

Guide for Research Resulting in Practical Application of the Highway Safety Manual.

The main objective of this document is to foster improved research consistency and reproducibility that leads to a more practical application of highway safety research results. This document should guide the development, review, and scope creation of NCHRP research problem statements. The following guidelines are recommended for all researchers:

- **Compatibility with existing research.** New research should produce outcomes which (A) are consistent and compatible with existing research products or (B) clearly define divergences from existing research, explain their purpose and relative value, and provide guidance for practitioners and future researchers to reconcile differences and harmonize relevant applications and approaches. Reasons for divergences from existing research should be reviewed by practitioners and may include correcting erroneous methods, updating methods in response to changes in technology, or evolving methods to better serve the goals of practitioners. Researchers should *document* how the scope of developed models relates to existing models and provide guidance on how practitioners should select between new and existing models where their scopes overlap.
 - Prioritize consistency with previous HSM research related to crash-type definitions and grouping of crash severities.
 - Prioritize consistency with previous HSM research regarding model creation.
- **Model scope, sensitivity testing and edge cases.** Relevant analysis models developed under new research should include thorough *documentation* of the full scope of their application and sensitivity analysis of the models within this scope. New research should provide *documentation* for the impacts of use cases outside the scope of the models, assess common edge cases, and provide quantitative metrics for the precision and significance of the models.
- **Tools for performing calculations.** Spreadsheet, web-based, and other types of tools developed for practitioners to use will support implementation. Tools developed by a research effort should meet the functional needs of state DOT and other practitioners. These include accessibility as it relates to format (spreadsheet vs. web), delivery method (file sharing site, download from website, etc.), and other factors; ability of an agency to customize the tool (calibration, report function); and level of effort needed to use.
- **Availability of collected data.** Data collected and archived during the project should be delivered to NCHRP prior to the end of the project and should be accessible to future users to the extent practical and appropriate, following a data archiving and sharing plan developed by the researcher in accordance with National Academies policy regarding data use by others and approved by the panel.
 - Researchers who use proprietary data that cannot be readily shared should describe how the initial data set was obtained in the research documentation. This information should include the source and parameters of the provided data.

- **Pilot testing of models and tools.** When relevant, analysis models developed under new research should be pilot tested by a geographically diverse working group of practitioners who reflect the target audience of the models prior to finalizing the research. Pilot testing should cover diverse test cases and help to refine the models and related developed tools, produce examples and case studies to supplement documentation, and ensure that developed models are practical to apply (e.g., accessible, understandable, not overly burdensome data requirements). When relevant, pilot tests should include comparisons between new and existing models when applied to the same or similar facilities.
- **Frequently asked questions.** New research should produce supplemental documentation for practitioners in the form of frequently asked questions which address anticipated technical questions. Questions should be general and reflect common use cases, and answers should be thorough but concise, avoiding technical jargon.
- **Implementation planning.** NCHRP guidance on [active implementation](#) should be referenced when conceptualizing and developing implementation plans. Plans for implementing research results should consider strategies both prior to and after completion of the research. Plans should involve direct engagement with stakeholders and practitioners prior to publication of results to increase awareness of research products and applications, build credibility, and provide opportunities for feedback while the research is still ongoing. Plans for implementing final research results should:
 - Present strategies and activities appropriate for the objectives of the research.
 - Present research results in a summarized and concise format for implementation by practitioners.
 - Be directly relevant to the type of research products and the intended users of the research products.
 - Consider and accommodate potential implementation barriers and facilitators.
- **Liability-neutral language.** Documentation of research results, including text used in reports, guidelines, tools, case studies, or other products, should use [liability-neutral language](#).