CRASH MODIFICATION FACTORS CLEARINGHOUSE

# Q&A: Participant Submitted Questions from CMF Clearinghouse Webinar, Dec. 13, 2012

**Q: DOTs are being asked to include focused enforcement as part of corridor and systemic improvements. How should behavioral change be included with infrastructure improvements that are selected based upon the use of CMFs? [Robert Peterson] [robert.peterson@dot.ca.gov] [Q: 2:15 PM]**
As indicated by the question, both focused enforcement and infrastructure improvements would be expected to improve road safety (decrease crashes). The CMF Clearinghouse contains CMFs related to infrastructure improvements but not other safety efforts, such as focused enforcement. The Clearinghouse provides links to resources on the safety effects of behavioral measures (http://www.cmfclearinghouse.org/resources_countermeasures.cfm).

**Q: For crash severity, what are the definitions for terms such as serious injury? [Arianna Valle] [arianna.valle@dot.gov] [Q: 2:27 PM]**
Due to the various definitions and ways in which study authors report their findings, there is no one-to-one comparison with a scale such as MAIS or KABCO, but the best comparison is that "Serious Injury" would generally be disabling (A) or evident (B) injuries, and "Minor Injury" would generally be possible (C) injuries. One of the frequently asked questions on the Clearinghouse addresses this topic as well (http://www.cmfclearinghouse.org/faqs.cfm#q14).

**Q: How much review can be assumed for CMFs that are presented without a star rating? [Ben Swanson] [bswanson@rsginc.com] [Q: 2:31 PM]**
CMFs in the Clearinghouse without star ratings will either have a notation of “Cannot be rated” or “Cannot be rated (HSM)”. Those CMFs with “Cannot be rated” were obtained from previous existing sources of CMFs and were based on sources which could not be rated, such as a survey of state DOTs. Due to this, these CMFs were not reviewed at all by the CMF Clearinghouse team.

CMFs with “Cannot be rated (HSM)” indicates that it appears in the first edition of the Highway Safety Manual (HSM) without an adjusted standard error. The Clearinghouse uses the adjusted standard error to provide a surrogate star quality rating for all CMFs that were imported from the HSM, so without this value, a star rating is not possible.

In short, the CMF Clearinghouse team did not review either type of non-star rated CMF. But those that appear in the HSM have more credibility due to the fact that they were deemed reliable enough by an expert panel to include in the HSM.

**Q: Why do some CMFs not have star ratings? Are they new and waiting to be reviewed?[John Wilson] [john.wilson@state.mn.us] [Q: 2:32 PM]**
Some CMFs do not have star ratings because they were either based on sources which could not be rated, such as a survey of state DOTs, or because they were obtained from the Highway Safety Manual

and were not assigned an adjusted standard error in that document. CMFs that are new and waiting to be reviewed are not made live on the Clearinghouse until they have been submitted through the entire review process and assigned a star rating.

**Q: Any recommended procedures for combining CMFs? [Christopher Underwood] [chris.underwood@dot.ny.gov] [Q: 2:34 PM]**
**Q: What is the procedure for combining CMFs for multiple improvements?[Michael Wieszchowski] [mwieszchowski@gpinet.com] [Q: 3:18 PM]**
This question has been addressed in our Frequently Asked Question page (http://www.cmfclearinghouse.org/faqs.cfm). The answer that appears there is as follows:

If multiple countermeasures are implemented at one location, then common practice is to multiply the CMFs to estimate the combined effect of the countermeasures. In fact, there is limited research documenting the combined effect of multiple countermeasures. Although implementing several countermeasures might be more effective than just one, it is unlikely the full effect of each countermeasure would be realized when they are implemented concurrently, particularly if the countermeasures are targeting the same crash type.

For example, shoulder rumble strips and enhanced edgeline retroreflectivity would both target roadway departure crashes, so the CMFs for these treatments would be highly related. Other examples of related CMFs would be the use of increased lighting and installation of pavement reflectors, both of which would target nighttime crashes; and chevrons and advanced curve warning signs, both of which would target curve-related crashes.

