

Beyond Our Doors: Emergency Physicians and Public Health

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As emergency medicine physicians, we specialize in the treatment of the acutely ill and injured. But we also serve as a safety net for the most disadvantaged members of our society. It often seems that what our patients need most of all is a listening ear, a safe place to be, or some sage advice.

Emergency physicians could become frustrated by the multitude of preventable injuries and other illnesses we see. Instead, we choose to investigate ways to address the underlying reasons for these visits.

In this issue, we highlight three of our department's public health initiatives. These programs are only the tip of our work. We are actively engaged in a myriad of research and community outreach efforts. These range from partnering with motorcycle safety instructors to improve helmet education, to investigating whether motivational interviewing can decrease substance abuse among emergency department patients, to providing child passenger safety education to families, to examining how to best decrease risky driving behaviors in young adults.

We are proud of our work to treat Rhode Islanders' acute health problems. We are even more pleased to share with you our efforts to help them stay healthy.

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Evaluating the Effectiveness of Motivational Counseling and Hospital Emergency Department Observation for Court Mandated Young Drivers

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Motor Vehicle Crash (MVC) is the leading single cause of death and injury for 15 to 20 year olds: 40% of all deaths of 16-17 years olds occur as the result of an MVC, and most teenage passenger deaths happened when the vehicle was driven by another teenager (Insurance Institute for Highway Safety, 2006). In 2002, 16% (1,825,000) of all police-reported crashes involved a young driver.¹ High-risk driv-

ing behaviors (e.g., driving after alcohol and marijuana use, not using seat belts, high speed driving, and driving distractions) often result in moving traffic offenses, and those offenses are predictive of MVCs.

The established association between prior driving offenses, particularly alcohol-related offenses, and increased risk for an MVC^{2,3} points to the potential benefit of an intervention to reduce high-risk driving behaviors.

The **Reducing Youthful Dangerous Driving Program (RYDD)** was implemented in 2001 as a demonstration project for young drivers receiving high-risk driving offenses. This program was established with the cooperation and support of the National Highway Traffic Safety Administration and the Rhode Island Office of Highway Safety, Department of Transportation and Judicial Office. Judges were en-

couraged to sentence young drivers with high-risk driving offenses to RYDD as a community service component of the court's disposition. This 16-hour program had two integrated components: four intervention groups based on **motivational interviewing (MI)** and two sessions observing in the emergency and trauma services at a level 1 trauma center.

MI targets several critical factors addressed in theories of behavioral change⁴ and is well suited for use with teens. Adolescence is a time when teens need to develop autonomy and individuation, yet tend to question and resist authority figures. It is also a time characterized by ambivalence, in terms of risk behaviors. Adolescents may be most likely to respond to a style that respects their autonomy, provides choices and not only acknowledges ambivalence, but capital-

izes upon it to decrease resistance and develop motivation for change. The suitability of MI for individuals who are more angry and oppositional at the start of treatment⁵ also suggests that this approach is particularly suited to adolescents who may have had negative experiences with the police or court officials. MI has been adapted for use in a wide array of settings and populations.^{6,7}

There were a total of four group MI sessions, each lasting approximately two hours, comprised of 6 to 10 drivers, ages 16 to 20. In the first session, the counselor helped youth to share their experiences of high risk driving and examine the pros and cons of those behaviors. During the second session, a paramedic discussed MVC-related injuries. The counselor provided feedback to the youths regarding norms of peer alcohol and drug use, risk factors such as speeding and distractions, and used reflective listening and summarizing techniques to establish the pros and cons of alcohol use and high-risk driving behaviors.

In the third and fourth MI group sessions, participants reflected on their experience in the **emergency department (ED)** and trauma service. The counselor facilitated a discussion about changing high risk behaviors, and helped the youth develop a plan for changing these behaviors.

The ED and trauma service experience let the participants vicariously experience the negative consequences of high risk driving behaviors. RYDD participants were assigned to two 4-hour sessions in the ED which occurred at 6pm to 10pm and 10pm to 2am on Friday or Saturday nights. The RYDD trauma center mentors escorted participants in small groups of 2-3 around the adult ED, the trauma intensive care unit, and the pediatric ED. The interaction with and observation of the doctors, nurses, EMTs, and police working together, as well as the sights, sounds and smells, added a dimension to the consequences of high risk behaviors that the educational session could not convey.

EVALUATION OF RYDD PROGRAM

We assessed the change in the numbers of traffic offenses during the 12 months before and after completion of RYDD. As a secondary analysis, to verify our pre-post RYDD traffic offense comparison, we re-analyzed the data by comparing an age-appropriate group who

during the same developmental period had not received RYDD to similar participants who had received RYDD. The RI Hospital research review committee deemed our analysis protocol exempt.

