Equity Analysis of a Proposed SEPTA Network Redesign

Public transit can provide us all with affordable, clean, and convenient connections to the essentials of daily life. Equitable public transit should provide the best access to people who've been excluded from accessing opportunities by discriminatory transportation planning in the past.

Transit planners must understand and account for how routine or revolutionary service adjustments impact transit equity by tracking transit outcomes for Black and brown people, working-class people, and other marginalized groups.

The TransitCenter Equity Scenario Comparison Application (TESCA) compares public transit access to important destinations —like employment, healthcare, supermarkets, and more — for people of different demographics, given a change in public transit service in a specific region.

This project evaluates the change in access to opportunities caused by a proposed SEPTA bus network redesign and the distribution of those access changes across marginalized population groups living in the Philadelphia region.

See the about section for a map of the impact area.

This report generates two types of access measures:

- Cumulative measures count the total number of a type of destination that someone can access in a specified number of minutes. For example, how many jobs can someone reach by public transit, from their home, within 45 minutes? **With this metric, higher is typically better**.
- Travel time measures assess how long (in minutes) it takes to reach a specified number of locations of a type of destination. For example, how long does it take to travel to the 3rd closest grocery store? **With this metric, lower is typically better**.

TESCA's summary access measures represent the population-weighted average compared across various demographic groups.

Scenario Details

This analysis compares two scenarios across various access to opportunities and demographic groups. Details of the scenarios are found in the table below:

	Business as Usual	Proposed Network Redesign
Description	The business as usual represents the SEPTA network in its current state as of March, 2023.	The proposed redesign scenario represents a tentative SEPTA network change, with plans current as of March 2023.
Time	Wed, Mar 29 at 7:00AM to Wed, Mar 29 at 9:00AM	Wed, Mar 29 at 7:00AM to Wed, Mar 29 at 9:00AM
Modes	transit	transit

The following access to opportunity measures were calculated:

- Access to Employment (jobs) in 30 and 45 minutes.
- Travel time in minutes to the 1st closest Hospitals.
- Travel time in minutes to the 1st and 3rd closest Supermarkets.

Access measures were calculated for the following demographic groups living in the impact area: all residents, white people, Black people, Asian people, Hispanic or Latino people, and people living in poverty.

