Disconnected in Maryland: Statewide Data Show the Racial and Economic Underpinnings of the Digital Divide

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SUMMARY OF FINDINGS

The COVID-19 pandemic has exposed a number of shortcomings in the nation's social infrastructure, one of which is access to the internet. When school is exclusively online or medical appointments rely principally on telehealth, those without online access are not merely inconvenienced. They are socially excluded, given their limited means to get online. This turns attention to digital inclusion – making sure people have the ability to go online from home, with the digital hardware and skills to enable participation in society.

This report takes stock of digital inclusion in Maryland by examining two digital access tools that enable robust online access. The first is wireline high-speed internet subscriptions at home. The other is whether a household has a working desktop, laptop, or tablet computer. Analysis of household adoption for home wireline internet service and computing devices shows that:

- Some 520,000 Maryland households do not subscribe to wireline broadband service at home. That comes to 23% of homes lacking service.

- Approximately 391,000 Maryland homes do not have a desktop or laptop computer, or 18% of all households.

- Close to 290,000 Maryland households have neither a desktop, laptop, nor tablet computing device in their homes. That is 13% of households without these digital access tools.

Gaps in the adoption of digital tools fall heavily along three (non-mutually exclusive) categories:

- **Geography:** Two-thirds of Maryland households lacking in digital tools such as home wireline broadband connections and computers live in the state's metropolitan counties or Baltimore City.

- **Race:** 40% of all Marylanders without wireline broadband, or 206,000 households, are African American and the figures are similar for computer ownership of any kind (i.e., desktop, laptop, or tablet).

- **Income:** Marylanders living in the poorest households are about half as likely to have

wireline broadband at home than high-income households. Overall, nearly three-quarters of all disconnected Maryland households are those below the state's median income.

Geography

A strong majority of disconnected Maryland residents live in the state's metro counties and Baltimore City. Some 342,000 Maryland homes in Maryland's metro counties and Baltimore City do not have broadband internet subscriptions at home and 193,000 do not have a desktop, laptop, or tablet computer. Those figures for rural areas are 178,000 and 95,000, respectively. This means that about two-thirds of all household in Maryland without internet access tools live in metro counties or Baltimore City.

At the same time, the adoption rates for wireline broadband and computers play out differently throughout a state that is diverse geographically and demographically. Maryland has mountains in the west, beaches in the east, and large cities and metropolitan areas in between. Its rural areas tend to have lower rates of adoption of digital tools, although Baltimore City has the distinction of having both population density and low technology adoption rates. When looking at home wireline and computer adoption, the state falls into 4 distinct geographical groups.

1. **Baltimore City:** The state's largest city is both densely populated and has a low home wireline adoption rate. In Baltimore, some 41.3% of households do not subscribe to wireline internet and one-third (31.9%) lack a desktop or laptop computer. Some 26.1% have neither a desktop, laptop, nor tablet, well below 12.9% figure for the state.

2. **Densely populated counties in metropolitan areas:** Some 19.3% of all households in these areas do not have a wireline subscription and 14.0% lack a laptop or desktop computer. One in ten (9.7%) do not have a desktop, laptop, or tablet computer. These counties (60% of the state's households) are: Anne Arundel, Baltimore County, Howard, Montgomery, and Prince George's.

3. **Rural counties whose incomes are below the state average:** Collectively, 33.6% of homes in these areas do not subscribe to high-speed service (below the 23.3% figure for the state) and 25.5% lack a desktop or laptop. Some 19.4% have neither a desktop, laptop, nor tablet device in the home. The counties in this category are Allegany, Caroline, Cecil, Dorchester, Garrett, Queen Anne's, Somerset, Talbot, Washington, Wicomico, and Worcester.

4. **Rural counties with above-average household incomes:** In these counties, 22.2% of households do not have a home high-speed subscription (slightly less than the state's overall figure) and 14.5% do not have a desktop or laptop computer. One in ten (10.9%) lack a desktop, laptop, or tablet computer. The counties are Calvert, Carroll, Charles, Frederick, Harford, and St. Mary's.

A number of other factors come prominently into play in examining the adoption of digital tools:

Income: More than half (53.2%) of low-income households (those whose annual incomes are below $25,000) lack wireline broadband at home and about half (47.9%) do not have a desktop or laptop computer. In some areas, gaps are more severe. In Baltimore City, two-thirds (68.2%) of low-income households do not subscribe to wireline broadband. In lower-income rural counties (group 3), 57.8% of low-income households do not subscribe to service.

