

Why buses can't get wheelchair users to most areas of cities

May 10 2023, by Jeff Grabmeier



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Imagine you could travel to only 1% of the city where you live—areas that were easily accessible to other residents.

That's the situation for manual [wheelchair users](#) traveling by [public buses](#) in Columbus, a first-of-its-kind study finds. The situation for those with powered wheelchairs is only somewhat better—the study found they have access to about 25% of the areas available to the general bus ridership.

But the main problem isn't with the bus system itself—the key obstacle is with the sidewalks and other infrastructure that [wheelchair](#) users need to get from their homes to [bus stops](#) and from bus stops to their final destinations, researchers found.

"Damaged and missing sidewalks are a huge factor in making much of the city inaccessible to wheelchair users who rely on public transportation to get around," said Luyu Liu, lead author of the study and a doctoral student in geography at The Ohio State University.

"People with mobility disabilities need to get to and from bus stops in order to use public transportation and that isn't easy in many parts of the city."

The study, published recently in the [Journal of Transport Geography](#), is significant because it is one of the first studies to obtain high-resolution, [real-time data](#) on the usage of buses by people with and without disabilities and compare it with data on infrastructure such as sidewalks.

"We've never been able to do an analysis like this before. The data simply did not exist until recently," said study co-author Harvey Miller, professor of geography at Ohio State and director of the university's Center for Urban and Regional Analysis.

"It allows us to get new insights into how public transportation operates in our cities and the social equity challenges we are facing."

And while this study was done in Columbus, it is not the only city that has an accessibility problem for those with disabilities.

"Columbus is typical of many cities in the United States, particularly cities of a similar size, because they are very car dependent," Miller said.

"Public transit is not emphasized in many American cities, and many cities have a problem with providing sidewalks."

The study area is Franklin County, where Columbus is located. Franklin County is home to 1.3 million people, including about 64,000 who have mobility disabilities. The researchers focus on the Central Ohio Transit Authority bus system, which serves about 50,000 people daily.

The researchers had access to real-time data on bus operations between 2018 and 2021, including the number of riders and every time a bus deployed equipment to accommodate a wheelchair.

In addition, they used data on all recorded sidewalks in the Franklin County area and the status of each sidewalk segment.

Results showed "striking disparities in accessibility" in the bus system between people with mobility disabilities and non-disabled users, Liu said.

In one analysis, the researchers found how many of the bus stops could get users to various spots in the city within 30 minutes. They found that 75% fewer bus stops could get people with manual wheelchairs to specified points within 30 minutes compared to non-disabled users. Powered wheelchair users had 59% fewer stops.

The researchers then completed calculations that gave riders twice as much time—60 minutes—to get to various spots, and disabled riders were still at a huge disadvantage.

"Even if we could wave a magic wand and give disabled riders an unrealistic amount of time to travel, they would still have access to significantly fewer opportunities and resources than the general population," Miller said.

In the bus rider usage data, the study found that the bus stops that people with disabilities tended to use were very different—and a much smaller number—than those of the general population.

"Wheelchair users are self-segregated into areas of the city where they know there are sidewalks and built infrastructure that they can use to get to bus stops," Liu said.

Spatial patterns identified in the study showed that in much of the city, people with mobility disabilities had accessibility levels that were 60% to 100% below levels for [public transit](#) users without disabilities.

Strikingly, they found that the core of the city—the place with the highest overall ridership and accessibility—was also the place with the highest access disparities between those with disabilities and those without.

That's because the center of the city has the highest level of accessibility to all parts of the city to those without disabilities. But for those with disabilities, there were many places they could theoretically travel to from the center of the city—but once they reached the bus stop, they had no good way of getting to their final destination.

"Once you get there, there are no sidewalks," Liu said. "You're stuck."

Miller said the study shows that buses and bus stops that are accessible to people with disabilities are necessary, but not sufficient, for those who use wheelchairs.

"Sidewalks are part of our transportation system. We cannot have effective and equitable public transit without having a good sidewalk network," he said.

Miller noted that those with mobility disabilities are more likely than others to be less affluent and to have to rely on public transit to get to jobs, medical appointments and shopping. That makes it even more crucial to ensure that infrastructure works for them throughout the [city](#).

"Public transit is not a business, it is not just a social service. It is crucial urban infrastructure," Miller said. "Sidewalks are part of that."

Other co-authors, all at Ohio State, were Armita Kar, Ahmad Ilderim Tokey and Huyen T.K. Le.

More information: Luyu Liu et al, Disparities in public transit accessibility and usage by people with mobility disabilities: An evaluation using high-resolution transit data, *Journal of Transport Geography* (2023). [DOI: 10.1016/j.jtrangeo.2023.103589](https://doi.org/10.1016/j.jtrangeo.2023.103589)

Provided by The Ohio State University

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