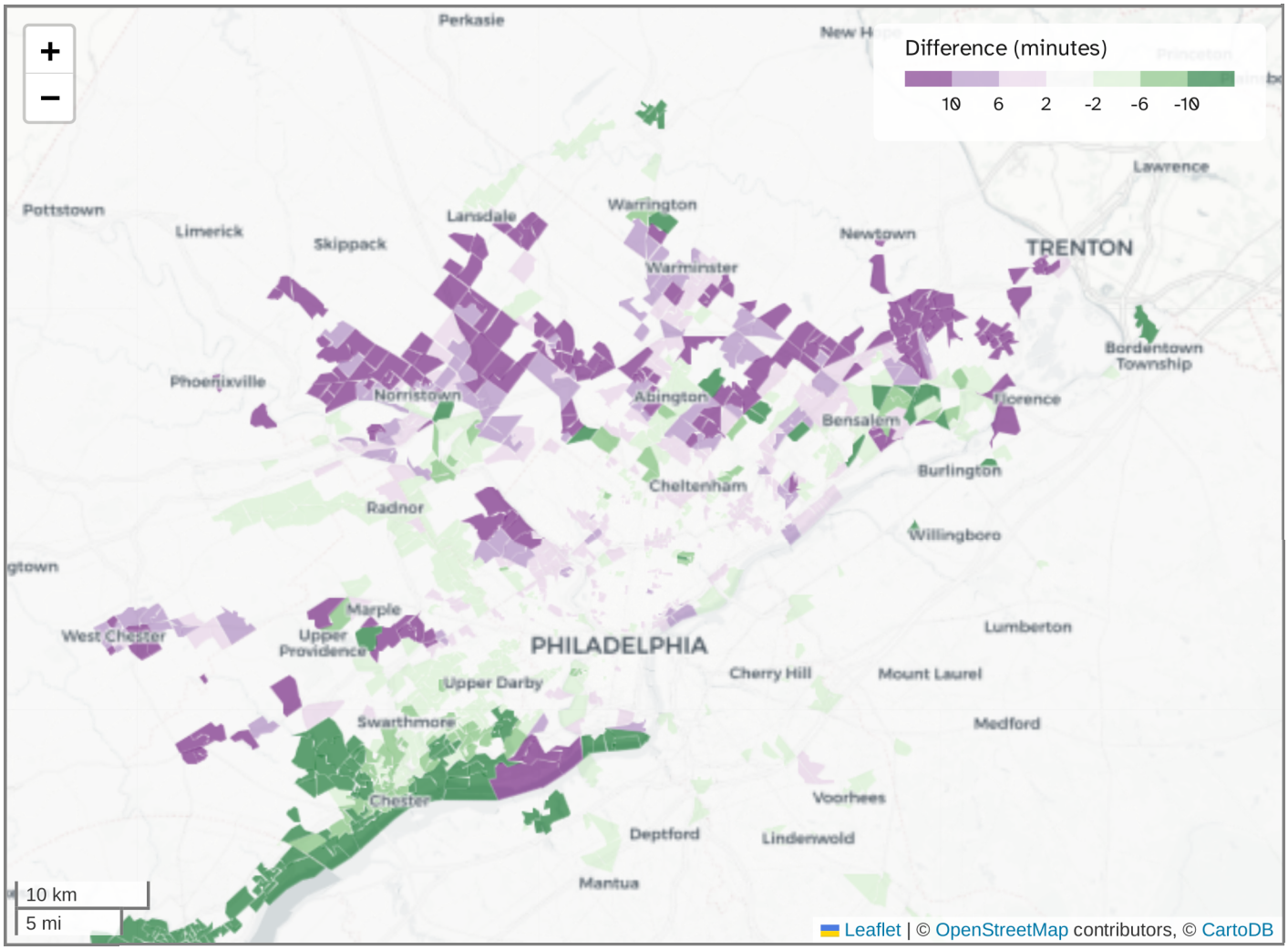
Results

This section examines differences in access to opportunity by public transit between the Business as Usual and Proposed Network Redesign scenarios. We compare measures of transit access to Employment, Hospitals and Supermarkets.

By and large the results show minimal marginal change across opportunities and population groups. We see slightly longer travel times to hospitals and supermarkets, but a small increase in access to employment. Since the network redesign focuses on simplifying operations and making a more robust network, this minimal change in access across groups is reasonable.

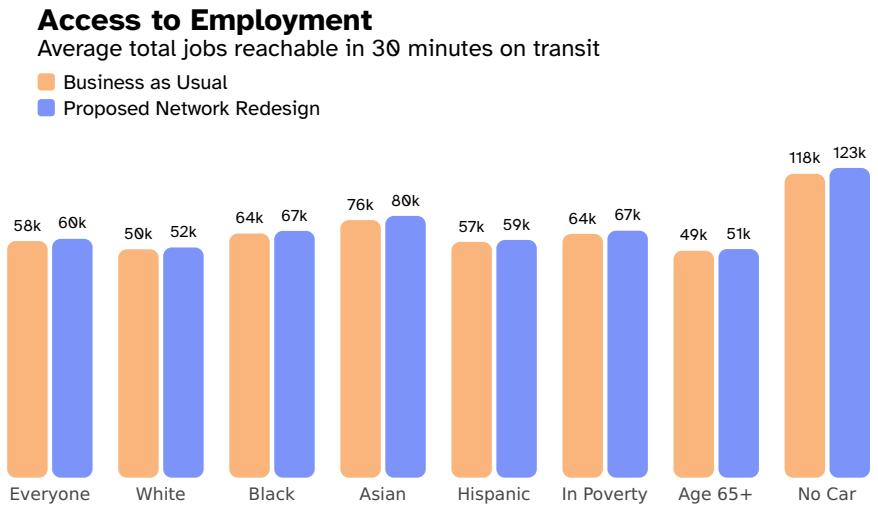
Region Map

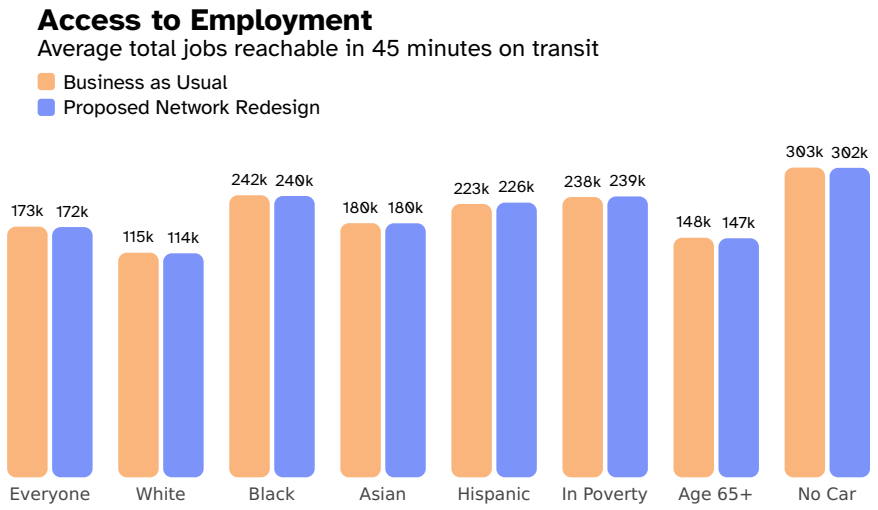
Access to Hospitals (Nearest 1)



