New York's Digital Divide:
Examining adoption of internet and computers for the state and its library districts

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Summary

The COVID-19 pandemic has vividly demonstrated the disadvantages of lacking home internet service. One in 4 households in New York State do not have a foundational tool for internet connectivity – a wireline high-speed internet subscription for their home. These gaps are more pronounced for low-income New Yorkers, older adults, and communities of color.

Closing these gaps will require an "all hands" approach and public libraries are well positioned to be a team leader. Public libraries have always played a role in addressing the digital needs of those with limited means of digital connectivity. They are also highly trusted institutions in the eyes of the public. This positions libraries to play a prominent part in addressing the digital divide, which will persist even as the COVID crisis fades. The following data shines a light on access to digital tools in New York State using 2019 American Community Survey data. Key datapoints are as follows.

Two million New York households **do not** subscribe to high-speed wireline internet service at home and some 1.6 million households **do not** have a computer.

- Nearly 27% of New York households do not subscribe to wireline broadband service at home.
- Some 22% of New York households do not have a desktop or laptop computer at home.

Poor New Yorkers, older adults, and communities of color have low adoption rates of digital tools.

- Half of New York's lowest income residents (those whose annual incomes are $25,000 or less) do not have a wireline broadband subscription and half lack a computer.
- 40% of older (age 65 and above) New Yorkers do not have wireline subscriptions for internet service and about one-third do not have a computer.
- One-third of African American and Latino households do not have wireline broadband at home and similar numbers do not have a desktop or laptop computer.

Rural New York households are less likely than metropolitan dwellers to have wireline service, but low-income rural New Yorkers struggle affording service in the same way as their counterparts in metropolitan areas.

- 31% of households in non-metropolitan areas do not have wireline broadband compared with 26% of households in metro areas do not subscribe to wireline service.
- Low-income households in both areas are much less likely to have wireline service, with half of such households in metro and non-metro areas lacking service.

There is significant variation in the adoption of digital tools across the state's 23 library systems.

- Lower-income rural areas (e.g., in the western part of the state), as well as some urban library locations (e.g., the Bronx), have home wireline adoption rates that are 20 percentage points lower than wealthier counterparts.
- Some library systems with low population density and (on average) healthy household incomes have broadband adoption rates above the state average.

The report also makes recommendations for closing the digital divide, including funding partnerships for digital inclusion, promoting awareness of discount internet offerings, strengthening the state's role in digital inclusion, and helping enhance users' digital skills in using the internet and computers. Libraries are not the only institution that will be part of the solution, but they are uniquely situated to anchor it. To that end, libraries will require additional funding for digital inclusion programs and to upgrade the network speeds for library facilities to meet growing demand.

I. Libraries are digital lifelines for low-income households

When institutions throughout society shut down in the face of the pandemic, the closure of public libraries opened up a hole in many places. As hubs for socialization, collaboration, and digital connectivity, libraries are truly community anchors. Prior to library buildings being closed, many branches would host thousands of people per day for programs, computer access, or just sitting and reading newspapers. It was not uncommon for libraries in low-income areas to have 100% computer usage throughout the day and for more affluent ones to have people bringing their own devices for free Wi-Fi.

With the pandemic, the importance of libraries as community anchors has grown. Many boosted the strength of the Wi-Fi signal so people could get online outdoors. Users – many for the first time – had to rely on digital collections, which was not possible for those without online access at home.

When libraries fully reopen as the pandemic fades, their role as digital lifelines to lower-income Americans will continue. Libraries have long been part of the "workaround ecosystem" for low-income people as they patch together internet access in the absence of connections at home. Research shows that, for new at-home subscribers, libraries were the place to which many turned for access before subscribing to service. Once they obtained service, new at-home users often turned to the library for digital skills training.

The persistence of the digital divide will sustain public libraries' role as an online resource for low-income Americans. A recent survey shows that some 15% of Americans lost their main source of internet connectivity during the pandemic. Other data underscore the stubbornness of the digital divide. Analysis of Census Pulse surveys, fielded at the pandemic's outset, shows little change in internet and computer availability for students from April 2020 through November 2020. The same is true for New York State. Census finds that 73.1% of students always had the internet available to them in the early days of the pandemic (April 2020), a figure that changed modestly (74.1%) in its March 2021 survey.