Age: 35.3% of Marylanders who are age 65 or older lack wireline broadband service at home and 27.7% do not have a desktop or laptop computer. That figure is 44.6% for those over the age of 74 and 38.2% in that age group do not have a desktop or laptop computer.

Race and ethnicity: For African American and Latino Marylanders, home wireline broadband and computing devices are scarce relative to Whites and Asian Americans. One-quarter (25.6%) of Latinos do not subscribe to high-speed service at home and 29.5% of African Americans do not. For Asian Americans and Whites, the numbers are 14.0% and 20.5%, respectively. The pattern is similar for desktop or laptop computers, as 25.6% of Latinos and 23.8% of African Americans do not have them; 14.1% of Whites and 7.7% of Asian Americans do not.

Households with children under age 18: Some 15.6% of Maryland households with children under 18 do not subscribe to wireline broadband service and 10.1% lack a desktop or laptop computer. This "homework" gap is consequential when school is all (or mostly) online and when more than one student in a household needs connectivity. Some 108,000 Maryland households with children, in 2019, did not have a wireline high-speed subscription and 70,000 do not have a desktop or laptop. Low-income, African American, and Latino households with children are more likely to lack digital tools.

Stakeholders in Maryland should consider the following actions to help close digital adoption gaps:

Statewide planning: The state should embark on a statewide broadband planning process to explore how to close home broadband and computer adoption gaps. Other states have used broadband planning to address the entire range of problems, including network deployment and investing in digital skills.

Prioritizing digital inclusion: In many cities around the country, local governments have digital inclusion funds to support non-profits that provide digital skills training and tech support for low-income communities. Maryland should consider funding such programs. The state should also consider creating an Office of Digital Inclusion to manage initiatives throughout the state.

Increasing public awareness of affordability programs: In many parts of Maryland, discount internet offers are available for low-income households. However, many eligible households may not be aware of the program or may experience difficulty in signing up. Stakeholders should promote awareness of them and explore ways (e.g., working with school districts or housing authorities) to make signing up for service easier. Maryland stakeholders should also consider advocating for federal programs to promote affordable internet options.

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 (nationally and in Maryland) to help get computers to low-income households. Stakeholders should explore ways to expand them to all parts of the state to meet growing demands spurred by the pandemic.

"Digital disconnectedness – particularly during a crisis like a pandemic – amounts to social exclusion. Fixing this problem amounts to promoting digital inclusion, a more expansive notion than the digital divide, which has a focus on whether people have (or do not have) online access."

INTRODUCTION

Since the COVID-19 pandemic, the digital divide – the extent to which people access and use the internet – has become a focus of policymakers and stakeholders at all levels of government. When logging onto the internet is the only way to go to school or have a medical consultation, internet access becomes vital.

The digital divide has two components. One is network access, that is, whether a high-speed network serves the home a person occupies. Some households – usually in remote rural areas – may have no network service at all. If they do, it may be satellite service, which generally does not have the technical capabilities for robust use. For others, it is about speed. They may have wireline service but if it is digital subscriber line (DSL) over legacy telephone networks, it is not likely to be fast enough to meet the 25 Megabits (Mbps) download/3 Mbps upload threshold that, according to the Federal Communications Commission (FCC), defines broadband service. See the Appendix. for detail on what is known about the state of network deployment in Maryland.

The other component is consumer adoption. Most households have wireline internet service available but do not subscribe to it. That

phenomenon is the focus of this report. It will examine shortfalls in home internet adoption in Maryland, while also looking at adoption of digital tools to access the internet, such as desktop, laptop, and tablet computers. As the pandemic has made clear, home internet service and computers to access digital content are indispensable.

To explore this, the report relies on data from the American Community Survey (ACS), a large-scale U.S. government survey that allows analysis at the state level and geographies within a state. At the center of the analysis will be the extent to which households subscribe to high-speed wireline internet service at home and whether households have access to computing devices to get online. The ACS question on wireline service asks whether a household's internet subscription is digital subscriber line (DSL), cable modem, or fiber optic. Importantly, the ACS question does not ask about the consumer's network speed. A "yes" answer to the question does not necessarily mean that a household's service meets or exceeds the FCC's 25 Mbps broadband speed threshold.

