

HSIS STUDENT RESEARCH PAPER COMPETITION
EXCELLENCE IN HIGHWAY SAFETY DATA AWARD
SECOND PLACE

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**“Quantifying Causal Safety Benefit of Median Separation on
Rural Highways”**



ITE—A Community of Transportation Professionals is pleased to recognize **Philip F. Balyagati**, with **Abdul S. Ngereza, Tumaini A. Sakaza, Faraji A. Rajabu, Caroline S. Bikuba, and Esther Bukuru**, as the second-place recipients of the [2026 HSIS Excellence in Highway Safety Data Award Student Research Paper Competition](#) for their paper, “Quantifying Causal Safety Benefit of Median Separation on Rural Highways.”

The Federal Highway Administration’s Highway Safety Information System (HSIS) Student Research Paper Competition encourages university students to use HSIS data to introduce future highway safety professionals to quality safety data, appropriate research methods, and the practice of using data to support transportation safety decisions.

The award-winning paper examines the safety benefits of median separation on rural highways, one of the most widely used countermeasures for reducing roadway-departure, head-on, opposite-direction, and cross-median crashes. Using Ohio HSIS data from 2021 to 2023, the research applies propensity score matching with doubly robust negative binomial regression to estimate the causal effect of converting undivided rural highway segments to divided segments.

The study analyzed 73,322 rural, non-freeway state-maintained roadway segments, including 5,427 divided segments and 67,895 undivided segments. Crashes were aggregated at the segment level and evaluated across four outcomes: total crashes, any-injury crashes, fatal-and-serious-injury crashes, and fatal crashes.

The findings show that median separation is associated with meaningful and statistically significant crash reductions across all severity categories. The estimated average treatment effect on treated segments corresponded to a 15.1 percent reduction in total crashes, a 25.7 percent reduction in any-injury crashes, a 22.4 percent reduction in fatal-and-serious-injury crashes, and a 33.8 percent reduction in fatal crashes.

A key contribution of the paper is its severity-stratified analysis, which demonstrates that the safety benefits of median separation become more pronounced as crash severity increases. This finding provides practitioners with more refined information for benefit-cost analyses and rural-corridor investment decisions, complementing crash modification factors already used in safety planning.

The research recommends that state agencies prioritize median treatments on high-speed, high-volume rural corridors and integrate severity-specific rate ratios alongside existing crash modification factors. The authors also identify opportunities for future work, including sensitivity analysis, difference-in-differences after matching, and crash-type disaggregation.

ITE congratulates Philip F. Balyagati and his co-authors on this outstanding achievement and celebrates their contribution to advancing highway safety research, causal inference methods, and data-driven decision-making.

You can read about Fazalay's research in an upcoming issue of *ITE Journal*. Learn more about [ITE's Awards Program](#).