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How mobile hotspots can connect America's underserved broadband areas

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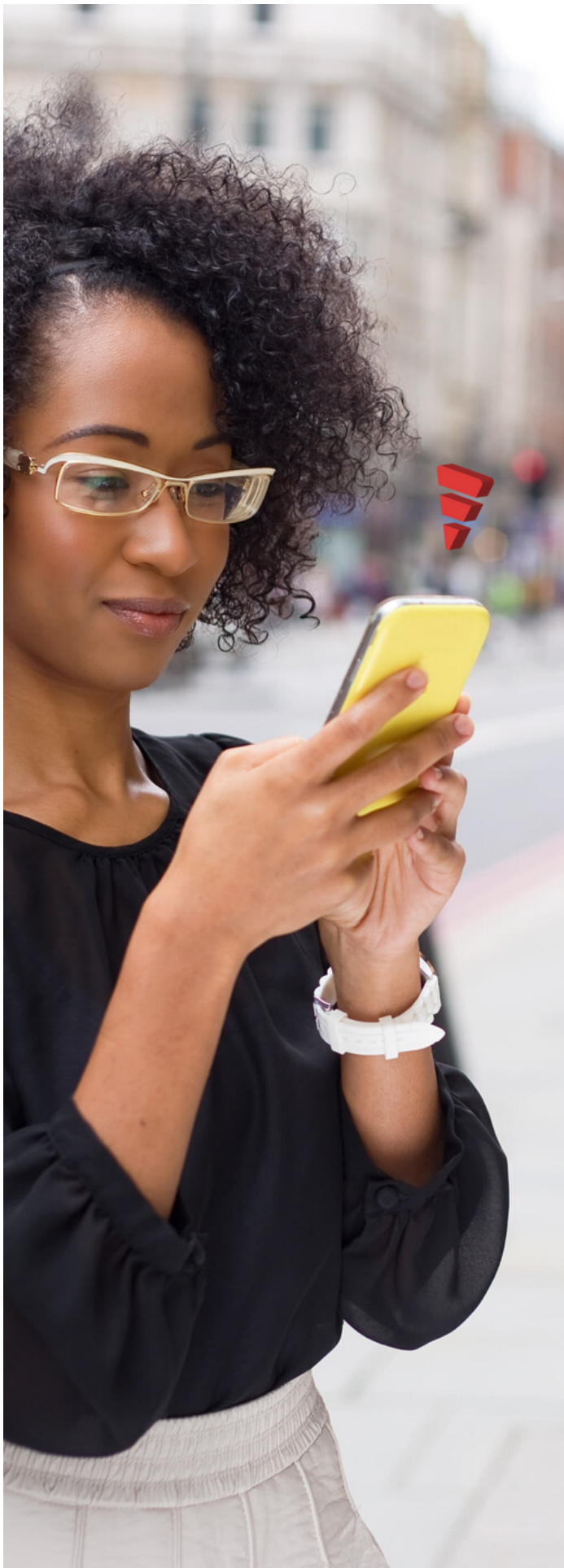
Introduction

With education having moved completely online for most students over the last month, the availability of internet at home is a more critical issue than ever. Building out last-mile infrastructure to supply home broadband is not feasible in the short run, so mobile networks are a logical solution for helping to bridge the digital divide in the near future.

Legislators and FCC commissioners have highlighted the immediate need for a stop-gap measure to supply internet, particularly to schools and students in areas underserved by broadband home internet. To help operators prioritize areas where home internet is particularly lacking but mobile networks provide good service, Tutela has cross-referenced its proprietary wireless network performance data with information on areas underserved by fixed broadband, using census blocks that that were either eligible for the FCC's Connect America Fund, Phase II, or were included in last year's CAF Phase II auction.

According to the wireless network performance data, more than 2,500,000 households out of the 5,000,000 households in our study are in areas covered by at least one nationwide operator with adequate service, which shows the potential scope of a program to offer wireless hotspots to areas most in need.



