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COMMUNITY DEVELOPMENT

Digital Equity in the Northeast: Overview of Broadband Access, Speed, and Affordability among Covered Populations

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Motivation

- To extract insights on broadband access, speed, and affordability at the regional level in the Northeast, with a particular focus on the covered populations defined by the Digital Equity Act
- To provide an additional resource to Northeastern states to cite for their DEA and BEAD Plans and illustrate the unique needs of each covered population
- To take stock of publicly available data on digital equity and highlight data needs

Population Coverage

States: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Pennsylvania, Vermont, Delaware, Puerto Rico, US Virgin Islands

Covered populations: Populations that have historically experienced lower rates of computer and internet use. (Digital Equity Act, 2021)

- Rural populations, Aging populations (65+), Low-and-moderate income households, Individuals with disabilities, Individuals with language barriers, Racial and ethnic minorities, Tribal communities, Veterans

Not covered: Incarcerated population (Due to lack of regional data in recently released formerly incarcerated individuals)

About the Data

- **Broadband Availability**
  - FCC Form 477/FCC National Broadband Map
- **Broadband Speed**
  - Ookla Speed Tests (as of 7/21/23)
- **Broadband Affordability**
  - Broadband Now
  - The MarkUp
- **Other**
  - Affordable Connectivity Program (ACP)
  - NTIA Internet Usage Survey
  - ACS Broadband Subscription
- **Demographic Information**
  - Census Bureau – American Community Survey (ACS) 2020 5-yr Estimates

	Technical Definition	A Family of Five
Unserved	No access or access to less than 25 mbps download and 3 mbps upload and 100 ms latency	Up to 2 uses simultaneously
Underserved	Lack access to 100 mbps download and 20 mbps upload, and 100 ms latency	Up to 3-4 uses simultaneously
Served	100 mbps Download and 20 mbps upload or greater	5+ uses simultaneously

Source: Benton Institute

Comparing Speed Data: FCC Form 477 Data/National Broadband Map

- Internet Service Providers submit a list of their available offerings for all their locations in the U.S. and territories to the Federal Communications Commission (FCC)
- Can aggregate data to geographies as small as the Census Block level
- Individuals and organizations can challenge the internet or location information on the map by submitting a challenge
- The challenge process is ongoing, and new maps with the data collected from this process will be released
- Useful for macro-level trends in broadband, will be useful for community-level trends when improved
- **Important caveat:** Since the FCC National Broadband Map challenge process is ongoing (as of the release of this presentation), the maps in this presentation may be outdated and more representative data may be available to use from the FCC for mapping as the challenge process is finalized.

Comparing Speed Data: Ookla Speed Tests

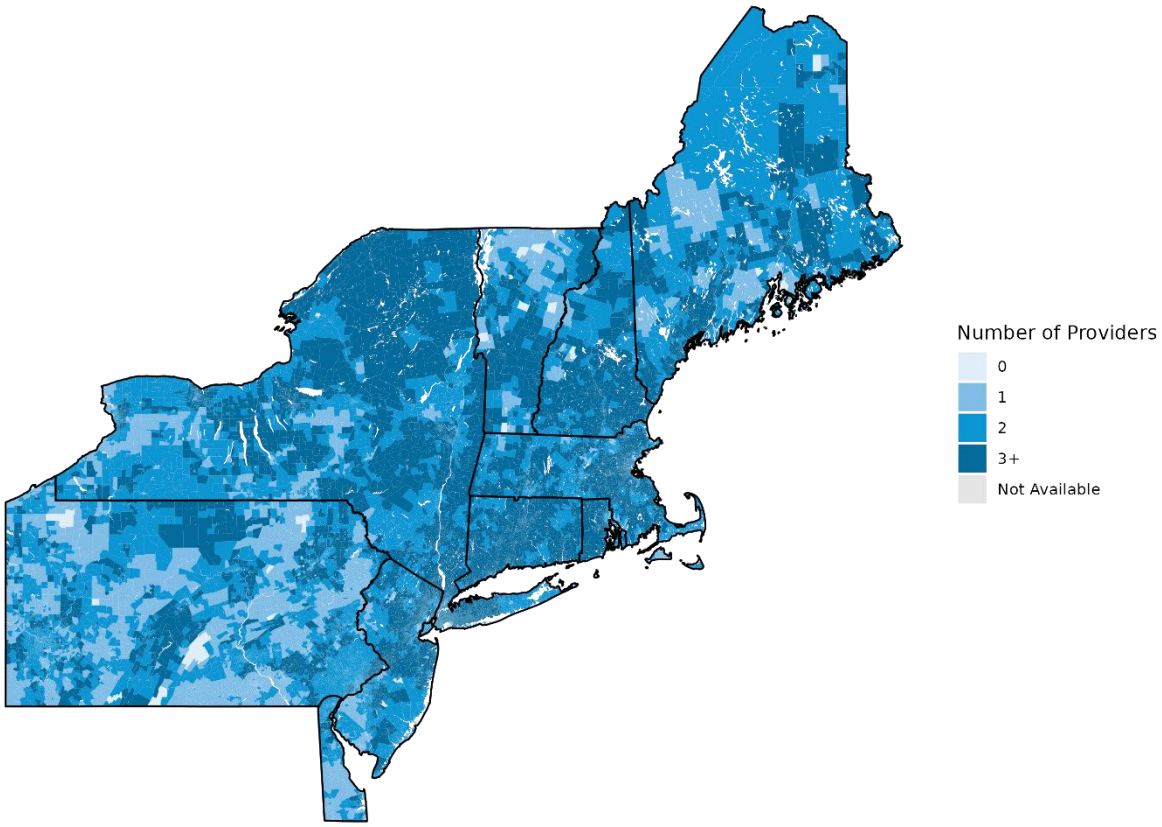
- Ookla collects speed tests worldwide and provides data on average download and upload speeds for geographic tiles, updated on a monthly basis
- These tiles can be aggregated to Census Bureau geographies
- More populated areas are more likely to be precise, while underpopulated areas may either over or underestimate speed (given lower sample of speed tests, uncertainty around in-home factors)
- Useful for macro and micro-level trends in broadband

Potential uses of pricing data from the MarkUp

- The newly released technical documentation (DIY guide) provides a guide for communities to aggregate addresses in their area and run a web-scraping algorithm to pull prices for various tiers of internet service from different ISPs
- The data collected from this approach is much more granular and accurate. It can also be combined and compared with qualitative information obtained from communities
- City-level data is available to more accurately study the local discrepancies in broadband pricing and demographic characteristics

