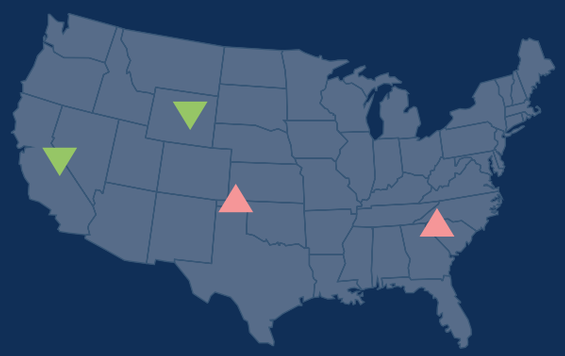
STREETLIGHT

EBOOK

Safe Speed Index

Ranking America's Cities for Pedestrian Safety



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Why Pedestrian Safety Starts with Reducing Vehicle Speed

Pedestrian safety is an urgent crisis. The number of U.S. pedestrian deaths from vehicle crashes has risen 80% between 2009 and 2021.[1] During the pandemic, safety conditions worsened as cars sped on deserted streets. But even as these driving behaviors have receded, conditions have not gotten safer. In fact, pedestrian deaths were estimated to rise again, by 5% year-over-year in the first half of 2022.[2]

Transportation agencies are paying attention.

Where previously transportation agencies emphasized moving people in cars as fast as possible, now protecting those outside of vehicles is a central focus. The Biden Administration has called out Vulnerable Road Users (VRU) — those on foot or bicycle — as a specific mandated focus for funding. Beyond mandates, as of August 2022, 45 cities had signed on to Vision Zero, which is a strategy to eliminate fatal or severe roadway fatalities for all road users.[3]

There are many factors that contribute to unsafe conditions for Vulnerable Road Users. Increasingly, speed is understood as the biggest threat to the safety of those outside of vehicles, because higher speeds lead to far worse outcomes when accidents happen.

A pedestrian is twice as likely to be killed in a collision when a car is traveling at 30 MPH compared to 20 MPH, and over five times more likely when the car is driving 40 MPH, according to data from the AAA Foundation.

Dangerous speed is why safety advocates are shining the spotlight on arterial roadways in particular. In urban areas, **arterials make up about 15% of all roads, but are the site of 67% of pedestrian deaths.**[4] Broadly, major roadways (sometimes called “stroads”) see a confluence of unsafe conditions — fast-moving vehicles alongside a heavy concentration of retail and service locations and pedestrians going about their daily life.

Reducing speeds on these roadways has been a central focus for cities and advocates trying to make streets safer for pedestrians.

To see a snapshot of how cities are faring at taming speeds on these streets, StreetLight has produced the Safe Speeds Index.

[1] Insurance Institute for Highway Safety, “Fatality Facts 2021, Pedestrians.” May 2023.
[2] Governors Highway Safety Association, “Pedestrian Traffic Fatalities by State: 2022 Preliminary Data.”
[3] Vision Zero Network, “Vision Zero Communities.” August 2022.
[4] Sindhu Bharadwaj, Streetsblog NYC, “Vision Zero Cities: How to Fix Our Most Dangerous Roads.” October 18, 2022.

Ranking Cities by Safe Speed Conditions

The Safe Speed Index analyzes the 30 most populated cities for average vehicle speed distribution on major roadways with significant pedestrian activity. StreetLight focuses on average speed, not speed limits on these roads, to understand the real conditions faced by road users.

The Speed Index shows significant disparities in average speeds on these roadways by city.

New York City, which lowered speed limits to 25 MPH in 2014, sees an impressive 84% of its pedestrian-heavy major roadways with an average speed below 25 MPH. Notably, in 2022, the city saw its pedestrian fatality rate decrease,[5] bucking the worst national trends, though above the low in pedestrian fatalities seen in 2017.[6] In addition to lowering the speed limit, the city has prioritized tactics like traffic enforcement, especially through expanding the use of speed cameras.[7]

Key takeaways from the Speed Index:

- New York City is in first place in our study for safe speed. 84% of major pedestrian roadways in NYC have average speeds of under 25MPH, the highest percent in the nation. Washington follows at 70%, then San Francisco (66%), Boston (61%), and Chicago (61%).
- In the remaining 25 cities, only 26% of these roadways on average have speeds under 25MPH, while a significantly larger 33% are in the unsafe zone, with average speed above 35 MPH.
- Southern cities see the most dangerous speeds. In Fort Worth, Jacksonville, and Las Vegas, around 50% of pedestrian-heavy major roadways see average vehicle speeds above 35 MPH. In Phoenix, that number is 65%.

