

The following Implementation Memo is supplemental to *NCHRP Research Report 1069: Estimating Effectiveness of Safety Treatments in the Absence of Crash Data: A Guide* (NCHRP Project 17-86, “Estimating Effectiveness of Safety Treatments in the Absence of Crash Data”). The full report can be found by searching for the report title on the National Academies Press website (nap.nationalacademies.org).

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**Implementation Memo for NCHRP Project 17-86 Research
Findings and Products**

R.J. Porter, Kristin Kersavage, Michael Dunn, and Frank Gross

VHB

Raleigh, NC

Research Results

The purpose of this memorandum is to describe the critical steps, action items, and champions to implement the NCHRP 17-86 research results in practice. The sections of this memorandum include:

- Research products.
- Discussion of applicability to improving practice.
- General implementation plan.

Research Products

Two primary products resulted from this research:

- A procedural guide that includes nine primary chapters:
 1. Introduction
 2. Vision for Surrogate Use in Practice
 3. Surrogate Measure Definitions
 4. Types of Data Collection Technologies for Surrogate Measurement
 5. Study Design and Statistical Analysis Considerations
 6. Types of Treatments for Evaluation with Surrogate Measures
 7. Case Studies
 8. Summary and Recommendations for Future Work
 9. References
- A final report that includes seven primary chapters:
 1. Introduction
 2. Review of Literature
 3. Types of Data Collection Technologies for Surrogate Measurement
 4. Identify Safety Treatments with No or Low-Rated Crash Modification Factors (CMFs)
 5. Case Studies
 6. Procedural Guide Development
 7. Summary

Applicability to Improving Current Practice

The 17-86 products are intended to guide safety practitioners and researchers in using alternative, or surrogate, measures of safety for developing CMFs and other quantifiable measures of safety performance in the absence of crash data. This will improve current practice by increasing the set of tools available to practitioners, particularly in situations where crash-based methods are limited or unavailable.

The procedural guide establishes a vision for using surrogate safety measures in practice, and provides information on a range of surrogate measures, data collection methods, and study design principles. It is intended to inform treatment evaluations, the results of which could inform decision-making during the project planning and development process, as well as other road safety management activities.

Implementation Plan

Target Audiences for the Products

Target audiences for the products include safety researchers, state departments of transportation (DOTs), Federal Highway Administration (FHWA) program leads and technical subject matter experts in safety and operations, local agencies, and other safety practitioners wishing to consider alternative measures of safety to evaluate safety treatments and inform planning, design, and operational decisions.

Institutions and Individuals Who Might Take Leadership in Applying the Products

Multiple agencies can assume leadership in implementation, including state DOTs individually and through the American Association of State Highway and Transportation Officials (AASHTO), FHWA, and private groups that promote safety (e.g., AAA Foundation for Traffic Safety and Institute of Transportation Engineers). AASHTO and Transportation Research Board (TRB) committees can also provide leadership for the dissemination of the research results. AASHTO facilitates the implementation of research results through updates to their policies, guides, and manuals (e.g., the AASHTO Highway Safety Manual). There is likely substantial interest and potential to integrate the results of this project into a future edition (likely, the third edition) of the HSM. FHWA currently hosts the CMF Clearinghouse. One potential future direction described in the NCHRP 17-86 products is the establishment of a strategic research program, which could potentially be advanced by AASHTO (through NCHRP), FHWA, or through another pooled-fund program. This strategic research program could include work to develop a “star” or “point-rating” system for surrogate evaluations and surrogate-crash linkages much like what the safety community has for CMFs on the FHWA CMF Clearinghouse. The rating system could have similar criteria to that of the crash-based CMF rating system, such as use of appropriate analysis methods and sufficient data, but it could use additional criteria specific to surrogates, such as a logical link to crashes and the applicability of the surrogate to real-world contexts.

Potential Impediments to Implementation and Opportunities to Overcome Challenges

Practitioners will need to choose to accept and implement the research products. The following are potential impediments to acceptance and implementation of the products as well as opportunities to overcome the impediments.