Broadband Availability and Speeds

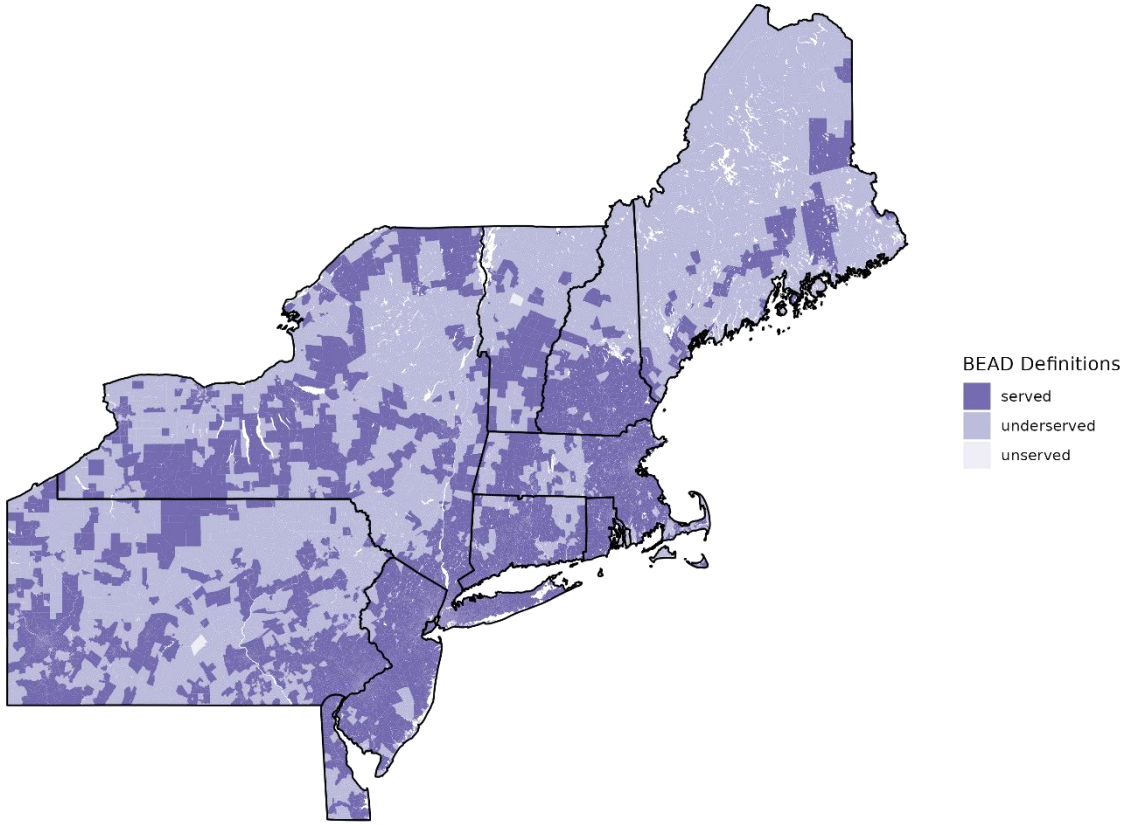
Internet Providers (at least 100/20 Mbps)



Source: FCC; Census Bureau

- Many areas are serviced by more than 3 providers, but these are somewhat concentrated in metro areas
- Large swaths of rural/less densely populated areas in Pennsylvania, Maine, Vermont, and others see more instances of 1-2 providers

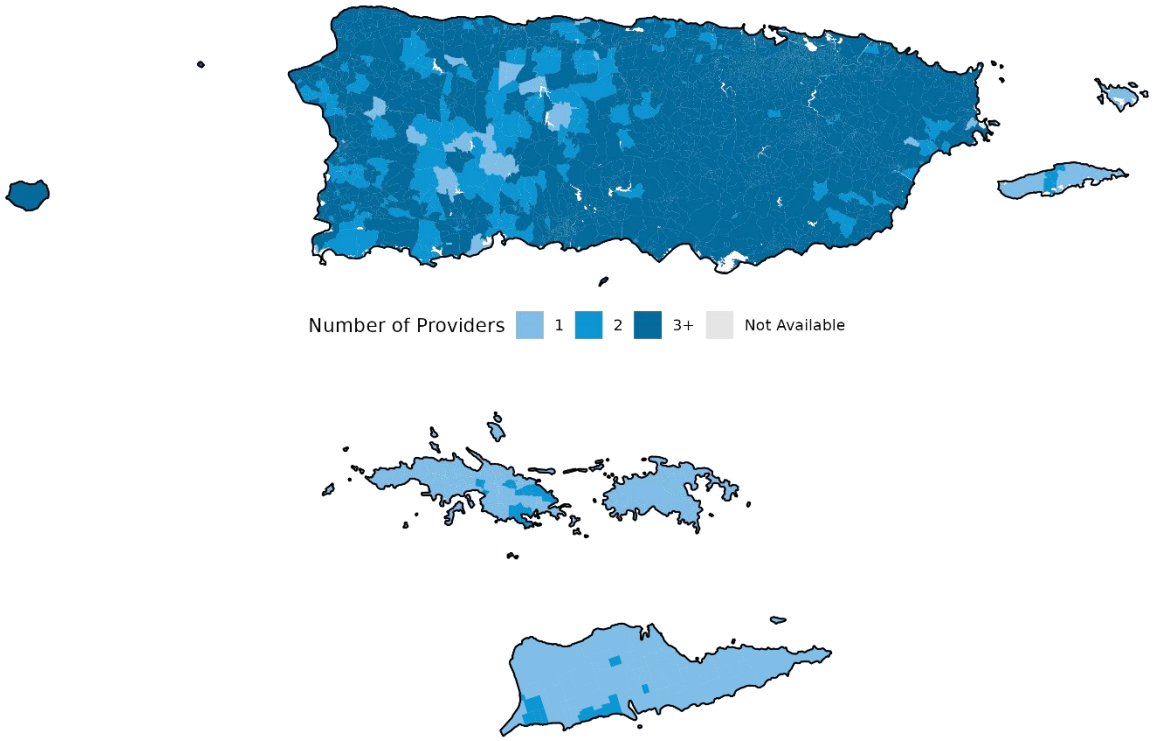
Northeast Fixed Broadband Speeds



Source: Ookla; Census Bureau

- Ookla speed test data reveal a clear urban versus rural divide in the download and upload speeds communities experience
- Although some areas may seem sufficiently served from a regional outlook, a more granular look at city and community-level data will reveal differences in speeds by neighborhoods or even by streets