These aggregate numbers do not necessarily mean that recent efforts to improve computer and internet access for schoolchildren have been for naught. They could reflect society treading water in the face of a pandemic, with many households losing access and many gaining through programs to address the "homework gap." The data do, however, suggest that the digital divide will be with us after a sense of normalcy returns in society. Libraries will resume – and undoubtedly expand – their roles as digital hubs in their communities.

II. Metrics of the digital divide

In the state of New York, digital access varies greatly across geography and socio-economic groups. This report uses 2019 American Community Survey (ACS) data to characterize the state of digital inclusion in New York. It is important to emphasize that the report examines broadband and computer adoption, that is, whether people subscribe to service at home or have a working computer. The report does not

examine broadband access, that is, whether a household has a high-speed network deployed to the premises.

The report focuses on four metrics:

- **Broadband of any type**: This refers to whether a person subscribes to any service that provides high-speed internet connectivity. For the most part, this means whether people have a wireline subscription at home, such as cable, fiber, or digital subscriber line service. But it also includes cellular data plans (e.g., those on smartphones or mobile hotspots) as well as satellite service.
- **Wireline broadband**: This is a subset of "broadband of any type" and relies on an ACS survey question that asks whether people subscribe to cable modem, fiber optic, or digital subscriber line service. The difference between adoption rates for "broadband of any type" and wireline service is, for the most part, attributable to those who rely only on wireless data plans (primarily using smartphones) for internet access.
- **Desktop or laptop computers**: The ACS captures whether a household has either kind of device – and these devices are obviously useful for creating and sharing digital content.
- **Tablet computers**: The ACS also asks whether households have such devices, which (though typically less powerful computing devices than desktop or laptop computers) are nonetheless used in many educational settings.

One of the four metrics above has a privileged place in policy discussions – wireline home high-speed subscriptions. That is because it has both the speed and monthly data allotments that allow people to use the internet with little or no constraint for work, learning, or telehealth. Wireless data plans are undoubtedly useful online tools, but as sole means for home internet access, research has shown that they limit students in doing homework and other schoolwork. Monthly data limits usually are not enough to support work-at-home or telehealth applications.

III. Low-income households, older adults, and communities of color lag in digital adoption

a. New York State's broadband and computer adoption rates are in line with national figures

Some 13.8% of New York households do not have "broadband of any type," a rate comparable for the figure for the entire United States – 13.4%. For computers, 22.2% lack a desktop or laptop computer and 38.4% do not have a tablet, essentially matching national figures of 22.73% and 38.5% respectively. The state's figure for those without wireline broadband is 26.7% is somewhat better than that for the entire United States (29.2%).

These figures mean that nearly 2 million New York households do not have a wireline broadband subscription at home and 1.6 million do not have a desktop or laptop computer at home.

b. Low-income New Yorkers have the lowest rates of broadband and computer adoption

Half (50.3%) of New York households whose annual incomes are $25,000 or less lack wireline broadband subscriptions at home and one-third (34.5%) do not have broadband of any type. For computers, half are without a desktop or laptop computer and about two-thirds (34.9%) lack a tablet. The table below lays out digital access by income, showing how stark the differences are when comparing low-income to middle- and upper-income New York households.

Table 1: Low-income households: Those without digital access tools

	ALL	Less than $25K	Between $25K and $50K	Between $50K and $75K	Between $75K and $150K	Greater than $150K
Broadband of any type	13.8%	34.5%	18.6%	10.8%	5.7%	3.1%
Wireline broadband	26.7%	50.3%	35.3%	24.8%	17.3%	10.5%
Desktop or laptop computer	22.2%	50.0%	32.1%	19.8%	10.7%	4.6%
Tablet computer	38.4%	65.1%	50.7%	37.8%	28.2%	16.3%
Number of households	7,446,217	1,435,955	1,331,372	1,115,898	2,051,498	1,511,494

Income has an obvious relationship with wireline broadband adoption and a strong majority of households without service are those whose incomes fall below the state's median. Some 74% of all New York households without a home wireline broadband subscription have incomes below the state's median income figure, which is approximately $72,000.

c. Older adults in New York trail younger counterparts in the adoption of digital tools.

