



# Need help estimating reliability of CPMs, CMFs, and other safety analyses?

New Crash Prediction Models guidance now available!

User-friendly Guide designed for practitioners and researchers working in transportation and road safety analyses:

- Showcases several “scenarios” encountered by practitioners and researchers in their real-world analyses using Crash Prediction Models (CPMs) and Collision Modification Factors (CMFs) for safety estimate predictions
- Breaks down methods and procedures to quantify the impact of selecting or neglecting certain data parameters in the safety estimate predictions
- Helps to estimate, interpret, and improve the reliability of predictions and use of CMFs in various analyses

Explore real-world scenarios, methods, and procedures related to:

**Scenario 1:** Considering mismatch between CMFs and Safety Performance Function (SPF) base conditions

**Scenario 2:** Applying a CPM to predict crash frequency for design or networks screening

**Scenario 3:** Estimating CPM with a focus on the number of variables in CPM

**Scenario 4:** Using a CPM to estimate frequency of rare crash types and severities

**Scenario 5:** Predicting outside the range of independent variables

**Scenario 6:** Predicting using CPMs estimated for other facility types

## What is the definition of reliability?

The reliability of the prediction from a CPM can be described in terms of bias, variance, and repeatability:

- Bias represents the difference between the CPM estimate, i.e., the estimated average crash frequency and the true value.
- Variance describes the extent of uncertainty in the CPM estimate due to unexplained or random influences.
- Repeatability describes the extent to which multiple practitioners using the same CPM with the same training, data sources, and site of interest obtain the same results (as measured by the number of significant figures showing agreement among results).

A more reliable CPM estimate has little bias, a smaller variance, and is likely to have results that show several significant figures in agreement (should there be repeated independent applications).