

Early Care and Education Mapping Tool Accessibility Methodology FAQ

What is the core question the accessibility model is addressing?

This model is attempting to answer which communities have more and which ones have less accessibility to licensed early care and education facilities across Metro Denver.

What are the current barriers to answering this core question?

Determining where a shortage and surplus of ECE exists at a community-level is not as simple as taking the difference between the number of children under five and the licensed capacity in the same community. At larger geographic units (e.g. the state, and possibly the county) this is defensible, but, as you move to smaller geographic units, (e.g. Census tracts) to depict community, more “leakage” occurs. This is because smaller geographic units don’t represent the complete market that serves families, and families make different choices on where they take their children for care. Some of those choices can result in finding care within their own community, but many times the choices are based on factors we cannot account for, such as convenience to have children in ECE that is closer to work, especially when the parents or caregivers works far from the home. Therefore, knowing what the general pattern of this choice behavior looks like across different communities is paramount to creating the accessibility index at a community level.

In addition, when it comes to understanding where children attend school, ECE is not organized in the same way that the K-12 public education system. Therefore, we do not know how many children attend ECE facilities, or where they come from, because they are not required to report their enrollment data to a centralized authority, like the Department of Education.

And, because ECE is not universally publicly funded, like K12, the majority of facilities are private and lack a holistic way of identifying the best locations to site facilities to ensure reasonable access to the 0-5 population.

If data doesn't exist in a centralized source, how do we understand the choices families are making when selecting an early care and education facility across the entire 0-5 population?

We sourced aggregated third party cell and GPS data (that is entirely anonymous) to depict families' travel patterns, and, therefore, the choice behavior of individuals originating from communities and going to early care and education facilities. This data serves as the proxy for the enrollment distribution.

How is this data created?

All cell or GPS devices send signals to the nearest relay tower, even when individuals are using them, to ensure they stay connected to the network. These pings provide data in the form of locations, or coordinate points. If you identify the boundaries of an area, it creates a "container" and the raw cell or GPS data can be queried to collect the number of pings in the given "container." In this case, we provided Census Block Group geographies in Metro Denver to serve as the "home community," or the "container" where the pings originate. Because a geographic "container" is needed to collect the data, ECE facility addresses were not adequate, so the parcel that each ECE facility is located on was identified to serve as the ECE facility "container." After we identified "containers" for a home location and the ECE facility, we could query the data to report (in aggregate) the distribution of trips between each set of locations.

Is this travel data really reliable?

In order to build confidence in the travel data, we partnered with the Denver Preschool Program to use its enrollment data as the real world comparison to determine the accuracy of the travel data. In the end, we learned it is a very reliable depiction of where children are attending ECE facilities.

How does the travel data inform the accessibility measure?

The travel data depicts the pattern by which trips originating from home communities are traveling to different ECE facilities, creating a "homeshed" distribution. It also provides the inverse picture, or distribution of each ECE facility's draw from around the region.

Are all home community ECE travel patterns the same?

No, each community was categorized based on income (low vs. high) and by its development pattern or built form (urban vs. suburban vs. rural) to calculate the commuting distance distributions for each type.

After establishing each community category's commuting distribution, we used the 50th percentile to represent the "typical" commute. This cutoff represents the radius distance to travel to an ECE facility from each community, or "home-shed."

How is accessibility calculated?

First, we need to understand the demand, or estimate how many children there are age 0-5 that we can reasonably expect to need licensed ECE in a given "home community" (or Census tract, as the technical geography is known), since many children do not attend licensed care due to factors like economics or cultural norms. To determine this, we multiply each age by the expected participation rate (based on national research) in ECE, and add them together.

Next, we need to understand the supply, or estimate what proportion of each ECE facility is serving the "home community," since any given ECE facility is serving children coming from multiple "home communities." To determine this, we multiply each ECE facility's total licensed capacity in the "homeshed" by its respective share of service to the "home community" and add them together.

Finally, now that we have an estimate of how many children need care and an estimate of the adjusted capacity each facility provides to the "homeshed" area, we divide each facility's adjusted capacity by the total number of children needing care, and add them together to get the accessibility value.

What does the accessibility value represent?

When looking at the accessibility results, a value of one (=1) is equilibrium, or there is a balance between the number of children needing care and the proportional capacity of the ECE facilities in the "homeshed" serving the "home community."

DATA DRIVING

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If the result value is less than one (<1), then there are more children in need of care in the “home community” than the ECE facilities can support in the “homeshed.”

If the result value is greater than one (>1), then there is more capacity among ECE facilities in the “homeshed” than there are children in the “home community.”