Publicly-available data sets containing consumer-generated internet speed test data may leave rural communities behind

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Background

High-speed internet—also known as broadband—is a necessary feature of communities for residents to fully participate in work, education, business, and healthcare.[1] Broadband access is not equally distributed across the United States (U.S.), and many rural, racial/ethnic minority, and low socioeconomic status communities are particularly underserved by broadband.[2] This lack of access to broadband has important implications for healthcare access, as telehealth can be an important tool to increase access to healthcare for many underserved patient communities.[3,4] However, many types of telehealth are only feasible when broadband is also accessible and affordable. Broadband data are, therefore, critical to identify communities lacking sufficient broadband access. In response to the need for more granular broadband data and to more equitably allocate funds for the Broadband Equity, Access, and Deployment (BEAD) Program,[5,6]

Key Findings:

- The number of consumer-generated speed tests per 1,000 residents in publicly-available data sets has increased since the first quarter of 2020.
- Rural counties had generally fewer consumer-generated speed tests per 1,000 residents than urban counties, but only for analyses of fixed connections.
- Counties with higher poverty rates and a larger percentage of residents over age 65 were also underrepresented in these data sets.

the Federal Communications Commission (FCC) released new data and maps in 2022 that identify whether individual broadband serviceable locations have access to broadband.[7] These latest maps use information from internet service providers and additional information from challenges to initial data and map releases from the public to improve the accuracy of the information.[8]

Although these latest data are a valuable source of information on broadband access, data containing direct measurements of consumer broadband remain important sources of information to reflect the user experience of broadband. For example, some consumers may have a broadband connection, but the connection may vary in speed and quality such that the service may not meet the technical definition of "broadband" every minute of every day. Assessing the experience of broadband as a user is therefore critical when determining a patient's broadband access and telehealth readiness. Thus, supplementing our understanding of broadband using these FCC data assessing broadband access at individual broadband serviceable locations—with analysis of additional data sets that can speak to the user experience of broadband—is important for health services researchers, healthcare providers, and policymakers alike.

Methods

In recognition of the need for quality measurement of the experience of broadband in rural communities, the Telehealth Broadband Pilot (TBP) Program charged the Alaska Native Tribal Health Consortium (ANTHC) and the Rural Telehealth Research Center (RTEC) with measuring broadband connections in rural communities to help understand and improve broadband and telehealth access. As part of this effort, RTEC examined two large, publicly-available data sets of consumer-generated broadband speed tests: Measurement Labs (M-Lab) and Ookla for Good (Ookla). These two data sets contain broadband speed test measures for tests initiated by consumers throughout the U.S. RTEC investigated specifically how well-represented consumers in rural counties were in these data sets.

Results

In a recent study published in the journal *Telemedicine Reports*,[9] we identified several factors significantly associated with fewer speed tests conducted per 1,000 residents, including a lower percentage of county residents living in poverty and more recent time periods, relative to the first quarter of 2020 (primarily before the declaration of the COVID-19 PHE). We also observed more fixed connection speed tests conducted per 1,000 residents in counties with a higher percentage of households with a computer and broadband connection, a lower percentage of residents over the age of 65, and a lower percentage of residents living in poverty.

Additionally, we found that the number of consumer-generated fixed connection speed tests conducted per 1,000 residents was generally lower for residents of rural counties. However, no differences were found in the number of mobile connection speed tests conducted per 1,000 residents across rural and urban counties. This finding that consumers in urban counties are overrepresented in fixed connection speed tests highlights the need for programs like the TBP Program to better understand the consumer experience of broadband in rural communities, particularly on fixed connections.

Discussion

Fixed connections represent broadband as it is delivered to a particular residence or business (using technologies such as cable, fiber optic, digital subscriber lines (DSL), or fixed wireless internet), whereas mobile connections include coverage provided over cellular services and are not delivered to a specific location.[10] Our results support several recent findings demonstrating that the digital divide in broadband infrastructure investment in mobile technologies may be closing—particularly for the rural versus urban divide and the divide between residents of higher and lower socioeconomic status,[11,12] as evidenced by the number of consumer-generated mobile speed tests in publicly-available user-generated speed test data. However, our findings also demonstrate that we may lack sufficient data of direct measurement of consumer broadband to have a complete picture of the experience of fixed broadband connections in rural communities. Thus, the data provided and the technology facilitating longitudinal broadband measurement developed by the TBP Program may fill a critical gap in broadband access data by providing longitudinal speed test measurements at healthcare sites, consumer residences, other Community Anchor Institutions, and businesses, helping to better understand the experience of broadband in rural communities.

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