



It suggests that a 1-unit increase in the travel time index on expressways is associated with an increase of 77 crashes per 100 million VMT. (For reference, 100 million VMT is an amount of travel that occurs in about two days on the Chicago region expressway system.) Note, however, that this is just a correlation and that confounding factors are involved. For instance, the scans indicate that crashes tend to cluster near ramps, but expressway segments with higher congestion and higher volumes also tend to have more closely spaced ramps (that is, more ramps per expressway segment). Additional analysis may provide more insight on which factors influence crashes on expressways in the Chicago region.



The connection between crashes and congestion is an area of current research interest, with some researchers finding results similar to those shown here. For example, a [recent study](#) of expressways in five U.S. cities sponsored by the Strategic Highway Research Program found a "J-shaped" relationship in which crash rates were lowest at moderate traffic volumes and slightly higher at very low traffic volumes. As traffic densities increased and congestion ensued, there was a continuous increase in the crash rate. By contrast, CMAP's study did not examine crash rates when traffic volumes were very low. A [literature review](#) by Dutch researchers found mixed results, with one study finding that higher congestion resulted in higher crash rates but less severe crashes, another finding no relationship, and yet another finding that crash rates decrease at high traffic density. In one British [study](#), researchers similarly hypothesized an inverse relationship between congestion and crash rates but ultimately found that congestion had little impact on accident frequency, at least on the roadway involved in the study.

## Crash frequency on expressways versus arterials

While the crash scans focus on the expressway system, expressways in general have a much lower crash rate than roadways that are not access-controlled. The difference is mostly due to the presence of at-grade intersections on arterials, which lead to more stopping and starting and cause potential conflicts between turning vehicles. Thus, projects that encourage more traffic to use the expressway system rather than arterials generally reduce crash rates (although initiatives to shift auto trips to transit, biking, or walking would have the largest safety benefit by reducing driving altogether).

Because of higher speeds, the fraction of fatal and serious injury crashes on expressways is higher than on arterials. Even then fatal and serious injury crash rates are lower on expressways than on arterials: The rate on expressways between 2008 and 2012 was 3.2 per 100 million VMT, while on arterials it was 13.3 per 100 million VMT. The latter value is an average of crash rates on principal arterials, minor arterials, and collectors. Local roads and streets are not included (they cannot be directly compared because of changes in the availability of VMT information during the 2008-12 period). Serious injuries are any incapacitating injury that prevents the injured person from walking, driving, or normally continuing the activities the person was capable of performing before the injury occurred.



The data used to compile these crash scans originated with IDOT, which makes the data available through its [Safety Portal](#). The data are anonymized to omit all details of a crash beyond its type and location. CMAP downloaded the data in tabular form, mapped the crashes in a Geographic Information System (GIS), and then assigned the crashes to tenth-mile intervals along each expressway. The resulting dataset is available on CMAP's [Data Hub](#). CMAP intends to update the crash scans to include more recent data at a later time.

## Looking ahead

GO TO 2040 identifies public safety as a crucial goal. This includes developing a transportation system that reduces the risk of crashes. GO TO 2040 supports strategies by transportation agencies to reduce crashes through project design, enforcement, education, and other approaches. CMAP also works with partner agencies through CMAP's Advanced Technology Task Force and Regional Transportation Operations Coalition to identify, finance, and implement needed

technology and highway operational improvements to reduce the number of crashes and respond to them quickly when they do occur. In its own work, CMAP has used IDOT's identification of "[5-percent locations](#)" (locations that are the worst 5 percent on the highway network in terms of the frequency and severity of crashes) to help guide programming of highway projects. Under new federal [performance measurement requirements](#), CMAP will also need to coordinate with IDOT to track and set targets for reducing fatal and serious injury crashes on public roads in northeastern Illinois, and establish regional strategies for doing so.