Wireline and computer access at home are important particularly during a pandemic. A high-speed connection generally allows people to access schoolwork or telehealth applications without the constraints that come

with data-limited wireless plans. Research has shown the limits of having smartphone-only access on wireless data plans for doing schoolwork or applying for unemployment benefits. Wireline plans, that have no (or very high) data caps, are far better internet plans for most applications. Similarly, computing devices such as desktop, laptop, or tablet computers have sufficient screen size to take full advantage of these applications.

This report's focus on the consumer adoption introduces the notion of digital inclusion to the policy discussion. Digital disconnectedness – particularly during a crisis like a pandemic – amounts to social exclusion. In that light, fixing this problem amounts to promoting digital inclusion – a term that has emerged in recent years. Digital inclusion has three components:

- Widespread availability of affordable discount internet offerings;

- A supply of low-cost computing devices for low-income households, and;

- Digital skills training and technology support.

Digital inclusion is a more expansive notion than the digital divide, which has a focus on whether people have (or do not have) online access. This is a necessary condition for use of digital tools to participate in society, but not sufficient. The ideas that digital inclusion encompasses – skills and tech support – are crucial as well.

Notwithstanding this report's focus on consumer adoption, network deployment is an obvious part of the state's internet landscape. The report's appendix discusses what current data tells us about network deployment in Maryland.

DIGITAL INCLUSION IN MARYLAND

Geography and income loom large in understanding adoption gaps

Maryland fares better than the nation at large when it comes to wireline high-speed adoption at home. Some 76.7% of all Maryland households in 2019 subscribe to a high-speed internet service, above the national figure of 70.8%. For computers, 82.4% of Maryland homes have a desktop or laptop computer compared with 77.3% for the entire United States. Overall, 87.1% of Maryland households have either a desktop, laptop, or tablet computer.

Within the state, however, there is sizable variation in wireline and computer adoption. The following analysis relies on the most disaggregated geographies for Maryland that the 2019 ACS data permit. In its one-year estimates, ACS classifies places by Public Use Microdata Areas (PUMAs). These are places with a large enough sample of households so that statistical inferences from the ACS are reliable. This makes it possible to examine large counties, such as Prince George's or

Howard. For smaller (typically rural) counties it is often necessary to combine them. This report combines counties, following how ACS aggregates counties in Maryland in accordance with the size of PUMAs in the state. This yields 16 separate geographies in Maryland for the analysis in the report. They fall into four distinct categories in Maryland.

1. **Baltimore City:** The city of Baltimore is an outlier compared to other areas of the state. The state's largest city is both densely populated yet has a low home wireline adoption rate. In Baltimore, 58.7% of households subscribe to wireline internet and 68.1% have a desktop or laptop computer. Some 73.9% have either a desktop, laptop, or tablet, well below 87.1% figure for the state. Much of this is driven by poverty in Baltimore City. Some 27% of households in the city make $25,000 per year or less and, of these households, just 31.8% subscribe to high-speed service and 38.3% have a desktop or laptop computer. Baltimore City's median income is $49,000. For more information on Baltimore City, see a 2020 Abell report here.

2. **Densely populated counties in metropolitan areas:** Maryland's densely populated large counties – Anne Arundel, Baltimore County, Howard, Montgomery, and Prince George's – have 60% of the state's households. Together 81.7% of these households have a wireline subscription and 86.0% with a laptop or desktop computer. Some 90.3% have either a desktop, laptop, or tablet computer. The median income for all these counties is $94,000.

"When logging onto the internet is the only way to go to school or have a medical consultation, internet access becomes vital. Wireline and computer access at home are important particularly during a pandemic."

3. **Rural counties whose median incomes are below the state's average:** This group consists of Allegany, Caroline, Cecil, Dorchester, Garrett, Queen Anne's, Somerset, Talbot, Washington, Wicomico, and Worcester Counties. Collectively, 66.4% of homes in these areas subscribe to high-speed service and 74.5% have a desktop or laptop. Some 80.6% have either a desktop, laptop, or tablet device in the home. The median household income in these counties is $64,000 annually compared with $85,400 for the entire state.