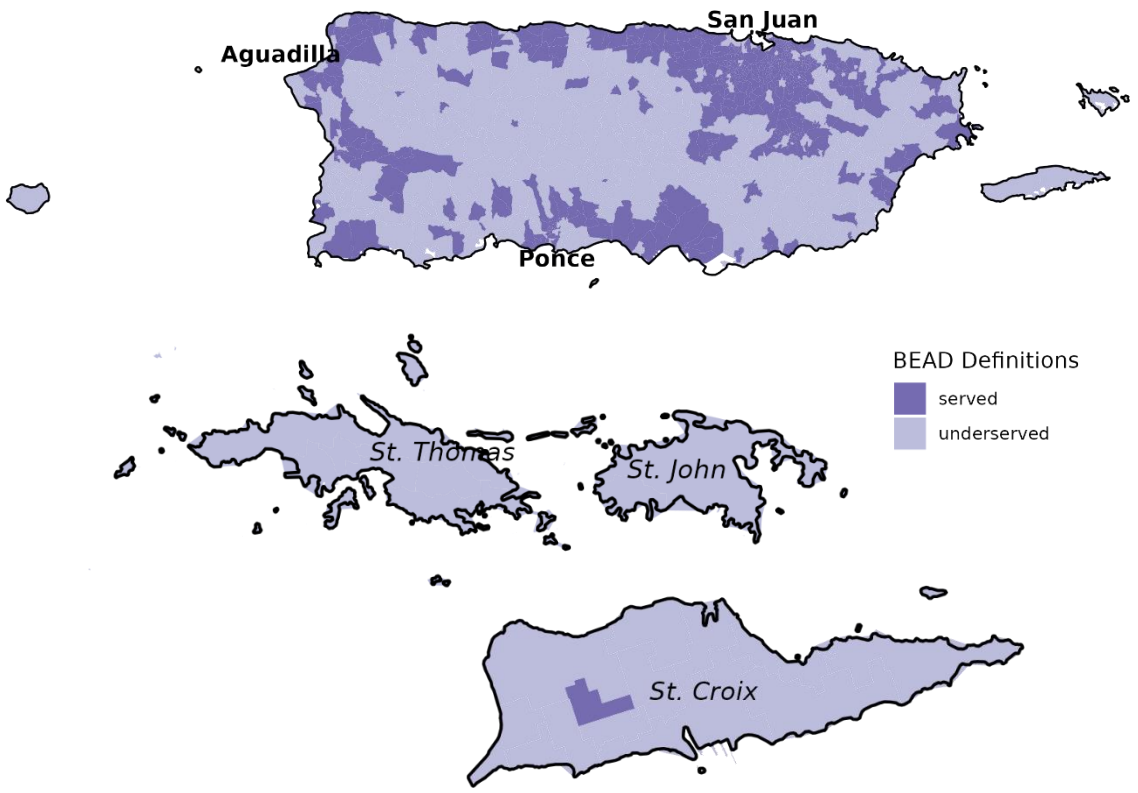
Puerto Rico & USVI Internet Providers (at least 100/20 Mbps)



Source: FCC; Census Bureau

- According to the FCC, ISPs in Puerto Rico show coverage by 3+ providers offering speeds of at least 100/20 Mbps in the eastern half of the island (mainly San Juan and surrounding areas)
  - This does not reflect the reality of access experienced on the ground
- The western half of the island has more underserved areas with only 1 to 2 providers.
- USVI sees no areas offering more than 3 providers of 100/20 Mbps – largely underserved

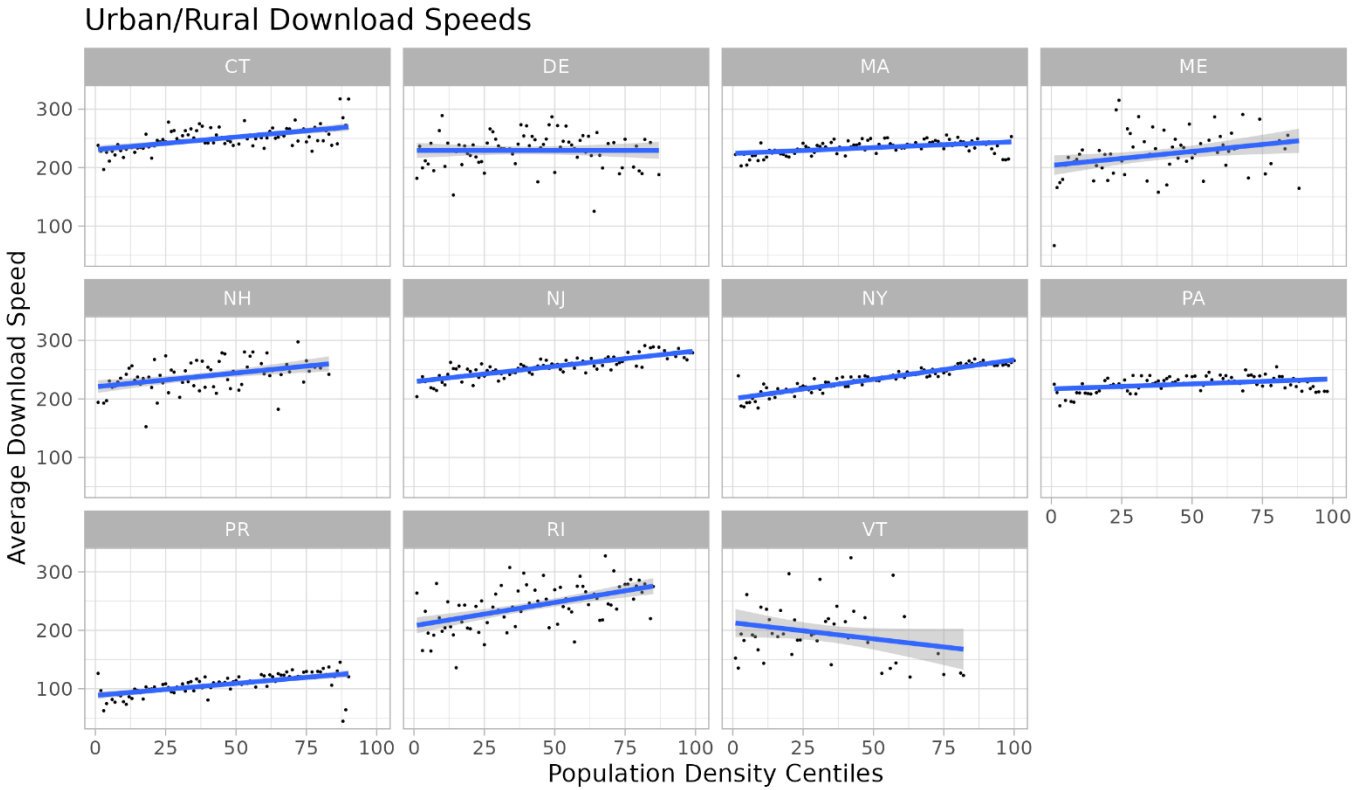
Puerto Rico & USVI Fixed Broadband Speeds



