



Better CMFs, safer roadways: Tips for building high-quality CMFs

Are you conducting a safety effectiveness study of a particular treatment, countermeasure, strategy or a combination of these? By developing a crash modification factor (CMF) from your research, you can provide valuable data to be used in safety, design and analysis decisions.

The better the research, the better the “real-world” result – reliable CMFs help transportation practitioners make more informed decisions. This tip sheet provides information to help ensure your CMF is high quality and free of common biases.

What does a quality CMF study look like?

Accuracy, precision and general applicability of study results are vital to creating reliable CMFs. While not every study will meet all of the “common characteristics of a high-quality CMF” listed below, you can ensure your CMF is high quality by incorporating as many as possible. Each study will have its own strengths and weaknesses. For example, one study that uses a large, diverse sample may yield a similar star rating to another that uses an EB study design but had a limited sample from only one jurisdiction.

Common characteristics of a high-quality CMF:

- the study design is statistically rigorous with reference group or randomized experiment and control
- the sample size is large and covers multiple years with a diversity of sites
- the standard error is small compared to the value of the CMF
- the study controls for all sources of known potential bias
- the data source is diverse, including states representing different geographies



“It is imperative that safety practitioners support their project decisions with solid research and quantitative data. By creating high-quality CMFs, transportation researchers can provide data that support cost/benefit analyses and inform the decisions that lead to fewer crashes and injuries occurring on our roadways.”

- **John Milton**
chair, Highway Safety
Performance Committee (ANB25)

Why is documentation important?

Documentation is critical to the decision-making process. It gives a transportation practitioner the ability to accurately assess the quality of a study and identify in which situations it is appropriate to apply a particular CMF. Documentation should include site characteristics, study methodology, sample size, data source, standard error, and the influence of biases.

For more tips on documentation, visit the CMF Clearinghouse's resources section at www.cmfclearinghouse.org/resources.cfm. "A Guide to Developing Quality Crash Modification Factors" (FHWA) and "Recommended Protocols for Developing Crash Modification Factors" (NCHRP) outline data elements that should be included in any CMF research report, highlight potential biases, and show the pros and cons of several study methods.



Looking for inspiration?

The CMF Clearinghouse collects multiple CMFs on similar countermeasures so practitioners can choose the CMF that best fits their needs – the more options available, the better. However, some countermeasures have not yet been covered well. Based on CMF Clearinghouse search history and other feedback, the following countermeasures are some of those identified as “most wanted.”

- driveway or access density near intersections
- work zone traffic control devices
- school zone related countermeasures
- pedestrian refuge areas
- sharrows (shared lane markings)
- split phasing
- signal clearance intervals
- signal head backplates

How can I share my results?

You've developed a CMF, now put it to use! By adding your study to the CMF Clearinghouse, practitioners can use it to inform their countermeasure choices.

Go to www.CMFClearinghouse.org to submit your CMF.



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