4. **Rural counties with household incomes above the state's median:** This group includes Calvert, Carroll, Charles, Frederick, Harford, and St. Mary's Counties. Taken together, 77.8% of households in these counties have a home high-speed subscription and 85.5% have a desktop or laptop computer. Nine in ten (89.1%) have either a desktop, laptop, or tablet computer. Within this group, Carroll County has a particularly low home wireline adoption rate at 63.8%; residents there compensate for this with a high reliance on wireless data plans (21%, twice the state figure) only as their access means. This suggests insufficient availability of wireline networks inhibits subscription in Carroll County. The median household income for all these counties is $99,600.

Table 1 on pages 8 and 9 summarizes key data points for each of Maryland's 16 PUMAs, grouped by the four categories outlined above and presented in order of wireline broadband adoption rate. Excluding Baltimore City, which is densely populated and has a low wireline high-speed subscription rate, there is a strong positive correlation between population density and having wireline broadband at home.

Table 1 shows lower adoption rates in rural Maryland, but the size of groups 1 and 2 (Baltimore City and metro counties) means that far more people in those areas lack wireline broadband and computers than in rural areas. Groups 1 and 2 make up about 71% of all Maryland households and 66% of all households without wireline broadband subscriptions and 67% of those without laptop, desktop, or tablet computers.

In terms of an overall rural/non-rural comparison, 72.8% of the rural counties (groups 3 and 4) have a wireline high-speed connection at home compared with 78.2% of the urban or metro areas (groups 1 and 2). Rural areas have lower adoption rates, but the larger populations in groups 1 and 2 mean the number of disconnected there is greater.

Table 1: Adoption of digital tools and services in Maryland

Total	Computer (desktop or laptop)	Wireline Broadband	Tablet computer	Tablet or laptop	Households	Population density (people per square mile)
Group 1 (Baltimore City)						
Baltimore City	67.5%	58.7%	52.6%	73.9%	242,694	6,424
Group 2 (Metro Counties)						
Baltimore County	82.3%	77.4%	65.3%	87.7%	312,466	1,381
Prince George's	80.8%	78.1%	67.1%	86.6%	316,361	1,877
Anne Arundel	88.2%	84.7%	74.3%	91.6%	216,200	1,368
Montgomery	90.6%	84.7%	72.6%	93.9%	368,897	2,110
Howard	90.5%	88.6%	77.0%	93.1%	115,772	1,257
Group 3 (Rural, lower income)						
Allegany & Garrett	67.9%	58.9%	52.3%	75.0%	39,789	101
Queen Anne's, Talbot, Caroline, Dorchester & Kent	76.8%	63.8%	61.3%	83.3%	68186	108
Wicomico, Worcester & Somerset	76.6%	64.7%	56.1%	82.1%	70,210	127
Washington	70.4%	69.4%	61.1%	76.8%	56,225	327
Cecil	80.1%	73.3%	64.7%	84.0%	38,547	296

Table 1: Adoption of digital tools and services in Maryland (continued)

Total	Computer (desktop or laptop)	Wireline Broadband	Tablet computer	Tablet or laptop	Households	Population density (people per square mile)
Group 4 (Rural, upper income)						
Carroll	83.1%	63.8%	70.0%	88.3%	60,617	374
Frederick County	87.0%	77.8%	70.0%	89.4%	93,768	376
St. Mary's & Calvert	84.3%	79.2%	69.6%	86.7%	73,100	363
Charles	86.1%	80.9%	75.0%	90.0%	57,732	344
Harford	86.0%	83.4%	72.2%	90.5%	96,203	574
All Maryland						
State of Maryland	82.4%	76.7%	67.1%	87.1%	2,226,767	625

The reasons behind households' decisions to subscribe to broadband or purchase computers are of obvious interest to policymakers and other stakeholders. Research consistently finds that multiple reasons are behind non-adoption, such as affordability of service, lack of digital skills, and inadequate networks that make subscription unattractive. Struggling with monthly service fee is most often cited, with 50% of non-broadband users saying that, with about a third (31%) saying it is cost of a computing device, and 22% saying service is not available (or available at an acceptable speed). Some 7% of respondents in a national sample say network availability is the most important reason they do not subscribe.

The ACS data does not allow a clear way to distinguish between different reasons behind technology adoption choices. In addition to the role of population density noted above, the data strongly suggests a link between income and tech adoption. The table below summarizes home wireline adoption and computer adoption (either a desktop or laptop computer) by income for each of the four groups of counties listed in Table 1.