Source: Ookla; Census Bureau

- In reality, the majority of Puerto Rico is underserved. Areas that are served appear to be closer to more urban areas, while areas that are rural are largely underserved
- The vast majority of the USVI is underserved, with most experiencing internet speeds of below 100/20 Mbps
- There is a larger gap in the speeds reported by ISPs to the FCC and the speeds experiences by communities in Puerto Rico/USVI compared to Northeastern states

Urban vs. Rural Divide in Broadband Speeds



Source: Ookla; Census Bureau

- Most states see an urban/rural divide in average download speeds, specifically in states with a major city/metro area
- The relationship between population density and average speed is not as strong for states like Vermont and Maine, which are more rural compared to other states in the Northeast
- Puerto Rico has an overall lower average speed across the entire island compared to the Northeastern states

Share of Covered Population with Access to an Internet Provider (at least 100/20 Mbps)

	Number of internet providers			
	0	**1**	**2**	**3+**
Rural population	0.1%	4%	18%	78%
Aging population (65+)	0%	3%	15%	82%
Low/moderate income	0.1%	2%	18%	81%
Individuals w/ Disabilities	0%	1%	4%	95%
English as a Second Language	0%	1%	5%	93%
Racial and Ethnic Minorities	0%	2%	7%	92%
Native/Tribal communities	0.3%	4%	30%	76%
Veterans	0%	0%	4%	96%

Source: FCC National Broadband Map, American Community Survey 2020 5-yr Estimates

- Method: Covered populations were assigned an average number of providers across census block groups at the census tract level, then the following was calculated: (number of <Covered Population> with <0/1/2/3+> providers / total population of <Covered Population>)
- The shares of covered populations that live in census tracts with no providers offering 100/20 Mbps at all appear to be nearly zero
- Rural populations, aging populations, and tribal communities are the most impacted by access to providers offering 100/20 Mbps
- Remaining populations seem to live in census tracts with access to 3+ providers, but there may be discrepancies in access on a neighborhood level that may remain

Average Speeds by Covered Populations

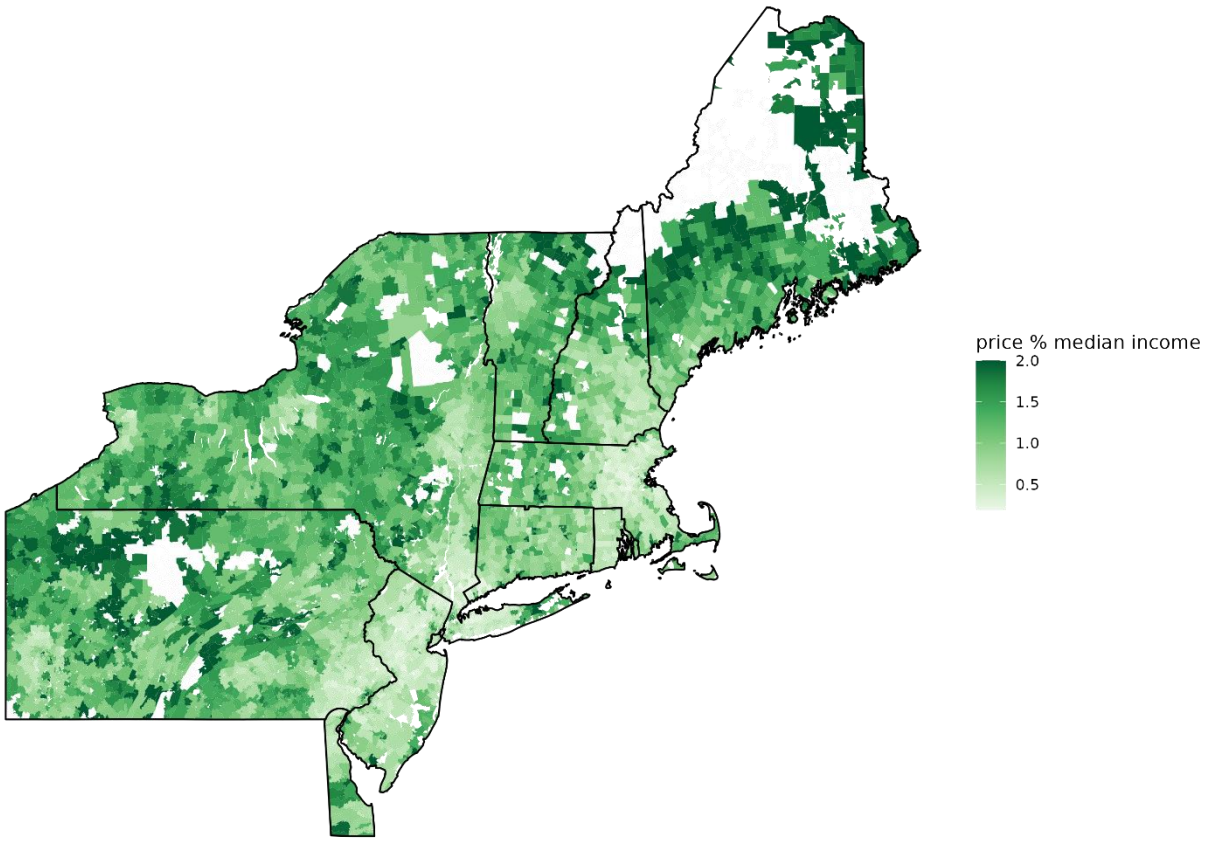
	Average Download (Mbps)	Average Upload (Mbps)
Rural populations	95	27
Aging populations (65+)	151	40
Low/moderate income	145	41
Individuals w/ Disabilities	145	30
English as a Second Language	170	50
Racial and Ethnic Minorities	159	45
Native/Tribal communities	87	20
Veterans	156	45