Some two in five (39.2%) of New York residents age 65 and older do not have wireline broadband subscriptions at home, significantly higher than the rate for all other adults in the state. The gaps are similar for broadband of any type and computers.

Table 2: Older adults: Those without digital access tools

	Age 18-64	65+
Broadband of any type	8.8%	26.6%
Wireline broadband	21.8%	39.2%
Desktop or laptop computer	17.3%	35.0%
Tablet computer	32.3%	45.9%
Number of households	5,383,445	2,062,772
People	12,140,097	3,295,799

d. African Americans, Latinos, and Native Americans have lower adoption rates for digital tools

Roughly one-third of African Americans, Latinos, and Native Americans are without wireline broadband at home compared with one quarter for whites and Asian Americans. The gaps are narrower when looking at "broadband of any type." This is because Latinos and African Americans are more likely than whites to rely on wireless data plans *only* for internet service.

Table 3: Race and ethnicity: Those without digital access tools

	Asian Americans	Whites	Latinos	Blacks	Native Americans
Broadband of any type	9.4%	12.9%	16.0%	17.8%	20.1%
Wireline broadband	22.3%	24.3%	32.2%	34.1%	35.1%
Desktop or laptop computer	15.9%	19.6%	31.7%	30.4%	30.3%
Tablet computer	33.5%	36.9%	43.5%	43.0%	44.4%
Number of households	608,461	5,175,162	1,174,170	1,213,582	74,171

e. Households in rural New York State are less likely to subscribe to wireline broadband

A well-known dimension of the digital divide is less availability of high-speed networks in remote rural areas. According to the Federal Communications Commission, (FCC) just 1.2% of all New Yorkers do not have networks available to them at broadband speed of at least 25 megabits per second (download), although that figure is higher (7.6%) in rural areas. Although FCC data may understate the problem of insufficient network deployment by a factor of two, all measures of network deployment show rural areas lagging.

These differences manifest themselves in lower wireline subscription rates in those areas. For New York, 30.6% of households in non-metropolitan areas do not subscribe to broadband compared with 25.9% for metropolitan areas. Note that the Census Bureau does not use the term “rural” in characterizing geographies, but rather uses “metro” and “non-metro” to describe geographies. Following the Census Bureau’s practice, the data in the table below defines metro areas as urbanized areas of 50,000 or more people and urban clusters of at least 2,500 people but less than 50,000; remaining areas are non-metro.

Table 4: Metro versus non-metro : Those without digital access tools

	Non-Metro Households	Metro Households
Broadband of any type	16.0%	13.4%
Wireline broadband	30.6%	25.9%
Desktop or laptop computer	24.9%	21.7%
Tablet computer	40.9%	37.9%
Number of households	1,167,780	6,278,437

The patterns for adoption – especially for wireline broadband service – are similar across income levels for metro and non-metro households. Of particular interest is adoption levels at lower income levels, which differ very little. This underscores how affordability of service powerfully influences adoption decisions, even in rural parts of the state.

Table 5: Metro, non-metro, and income: Those without digital access tools

Metro Households	Less than $25K	Between $25K and $50K	Between $50K and $75K	Between $75K and $150K	Greater than $150K
Broadband of any type	34.0%	18.1%	10.2%	5.5%	3.1%
Wireline broadband	50.0%	34.8%	24.0%	16.4%	10.4%
Desktop or laptop computer	49.8%	31.6%	19.5%	10.2%	4.6%
Tablet computer	64.6%	50.1%	37.1%	28.4%	16.2%
Number of households	1,197,411	1,107,436	927,529	1,721,530	1,323,978