Table 2 on pages 10 and 11 shows how many households in each category in each region listed above do not have a particular digital tool.

Table 2: Lack of adoption of digital tools and services in Maryland

Total	Computer (desktop or laptop)	Wireline Broadband	Tablet computer	Tablet or laptop	Households
Group 1 (Baltimore City)					
Baltimore City	78,876	100,233	115,037	63,343	242,694
Group 2 (Metro Counties)					
Baltimore County	55,306	70,617	108,426	38,433	312,466
Prince George's	60,741	69,283	104,083	42,392	316,361
Anne Arundel	25,512	33,079	55,563	18,161	216,200
Montgomery	34,676	56,441	101,078	22,503	368,897
Howard	10,998	13,198	26,628	7,988	115,772
Group 3 (Rural, lower income)					
Allegany & Garrett	12,772	16,353	18,979	9,947	39,789
Queen Anne's, Talbot, Caroline, Dorchester & Kent	15,819	24,683	26,388	11,387	68,186
Wicomico, Worcester & Somerset	16,429	24,784	30,822	12,568	70,210
Washington	16,643	17,205	21,872	13,044	56,225
Cecil	7,671	10,292	13,607	6,168	38,547

Table 2: Lack of adoption of digital tools and services in Maryland (continued)

Total	Computer (desktop or laptop)	Wireline Broadband	Tablet computer	Tablet or laptop	Households
Group 4 (Rural, upper income)					
Carroll	10,244	21,943	18,185	7,092	60,617
Frederick County	12,190	20,816	28,130	9,939	93,768
St. Mary's & Calvert	11,477	15,205	22,222	9,722	73,100
Charles	8,025	11,027	14,433	5,773	57,732
Harford	13,468	15,970	26,744	9,139	96,203
All Maryland					
State of Maryland	391,911	521,063	732,606	287,253	2,226,767

For the state as a whole, low-income Marylanders are about half as likely to subscribe to wireline broadband at home and a similar pattern applies to having a desktop or laptop computer. The income effect is particularly clear for Baltimore City. There households whose incomes are below $25,000 annually (about one-quarter of all households) have less than a one in three probability (31.8%) of having a wireline subscription. A somewhat larger share has a computer. At the same time, lower-income households in rural counties whose incomes are below the state norm also have low rates of home wireline and computer adoption.

Table 3 on pages 12 and 13 also offers some insight into the relative weights of population density and income in broadband adoption patterns. Upper income households in Group 3 (largely rural) areas have lower rates of home wireline adoption (by about 11 percentage points) than those in metro counties, suggesting that deficiencies in network deployment inhibit wireline adoption. But even in Metro counties, low-income households are less likely to subscribe to service than upper income ones. This underscores the role of income in explaining adoption. Somehow lifting overall adoption rates in Group 3 to Group 2 levels would still leave many low-

Table 3: Broadband and computer adoption by income

	Less than $25K	Between $25K and $50K	Between $50K and $75K	Between $75K and $150K	Greater than $150K
Group 1 (Baltimore City)					
Wireline Adoption	31.8%	52.3%	59.6%	84.6%	84.8%
Computer (desktop or laptop)	38.3%	63.8%	75.1%	90.2%	96.6%
Group 2 (Metro Counties)					
Wireline Adoption	54.9%	68.8%	81.6%	86.9%	92.7%
Computer (desktop or laptop)	61.0%	73.9%	82.2%	92.3%	96.6%
Group 3 (Rural, lower income)					
Wireline Adoption	42.2%	62.3%	68.0%	76.9%	80.9%
Computer (desktop or laptop)	46.3%	65.8%	74.5%	90.4%	94.2%
Group 4 (Rural, upper income)					
Wireline Adoption	49.0%	63.0%	72.1%	85.3%	89.1%
Computer (desktop or laptop)	50.8%	71.8%	83.7%	92.2%	97.2%
All Maryland					
Wireline Adoption	46.8%	64.2%	75.9%	85.3%	90.8%
Computer (desktop or laptop)	52.1%	70.6%	80.7%	91.9%	96.5%

income households disconnected. Solving network deployment issues is likely to help with adoption gaps, but not completely. Tackling affordability (for low-income households) will still be part of the solution for low-income households throughout the state.