San Francisco, Boston, Chicago, and Washington, D.C., round out the top five for the highest share of roadway miles with speeds under 25 MPH. All four cities see between 61–70% of road miles below 25 MPH for average speed.

Other cities like Phoenix, Fort Worth, Jacksonville, and Las Vegas have much to do to lower speeds to levels that are less threatening to pedestrians. **Over half** of major roadways with significant pedestrian activity in these cities have average speeds above 35 MPH.

Importantly, these speeds may not be illegal or subject to enforcement. **In fact, these roadways may have been designed to prioritize vehicle travel — the faster, the better — with limited consideration for the negative outcomes for those outside the vehicle. But now that Vulnerable Road Users are being centered in the safety conversation, these speeds are at odds with protecting those individuals.**

Many cities, of course, fall in middle territory. Portland and Seattle, for example, have a relatively small percentage of their roadways in the “red” zone, but around half of roadways see speeds above 25 MPH.

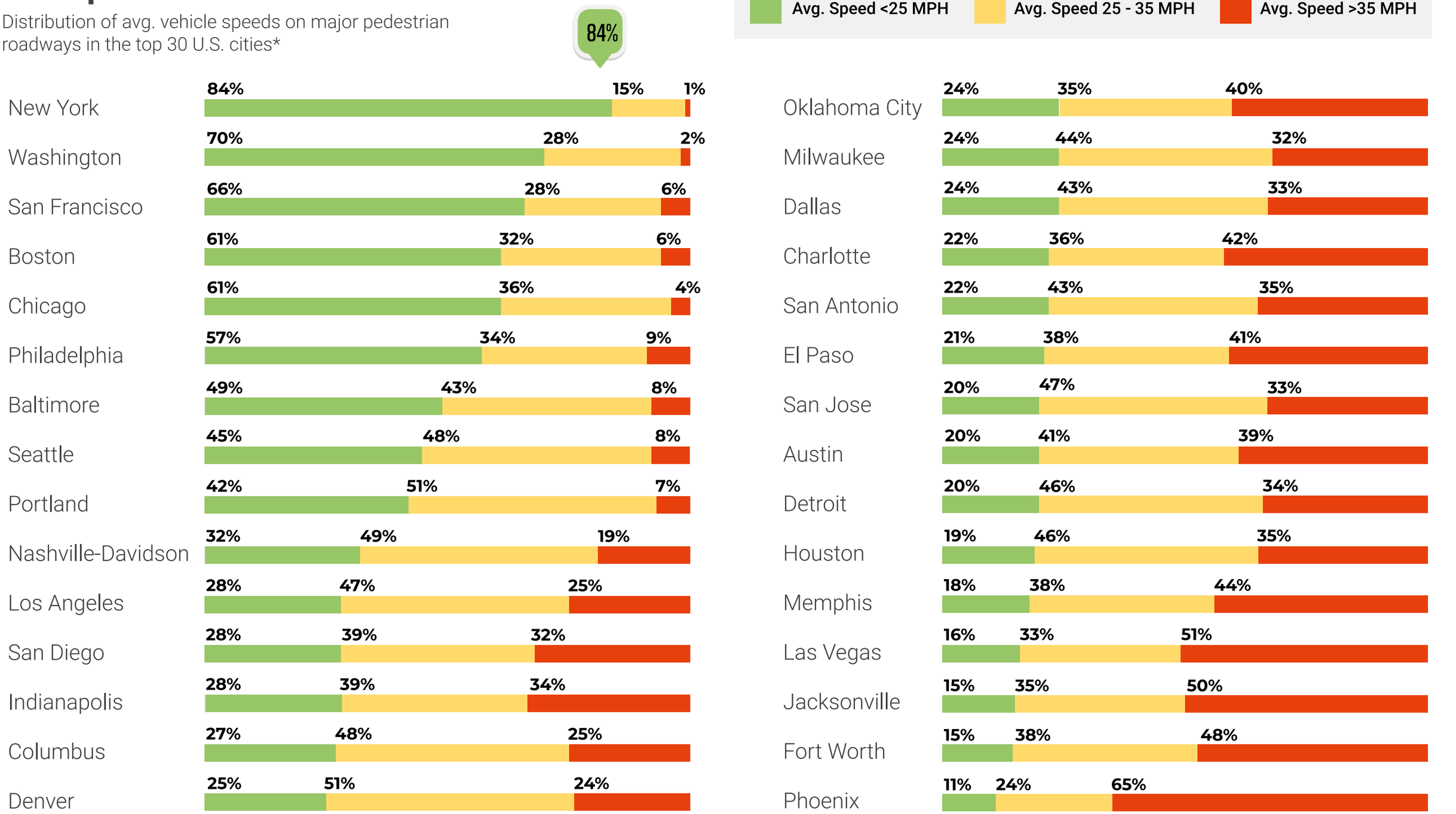
Charlotte, Memphis, and El Paso hover around 40% of studied roadways above 35 MPH.