Countermeasures that would be considered independent are those that target different crash types. For example, the installation of a pedestrian signal would be relatively independent of the installation of a left turn phase at an adjacent intersection, since the one addresses pedestrian-vehicle crashes while the other addresses left-turn opposite-direction crashes. Likewise, the conversion of a left turn phase from permissive to protected along with the installation of an exclusive right turn lane would be fairly independent in that they target different crash types.

Therefore, unless the countermeasures act completely independently, multiplying several CMFs is likely to overestimate the combined effect. The likelihood of overestimation increases with the number of CMFs that are multiplied. Therefore, much caution and engineering judgment should be exercised especially when estimating the combined effect of more than three countermeasures at a given location.

These questions will also be addressed by the upcoming NCHRP Project 17-63, “Guidance for the Development and Application of Crash Modification Factors”.

**Q: Some of the research study reports cannot be accessed and are only available for purchase. Not all agencies have budget to purchase the reports. What are others doing to access the study reports? [RICHARD WEEKS] [rweeks@azdot.gov] [Q: 2:37 PM]**
The CMF Clearinghouse team does not have specific knowledge about how the user community is accessing full study reports when they are not freely available online. Full study reports may be available

through FHWA, State DOT or local university research libraries. Users might also contact the study author directly.

**Q: Is there a minimum star rating that is recommended to use as a "quality" CMF? [Howard Lubliner] [howardl@ksdot.org] [Q: 2:57 PM]**
The CMF Clearinghouse does not provide a recommendation for a minimum star rating when an agency is selecting a CMF. We do encourage caution when using CMFs that have one or two stars, since these CMFs may have certain biases that would affect the accuracy of the estimate. CMFs with five stars would be considered very reliable, but may need further inspection to make sure that they fit the particular scenario you are working with.

**Q: What if I had to compare a HAWK signal as opposed to a pedestrian bridge? (In terms of safety, of course) [Ioannis Maris] [yiannismaris@gmail.com] [Q: 3:06 PM]**
If you are comparing two alternatives for a pedestrian crossing, a HAWK signal (pedestrian hybrid beacon) and a pedestrian bridge, you would first need to identify a CMF for each countermeasure. You would then apply that CMF to an estimate of the crashes that would be expected at the site, based on either past crash history or a predictive method such as presented in the Highway Safety Manual Part C. This would indicate how many crashes you would expect to prevent with each alternative. You could then conduct a benefit-cost analysis, using those crash savings estimates as the benefit and the construction and maintenance costs of each alternative as the cost.

As of December 2012, there are three star-rated CMFs for the HAWK signal (search “HAWK”). There are no star-rated CMFs for a pedestrian bridge, but there are several non-star rated CMFs for that countermeasure (search “Install pedestrian overpass/underpass” as the countermeasure name). For the pedestrian bridge, you might consider using the non-star rated CMFs if you deem them appropriate for your local area.

**Q: There's a good FHWA study (2012) about j-turn (RCUT) intersections with crash reduction info at the following website:**
**http://www.fhwa.dot.gov/publications/research/safety/hsis/11067/index.cfm[William Stein] [william.stein@dot.gov] [Q: 3:08 PM]**
Thank you for the suggestion. We have actually identified this study already and it is undergoing our review process.

**Q: Do CMFs multiply directly against crash counts, or against crash rates (per VMT)? [John Wilson] [john.wilson@state.mn.us] [Q: 3:16 PM]**
CMFs are most commonly multiplied against crash frequencies (i.e., crashes per year for intersections or crashes per mile per year for segments). The complication with multiplying against crash rates is that you would have to assume that the traffic volume component of the rate will stay the same throughout the period of analysis, which may not be accurate.

**Q: Is there any update on the SPF Clearinghouse? [Clayton Rudy] [crudy@ourston.com] [Q: 3:18 PM]**
A detailed resource assessment for an SPF Clearinghouse is currently underway.