Which matters more in explaining adoption gaps – network quality or income? Both play a role. However, more detailed statistical analysis (see Appendix) shows that addressing affordability for low-income households throughout the state would have a larger positive impact on wireline adoption rates than addressing network deployment alone.

Beyond income and geography, several other factors loom large when considering variations in wireline and computer adoption rates across Maryland.

OTHER FACTORS THAT COME INTO PLAY WHEN IT COMES TO DIGITAL ADOPTION

Race and ethnicity

In Maryland, African Americans and Latinos are two groups whose wireline broadband adoption and ownership of computing devices are below state averages overall.

As Table 4 below shows, Asian Americans have the highest rate of wireline adoption at home, followed by Whites. African Americans trail Whites by 9 percentage points with Latinos not quite as far behind. Native Americans lag notably in computer ownership.

The Asian American category in Table 4 aggregates the responses to the survey's question on race that include choices of

Table 4: Tech adoption by race and ethnicity

	Asian Americans	Whites	Latinos	African Americans	Native Americans
Wireline Broadband	86.0%	79.5%	74.0%	70.5%	70.6%
Desktop or Laptop	92.3%	85.9%	74.4%	76.2%	72.5%
Tablet	75.8%	69.1%	63.5%	63.1%	60.7%
Tablet or Laptop	94.8%	89.8%	82.2%	82.0%	76.9%

Asian ethnic groups such as "Asian Indian" and "Other Asian." The "Other Asian" choice offers respondents to identify specifically their ethnic origin (e.g., Hmong, Laotian, and others). This means the Asian American entry in this analysis does not take into account, for example, how those identifying as Chinese may have different tech adoption patterns from Laotians. The sample size of the ACS 1-year survey is not large enough to explore these differences for a state of Maryland's size.

Age

Age is a familiar differentiator when it comes to technology adoption and that holds true in examining Maryland residents.

Younger adults are more likely to have wireline broadband subscriptions and computers. The gap in technology adoption is severe for Marylanders who are age 75 and older. For all Marylanders age 65 or older, 64.7% have wireline broadband subscriptions at home and 72.3% have a desktop or laptop computer.

Households with children under 18

Perhaps the strongest motivator for examining technology adoption since the pandemic has been gaps for households with children. The consequences for households with children without broadband and computing devices are enormous. These homes will have children missing school when classes are virtual. As Table 6 on page 15 shows, nearly 16% of Maryland households with children under the age of 18 do not have wireline broadband at home. Some 6.4% have no computing device (i.e., no laptop, desktop, or tablet computer).

This comes to 108,000 Maryland households in 2019 lacking a wireline broadband

subscription at home and 70,000 do not have a desktop or laptop computer; close to 7,000 without any computing devices. The "homework" gap is most prevalent among lower income households. For those whose annual incomes are below $50,000, nearly one-third (32.4%) lack wireline broadband – or 32,000 households. African American and Hispanic households with children also have high rates of falling into the homework gap.

RECOMMENDATIONS

The COVID-19 pandemic has fueled action on how to close the digital divide. Some initiatives have centered on increasing the supply of computing devices to households with children and addressing the affordability of such services. Many of these initiatives have used the $150 billion Coronavirus Relief Fund to help ease the path to digital learning. Some 12 states (including Maryland) have done this as of November 2020. Other kinds of initiatives include grants to promote telehealth applications, expansion of public Wi-Fi, and grants for residential broadband infrastructure.

Even with recent infusions of funding, the future holds significant uncertainties. The pandemic's economic disruption means it will take time for the nation to return to pre-pandemic levels of employment. As many as one-third of all jobs, particularly in the service sector, may not return; people will have to transition to new lines of work. Those jobs are likely to demand high levels of digital skills from workers. Even if recent initiatives have made a dent on the digital divide, sustaining those gains will be difficult if households cannot afford home internet service and computers.