Source: Ookla; Census Bureau

- Method: Covered populations assigned average download/upload speed at the census tract level, then average download/upload speed across census tracts was calculated for each covered population
- Rural areas and tribal lands are the most impacted in terms of download and upload speeds
- For other populations, although the average speeds may seem higher, it is unclear to what extent these populations are actually able to adopt broadband options at these speeds

Broadband Affordability

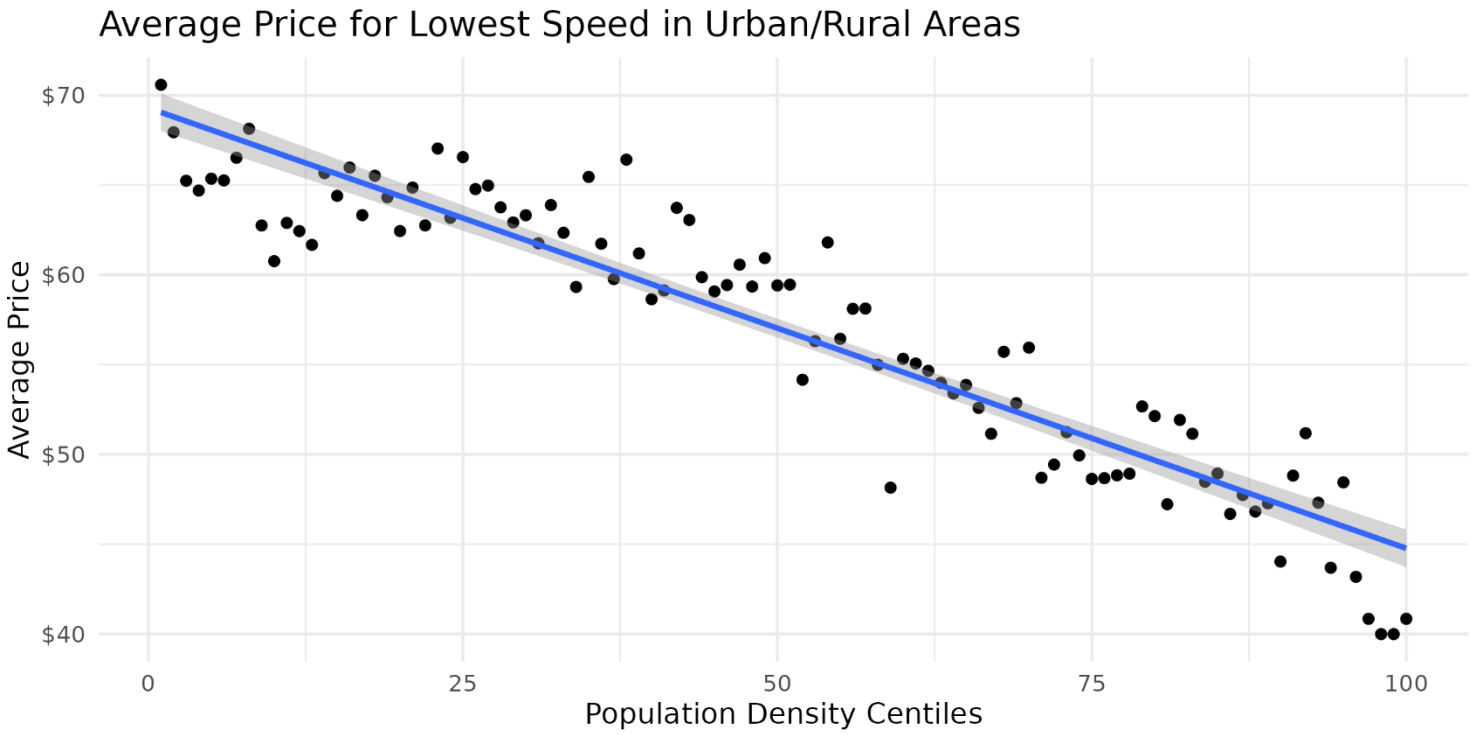
Lowest available broadband price (25/3 mbps)



Source: Broadband Now (2021); Census Bureau
Note: Percents are capped at 2%. White areas indicate no data.

- Prices appear to be a small burden on median income in areas that are more urban and populated, while less populated, more rural areas see shares as high as 2%
- Considering this metric is *lowest* available price, 2% is significant
  - LMI populations make trade-offs between utilities including broadband
- In general, households spend roughly 3% of their income on utilities

Internet Prices in Urban/Rural Areas



Source: Broadband Now (2021); Census Bureau

- The most rural areas are paying a higher average price for the lowest speed internet in their area
- The less rural an area in the northeast becomes, the less expensive their lowest average price 25/3 Mbps internet becomes

