
Frank Gross

SCOHTS/SM Joint Meeting

April 2017
Objectives

1. Assess existing HSM inclusion criteria
2. Develop proposed revisions to inclusion / exclusion criteria
3. Apply revised criteria and develop a list of CMFs for HSM 2\textsuperscript{nd} edition
Project Team

- UNC Highway Safety Research Center
  - Raghavan Srinivasan (PI), Daniel Carter (Co-PI), and Sarah Smith

- VHB
  - Frank Gross, Scott Himes, RJ Porter, and Thanh Le

- Persaud & Lyon
  - Bhagwant Persaud and Craig Lyon

- Kittelson and Associates
  - James Bonneson and Erin Ferguson
Approach

• Phase 1 (complete)
  ✓ Task 1: Review inclusion criteria for CMFs
  ✓ Task 2: Review CMF Clearinghouse star rating system
  ✓ Task 3: Determine user preferences and practices
  ✓ Task 4: Develop recommendations for how CMFs may be incorporated in the HSM
  ✓ Task 5: Interim report
  ✓ Task 6: Interim meeting
Approach

• Phase 2 (underway)
  – Task 7: Review existing CMFs
  – Task 8: Assemble CMFs for HSM 2nd edition
  – Task 9: Conduct CMF gap analysis
  – Task 10: Develop guidance for practitioner use
  – Task 11: Develop standalone document describing inclusion criteria
  – Task 12: Develop final report and other documents
User Preferences and Practices

PHASE 1 HIGHLIGHTS
Selecting and Applying CMFs

• What kind of CMFs do you use?
  – Use aggregate (total) AND disaggregate CMFs (specific to crash type or severity)

• What crash value do you apply the CMF to?
  – Most users (60%) applied CMF to historical crash data
CMF Quality

• Do you use information on CMF quality?
  – Majority (75%) said always or most of the time

• How do you use information on CMF quality?
  – For prioritizing CMFs (62%)
  – As a minimum threshold (21%)

• Focus group: no one used HSM adjusted standard error as indication of quality
  – Some do not understand it
AASHTO Recommendation

• AASHTO Steering Committee for the HSM
  – No CMFs in Part D
  – CMFs included in CMF Clearinghouse with HSM stamp of approval
  – Periodic report of selected CMFs as PDF
    • Details to be determined
CMFs in HSM 2nd Edition

• What guidance on CMFs should be presented in the HSM 2nd edition?
  – Guidance on applying CMFs (almost 100%)
  – Guidance on developing CMFs in research studies (50%)
HSM Stamp of Approval Method

PHASE 1 HIGHLIGHTS
HSM Stamp of Approval Method

• Inclusion/exclusion criteria:
  – Must be crash-based
  – Must specifically report CMF or CMFunction
  – Must include 1 or more CMFs with 4+ stars
  – Exclude simple before-after studies
  – Exclude non-regression, cross-sectional studies
  – Combined CMFs should pass homogeneity test

Applied for supplemental funding
HSM Stamp of Approval Method

150-point Scoring Process

• Data
  – 55 points

• Confounding and Appropriateness of Statistical Analysis
  – 75 points

• Statistical Significance
  – 20 points
Part D Guidance

PHASE 2 HIGHLIGHTS
Part D Outline

1. Introduction
2. Selecting CMFs
3. Applying CMFs
4. Developing CMFs

Target Audience
Practitioners **AND** Researchers
Chapter 1: Introduction

• Purpose of Part D
• Relationship to:
  – Safety Mgmt. Process
  – Proj. Dev. Process
• Relationship to Parts A, B, and C of HSM
• Guide to Applying Part D
Chapter 2: Selecting CMFs

- Introduction
- Identifying the Most Appropriate CMF
- Searching for CMFs
- Developing a CMF List
- CMF Selection Example
Chapter 3: Applying CMFs

• Introduction
• Estimate Baseline Crashes
  – Observed, Predicted, Expected
• Apply CMF to Baseline Crashes
  – Single vs. Multiple CMFs
  – Adjusting CMFs (crash type/severity, local)
• Estimate Confidence Interval
• Using Results
Chapter 4: Developing CMFs

- Fundamentals of CMF Development
- Relevant Statistical Concepts and Terms
- Study Designs and Analysis Approaches
- Alternative Approaches to Developing CMFs
- CMF Reporting
- Developing CMFunctions
- Resources
Review Existing CMFs

PHASE 2 HIGHLIGHTS
Review Existing CMFs

- **Identification**
  - CMF Clearinghouse
  - CMFs from 1st edition of HSM
  - CMFs published between 2008 and 2010
  - CMFs from state lists or panel members

- **Evaluation**
  - Use inclusion/rating process from Phase 1
Conduct CMF Gap Analysis

PHASE 2 HIGHLIGHTS
Conduct CMF Gap Analysis

• Gaps in Quality
  – CMFs exist, but do not meet inclusion criteria

• Gaps in Applicability
  – CMFs do not exist for specific conditions (e.g., crash severity or facility type) for a given countermeasure
## Conduct CMF Gap Analysis

<table>
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<tr>
<th>Category</th>
<th>Countermeasure</th>
<th>Facility Type</th>
<th>Rural, Two-Lane</th>
<th>Rural, Multilane</th>
<th>Urban/Suburban</th>
<th>Freeways</th>
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</tr>
</tbody>
</table>

● = No gap (high-quality CMF available)  
○ = Gap in quality (CMF available, but does not meet inclusion criteria)  
Blank = Gap (no CMF available)
Questions

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