Table 5: Tech adoption by age

	Age 18 to 64	Age 65 to 74	Age 75 and over
Wireline Broadband	80.9%	71.4%	55.4%
Desktop or Laptop	86.2%	79.8%	61.8%
Tablet	72.6%	59.3%	40.7%
Tablet or Laptop	90.4%	84.7%	67.9%

Table 6: Tech adoption by households with children under 18

	Households with children under 18	Low-income households with children under 18	African American households with children under 18	Hispanic households with children under 18
Wireline Broadband	84.4%	67.6%	80.6%	76.2%
Desktop or Laptop	88.9%	72.8%	85.2%	75.7%
Tablet	82.5%	63.7%	78.8%	70.1%
Tablet or Laptop	93.6%	82.0%	91.8%	84.8%

Stakeholders in Maryland should consider the following in addressing digital gaps in the state:

Statewide planning

Home broadband and computer adoption gaps touch all corners of the state – rural areas with below-average incomes to urban areas with significant pockets of poverty. Taking the statewide view is something that is happening in other places, such as Connecticut. Not unlike Maryland, Connecticut is not a heavily rural state, but has places where broadband adoption gaps follow lines of income and race. Stakeholders in Connecticut have recognized the statewide character of the problem, as the Connecticut Conference of Municipalities has taken a lead on the issue along with local philanthropy. In Wisconsin, the governor has issued an executive order to establish a broadband planning task force that will consider infrastructure and digital inclusion (i.e., broadband adoption) issues. The state of Maryland should embark on similar comprehensive planning.

Partnerships for digital inclusion

Boosting home wireline and computer adoption is about more than having the right infrastructure in place. It is also about making service affordable and usable to households that may not have had home service before (or have had it intermittently). This means supporting institutions that provide digital skills training and technology support for low-income populations. These are often local public libraries, but also include non-profit organizations whose missions (e.g., job training, helping older adults) can be carried out more effectively if people have home internet access. In cities such as Seattle, Austin, and Philadelphia, governments fund grant programs to support digital inclusion initiatives. Maryland should consider seeding such funding programs, perhaps jointly with philanthropy to leverage dollars. The state should also consider creating an Office of Digital Inclusion to manage such initiatives. This idea is currently on the agenda for the 2021 Maryland state legislative session.

Increasing public awareness of affordability programs

With the wireline broadband adoption gap most pronounced for low-income Marylanders, discount internet offerings can make a difference in boosting adoption. One of the nation's most prominent discount internet plans is Internet Essentials from Comcast. Low-income households with school-age children or that qualify for certain government benefits can purchase 25 Mbps for $9.95 per month (plus tax). Comcast offers service in most areas in Maryland east of Interstate 81. Increasing public awareness through public information campaigns could help address the access needs of many low-income. Stakeholders should encourage internet service providers in areas not served by Comcast to develop and publicize such offers. Maryland stakeholders should also consider advocating for federal action, such as a direct internet subsidy (as the HEROES Act proposed) or through reform of the Federal Communication Commission's Lifeline program.

Improving the pipeline of computing devices

Affordability of computers is a barrier to people subscribing to broadband. Nationally, initiatives exist to channel computers that businesses and governments would otherwise discard to low-income households who need them. One such group, PCs for People, has a presence in Maryland, as well as DigiBmore, which aims to donate laptops for students. These initiatives, and others like them, are likely to face growing and ongoing demands after the pandemic fades. Stakeholders in Maryland should explore ways to expand and sustain such initiatives to all parts of the state.

ABOUT THE AUTHOR

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THE COMMUNITY DEVELOPMENT NETWORK OF MARYLAND (CDN)

The mission of CDN is to promote, strengthen, and advocate for the community development sector throughout Maryland's urban, suburban and rural communities. The digital divide is a barrier to education and economic equality, impacting both rural and urban areas, particularly low-income communities and communities of color where lack of infrastructure and unaffordable internet service plans are major obstacles. In an effort to gain a full understanding of the gaps that exist in Maryland, CDN collaborated with the Abell Foundation on this report using the most recent American Community Survey data.

APPENDIX

Broadband network deployment in Maryland

Understanding the state of network deployment in the United States is a well-known challenge. It starts with how the FCC collects data on where networks are and their speeds. The FCC asks carriers to report whether it serves each census block in its coverage area and at what advertised speed. This means a carrier can report that it serves an entire census block even if it serves only a handful of customers there. In rural areas, where census blocks can be geographically large, many households may seem to have broadband service (per the FCC's methodology) when they do not. The FCC's approach, therefore, likely overstates coverage.

Using the FCC data collection method shows that 94.4% of Americans have 25 Mbps broadband – or just 5.6% of Americans are without broadband networks at 25 Mbps threshold. For Maryland the number of residents not served by a broadband network (per the FCC) is smaller – just 2.6% That figure is higher in rural areas, where 7.1% of rural Marylanders do not have broadband networks at that speed.