Non-Metro Households	Less than $25K	Between $25K and $50K	Between $50K and $75K	Between $75K and $150K	Greater than $150K
Broadband of any type	36.9%	20.7%	13.7%	6.5%	2.8%
Wireline broadband	51.6%	37.9%	28.9%	22.3%	11.5%
Desktop or laptop computer	50.8%	34.4%	21.2%	13.1%	5.1%
Tablet computer	67.4%	53.3%	41.6%	26.9%	16.4%
Number of households	238,534	223,846	188,469	329,668	187,816

f. More than 400,000 households with children under 18 lack wireline broadband

The table below shows that 19.9% of households with children under the age of 18 lack wireline broadband subscriptions in their homes. Just 6.8% do not have “broadband of any type,” suggesting that about 13% of households with children rely on wireless data plans for online access. With approximately 4 million children living in New York State, this translates into at least 800,000 children living in households without sufficient internet access for logging onto class at home.

Table 6: The “Homework” gap: Those without digital access tools

	Households with children 17 or younger	Households without children
Broadband of any type	6.8%	16.5%
Wireline broadband	19.9%	29.3%
Desktop or laptop computer	15.4%	24.9%
Tablet computer	23.1%	44.3%
Number of households	2,081,191	5,365,026

Adoption rates – whether for wireline broadband or computers – are higher for households with children than the rest of the population. That is likely because households with school-age children are generally a younger demographic and perhaps many low-income households with children may nonetheless find a way to subscribe to broadband or purchase hardware given the importance of these tools in education.

IV. Adoption patterns across New York State Library Systems

The nature of the demands that libraries face likely vary depending on the nature of the places they serve. New York State has 23 library systems to serve the state's diverse regions. Below shows broadband and computer adoption rates in the state's library districts ranked from districts with the smallest incidence of non-adoption for "broadband of any type" to the highest.

Table 7: Library systems in New York State: Households without digital access tools

	Broadband of any type	Broadband such as cable, fiber optic or DSL	Desktop or laptop	Tablet or other portable wireless computer	Households
Suffolk	7.3%	15.4%	12.6%	30.3%	499,944
Nassau	10.0%	19.6%	14.4%	30.5%	450,798
Southern Adirondack	11.2%	23.5%	18.6%	36.7%	148,311
Westchester County	11.7%	22.2%	17.2%	32.5%	356,250
Mid-Hudson	11.9%	23.9%	18.7%	39.3%	179,844
Ramapo Catskill	12.9%	22.3%	20.9%	38.0%	331,181
Upper Hudson	13.3%	24.5%	19.9%	39.4%	194,174
Buffalo-Erie	13.8%	28.1%	24.9%	40.2%	398,326
Queens	13.9%	30.5%	23.2%	41.2%	784,802
Monroe	13.9%	26.0%	23.4%	37.3%	305,284
Pioneer	14.5%	29.2%	22.9%	36.6%	121,985
New York Public Library	14.7%	28.7%	25.4%	41.9%	1,448,640
Nioga	15.6%	29.8%	26.5%	40.5%	130,947
Brooklyn (Kings County)	15.9%	27.4%	23.3%	37.6%	979,041
Mid York	16.4%	31.3%	24.7%	41.2%	140,783
Finger Lakes	16.4%	30.6%	20.3%	39.5%	130,371
Onondaga	16.5%	28.2%	24.4%	40.5%	183,218
Four County	16.6%	28.2%	25.4%	41.5%	165,614
North Country	18.4%	34.5%	27.6%	42.8%	117,802
Southern Tier	18.7%	36.5%	25.7%	46.6%	106,964
Mohawk Valley	20.1%	30.5%	27.8%	42.4%	117,310
Clinton-Essex-Franklin	20.6%	34.2%	25.2%	44.1%	66,227
Chautauqua-Cattaraugus	22.0%	40.6%	32.8%	44.1%	88,401
ALL	14.0%	26.7%	22.3%	38.6%	7,446,217

Several things are striking about the numbers. First is the range of adoption rates across the state's library districts. For wireline subscriptions at home, only 2 in 10 households in wealthy areas such as Suffolk and Nassau Counties do not have a wireline subscription in their homes, while 4 in 10 in Chautauqua and Cattaraugus Counties lack home wireline broadband. The adoption rate is similar in the Bronx. Second, it is evident in this table how economic factors figure into broadband adoption regardless of geography. The median household income for Chautauqua and Cattaraugus Counties is about $50,000 annually and $41,000 in Bronx County – both well below the $72,000 figure for the entire state. Both places have low broadband adoption rates, although one is urban and the other much less densely populated. There are also places, such as Putnam and Dutchess Counties in the Mid-Hudson Library System that have low population density (certainly relative to the high-adoption Long Island counties) along with healthy household incomes (e.g., a median income of $86,000 annually in Dutchess County). They have above-average wireline broadband adoption rates.