Employment

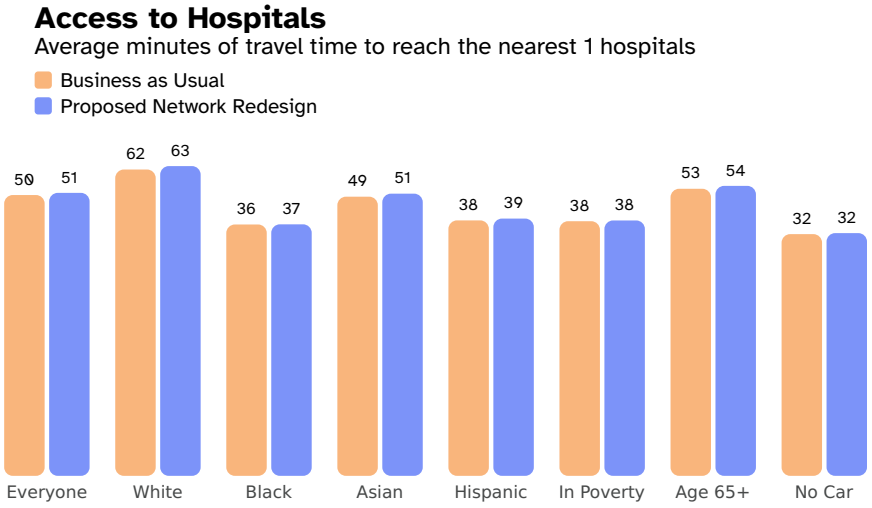
Here are the total jobs accessible by public transit on weekday mornings for the average member of each population group, in the Business as Usual scenario vs. the SEPTA Proposed Redesign scenario. This is a cumulative measure: higher values are better, representing greater access. Access to jobs by transit represents one's ability to access economic opportunity. Access to jobs is also a proxy for access to other destinations, since many jobs represent retail and service outlets that are important in people's everyday lives. Note that the age of job location data varies by state. Post-COVID employment and remote work trends may not be represented.