As the map on pg. 6 shows, the cities that have the highest share of speeds above 35 MPH are primarily concentrated in the south. These also align to the cities where Smart Growth America has found the greatest vulnerability for pedestrians.

[5] NYCDOT, “Vision Zero: NYC Traffic Fatalities Dropped in 2022 For First Time in Three Years, Pedestrian Deaths Near Record Lows.” January 6, 2023.
[6] NYCDOT, Bicycle-Pedestrian and Motor Vehicle-Pedestrian Crashes.
[7] NYCDOT, New York City Automated Speed Enforcement Program 2022 Report. 2022.

Safe Speeds Index

Distribution of avg. vehicle speeds on major pedestrian roadways in the top 30 U.S. cities*



*Analysis includes average speed between September-October 2022 on all primary and secondary roadway segments with over 200 pedestrian trips per day.
**Numbers may not sum to 100% due to rounding.

We include the top 30 U.S. cities by population from the Census 2020 cartographic boundary national places shapefile.

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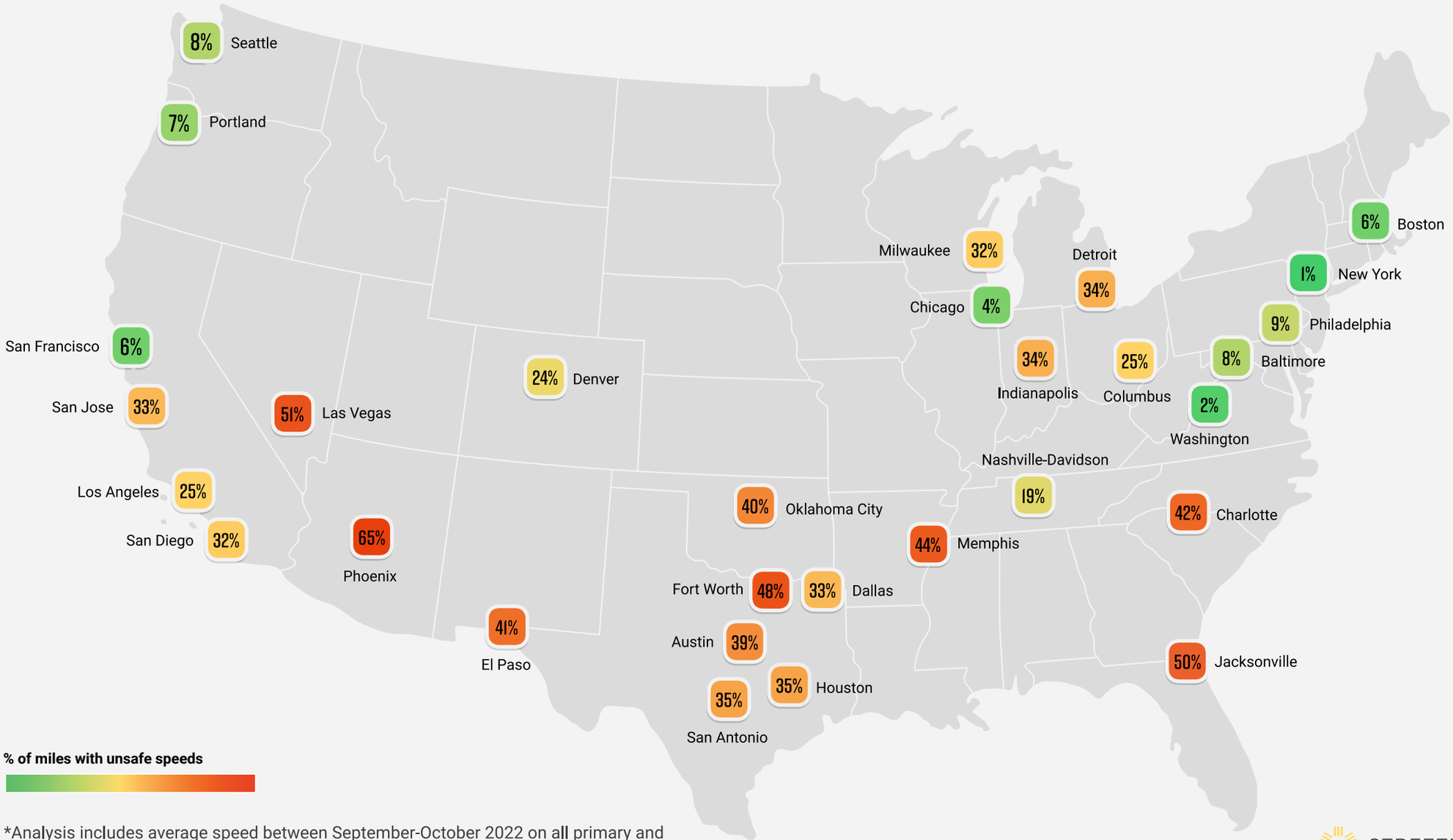
Unsafe Speeds Across US Cities

The percent of major pedestrian roadways with speeds above 35 MPH, by city



*Analysis includes average speed between September-October 2022 on all primary and secondary roadway segments with over 200 pedestrian trips per day.

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Practitioner's Corner: Diagnosing Peak Speeding Times

Even roadways that post an average speed under 25 mph may still see speeds rise well above that threshold at specific times, posing a safety threat. Analyzing changes in speed throughout the day can help further pinpoint safety risks.

An example segment speed analysis in StreetLight InSight® over a week. Speed can be analyzed by hour, day of the week, season, and other temporalities.

Walkability Analysis | Share of Roadways with High Pedestrian Activity

When running the Safe Speed Index analysis in the previous section, StreetLight specifically looked at major roadway segments where there was a reasonable level of **existing pedestrian activity** (at least 200 pedestrians per day) to ensure the analysis focused on roads where high speeds posed significant, immediate pedestrian risk.

In the Walkability Analysis, StreetLight highlights the percent of major roadway segments in each city that actually met this criteria compared to those that did not. This serves as a benchmark for the overall walkability of a city. Cities like New York and San Francisco are known as walking cities, and the data reflects this: in both cities, 96% of roadway segments analyzed see more than 200 pedestrian trips per day.

Conversely, in cities like Memphis or Indianapolis, only 29% of major roadways met the StreetLight threshold for significant pedestrian activity. This could be a reflection of more roadways in less dense areas, but it also could reflect dangerous conditions that suppress significant walking activity.

Phoenix demonstrates an interesting middle ground. At 52%, the city sees a relatively high share of its major roadways with significant pedestrian activity. However, it also ranks last on the Safe Speed Index, likely pointing to opportunities to improve safety by reducing speeds where there is already significant pedestrian activity.

Smart Growth America, using a different pedestrian analysis from StreetLight paired with fatality data, found that the cities where people historically walked more also did the best job of keeping pedestrians safe during the pandemic.[8] When looking at the change in walking activity in 2020, all cities saw more walking. And those cities that already rated highly for walking activity saw the smallest increase in fatality rates.

Cities where so few roadways even meet the walkability threshold may face some of the biggest safety risks of all. Correspondingly, cities that address speed and other dangerous roadway conditions may not only improve the safety of areas that are already popular for walking, but also create a positive feedback loop by inducing more walking activity.

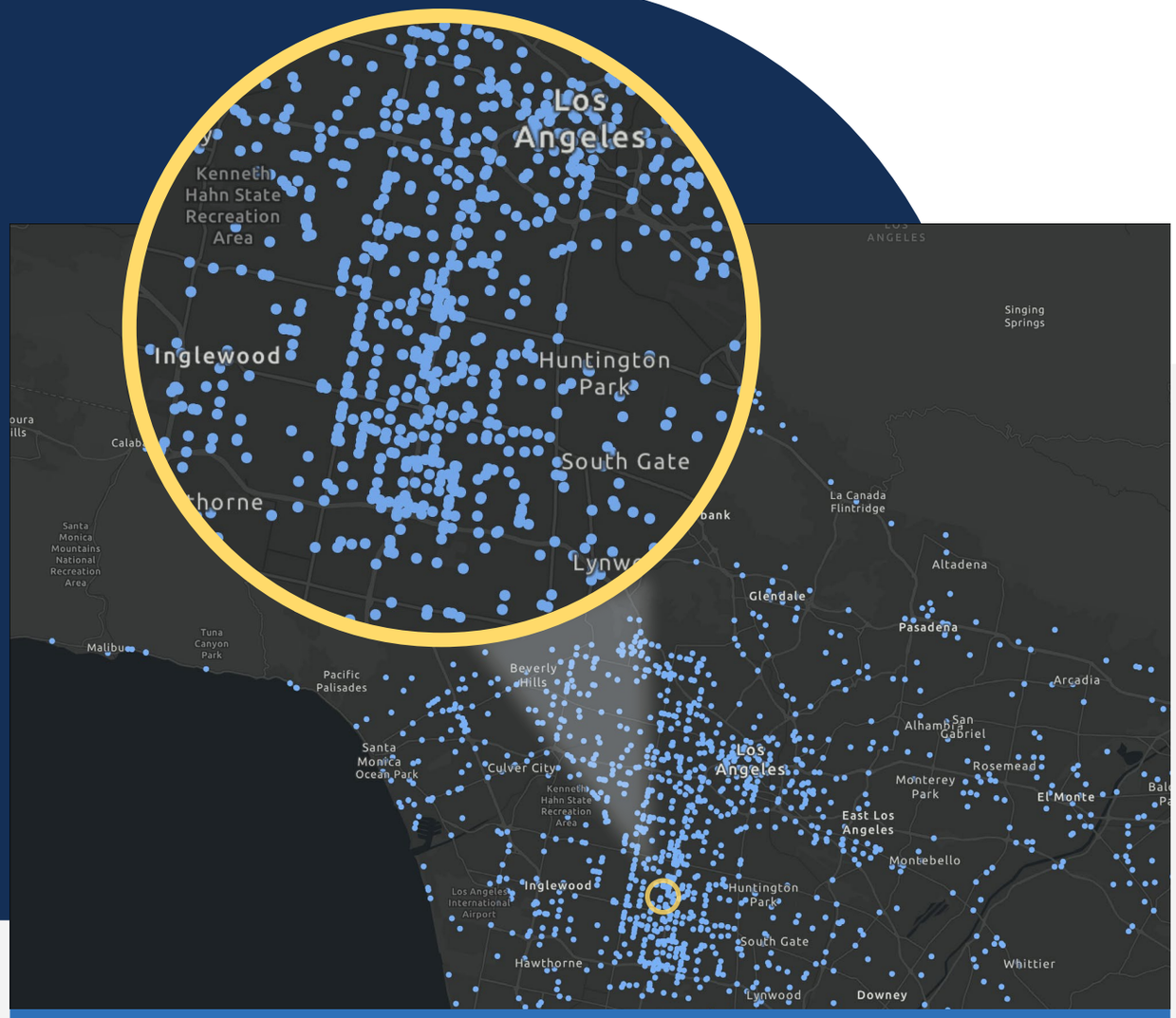
[8] Smart Growth America and National Complete Streets Coalition, *Dangerous By Design 2022.*

Overlaying Speed and Crashes | Los Angeles Example

As policy makers and practitioners look to build safer transportation systems, key metrics and analyses can help identify the biggest contributors to crashes and crash severity.

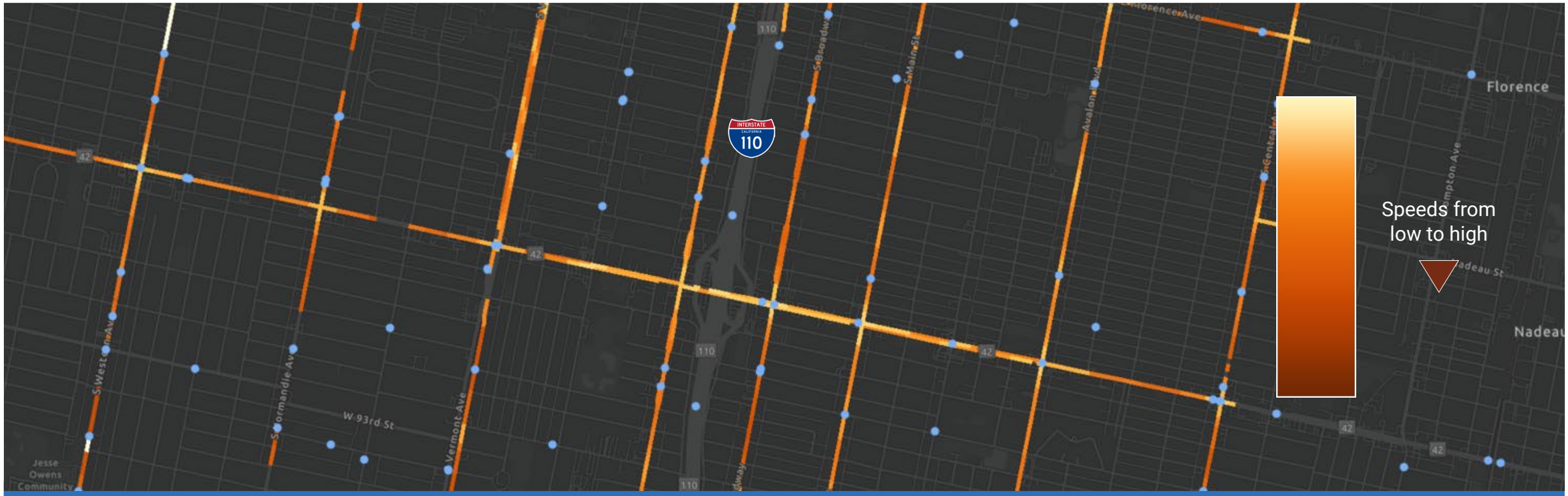
Maintaining a comprehensive database of crashes in order to identify places that see disproportionate issues is key for developing safer roadways, according to Vision Zero.[9] The database enables cities to begin analyzing why a roadway or neighborhood is unsafe and how it can be fixed. Los Angeles has one of the most up-to-date crash databases, maintained by the Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. This enables much more effective analysis of crash hotspots, including how speed may be impacting crash activity.

To show how crash information can be layered with speed data, StreetLight mapped crashes that caused severe pedestrian injury or fatality between 2021–2022 in Los Angeles.



Dots show all severe or fatal pedestrian crashes in LA between 2021–2022. The crash map reveals a few different hotspots, including one in south LA.

[9] Jen Fox, Vision Zero Network, "Where to Start on the Road to Vision Zero." April 21, 2023.



Blue dots represent severe or fatal crashes in south LA near the Florence neighborhood, in the area surrounding Highway 110.

StreetLight zoomed in on a small area of south LA to show crashes and speed data in the neighborhood side by side.

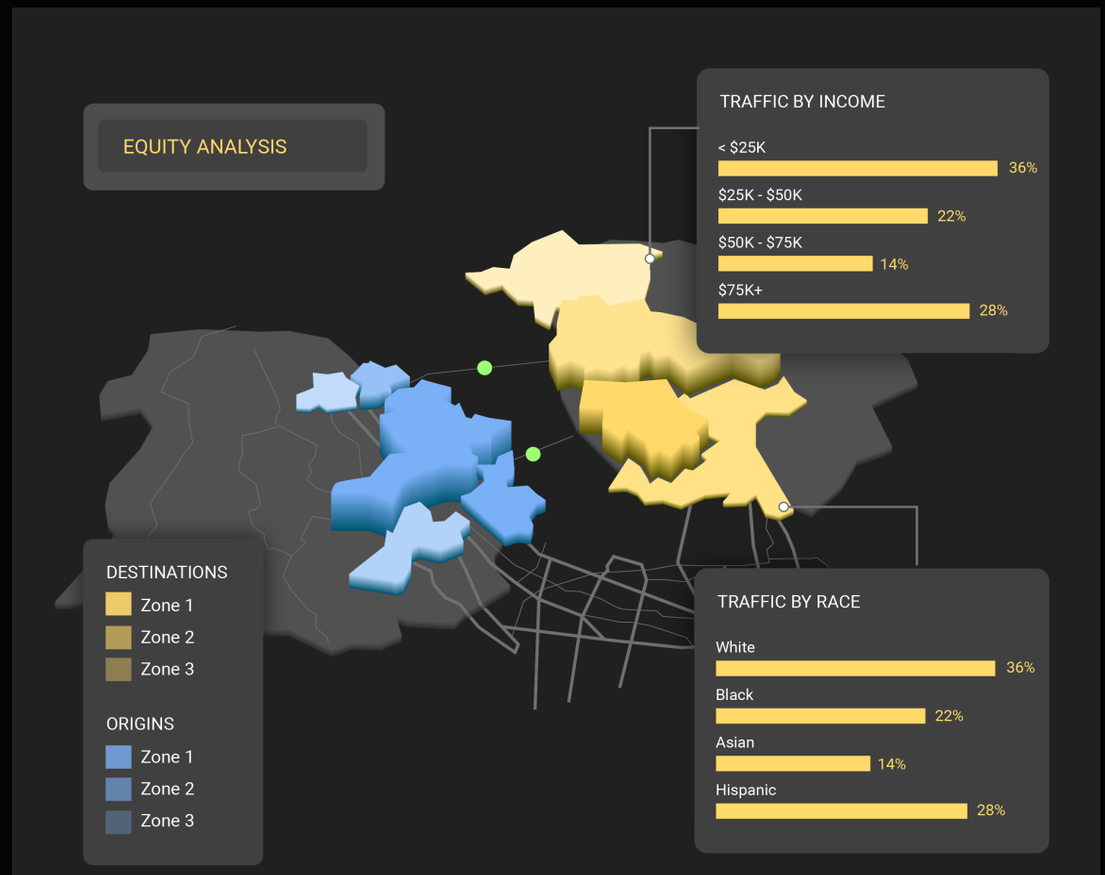
Overlaying these two sets of data together, we can begin to identify roadways where speed is likely a major contributor to severe accidents. For example, the major roadways running parallel and perpendicular to Highway 110 see high speeds and a heavy concentration of crashes and may be top candidates for speed reduction to improve safety. The potential for getting deep and actionable analytical insights when pairing crash data with other roadway metrics is robust.

Zooming back out to the full set of LA crash data, when StreetLight analyzed all crash types in LA between 2021–2022 on major pedestrian roadways the correlation between speed and severity of injury was stark. The average speed on roadways with a fatality (labeled crash severity 1) was 31.1 MPH, while crashes with the lowest severity rank of 4 were associated with an average speed of 27.6 MPH. For each increase in severity level, there was a slight increase in average speed.

These differences look very small on paper, but zoomed out, we can see they are quite literally the difference between life and death.

Practitioner's Corner: Analyzing Equity Impact

Pedestrian safety is, at its core, an equity issue. Lower-income neighborhoods are more likely to be cut through by arterial roadways built for high speeds and a high volume of traffic, exacerbating dangerous conditions for people walking and other Vulnerable Road Users.[10] Demographic aggregate travel patterns, across all modes, can help clarify the equity imperative for improving safety.



Demographics tied to travel patterns in StreetLight InSight® can show the distribution of vehicle, pedestrian, and bicycle activity by census demographic characteristics.

[10] Smart Growth America and National Complete Streets Coalition, *Dangerous By Design 2022*.

Visualize volume, speed, bike and pedestrian activity to identify high priority sites

- Access volume, VMT, speed, bike and pedestrian activity to identify high-risk intersections or corridors.
- Access historical multimode and demographic data (age, race, disability) to identify vulnerable users.
- Compare trip and traveler activity by time of day and day of the week.
- Compare changes in travel time, traffic volume, speed to measure the effectiveness of safety projects.

streetlightdata.com/safety

About StreetLight Data

StreetLight pioneered the use of Big Data analytics to shed light on how people, goods, and services move, empowering smarter, data-driven transportation decisions. StreetLight applies proprietary machine-learning algorithms and its vast data processing resources to measure travel patterns of vehicles, bicycles, and pedestrians, accessible as analytics on the StreetLight InSight® SaaS platform. Acquired by Jacobs as a subsidiary in February 2022, StreetLight provides innovative digital solutions to help communities reduce congestion, improve safe and equitable transportation, and maximize the positive impact of infrastructure investment. For more information, please visit:

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