage finances, seniors can connect with loved ones, and all can lead healthy lives.”

https://www.techgoeshome.org/

Education Superhighway: K-12 Bridge to Broadband

Education Superhighway works with school districts to identify households that currently lack broadband service. Without using students' personal information, internet service providers are able to identify locations which are unserved States or school districts can then use this actionable data to procure internet services on behalf of their students or make families aware that they may be eligible for federal subsidy programs.

Worcester may be able to leverage this data to increase participation in future programming, incentives, or digital literacy efforts.

https://www.educationsuperhighway.org/bridge-to-broadband/

Residential Retrofit Program

Administered by the MBI, this program is funded by the U.S. Department of Treasury Capital Projects Fund (CPF) grant. The goal of the program is to "deploy state of the art broadband infrastructure at ... Public & Affordable Housing properties [and] increase low-income residents' opportunity to access high-quality, reliable, and affordable broadband service in their homes by addressing deficient wiring and infrastructure through grants for the deployment of fiberoptic cabling to the unit to qualified Internet Service Providers (ISP's) who will install, own, and maintain equipment." Available funding will cover 100% of the eligible capital costs associated with the retrofit of eligible properties.

Worcester's Public Housing Authority could apply for this funding, which would provide residents of their buildings with updated and high-capacity infrastructure for internet connectivity.

https://broadband.masstech.org/retrofit

MAPC Apartment Wi-Fi

The Metropolitan Area Planning Council (MAPC), with funding from MBI, will provide funding, project management, and procurement support for the construction of Wi-Fi networks at public housing and affordable housing developments. The new networks will provide residents with equal or superior service to what is available from commercial ISPs,. The program provides for all capital costs associated with network design, construction, and equipment, as well as the first year of operating expenses. Participants in the Apartment Wi-Fi program are expected to support the future operational expenses of the network.

https://www.mapc.org/our-work/expertise/digital-equity/apartment-wi-fi/

Mobile Beacon

Mobile Beacon offers mobile connectivity solutions to municipalities and community anchor institutions through discounted devices and low-cost monthly service rates.

https://www.mobilebeacon.org/

National Digital Inclusion Alliance

The National Digital Inclusion Alliance (NDIA) supports digital inclusion through four pillars: practitioner support, policy, awareness, and data & research. The organization has a wealth of available resources, including models for implementing digital navigators, digital equity and inclusion webinars, and digital inclusion guidebooks and manuals.

https://www.digitalinclusion.org/

Conclusion

The Worcester digital equity charette process has provided valuable insights into the digital divide facing the City and laid the foundation for targeted interventions to promote digital equity and inclusion. Areas which would benefit from attention include the affordability of home internet subscriptions; access to laptop and desktop computers; language and age barriers to digital literacy; coordination between community organizations; and online safety.

While much work remains to be done, Worcester is fortunate to have a committed community of organizations and individuals invested in advancing digital equity. By tapping into the collective knowledge and resources of these stakeholders, the City has the opportunity to implement meaningful and lasting solutions that have a positive impact on residents.

Moving forward, it is imperative that Worcester continues its collaborative efforts, monitors progress, and adapts interventions based on evolving community needs. By prioritizing digital equity and inclusion, Worcester can create a more resilient and inclusive community where all residents have equitable access to the opportunities afforded by the Internet and digital technology.

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