METHODS

Study Groups

The RI Judicial System's District and Traffic Tribunal Courts referred participants (N=407) for high-risk driving behaviors including alcohol-related traffic offenses. Participants were eligible if they were between 16 and 20 years old. We compared the mean number of traffic offenses that occurred during the 12 months before and after completing RYDD. We also gathered and analyzed baseline data on participants' self-report of substance use and risky driving behaviors.

All participants received RYDD. However, because participants were enrolled into RYDD at different ages we created age-appropriate comparison groups. For example, since the one year pre-RYDD data of the 18-19 year olds (which refers to their behavior when they were 17-18 years old) reflects the same time period as the post-RYDD for those who received RYDD when they were 17-18 year olds we have an appropriate comparison group. Therefore, using a quasi experimental design we compared the offense data for the following groups: a) those who were 16-17 years old at the start of RYDD participation (n = 50) using their 12 month post RYDD data as the treated group data compared to those who were 17-18 years old at the start of RYDD participation (n = 196) using their 12 month pre-RYDD data (when they were 16-17 years old) as the control group data; b) those who were 17-18 years old at the start of RYDD participation using their 12 month post-RYDD data as the treated group data compared to those who were 18-19 years old at the start of RYDD participation (n = 97) using their 12 month pre-RYDD data (when they were 17-18 years old) as the control group data; c) those who were 18-19 years old at the start of RYDD participation using their 12 month post-RYDD data as the treated group data compared to those who were 19-20 years old at the start of RYDD participation (n = 28) using their 12 month pre-RYDD data (when they were 18-19 years old) as the control group data; and

d) those who were 19-20 years old at the start of RYDD participation using their 12 month post-RYDD data as the treated group data compared to those who were 20-21 years old at the start of RYDD participation (n = 36) using their 12 month pre-RYDD data (when they were 19-20 years old) as the control group data.

Baseline Measures

Traffic Offenses: Data (type, date and number of traffic offenses) for the 12 month period before and after RYDD were collected from RI courts. While the offense that resulted in court referral to RYDD was not included in the baseline and the year follow-up, it was recorded to test for a possible moderator effect, in particular, to ascertain any differential response to the program between participants who were referred or not referred for an alcohol related offense.

Alcohol Problem: The AUDIT, collected at baseline, is a 10-item self-report instrument used to determine whether the subject is drinking in a hazardous manner.^{8,10} The total AUDIT score is the weighted sum of the 10 items. A cutoff score of eight or more for males and six or more for females is indicative of hazardous drinking for adults. Among adolescents who drink, it has been suggested that the cut-off point for hazardous alcohol use be set at six.⁹

Risky Driving: The High Risk Driving Scale, collected at baseline, is a 12-item self-report scale that assesses the frequency of risky driving behaviors, including drinking and driving, being a passenger with a driver who had been drinking and/or using drugs, and use of seatbelts.

Follow-up Procedures

We have traffic offense court data on all 407 participants, 12 months before and after RYDD completion. At baseline 90% completed the AUDIT and Risky Driving Scale.

Data Analyses

Prior to statistical analyses the distribution of the data was analyzed and appropriate transformations were conducted. When appropriate, means, **standard deviations (SD)** and/or **confidence intervals (CI)** at the 95% significance level are reported.

Table 1: Baseline characteristics of RYDD participants

Pre-RYDD Traffic Offenses	Alcohol Severity AUDIT	Risky Driving in Past Three-Months
Alcohol related = 28%	Mean AUDIT = 9.3 (SD = 7.1; 95% CI = 8.6 to 10.02)	Reported driving after drinking alcohol = 51%
Speeding = 34%		Reported being a passenger with a driver using alcohol and/or drugs = 56%
Possession of marijuana = 8%	AUDIT ≥ 8 = 55%	Reported always using a seatbelt as a driver = 48%
Seatbelt violation = 2%	AUDIT ≥ 6 = 66%	Reported always using a seatbelt as a passenger = 47%
Traffic device/sign violation = 17%	Reported bingeing on alcohol = 71%	
Offense arising from MVC = 11%		

RESULTS**Baseline Data**

Participants' mean age was 17.5 years (SD = 1.10), 76% were male, and had an average of 2.25 traffic offenses in the 12 months prior to attending RYDD. Alcohol-related offenses (e.g., DUI, possession of open container of alcohol) and speeding offenses were the most common reason for referral to RYDD. (Table 1)

At baseline the mean AUDIT score of the entire sample was 9.3 (SD=7.1), with over 55% of participants attaining an AUDIT score ≥ 8. When we set the cut-off score to the adolescent level of 6, 66% of participants screened positive for hazardous drinking. Many participants (71%) reported bingeing on alcohol (at least 4 drinks for females or 5 drinks for males on any one occasion) in the last three months.