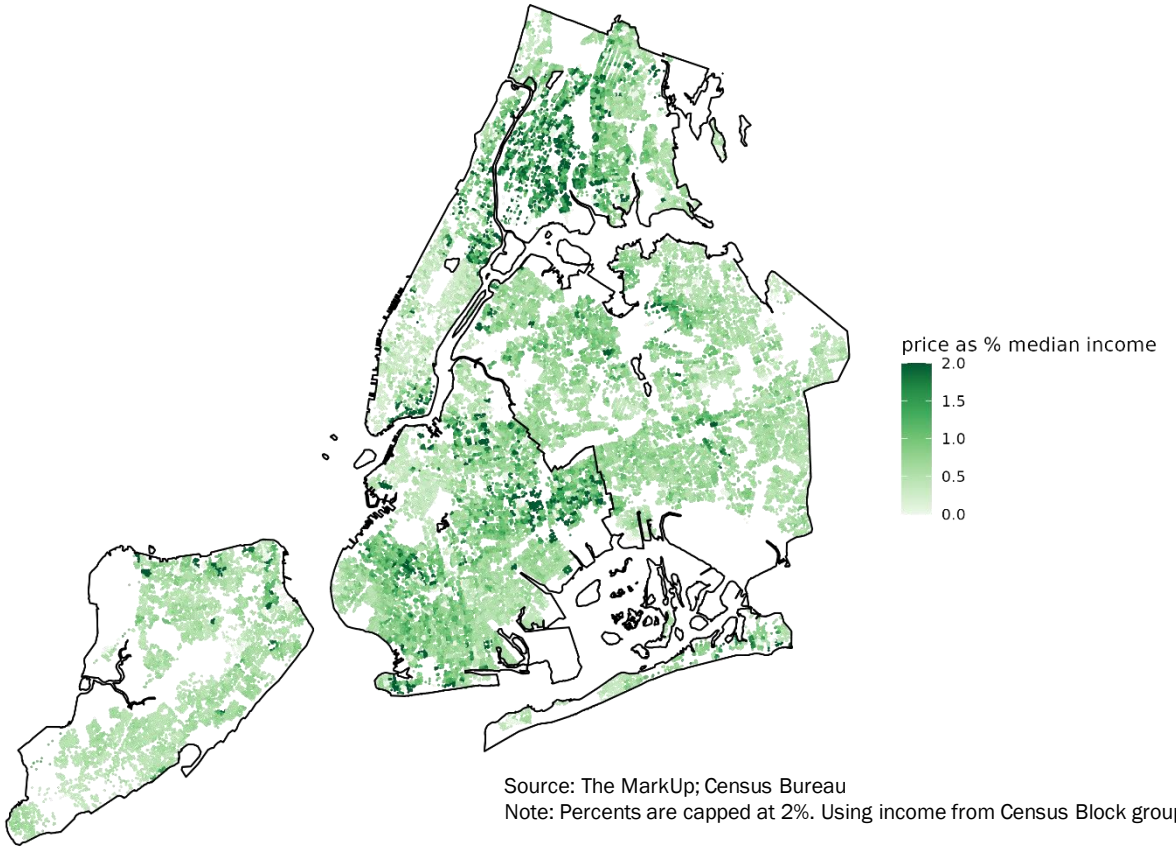
Lowest Available Price by Number of Wired Providers

Number of Wired Providers offering at least 25/3 Mbps	Average Lowest Price for at least 25/3 Mbps
0 (wireless offering only)	$108
1	$69
2	$59
3	$55
4	$51
5	$42
6	$39
7	$37

Source: Broadband Now (2021)

- Areas with exclusively wireless providers (i.e., Fixed Wireless, Satellite) pay on average $108 for the lowest price 25/3 Mbps broadband
- Having a wired provider (i.e., Cable, Fiber) in the area lowers the lowest average price to $69
- Competition amongst wired providers lowers the average price even more, to $59

Broadband Affordability in New York City



Source: The MarkUp; Census Bureau
Note: Percents are capped at 2%. Using income from Census Block group.

- Broadband prices are more of a burden for communities around the city, specifically the Bronx, Upper Manhattan, and Eastern Brooklyn
- MarkUp data for New York City is only available for one provider and is currently limited to households who purchase internet from this specific provider

Broadband Affordability Across the Northeast

City	State	Median Price ($)	Median Price (as % income)	Technology Offered
Boston	MA	39.99	0.63	Fiber
Bridgeport*	CT	49.95	1.52	Copper
Newark	NJ	39.99	1.34	Fiber
Philadelphia	PA	39.99	1.09	Fiber
Providence	RI	39.99	0.97	Fiber
Wilmington	DE	39.99	1.06	Fiber
New York City Boroughs				
Manhattan	NY	39.99	0.53	Fiber
Bronx	NY	39.99	1.08	Fiber
Brooklyn	NY	39.99	0.82	Fiber
Queens	NY	39.99	0.68	Fiber
Staten Island	NY	39.99	0.55	Fiber

Source: The MarkUp; Note (*): Bridgeport's data is from a different provider. Using income from Census Block group.

- Prices and technology are generally consistent for the (same) Fiber ISP provider, but the median price as % of income changes from city to city

- In Bridgeport, the MarkUp reports a Copper ISP provider, which is more expensive and is a higher financial burden for households

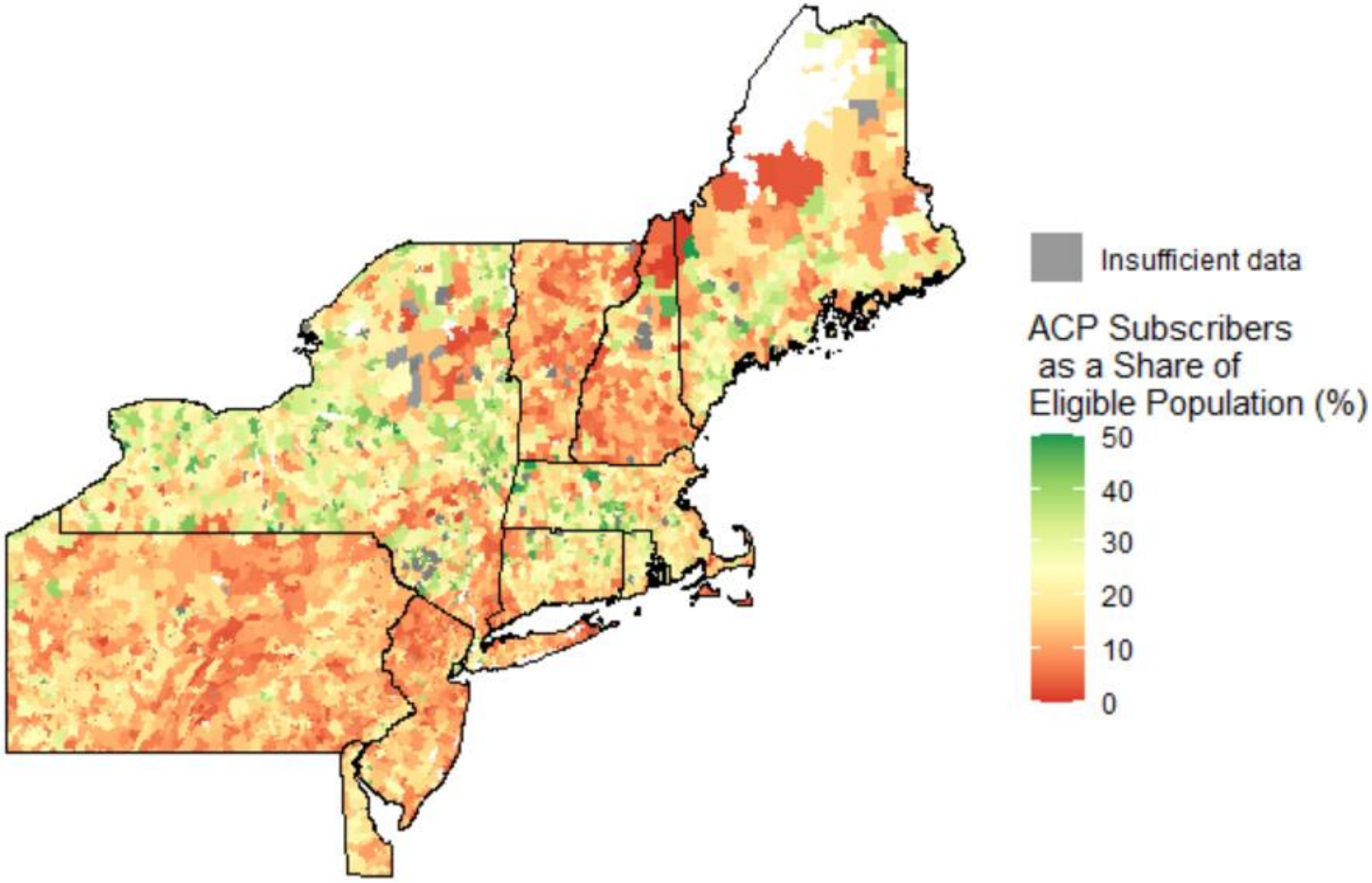
Case Study:
Affordable Connectivity Program (ACP)