Table 8: New York City and New York Public Library System: Households without digital access tools

Given the size of the New York Public Library (NYPL) system, it is worth disaggregating the areas it serves. The first three rows represent areas NYPL serves; with the exception of Manhattan, the NYPL serves citizens whose adoption rates of digital tools are below statewide figures.

	Broadband of any type	Broadband such as cable, fiber optic or DSL	Desktop or laptop	Tablet or other portable wireless computer	Households
New York County (Manhattan)	11.7%	22.1%	18.0%	38.3%	769,303
Richmond (Staten Island)	16.9%	28.3%	20.3%	33.7%	166,297
Bronx County	18.7%	38.7%	38.2%	50.0%	513,890
Queens County	13.9%	30.5%	23.2%	41.2%	784,552
Kings County (Brooklyn)	15.9%	27.4%	23.3%	37.6%	978,791
All New York City	14.9%	28.7%	24.2%	40.4%	3,211,033

The final two rows show findings for Brooklyn and Queens. For the entire city, a higher share of New York City residents lacks broadband of any type than other residents of New York State (by a 14.9% to 13.3% margin) and more do not have wireline home high-speed subscription (28.7% of city residents lack wireline subscriptions compared with 25.1% for other state residents).

V. Recommendations

Addressing adoption gaps will require action at the state and local levels of government in New York. The pandemic has already sparked action in the state, such as Governor Cuomo's call for internet service providers to have a $15 per month internet offer tailored to low-income New Yorkers who may struggle to afford service. But sustainable progress will require ongoing action.

Partnerships for digital inclusion: New York State should consider investments in digital inclusion, perhaps in partnership with philanthropic organizations. There are a number of digital inclusion coalitions throughout the state that can serve as the groundwork for these investments. Some activities that these

coalitions may contemplate – such as creating “digital navigators” to offer one-on-one tech support to people in need – require funding. Public libraries – already highly trusted by the public – are well-positioned to put investments in digital inclusion to good use.

These investments will have to extend beyond libraries to other community institutions; with additional support, digital inclusion coalitions can help identify such entities. Funding for digital inclusion should also promote participation among citizens who have traditionally been on the wrong side of the digital divide in the design of inclusion programs.

Increasing public awareness of affordability programs: The federal government’s Emergency Broadband Benefits offers qualifying households a $50 per month subsidy on their internet service bill. However, the federal government did not appropriate funds for outreach to potential beneficiaries or support in helping them sign up for the benefit. Given that – and New York’s intent to require carriers to offer discounted internet service – investing the funds for outreach would likely have payoffs in getting more people online. Libraries can play a constructive role in outreach due to the public’s trust in public libraries.

Improving the pipeline of computing devices: Affordability of computers is commonly cited as a reason people do not subscribe to home wireline service and initiatives exist to help get computers to low-income households. Stakeholders should explore ways to expand them to all parts of the state to meet demands that the pandemic has spurred. Libraries are already, in many places, community computing centers for citizens and can help new computer users increase their confidence in using digital devices.

Developing and maintaining strong state leadership for digital inclusion: The renewed focus at the federal level on the digital divide puts states squarely in the middle of initiatives to address digital equity. The state can take on a coordinating role in mapping the location of digital inclusion resources (e.g., skills training, places to find free or discount computers) and publicizing programs such as the EBB. In some states, the creation of a state-level Office of Digital Inclusion has served as a marker for government’s commitment to use public resources and coordinate with private-sector initiatives to close the digital divide.