Our analysis is based on an evaluation of wireless network performance at the census blockgroup level. We looked at mobile network coverage and performance data from the four largest U.S mobile operators: Verizon, AT&T, T-Mobile and Sprint. We considered T-Mobile and Sprint as separate entities, as the new T-Mobile has yet to fully merge its network with Sprint's.

Thanks to the geographic specificity of the performance data, as well as the performance data coming from smartphones used by real-world wireless subscribers, the data suggests that nationwide, more than 2.5 million underserved households in our study are in areas covered by at least one nationwide operator with an adequate network connection (using thresholds described below). To come to this conclusion, we considered coverage and performance of mobile networks in blockgroups across 2,877 US counties and all 50 states, with these blockgroups containing over 5 million underserved households in total.

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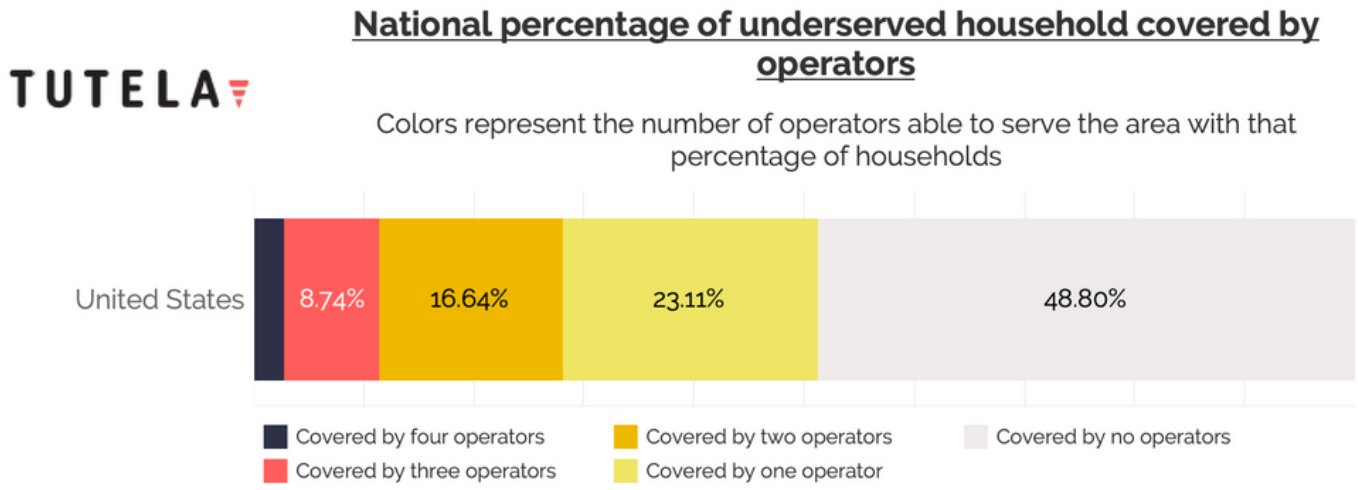
Thresholds used

KPI	Threshold	Explanation
Observed 4G Coverage	90%	Tutela's coverage metric was used to establish how much of landmass of the underserved blocks within a county was covered with a 4G network by an operator. 90% was selected as the threshold due to the importance of widespread coverage to ensure as many underserved households were supported as possible.
Excellent Consistent Quality	75%	Tutela's Excellent Consistent Quality thresholds have been designed using the latest available network performance recommendations from services like Netflix, Skype (including Skype for Business) and others. This makes it the best proxy for the range of use-cases used in online learning (where group video calls and HD video streaming are key activities). A 75% pass rate against the tests demonstrates that the network meets the requirements for this range of services 75% of the time. Networks also had to have at least 50 valid Consistent Quality tests in order to demonstrate a reliable and consistent presence.

