

# **A NASS/CDS database analyses to understand abdomen injuries in motor vehicle accidents**

Rakshit Ramachandra<sup>1</sup>, Ann Mallory<sup>2</sup>, Jason Stammen<sup>3</sup>, Kevin Morehouse<sup>3</sup>, John Bolte IV<sup>1</sup>

<sup>1</sup>Ohio State University, Columbus, OH

<sup>2</sup>Transportation Research Center Inc., East Liberty, OH

<sup>3</sup>NHTSA Vehicle Research and Test Center

## **Abstract**

*Data available on abdominal injuries, which resulted from motor vehicle accidents involving newer vehicle models, is very limited. A report by Klinich et. al (2008) included a review of the biomechanical and epidemiological literature on abdominal injury due to motor-vehicle accidents. The report also included a NASS database analysis of crashes that occurred between 1998 and 2004. However, there have not been further analyses completed since this report to see if trends in abdominal injury have changed. To address this need, analysis of the NASS database was performed to identify the changes in frequencies and patterns of abdomen injuries in later years (2005-2009). The study also focused on identifying the crash and restraint factors associated with these injuries in frontal and side crashes of modern day vehicles.*

*SAS programing was used to perform searches in the NASS/CDS database. The NASS/CDS analysis was occupant-based and focused on evaluating the risk of abdominal injuries using data on occupants with and without abdominal injuries. The NASS/CDS analysis showed a high belt usage of around 80%. Preliminary results showed that the risk of abdomen injury is more than 3 times higher for unbelted occupants as compared to belted occupants in frontal crashes. The risk of abdominal injuries is also lowered with use of seat belt in side crashes. The effect of airbag is not considered for this study since previous reports have shown that airbag deployment in frontal crashes does not substantially affect the risk of abdominal injury. The study also looked into injury by abdominal organs - liver, spleen, kidney, and hollow organs. Since abdominal injuries cannot be completely isolated from thoracic injuries due to the location of some of the organs being posterior to the ribs, the fractures to the ribs in occupants with abdominal injuries was also studied.*