Ensuring libraries have the resources to meet the digital needs of their communities: Libraries will play a cross-cutting role in helping to close the digital divide. As trusted community anchors, they can reach those who qualify for the federal EBB program, provide digital skills training, and raise awareness of other programs to help citizens use the internet to educate themselves, access government services, learn new job skills, and more. This will require investment in libraries’ digital capacities – including upgrading network speeds for library facilities.

Appendix

a. Methodology

The data used for this report come from the 2019 American Community Survey (ACS). This survey, conducted by the U.S. Census Bureau, contacts 3.5 million households per year. Households receive notices through the mail that they have been selected for the survey, and they can respond through the mail, using the internet, or by telephone. If contacted households do not respond, ACS follows up with phone calls to ask that the survey be completed. Some 90% of contacted households complete the ACS.

The large sample size of ACS allows analysis of fairly disaggregated geographic units, and, since the ACS is an ongoing survey, the Census Bureau aggregates the data in different ways. For analysis of census tracts (generally having populations of about 4,000 people though census tracts can be geographically large in rural areas), ACS aggregates data over five years, meaning some 17.5 million households are available for analysis. For larger geographic areas, such as states and many counties, the "1-year ACS estimates" are appropriate, as that survey can be used to analyze places with populations of 65,000 or more. For places whose populations are below 60,000, it is appropriate to use ACS 5-year estimates.

In this report, unless otherwise noted, results are based on ACS 1-year estimates.

To characterize "wireline broadband service" at home, the report uses an ACS question that asks whether a household subscribes to internet service such as cable, fiber, or digital subscriber line (DSL). It is worth pointing out that an affirmative answer to having wireline broadband at home does not reflect the speed of the underlying service. DSL service usually falls short of the Federal Communications Commission's (FCC) 25 Mbps threshold for broadband. As such, DSL is a basic internet service that may present difficulties when more than one person would like to engage in educational applications that, for instance, require streaming video. But the ACS data does not tell us which households have DSL compared to, say, cable modem service.

The report also has a measure called "broadband of any type." This includes a household with a subscription to any broadband service, i.e., one whose speed exceeds the 25 Megabit per second (Mbps) definition. This could encompass smartphones, wireline technologies (e.g., cable or fiber), hotspots, and satellite service. Households answer "yes" if they subscribe to any of these online access technologies. A "yes" answer is not conditioned on a speed test, that is, a tool to determine whether their home access exceeds the 25 Mbps threshold or not. Smartphone access is classified as broadband as its speeds on 4G wireless networks usually meet the 25 Mbps threshold. That is why the incidence for "broadband of any type" is greater than home wireline adoption, since "broadband of any type" includes smartphones.

For computer access, the ACS asks whether a household has a working laptop or desktop computer, and (in a separate question) whether the household has a tablet computer.

b. Percentage of households without digital tools by county

County	Broadband of any type	Broadband such as cable, fiber optic or DSL	Desktop or laptop	Tablet or other portable wireless computer	Number of households
Albany	13.4%	24.6%	19.5%	40.0%	128,284
Allegany	24.9%	47.7%	27.3%	47.8%	17,948
Bronx County	18.7%	38.7%	38.2%	50.0%	513,890
Broome	15.8%	26.9%	25.6%	39.9%	79,309
Cattaraugus	25.1%	49.0%	35.8%	46.6%	33,056
Cayuga	15.3%	34.0%	27.2%	36.3%	31,489

