

OHIO EMS INJURY PREVENTION RESEARCH GRANT

2009 – 2011 RESEARCH PROJECT

FINAL PROJECT REPORT

(April 2011)

PROJECT NAME: The Effect of Driving Simulator on Motor Vehicle Safety in Adolescents

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Introduction

The use of a simulation-driving program for newly licensed youth is one of the practical strategies that could improve driving safety in this population. Virtual simulators have been mandated by several industries prior to actual “real time” training to model superior performance. This technology is conspicuously absent in automobile driving training as a tool that can be utilized to improve driver safety. The Injury Prevention Center (IPC) possesses the “Virtual Driver Interactive® driving simulator with its accompanying Street Ready Software. This is a comprehensive simulation program that provides several features to achieve desired goals (explain or elaborate) in driving simulation training particularly in an adolescent population.

Thirty-five high school students who have been driving for less than one year were recruited only from Beavercreek High School in Greene Country, Ohio. Students meeting this criterion of having their license for less than one year were selected randomly from completed surveys by students who wish to participate. Seventeen of those selected were engaged in the simulator training (“Simulator Group”) and the other eighteen were not (“Control Group”).

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Executive Summary

Background - Motor Vehicle crashes (MVCs) are a major cause of morbidity and mortality in the United States, accounting for over 40,000 deaths and greater than 2.5 million injuries annually. Several initiatives over the last three decades have greatly improved driving safety in the United States. These include increased enforcement, better-designed roads and highways and improved safety features in cars.

Young adults however, are recognized as a high-risk population with regard to motor safety and are disproportionately represented in fatal crashes. Inexperience, risky driving practices, distractibility and the propensity to engage in irresponsible behavior are believed to be some of the contributing factors. Driver's insurance rates for individuals below 25 reflect the risk this age group present.

Study Objective – Given the success of virtual simulator training in other fields and coupled with constant refinements in technology, we hypothesize those adolescents who undergo a comprehensive 5 ½ hour driving simulation module will have fewer adverse traffic incidents than those who do not. Our hypothesis is that those with simulator training will become more proactive rather than reactive drivers, and will have benefited from the virtual training having less traffic incidents than those who do not.

Methodology – Thirty-five high school students who had been driving for less than one year were recruited from Beavercreek High School. The students were randomized equally to a “Simulator Group” and “Control Group” The individuals in the Simulator

Group will be subjected to 5 ½ hours of simulation training (minimum) on the Virtual Driver Interactive® driving simulator. This will consist of different modules over 3-4 sessions. Modules include lessons on managing intersection, getting ready to drive, managing curves and hills, and many more.

Following completion of the sessions, the driving records of the individuals in both groups will be followed for a one-year period at three-month intervals. The driving records are in the public domain and are obtained from the State of Ohio's Bureau of Motor Vehicles. Comparison will be made between the two groups seeking to identify any differences in the incidence of car crashes and traffic offences between those with the additional training and those without.

Major Conclusions – The Simulator group took more time than the 5 ½ hour minimum that was required to complete the Virtual Simulator sessions. The simulator group had to correct issues they had developed since acquiring their driver's license. These issues included but not limited to included speeding, rolling through stop signs, not reacting to dangerous situations, and understanding basic driving laws. Starting in June of 2011 the driving records of both "Simulator Group" and "Control Group" will be pulled every three months for up to a year. Many members of the "Simulator Group" learned existing driver practices and new methods to becoming a defensive driver.

Investigators and Project Personnel – Information/ Qualifications

Principal Investigator - Dr. Akpofure Peter Ekeh, MD, MPH, FACS - Dr. Ekeh has served as medical director for the Injury Prevention Center at Miami Valley Hospital since 2002. He is an Associate Professor of Surgery at Wright State University Boonshoft School of Medicine and a Trauma Surgeon at Miami Valley Hospital. Dr. Ekeh received his Doctor of Medicine degree from the University of Ibadan in Nigeria in 1991. He completed his residency in General Surgery at the Brooklyn Hospital Center, Brooklyn, New York and fellowships in Surgical Critical Care and Trauma at the University of Miami, Florida.

Project Research Manager – Kyle Herman, MBA – Kyle Herman has served as the manager of Injury Prevention Center of Greater Dayton at Miami Valley Hospital since 2010. He received his bachelor degree and master’s degree from Ashford University in Clinton, Iowa in 2009 and 2011. He has experience in data analysis in research projects.