Affordable Connectivity Program as a Case Study in Affordability

- **Goal**: To understand the take up for ACP enrollment and claims throughout the Northeast, as well as find regional differences in the difference between current enrollment and total eligible populations.

- **Approach**:
  - Using data from the American Community Survey's 2020 5-year estimates, we use the Ratio of Income to Poverty metric to identify the *income-eligible* population by zip code living at or below 200% of the Federal Poverty Threshold, as defined by the eligibility guidelines of the ACP program.
  - Using ACP enrollment data by zip code, we calculate the share of ACP subscribers/total income-eligible population by zip code to measure ACP participation.

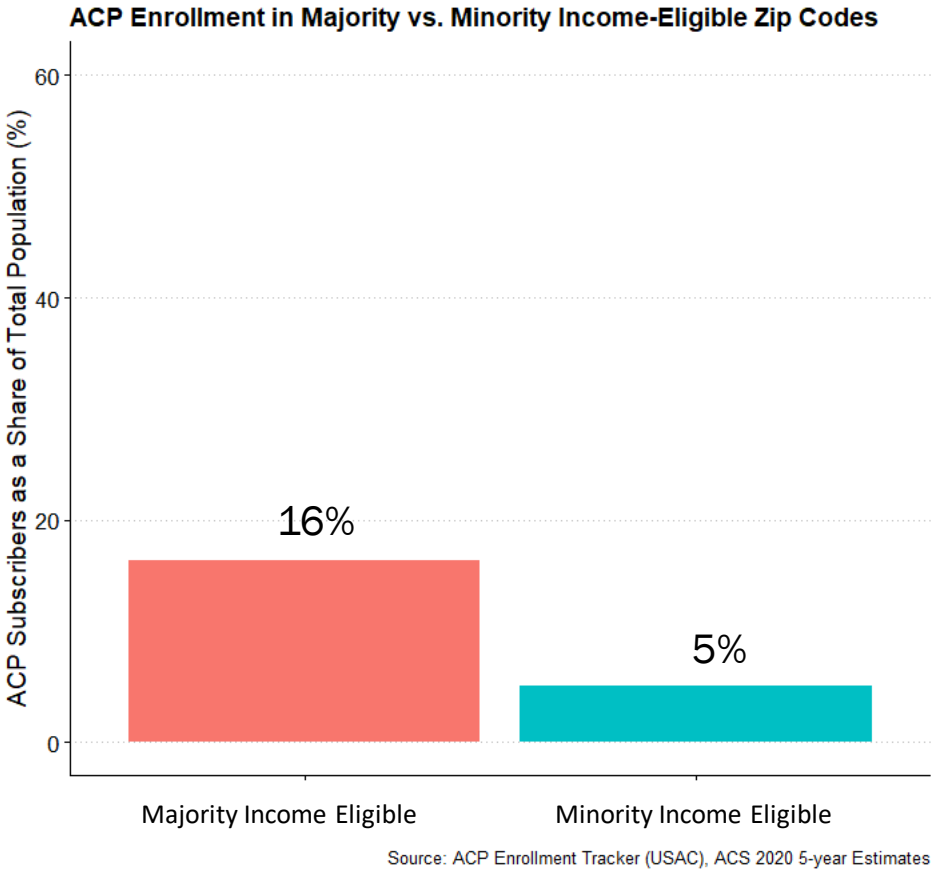
ACP Enrollment (Aug. 2023) and Income Eligible Populations