As noted, however, the FCC method to determine the availability of broadband networks has flaws. Other approaches yield very different results. Microsoft has examined the network speeds users experience when they download updates to the company's software. Microsoft finds that 65% of counties in Maryland experience broadband speeds of 25 Mbps, a far cry from the FCC's finding that nearly all counties have broadband at that speed. Maryland's rural counties have lower rates of broadband usage, with 30% of Garrett, Allegany, and Washington Counties having broadband speeds, and counties on the Eastern Shore also having speeds in that range. At the same time, the Microsoft method shows shortfalls in urban areas; 46% of residents in Baltimore City do no use broadband at FCC-defined speeds.

Overall, Microsoft's estimate for the nation shows 162 million people without broadband, nearly eight times the 21 million figure that the FCC's approach finds. And Microsoft is not the only measurement tool that diverges from the FCC. Another group, BroadbandNow, estimates that 42 million Americans lack access to fixed wireline or wireless broadband, using a sampling of nine large ISPs "check availability" tools.

Finally, there may also be discrepancies between advertised and actual speeds, as documented in Pennsylvania by Penn State University researchers. That analysis, using data on speed tests from households, found that no Pennsylvania county has more than 50% of households with 25 Mbps broadband.

Statistical analysis

Multivariate statistical analysis sheds light on the relative weight of network deployment or affordability in explaining variation in home wireline subscription rates. Both factors matter, but the effect of income is greater than network deployment.

Analysis of the role of network deployment rests on the assumption that some households in less densely populated areas of the state do not subscribe to service partly because their homes are

not served by broadband networks (either at all or of sufficient speed). Network deployment is therefore a constraint on subscribing to service. This analysis asks about the level adoption rates absent that constraint.

Exploring the income effect seeks to untangle a factor behind a clear finding in the report – that low-income households are less likely to subscribe to wireline broadband. But other factors may be at play – such as where people live or their race and ethnicity. The analysis on income looks at how large a role income plays when considering those other factors. If household income were not a constraint on adoption, how much greater would wireline subscription rates be in Maryland?

Multivariate statistical analysis allows an examination of wireline adoption rates while controlling for other factors, such as a PUMA region's household income levels, racial or ethnic makeup, and its population's levels of educational attainment. It enables simulation of adoption rates if the geographical characteristics of those regions were not relevant. If geography did not matter (that is, if the adoption choice for a consumer in a rural county in Maryland looked the same as the one in a metro area, including network characteristics) wireline broadband adoption in Maryland would be 3.6 percentage points higher than it currently is.

For the income effect, the analysis explores adoption rates if lower income Maryland households (specifically those whose annual incomes are $75,000 or less, below the state median of $84,900 for 2019) had household incomes in the $75,000 to $150,000 range (which describes about one-third of Maryland households).

From a policy perspective, the notion would not be to triple the income of low-income households. Rather, a subsidy for home internet service for low-income households would serve as a proxy. Simulating that scenario indicates that, by providing service subsidies for home broadband service to households whose incomes are below $75,000 annually, adoption rates would increase by 6.8 percentage points in Maryland. Limiting the subsidy threshold to households whose incomes are under $50,000 shows a 5.7 percentage point adoption boost.

The upshot is that taking steps to upgrade rural broadband networks in Maryland to quality levels like ones in metro or urban areas would clearly boost home wireline broadband adoption rates. However, taking steps to make service more affordable for low income households would also boost home wireline broadband rates – and do so to a greater degree than just addressing rural network deployment.

The

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**Disconnected in Maryland: Statewide Data
Show the Racial and Economic Underpinnings
of the Digital Divide**

by John B. Horrigan, Ph.D.

About the Abell Foundation

The Abell Foundation is dedicated to the enhancement of the quality of life in Maryland, with a particular focus on Baltimore. The Foundation places a strong emphasis on opening the doors of opportunity to the disenfranchised, believing that no community can thrive if those who live on the margins of it are not included.

Inherent in the working philosophy of the Abell Foundation is the strong belief that a community faced with complicated, seemingly intractable challenges is well-served by thought-provoking, research-based information. To that end, the Foundation publishes background studies of selected issues on the public agenda for the benefit of government officials; leaders in business, industry and academia; and the general public.

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