Chautauqua	20.1%	35.6%	30.9%	42.6%	55,345
Chemung	16.8%	31.6%	23.7%	41.3%	33,490
Chenango	21.9%	34.2%	26.6%	49.1%	20,697
Clinton	16.6%	30.0%	23.0%	40.2%	31,422
Cortland	26.2%	37.9%	22.3%	45.7%	24,966
Columbia	20.3%	35.2%	21.5%	41.1%	17,745
Delaware	24.0%	36.2%	25.6%	54.0%	18,968
Dutchess	9.2%	21.2%	18.4%	39.1%	110,529
Erie County	13.8%	28.1%	24.9%	40.2%	398,326
Essex	21.9%	33.2%	22.0%	44.3%	15,790
Franklin	26.1%	41.8%	31.6%	50.6%	19,015
Fulton	23.0%	32.1%	35.1%	42.7%	22,557
Genesee	19.4%	31.7%	24.4%	42.7%	23,759
Greene	26.5%	44.8%	26.7%	51.9%	17,100
Hamilton	24.8%	33.1%	33.9%	44.2%	1,157
Herkimer	20.1%	36.3%	24.8%	47.7%	24,524
Jefferson	14.6%	30.4%	24.9%	40.1%	41,214
Kings	15.8%	27.3%	23.3%	37.5%	978,091
Lewis County	21.6%	37.9%	24.9%	46.0%	10,247
Livingston	13.6%	29.1%	22.3%	39.1%	23,409
Madison	17.5%	31.9%	17.8%	30.9%	25,986
Monroe	13.9%	26.0%	23.4%	37.3%	305,284
Montgomery	24.0%	36.0%	31.0%	48.3%	19,660
Nassau	9.8%	19.4%	14.2%	30.4%	449,798
New York	11.6%	22.0%	17.9%	38.2%	768,203
Niagara	13.9%	28.9%	27.2%	38.7%	90,625
Oneida	15.0%	29.7%	26.6%	42.4%	90,273
Onondaga	16.5%	28.2%	24.4%	40.5%	183,218
Ontario	11.7%	23.9%	18.8%	29.7%	46,025
Orange	12.2%	21.4%	21.3%	35.1%	131,421
Orleans	19.3%	32.5%	25.6%	47.4%	16,563
Oswego	12.5%	24.6%	24.5%	35.8%	46,640
Otsego	20.7%	41.5%	24.3%	47.5%	23,409
Putnam	6.1%	15.1%	13.7%	30.2%	34,470
Queens	13.9%	30.5%	23.2%	41.2%	784,552
Rensselaer	13.0%	24.4%	20.6%	38.1%	65,790
Richmond	16.9%	28.3%	20.3%	33.7%	166,297
Rockland	13.8%	23.5%	18.6%	34.5%	101,424
Saratoga	8.1%	17.6%	15.7%	34.3%	93,547
Schenectady	16.9%	24.9%	24.2%	38.9%	62,534
Schoharie	25.0%	46.5%	27.4%	50.3%	12,559
Schuyler	21.2%	37.9%	21.9%	50.2%	7,324
Seneca	20.4%	36.6%	25.1%	45.3%	13,564
St. Lawrence	19.9%	33.5%	32.6%	42.0%	42,832

Steuben	15.6%	34.2%	27.1%	48.1%	39,283
Suffolk	7.3%	15.4%	12.6%	30.3%	499,744
Sullivan	13.8%	24.3%	26.2%	44.5%	28,960
Tioga County	16.7%	30.5%	19.8%	44.4%	20,030
Tompkins	13.5%	23.1%	12.8%	36.5%	40,322
Ulster County	12.6%	21.2%	21.5%	46.0%	69,376
Warren	13.3%	25.5%	21.1%	36.4%	29,593
Washington	20.3%	43.8%	25.9%	46.0%	24,014
Wayne	15.1%	30.2%	27.1%	39.0%	36,634
Westchester	11.4%	22.0%	16.9%	32.3%	355,136
Wyoming	22.7%	42.4%	25.7%	47.8%	15,917
Yates	24.6%	41.1%	26.9%	54.3%	8,919
ALL NY	14.0%	26.7%	22.2%	38.5%	7,442,253
Source: American Community Survey 2019.					

c. About the Author

John B. Horrigan is Senior Fellow at the Technology Policy Institute, with a focus on technology adoption and digital inclusion. Horrigan is also a senior advisor to the Urban Libraries Council. Additionally, he has served as an Associate Director for Research at the Pew Research Center, where he focused on libraries and their impact on communities, as well as technology adoption patterns and open government data. Horrigan was part the leadership team at the Federal Communications Commission for the development of the National Broadband Plan. Views expressed in this report are his own. He has a Ph.D. in public policy from the University of Texas at Austin and a B.A. in economics and government from the University of Virginia.