Research Assistant – Dustin Bayham, BA – Dustin Bayham has been employed with the Injury Prevention Center since 2010 through the Wright State University Department of Surgery. He received his bachelor degree in Psychology and is currently pursuing a Masters of Science degree in Clinical Mental Health Counseling from Wright State University. He is anticipating Ohio Licensure in professional counseling in 2013.

Literature Review

Motor Vehicle crashes (MVCs) are a major cause of morbidity and mortality in the United States, accounting for over 40,000 deaths and greater than 2.5 million injuries annually. Several initiatives over the last three decades have greatly improved driving safety in the United States. These include increased enforcement, better-designed roads and highways and improved safety features in cars.

Young adults however, are recognized as a high-risk population with regard to motor safety and are disproportionately represented in fatal crashes. Inexperience, risky driving practices, distractibility and the propensity to engage in irresponsible behavior are believed to be some of the contributing factors. Driver's insurance rates for individuals below 25 reflect the risk this age group present.

The use of simulation in driving is a practical strategy that has been suggested to improve driving safety particularly in this population. Virtual simulators have been extensively used in the aviation industry, the military and in training police officers and fire fighters to enhance superior performance. This technology is a new frontier that can be potentially utilized to improve driver safety.

Several driving simulators using varying forms of state of the art technology are currently available. They range from simple Virtual reality programs to complex multi-million dollar multi-sensor complex outfits. The Injury Prevention Center of Dayton currently possesses the Virtual Driver Interactive® driving simulator with its accompanying Street Ready Software®. This is a comprehensive simulation program that provides several features to achieve desired goals in driving simulation training particularly in an adolescent population.

Historical Perspective

As indicated above, adolescents are the most inexperienced group of drivers utilizing our public roadways. To date, limited research has been conducted on the use of simulators in the adolescent population at the early stages of driving. The widespread application of this technology to this group could potentially result in a significant reduction in morbidity and mortality in this group. Parents and EMS personnel alike share a common interest in seeing the morbidity and mortality decrease in adolescent age group throughout all communities. The IPC intends to study the effect of driving simulators on teens with regard to their future driving safety. If our hypothesis is correct, the hope is that this research be published and disseminated to insurers and driving schools as incentive to provide this additional training option to student drivers.

Current Status in Ohio

To date, limited research has been conducted on the use of simulators in the adolescent population at the early stages of driving. The widespread application of this technology to this group could potentially result in a significant reduction in morbidity and mortality in this group.

Financial Considerations

The project, in total, cost \$54,410. The major expense was the Driving Simulator (\$27,000) and space rental to conduct the study (\$11,000). A total of \$38,000 in expenses had been given in kind through additional fundraising and donations. Additional expenses, totaling \$16,410 include a part-time worker to operate the simulator, brochure creation, BMV record allocations, incentives to participants, and travel of the simulator.

Conclusion

Participants that completed the “Simulator Group” corrected bad driving habits and learned new defensive driving techniques to become a safer driver. The required simulator time has been completed and starting in June 2011, the “Simulator Group” and “Control Group” will have their BMV driving records pulled. The data will then be put into graphs and spreadsheets including, speeding +10 mph, +15mph, +25mph, reckless operation, and DUI charges. This research project focused on the adolescent population who are known as “inexperienced” drivers.

References

1. National Highway Transportation and Safety Administration: Motor Vehicle Crash Fatality Counts and Estimates of People Injured in 2005. DOT HS 810 639, 2006
2. National Highway Traffic Safety Administration. *Traffic safety facts 2005*. Washington, DC: National Center for Statistics and Analysis, National Highway Traffic Safety Administration. United States Department of Transportation, February 2006.
3. Ferguson SA: Other high-risk factors for young drivers—how graduated licensing does, doesn't, or could address them. *J Safety Res.* 2003;34:71-7
4. Williams, A.F. Teenage drivers: patterns of risk. *J Safety Res.* 2003; 34: 5-15
5. Ekeh AP, Hamilton SB, Demko D, McCarthy MC: The effect of a trauma center-based intervention program on recidivism among adolescent driving offenders. *J Trauma.* 2008; 65:1117-20