- **Confidence in results:** Practitioners will hesitate to implement the procedures and results that come from alternative measures of safety if they are not confident in the research. The Project Team sought to conduct and document the research and develop guidance in a way that maximizes the potential for acceptance by focusing on information that is defensible and useful to practitioners. This includes providing transparent documentation of strengths and limitations of different alternative measures, data sources, analysis methods, and future needs. Even at the conclusion of NCHRP 17-86, there remains a significant number of research needs related to the use of surrogate measures of safety. It is important to note that a significant amount of targeted research dollars over the course of two decades or more has led to improved knowledge of how to design and execute a crash-based evaluation. This has led the profession to a point where state and local practitioners are regularly using the results of crash-based evaluations to inform decisions

about their safety programs. The same evolution of knowledge will be needed for surrogate measures of safety.

- **Awareness of guidance:** Practitioners need to be aware of the research products to implement them. To overcome awareness issues, members of the Project Team and panel can deliver presentations to key stakeholders (see next section) and assist in guiding the dissemination of results. Members of the project have already delivered this type of presentation at the North Carolina DOT Research & Innovation Summit.
- **Usability of the products:** The products must be useable for practitioners to employ them on a regular basis. To overcome usability issues, the Project Team applied expertise in developing applications-oriented material with clear figures that demonstrate key definitions and concepts and with brief case studies highlighting different applications. The stand-alone procedural guidance plays a key role in preparing agencies to maximize use of the project findings.
- **Demonstrated value:** Practitioners may be hesitant to implement the products if they do not clearly see a return on their time investment for using the procedural guidance. The guide clearly identifies the primary value to practitioners, which is to support treatment evaluations when crash-based methods are limited or unavailable. To help agencies further understand the value of the methods, the guide incorporates examples and case studies.
- **Limitations of products:** The usefulness of the products could decrease over time as agencies gain more experience with alternative measures of safety and seek to address any limitations in the methods that were identified during this project. To overcome limitations of the products, there will be a need to regularly identify and communicate additional research and funding needs to potential sponsor agencies.

Future Activities Necessary for Successful Implementation

The results will be disseminated as an NCHRP report and standalone guidance document. The Project Team will look for opportunities to deliver or coordinate with a project champion to deliver presentations to key stakeholder groups such as:

- AASHTO: Standing Committee on Safety (formerly Standing Committee on Highway Traffic Safety) and the HSM Steering Committee.
- TRB: ACS10 (Transportation Safety Management), ACS20 (Safety Performance and Analysis), ACS20(3) (Surrogate Safety Measures Subcommittee), AKD10 (Performance Effects of Geometric Design).

Potential venues to deliver the presentations include AASHTO meetings, individual TRB committee and subcommittee meetings, and the ITE Annual Meeting or Technical Conference. TRB, FHWA Office of Safety, the CMF Clearinghouse, and other organizations offer safety-related webinars to enhance practitioner knowledge. The panel could look for opportunities to offer updates in those forums. Other outreach activities may include electronic media (e.g., TRB e-newsletter or AASHTO Journal), print media (e.g., ITE Journal, FHWA's Public Roads, TR News), and transportation-related websites.

Criteria for Judging Progress and Consequences of Implementation

The primary criterion for judging progress in implementation of the results will be the extent to which State and local agencies are using the products to implement quantitative approaches to safety management supported by knowledge and tools developed with alternative measures of safety. The practice is still at its early stages of development. Surrogate measures of safety are a thriving area of research, but they have not yet routinely made their way into practical procedures for conducting data-driven safety analysis. This criterion may be difficult to measure, but interviews could be conducted to determine awareness and use of the research products.

Other measures related to dissemination can serve as a surrogate, including the number of related outreach activities (e.g., number of presentations delivered, or number of articles published), the number of online products and reports distributed or downloaded, and the number of citations of the final research report.

Recommendations for Additional Work Necessary to Reach Implementation Stages

One primary means for reaching the intended audience will be through the HSM. The previously listed outreach activities to the AASHTO and TRB committees and subcommittees will be key (see Future Activities Necessary for Successful Implementation).

NCHRP project 20-44, Accelerating the Application of NCHRP Research Results, focuses on improved methods of delivering research findings and promoting their use. This is a potential funding source for other dissemination and implementation opportunities that arise.