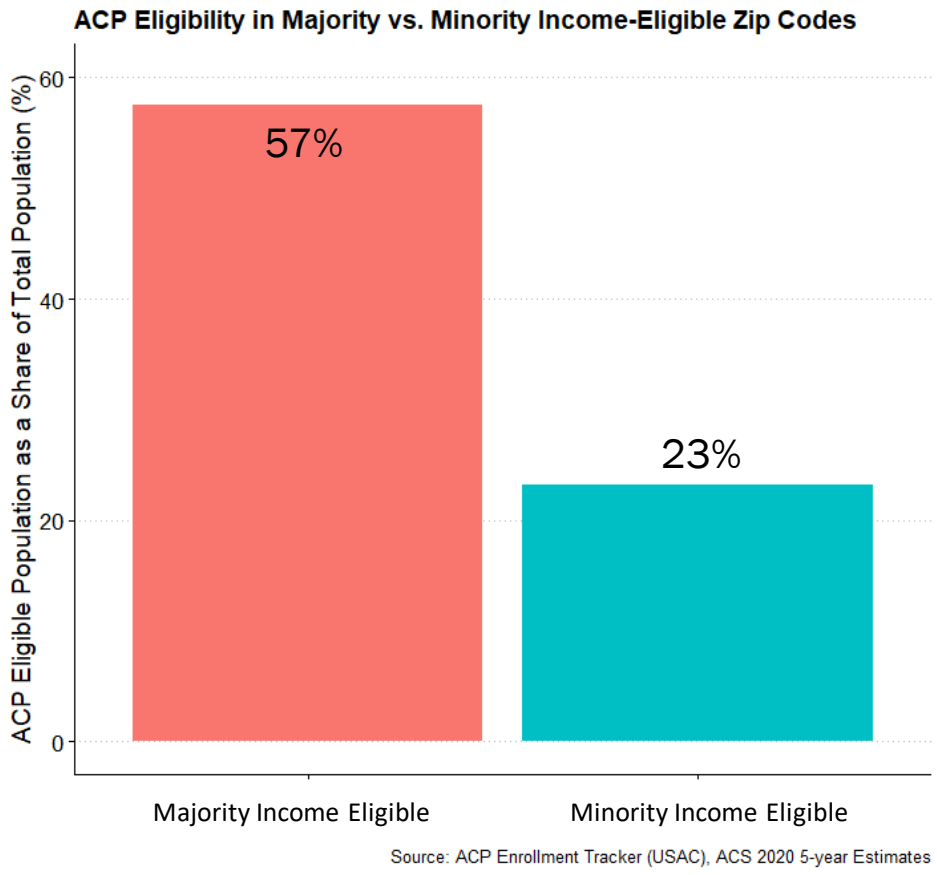


Note: Eligible population is defined as those living under 200% of the Federal Poverty Threshold.

Source: ACP Enrollment Tracker (USAC), ACS 5-year 2020 estimates

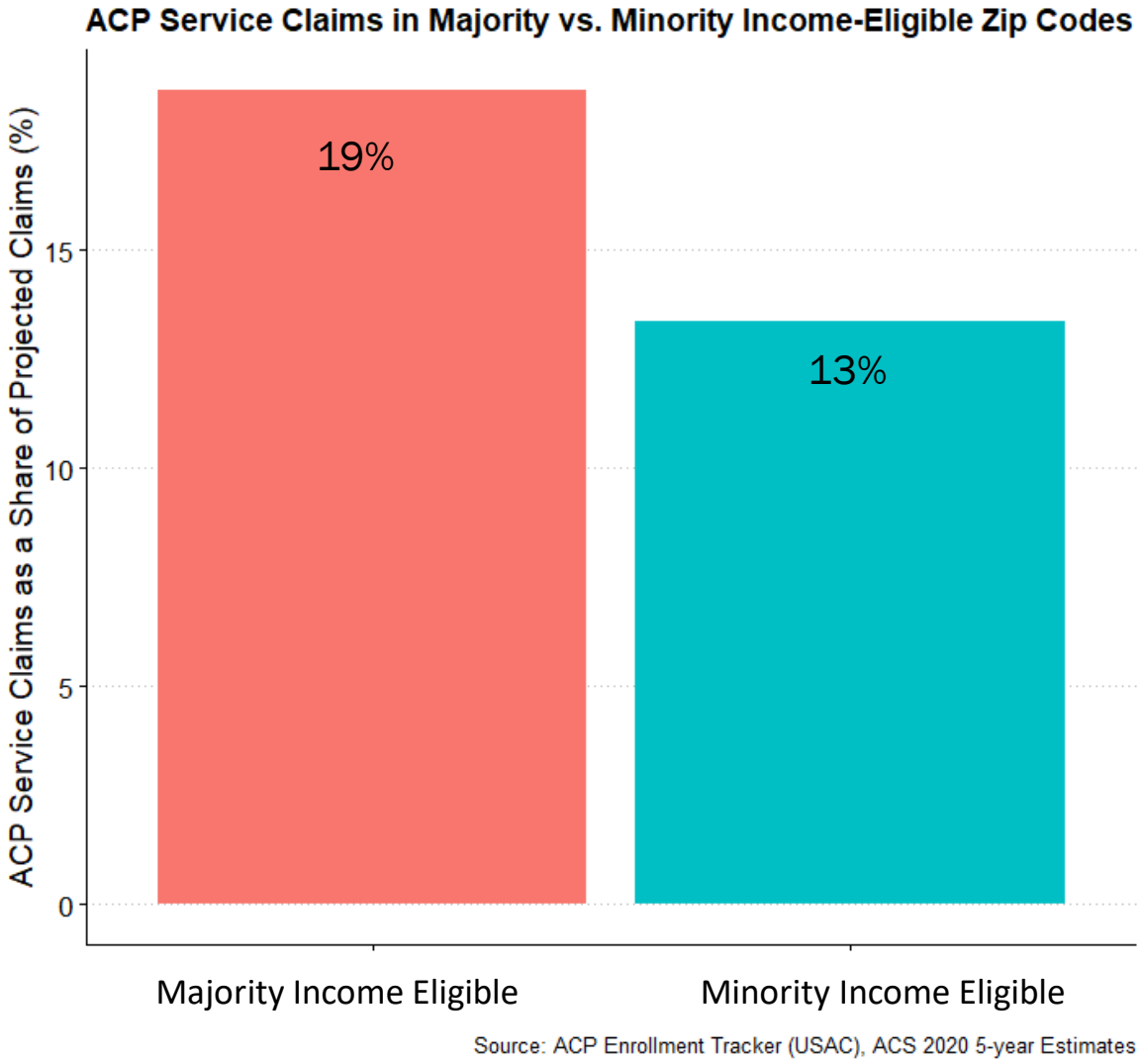
Income to Poverty Ratio and ACP Enrollment (Aug/Sept. 2023)





- ACP enrollment is relatively low in both zip codes with populations that are mostly ACP eligible and zip codes with populations that are less ACP eligible

Income to Poverty Ratio and ACP Claims (Aug/Sept. 2023)



- Service claims in both majority ACP eligible and minority ACP eligible zip codes are low relative to projected claims, but slightly lower in minority ACP eligible zip codes

Key Takeaways

- There are discrepancies between the speeds ISPs report and speeds experienced by users according to speed tests, especially for Puerto Rico and the USVI.
- Most states see an urban/rural divide in the speed test data.
- Internet, even at its lowest costs, can be a financial burden for lower income households.
- Rural, LMI and tribal communities are most impacted by access and quality. Access and quality are issues for areas where there are more communities of color.

Thank you!

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