Risky driving behaviors were frequently reported including driving after drinking (51%) or riding in a car with a driver who had been drinking (56%). Also, their report of always wearing a seatbelt (47%) was well below the national average for this age group (76%).¹¹

12 Month Outcome Data

The number of traffic offenses fell from a mean of 2.25 in the 12 months before attending RYDD to a mean of 0.64 (SD= 1.23) in the 12 months post RYDD completion ($t(406) = -17.17; p < .001$). This reduction was found for participants who were referred to RYDD as a result of an alcohol-related traffic offense (N = 173, baseline offenses M = 2.27 (SD=1.52), 12-month offenses M = 0.56 (SD= 1.0), mean reduction = 1.71, $t(171) = -13.8, p < .001$) and for those referred as a result of a non-alcohol related driving offense (N= 234, baseline offenses M = 2.24 (SD=1.70), 12-month offenses M = 0.70 (SD= 1.36), mean reduction = 1.50, $t(233) = -11.43, p < .001$). In total, fewer than 33% of participants received a traffic offense in the 12 months following RYDD. The most common re-offense involved speeding (25% of participants); the least common was an alcohol-related offense (10% of participants).

Across the age groups there was also a significant decrease in the mean number of traffic offenses from baseline to fol-

low-up. (Table 2) Using the binomial test for comparison of the probability of having 0 or more than 0 traffic offenses for groups at the same age comparing one year after receiving RYDD versus one year before receiving RYDD, all age groups showed a significant reduction in traffic offenses at one year follow-up: 16-17 yrs treated versus 17-18 yrs control; $Z = 2.33, p < .01$; 17-18 yrs treated versus 18-19 yrs control; $Z = 3.97, p < .001$; 18-19 yrs treated versus 19-20 yrs control, $Z = 2.92, p < .01$; and 19-20 yrs treated versus 20-21 yrs control, $Z = 2.27, p = .01$.

DISCUSSION

Most notably, a significant reduction in court-recorded driving offenses over the 12-month period following RYDD was observed. The RYDD recidivism rate for any traffic offenses is less than that expected from receiving no intervention, and the rates for recidivism for an alcohol-related offense are less than those expected from receiving an educational intervention.¹² These results suggest that attendance of court-referred youth to a

Table 2: 12 month mean pre and post RYDD traffic offenses by age group

Age Group	Pre-RYDD Offenses	Post-RYDD Offenses	Statistic
16 < 17 years (n=50)	Mean = 1.42 SD= 0.73 95% CI = 1.22 to 1.62	Mean = 0.28 SD= 0.54 95% CI = 0.13 to 0.43	$t(49) = -9.4, p < .001$
17 < 18 years (n=196)	Mean = 2.10 SD= 1.43 95% CI = 1.90 to 2.30	Mean = 0.70 SD= 1.26 95% CI = 0.52 to 0.88	$t(195) = -11.8, p < .001$
18 < 19 years (n=97)	Mean = 2.60 SD= 1.70 95% CI = 2.26 to 2.86	Mean = 0.63 SD= 1.24 95% CI = 0.38 to 0.88	$t(96) = -10.5, p < .001$
19 < 20 years (n=28)	Mean = 2.21 SD= 1.40 95% CI = 1.69 to 2.73	Mean = 0.79 SD= 1.42 95% CI = 0.26 to 1.32	$t(27) = -4.1, p < .01$
20 < 21 years (n=36)	Mean = 3.33 SD= 2.48 95% CI = 2.52 to 3.84	Mean = 0.75 SD= 1.52 95% CI = 0.25 to 1.25	$t(35) = -5.1, p < .01$

program tailored to address high risk behaviors may be a factor in reducing the probability of having a future driving offense.

RYDD participants had three sources of information: 1) the participants' own experiences (e.g., being charged with a traffic offense and receiving court and possibly familial and social sanctions), 2) the experiences associated with the ED experience (e.g., seeing the physical and emotional effects of high risk driving and alcohol behaviors), and 3) information from other RYDD group members. We theorized that all these thoughts and emotions combined to facilitate change in the high risk behaviors.

Specifically, we hypothesized that the combination of the highly arousing community service experience in the ED coupled with the techniques of MI directed at enabling the participant to make direct and relevant connections between the vicarious trauma experience and risky driving provides the optimal pathway for maintaining changes in high risk behaviors. Young participants may not have experienced negative consequences from their high risk behaviors; therefore any intervention targeted solely at educating participants about those consequences without personalizing the consequences would have less of an impact on changing behavior.

At the group sessions participants frequently reported the ED and trauma services experience as pivotal in shaping their decision to change their driving behaviors. Often participants reported an intention to use seatbelts, or use a designated driver if they had been drinking.

It is hoped that this change in behavior and a decrease in traffic offenses ultimately will result in a decrease in MVCs for this population.

Limitations

Because this was a demonstration program and not a clinical efficacy trial, we could not randomly assign participants to RYDD or to a more typical community service experience. By dividing the sample into control and treatment groups of approximate age equivalence, we controlled for the effects of maturation effects or regression towards the mean. However, some of the observed changes could have

occurred in the absence of an intervention, simply as a function of the driving offense, or further driving or life experience. Given the size of these effects, it is improbable that all of the change could be attributed to these other factors over such a short period of time.

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