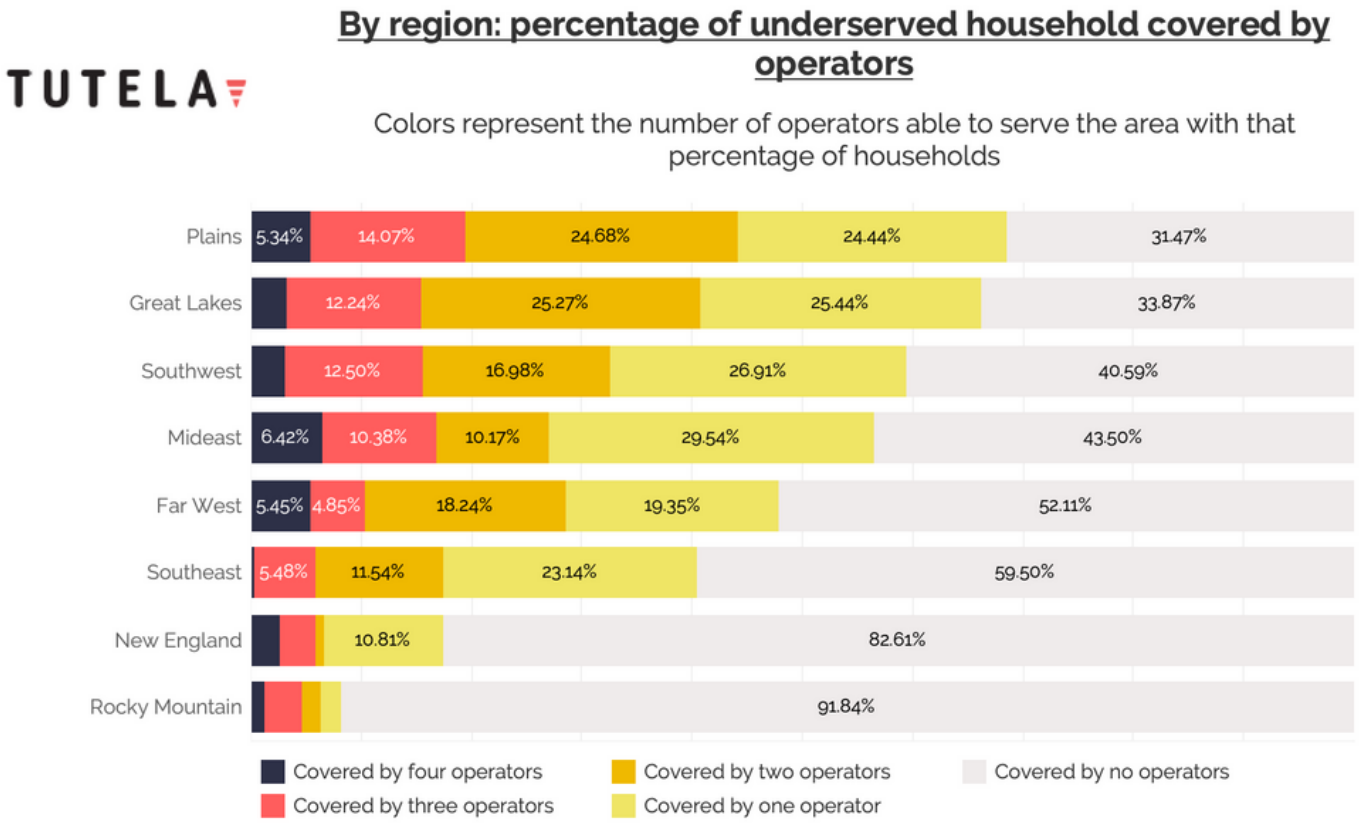
National coverage

On a national level, it is clear that mobile operators have the potential to bring internet to millions of underserved households. While only a small proportion of underserved households are in areas served by all four major mobile networks, a majority of underserved households nationwide are in areas adequately covered by at least one operator.



