

**Accepted for publication by TRB.**

**Title:**

Iowa's Experience with "Road Diet" Measures: Impacts on Crash Frequencies and Crash Rates Assessed Following a Bayesian Approach

**Authors:**

Michael D. Pawlovich, Ph.D., P.E. (Michael.Pawlovich@dot.iowa.gov)  
Iowa Department of Transportation

Wen Li, M.S. (shirley@iastate.edu)  
Iowa State University, Department of Statistics

Alicia Carriquiry, Ph.D. (alicia@iastate.edu)  
Iowa State University, Department of Statistics

Tom Welch, P.E. (Tom.Welch@dot.iowa.gov)  
Iowa Department of Transportation

**Abstract:**

A Bayesian data analysis to assess the reduction in crash history due to "road diets" in Iowa was conducted by the Iowa State University Department of Statistics in cooperation with Iowa Department of Transportation Office of Traffic and Safety (TAS). The study utilized monthly crash data and estimated volumes obtained from TAS for 30 sites, 15 treatments and 15 controls, over 23 years (1982-2004). The sites had volumes ranging from 2,030 to 15,350 during that time span and were largely located in smaller urbanized areas.

The main research objective was to assess whether "road diets" appear to result in crash reductions on Iowa roads. To meet the objective we analyzed crash data at each site before and after the conversions were completed. Given the random and rare nature of crash events, we fitted a hierarchical Poisson model to crashes, where the log mean was expressed as a piece-wise linear function of time period, seasonal effects, and a random effect corresponding to each site. Estimation of model parameters was conducted within a Bayesian framework. Results indicate a 25.2% reduction in crash

frequency per mile and an 18.8% reduction in crash rate. This differs from a previous, much publicized study which reported a 6% reduction in crash frequency per mile and an insignificant indication for crash rate effects. The results from the Iowa study fit practitioner experience and agree with another Iowa study utilizing a simple before/after approach on the same sites.