

### Using a Classification Tree to Associate Risk Factors with Farm Injury

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**Abstract:** Agriculture is considered a dangerous occupation, especially when more and more machines are being used. Therefore, it is important to associate risk factors with agriculture-related injuries, which can help to make policies that will help to prevent future injuries. Some previous research (Lyman, et. al.) used a multiple logistic regression model for this purpose. However, it is difficult to incorporate proper interaction in the logistic regression model.

In this paper the authors apply a classification tree to associate risk factors with farm injuries which will automatically handle any possible interactions. Based on a classification tree, it is also possible to develop different prevention programs for various subgroups given by the tree. We used a data set of 1,051 subjects from Alabama and Mississippi, USA, including African-American farm workers and Caucasian and African-American owners. Condition of farm machinery (Excellent/Good vs. Fair/Poor) first splits the tree. For fair/poor condition of farm machinery, large farms (749 or more acres) give high injury rates (0.28), while for farms with fewer than 749 acres, the estimated injury rate is 0.16 without farm safety training and it is reduced to 0.063 with farm safety training. For excellent/good condition of farm machinery, history of farm injury then splits the tree.

Factors that further split the tree include “How Often In A Hurry When Doing Farm Work”, education, primary commodity, wearing seat belt on machinery, race, alcohol consumed per week and farm safety training. Furthermore, classification trees are developed separately for Caucasian and African-American. The graphic displays of the tree are provided.