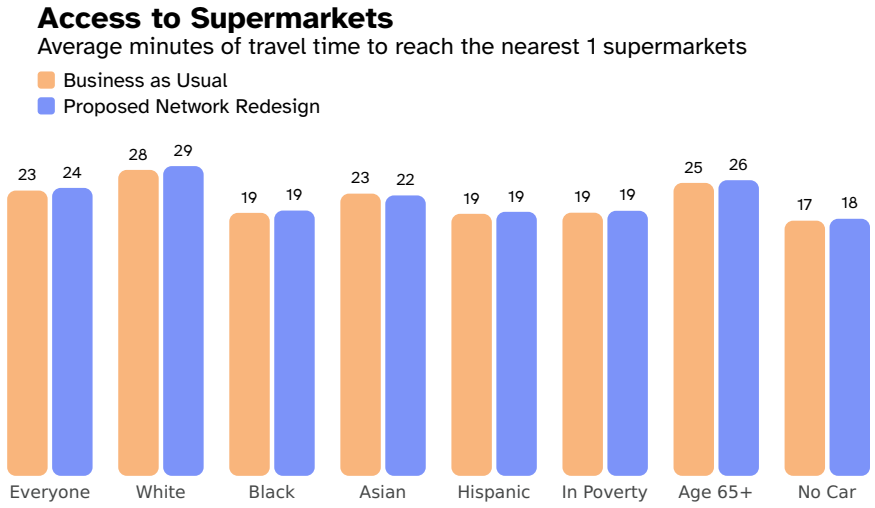
Hospitals

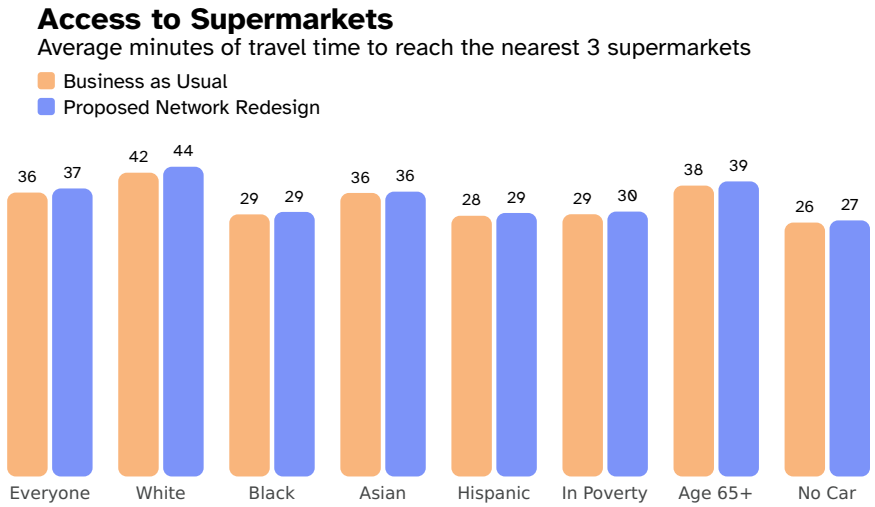
Here are public transit trip times, in minutes, on weekday mornings to the nearest hospital for the average member of each population group, in the Business as Usual scenario vs. the SEPTA Proposed Redesign scenario. This is a travel time measure: lower values are better, representing faster travel times. Reliable transit access to health care services is essential for community well-being: there is a strong connection between unreliable transportation and worse health outcomes, due to missed appointments or inability to access treatment in the first place.



Supermarkets

Here are public transit trip times, in minutes, on weekday mornings to the nearest supermarket for the average member of each population group, in the Business as Usual scenario vs. the SEPTA Proposed Redesign scenario. This is a travel time measure: lower values are better, representing faster travel times. Easy access to supermarkets ensures that transit riders can choose from multiple healthy food options that offer different combinations of value, quality, variety, and culturally-relevant food.





Unreachable Destinations

We also measure how many total individuals in various demographic groups cannot reach the closest (or nth closest) destination within the maximum travel time of two hours. The table below summarizes the totals.

Metric (nth)	Demographic	Business as Usual	Proposed Network Redesign
Hospitals (1st)	Zero-Car Households	3.12k	4.01k
Hospitals (1st)	Age 65+	21k	24k
Hospitals (1st)	In Poverty	5.67k	6.41k
Hospitals (1st)	Hispanic or Latino	8.75k	10k
Hospitals (1st)	Asian	10k	11k
Hospitals (1st)	Black People	13k	16k
Hospitals (1st)	White People	94k	107k
Hospitals (1st)	Everyone	131k	150k
Supermarkets (1st)	Zero-Car Households	192	238
Supermarkets (1st)	Age 65+	3.49k	3.42k
Supermarkets (1st)	In Poverty	868	711
Supermarkets (1st)	Hispanic or Latino	898	720
Supermarkets (1st)	Asian	2.64k	1.57k
Supermarkets (1st)	Black People	1.32k	1.39k
Supermarkets (1st)	White People	12k	13k
Supermarkets (1st)	Everyone	17k	17k
Supermarkets (3rd)	Zero-Car Households	192	264
Supermarkets (3rd)	Age 65+	3.49k	3.76k
Supermarkets (3rd)	In Poverty	868	851
Supermarkets (3rd)	Hispanic or Latino	898	803
Supermarkets (3rd)	Asian	2.64k	1.65k
Supermarkets (3rd)	Black People	1.32k	1.78k
Supermarkets (3rd)	White People	12k	15k
Supermarkets (3rd)	Everyone	17k	19k

About This Report

This TransitCenter Equity Comparison Analysis (TESCA) report was generated on behalf of TransitCenter on August 22, 2023. TESCA was developed by Klumpentown Consulting, with travel time matrix generation powered by Conveyal's R5 and implemented with R5py.

TESCA's methodology follows a similar approach to the TransitCenter Equity Dashboard, for more information on methods see the dashboard's how it works page or read this short paper. If you have questions about this analysis, please feel free to contact dashboard@transitcenter.org.

TESCA relies primarily on open-source data, including population demographics and employment data from the US Census, and walking network courtesy of the OpenStreetMap contributors.

Impact Area

The impact area of the analysis is the area over which demographic summaries are computer. This is typically a subset of the larger analysis area, which itself is used to compute travel time matrices and access metrics. A map of the impact area is shown in blue: