WHY ARE WE BUILDING SAFETY PROJECTS IN THE WRONG LOCATIONS?

WE MUST STUDY MORE THAN CRASH HISTORY

TRAFFIC SAFETY PROFESSIONALS' RELIANCE ON REPORTED CRASH HISTORY DATA TO GUIDE INVESTMENTS IS FAILING TOO MANY PEOPLE, PARTICULARLY THE HISTORICALLY DISADVANTAGED. INCORPORATING NEW DATA SETS FROM INNOVATIVE TECHNOLOGIES IS THE WAY FORWARD TO IMPROVE SAFETY AND EQUITY.

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Those of us concerned about transportation safety—from engineers and planners to advocates, educators, and law enforcement—have largely failed to make targeted and critical safety investments where they are most needed. This failure is evident in the steadily increasing number of U.S. roadway deaths each year, including the 42,915 people who lost their lives in 2021. Each death was preventable.

Part of this problem is that when we try to identify safety needs, we're looking at the wrong data. For far too long, engineers and analysts have defined and analyzed traffic safety in a simplified manner, examining motor vehicle-centric, officially reported crashes alone. If these simple numbers go down any given year, we pat ourselves on the back. If they go up, we look for something or someone to blame.

But people are not numbers. They are our children, parents, partners, friends, and co-workers. People require more from those of us entrusted to make transportation safe, including asking ourselves some tough questions:

- Exactly who is getting injured and killed?

- Where do these people live, work, and play?

- Might our focus on simple numbers and limited data negatively impact underinvested, low-income, and Black, Indigenous, and people of color (BIPOC) neighborhoods?

- Will we recognize the decades of systemic racism and classism that have resulted in inequitable investments in traffic safety?

These are the questions I have been asking myself for years in my role as a traffic safety engineer, as I have contemplated whether our current system of reducing traffic deaths is working (spoiler: it's not). Once I started to examine who was suffering most and the increased exposure to conflicts they faced in their neighborhoods and communities, I could not look away. The uncomfortable truth is that our current system of reducing traffic deaths relies on crude and outdated ways of predicting and remediating crashes, resulting in inequitable and ineffective investments. These choices result in poor traffic safety performance, exemplified by the more than 40,000 people who died last year, among whom low-income people, people with disabilities, and people of color were overrepresented.

Multiple research studies show us that people of color, low-income people, and people with disabilities face higher risk on our streets and roads.

For example, marginalized people walking and biking suffer a disproportionate rate of injury and death resulting from traffic crashes.

There is another reason to believe that traditional sets of data are not equitable or sufficient, stemming from the fact that the vast majority of data in crash history databases are collected through motor vehicle incident reports completed by law enforcement. It's not hard to understand how people living in disinvested and diverse neighborhoods hesitate before reporting traffic crashes to police. This phenomenon has likely skewed crash history data away from low-income, BIPOC, and Tribal communities and inaccurately inflated the relative safety needs of wealthier white areas for decades. As a result, the current methods of data collection are more likely to suggest investments that improve transportation safety for people like me: middle-aged, white, affluent, and privileged, living in neighborhoods with adequate and regularly-improved road facilities.

Vulnerable Road User safety risk is not equally distributed

The good news is that we can change this. By collecting larger and less-biased transportation data sets, and then combining these new data with more sophisticated analysis and other related demographic data, we can reduce traffic safety risks for the people living and working in underserved communities. We have an opportunity to target our transportation safety investments in the places where people are most likely to be impacted by traffic violence.

Doing this may give us the opportunity to make meaningful progress toward Vision Zero, at a time when we need to reduce the upward trend of traffic fatalities and serious injuries. While many European cities have been making significant progress at reducing traffic violence, disturbingly, U.S. traffic fatalities and injuries have only increased since cities have adopted Vision Zero as a goal.

New data sets and analysis tools—including crowd-sourced data, connected vehicle outputs, and near-miss conflict analysis—are a wealth of information that we can apply today to make our communities safer. In order to fully utilize what's available, our industry needs to learn where useful data are stored, how to collect this information, and how to analyze it, so we can apply the results to more accurately predict crashes and invest in transportation projects that address historical inequities and save lives. Here's how:

Leverage vehicles as data collectors. Every new car sold since 2017 is a connected vehicle, capable of continuously generating and uploading data about that car's performance to the cloud. Much of this data can be extracted, compiled, and analyzed in ways that may help us improve safety investment decisions. For example, information about rapid decelerations, lane changes, operating speeds, and near-miss conflicts with other road users can help us predict locations with the greatest potential for future crashes.

Maximize video capabilities. Video analytics can identify conflicts between road users at intersections, highway-rail grade crossings, school zones, and multi-use shared paths over a period of days or weeks, feeding that information to traffic engineers who can then make changes based on recent activity at that location, rather than relying only on historic crash reports. If these systems are deployed in an unbiased manner, analysis of video-collected conflicts should be more comprehensive and equitable than current reported crash history databases.

Road Users: Ute/Pickup truck, Van, Passenger Car, Bus, Pedestrian, Motorbike, Commercial Vehicle, Bicycle Conflict Type: All Conflicts Date From: 07-Oct-2020 to 08-Nov-2020 Time From: 4:00 - 23:00 Version: v1.8.0

ⓘ Conflict heat maps are based on conflict time gaps of less than 1.5 seconds.

ⓘ Severity indicates Delta-V (kph).

Video analytics tools identify conflict hot spots within intersections (Source: AMAG)

Utilize demographic data. Government agencies and academic institutions collect a lot of demographic data, much of it available publicly at the census tract and block levels. By overlaying demographic data like household income, race, and languages spoken at home with other data sets, safety analysts could generate a more complete and accurate picture of the safety conditions in individual neighborhoods and other locations.

Combining the data in smart ways. In order to turn these new data sets into useful information, safety professionals and system owners must visualize, analyze, and interpret the results. Engineers and planners can then make evidence-based safety recommendations through storytelling, to inform decision makers, elected officials, and the public.

NEXT GENERATION DATA INSIGHTS MUST LEAD TO SAFETY PROJECT INVESTMENTS

Done right, the combination of demographic data, connected vehicle outputs, non-crash conflict data, and collision history could provide communities with a more nuanced and comprehensive look at safety needs, permanently altering how we approach safety planning and investments. If we make more accurate and precise decisions about where to target safety investments, we will be much more effective in preventing future traffic violence—and in reducing systemic inequities.
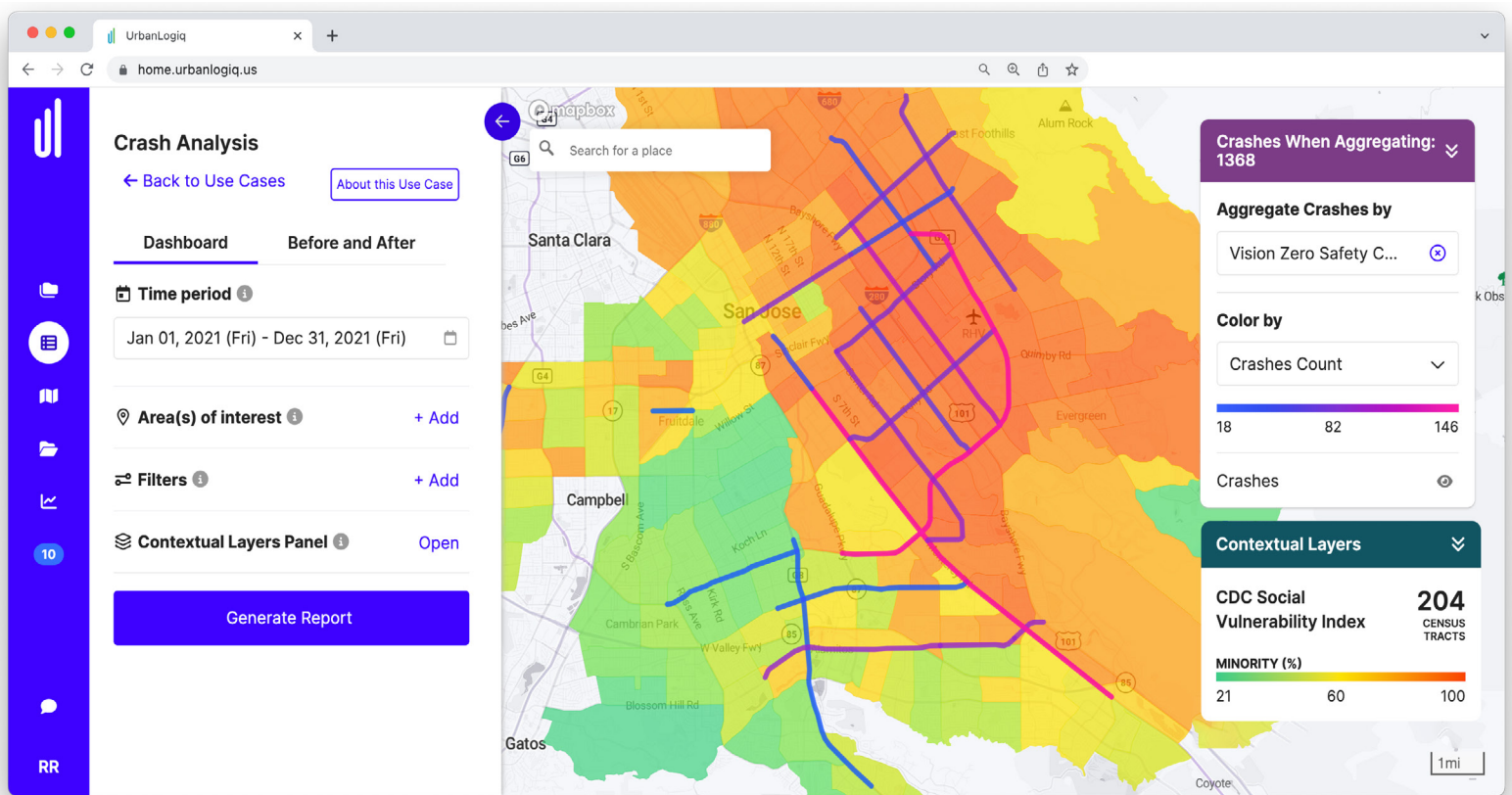
Map-based dashboards layer crash history, demographics, and other data for safety analysis (Source: UrbanLogiq)

In the United States, this emerging capability to predict safety risk and improve the effectiveness of safety projects comes at a perfect time. The 2022 Infrastructure Investment and Jobs Act (IIJA) includes unprecedented funding opportunities to save lives, including in the Safe Streets and Roads for All (SS4A) program, which offers up to $1 billion annually for local, regional, and Tribal agencies to develop safety action plans and implement transportation projects and strategies that reduce or eliminate serious injuries and deaths.

Pedestrian safety projects include pavement marking, signing, and warning devices like this Rapid Rectangular Flashing Beacon

This new approach of combining traditional and non-traditional data, smartly applied to guide investments in effective solutions at the places where they are needed most, should be on the agenda of every local, state, and federal agency tasked with transportation safety in the coming months and years. We have an opportunity to address historic inequities and achieve the ambitious long-term goal of zero roadway fatalities and serious injuries.

To Learn More Please Contact:

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