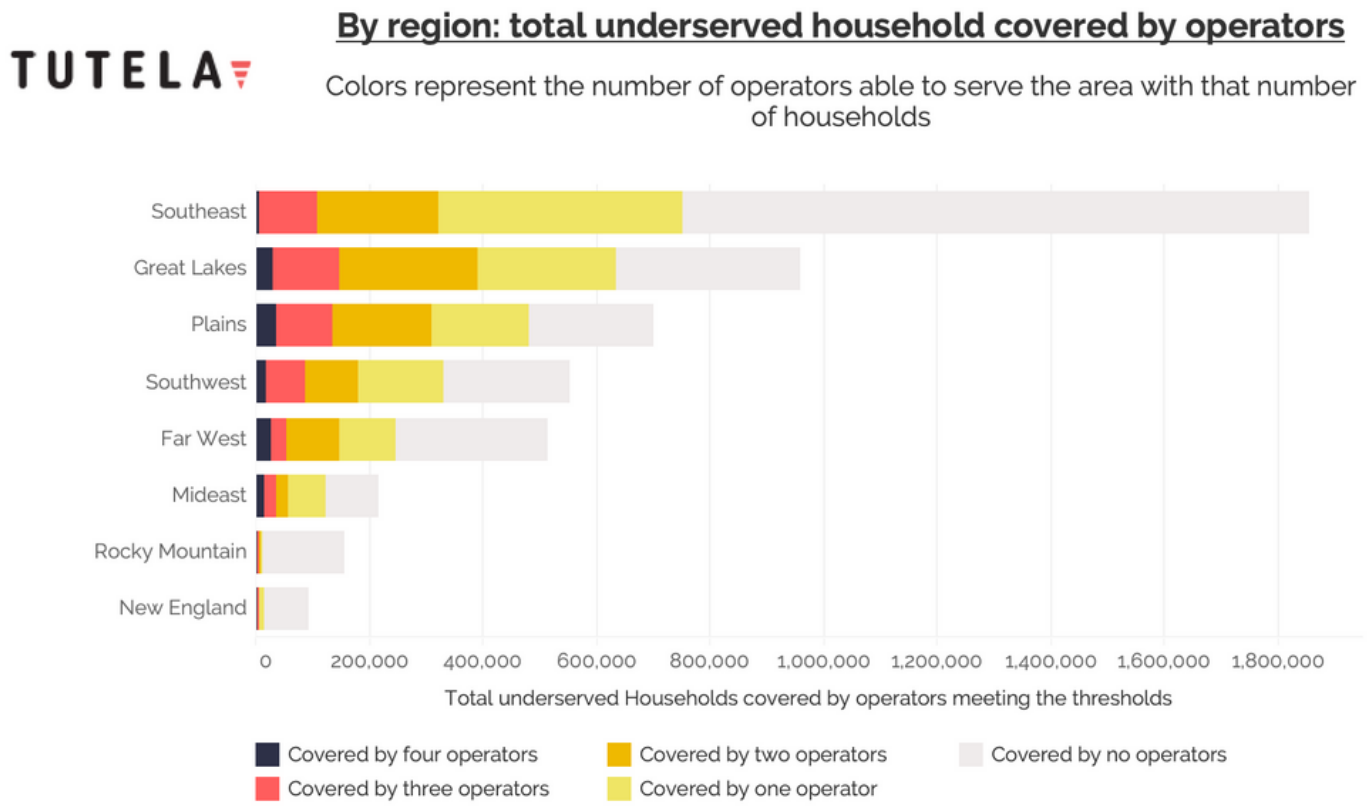
Regional percentage breakdown

Breaking this down regionally (using the Bureau of Economic Analysis geographic regions), it is evident that some areas are better-suited to internet provided via wireless hotspots, both in terms of the number of underserved households, and also the proportion of those covered by at least one operator.A majority of households in the Plains, Great Lakes, Southwest, and Mideast regions are covered by at least one operator, and most regions have nearly 40% of CAF-eligible households covered by at least one operator. Only New England and the Rocky Mountains, which have few underserved households at all, have few of their underserved households covered.



Regional total breakdown

Looking at the total number of underserved households covered, rather than just the percentages, paints a slightly different picture of priorities. The Southeast, which has 39.5% of underserved households covered (one of the lowest overall), has the most total underserved households, nearly a million more than the next-closest region. Over 700,000 of the Southeast's underserved households are covered by at least one wireless operator. The Great Lakes, which is second in terms of total number of underserved households, as well as underserved households covered, leads in terms of choice, as it has the most underserved households covered by two or three wireless operators.



Locations with the most impact

In order to help shortlist the areas where wireless operators could make the most difference — for example, by providing school districts with Wi-Fi hotspots to be distributed to students — we have compiled a list of counties where all four operators provide good-quality service, ordered by the number of underserved households within the county.

This shortlist highlights areas that could provide the most immediate results for any operator looking to assist underserved households and students through the provision of mobile internet. Although the shortlist is just a fraction of the millions of underserved households nationwide that could benefit from Wi-Fi hotspots, it would likely serve as an efficient starting point.

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Shortlist of counties where mobile hotspots could have a significant impact

Counties with at least 1000 underserved households, where all four national operators meet the thresholds

County	Number of underserved households
Maricopa - AZ	14,092
Santa Clara - CA	7,099
Wright - MN	6,312
St. Croix - WI	5,490
Blue Earth - MN	4,219
Sacramento - CA	4,187
King - WA	4,110
Johnson - IN	3,689
Alameda - CA	3,680
Jackson - MO	3,613
Polk - IA	3,499
Cook - IL	3,472
Carver - MN	3,449
Fairfield - OH	3,053
Benton - WA	3,002
Cumberland - PA	2,998
Jefferson - AL	2,811
Solano - CA	2,754
Sussex - DE	2,650
Clinton - OH	2,607
Washington - MN	2,563
Orange - CA	2,491
Lorain - OH	2,466
Sarpy - NE	2,386
Story - IA	2,020
Grand Forks - ND	1,889
Hennepin - MN	1,810
Wyandotte - KS	1,776
Anoka - MN	1,774
Kay - OK	1,727
Northumberland - PA	1,715
Allen - IN	1,687
Hancock - IN	1,444
Berks - PA	1,385
Weld - CO	1,281
Cuyahoga - OH	1,243
Fulton - GA	1,230
Vanderburgh - IN	1,007

Conclusions

While the United States anticipates its path back to a "new normal", the rise of more remote working and education is likely here to stay – not least in the short term, with 43 states having either ordered or recommended that schools remain closed for the remainder of the academic year.

Providing quick and effective solutions now to provide connectivity in areas that have historically been underserved will be critical to keeping these areas functioning as providers plan for more long term solutions supported by more robust federal and state programs.

About Comlinkdata

Comlinkdata helps players in the telecom ecosystem around the world understand and optimize both their go-to-market, operations, and network performance. Comlinkdata combines independently sourced, fine-grained datasets with deep telecom expertise that help our clients – including broadband operators, smartphone OEMs, mobile carriers and others – make smarter, faster decisions that have bottom-line impact. The company has offices in Boston, MA and Victoria, British Columbia. Tutela is a member of the Comlinkdata family.

About Tutela

Tutela Technologies, Ltd., is an independent crowdsourced data company with a global panel of over 300 million smartphone users. It gathers information on mobile infrastructure and tests wireless experience, helping organizations in the mobile industry to understand and improve the world's networks. Data and insights provided by Tutela are trusted by the engineering teams at mobile network operators and network equipment manufacturers around the world and used to compare operators as well as inform decisions in network and infrastructure planning and optimisation. The organization is headquartered in Victoria, British Columbia.

Tutela does not collect any sensitive personal data and is compliant with international privacy regulations including CCPA and GDPR.

For further information about the methodology, data and tools used to create this report, please contact analysis@tutela.com or visit www.tutela.com.

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