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## Reducing alcohol-impaired driving crashes through the use of social marketing

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### Abstract

Over the past decade there has been little decrease in the number of alcohol-related driving fatalities. During this time most interventions have been educational or legal. This paper presents the results of a field experiment that used social marketing to introduce a new ride program into three rural communities. Almost all people in the 21–34-year-old target know that they should not drive while impaired, and most agree it is not a good thing to do, but for many the opportunity to behave properly does not exist. The *Road Crew* program was developed using new product development techniques and implemented by developing broad coalitions within the communities. A key feature of the program included rides to, between, and home from bars in older luxury vehicles. Results showed a significant shift in riding/driving behavior, especially among 21–34-year olds, a projected 17% decline in alcohol-related crashes in the first year, no increase in drinking behavior, and large savings between the reactive cost of cleaning up after a crash and the proactive cost of avoiding a crash. Programs have become self-sustaining based on fares and tavern contributions, and have become part of the life style in the treatment communities.

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**Keywords:** Alcohol-impaired driving; Drunk driving; Social marketing

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### 1. Introduction

In 2004, 16 694 traffic deaths and 248 000 injuries in the United States were related to alcohol-impaired driving (AID) (NHTSA, 2005). In 2002, there were 1.5 million arrests for alcohol-impaired driving (Federal Bureau of Investigation, 2003) and an estimated 159 million episodes of alcohol-impaired driving (Quinlan, 2005). The risk of a crash increased when drivers were under 40, were driving at night, and were driving on less traveled roads (Keall et al., 2005), as well as among people who engaged in heavy and/or binge drinking (Quinlan, 2005). The economic impact of alcohol-impaired crashes in the United States in 2000 was estimated to be \$51 billion (NHTSA, 2003). In a 90-day study (Walsh et al., 2005) nearly two-thirds of trauma center admissions were victims of motor vehicle crashes, and over 65% of the drivers tested positive for either commonly

abused drugs or alcohol. Over the past decade there has been little change in the number of alcohol-related deaths, although alcohol's contribution as a percentage of all motor vehicle deaths has decreased slightly (NHTSA, 2005).

The Centers for Disease Control and Prevention (CDCP) and others have reviewed past work that attempted to influence AID behavior. Work has been reviewed with reference to the use of mass media (Elder et al., 2004), school-based instructional programs (Elder et al., 2005), law enforcement strategies (Shults et al., 2001), the interaction of law and publicity (Tay, 2005), and designated driver programs (Ditter et al., 2005). Overall, states with stronger countermeasures had fewer self-reports of AID (Shults et al., 2002). These behavior management strategies have made contributions to reductions in AID, but the sum of the impact has not been great in terms of crash or fatality reduction during the past decade.

Other strategic tools need to be added. This paper presents work that uses a social marketing model. The project goal of the funding agencies, U.S. National Highway Traffic Safety Administration (NHTSA) and the Wisconsin department of transportation (WisDOT), was to decrease alcohol-related crashes by 5%

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in the target group during a 1-year field experiment. Its focus was 21–34-year olds (who comprise a disproportionate share of alcohol-impaired drivers). The project sought to use a social marketing paradigm to help communities create ride programs for people who have had too much to drink, but it did not attempt to change the bar culture or the level of consumption (see Karsten and Rothschild, 2003 for the entire project report).

### 1.1. Social marketing as a conceptual and strategic base

*Social marketing* is the application of commercial marketing techniques to public health and social issues (Andreasen, 1994). *Marketing* is defined by the American marketing association as

“... an organizational function and a set of processes for creating, communicating and delivering value to customers and for managing customer relationships in ways that benefit the organization and its shareholders.” (Keefe, 2004)

There is a continuum of target segments available that range from “prone to behave as we wish” to “resistant to behave as we wish”. Those who are prone will easily respond to educational messages, while those who are resistant will need the force of law imposed upon them. Those in the middle can be managed through prudent marketing (Rothschild, 1999). The project pursued this middle group.

Marketing is based on a customer focus that considers the self-interested perspective of the target. The product must be perceived as providing greater immediate benefit than the alternative choices. In a free choice society, there is always a competitive choice available which opposes the one desired by the practitioner/manager. Since there is free choice, the manager has little power to impose a behavior.

In addition, the offer must be easily available with a minimum of barriers that might inhibit the desired behavior, and must be compatible with the daily processes of life. In this way, the environment is made more favorable for desired behavior, and value can be created, communicated, and delivered.

Appealing transportation options that fit into the routines of life must be developed if the need is for people to arrive home safely after excessive drinking. As with commercial products, the consumer has a choice; here it is to drive drunk or use alternative means of transportation.

Working from this conceptual base, extensive new product development research was conducted to develop transportation options that would appeal to the target (Section 2.1 below). These were adapted through local community coalitions to account for local opportunities and constraints (Section 2.1 below) and developed into ride programs that became the treatment in the field experiment (Section 2.2 below).

## 2. Method

### 2.1. Developing the treatment program via focus groups

A ride program (the *Road Crew*) was developed based on new product development research and was adapted to each community based on its unique opportunities and constraints. The

research consisted of:

- Eleven focus groups (7–12 participants) held with 21–34-year-old men who frequented bars and were known to drive regularly after excessive alcohol consumption. Groups met in the back of local taverns.
- Seven focus groups (6–8 participants) conducted with observers of the men who regularly drink and drive. These observers included bar owners and wait staff, law enforcement personnel, ambulance drivers, judges and lawyers, and other interested people. Groups met in convenient locations.

Sandwiches and nonalcoholic beverages were served, sessions lasted 1.5 h, and participants each were paid \$50. The focus groups considered issues that a marketing manager would be concerned with in trying to develop a new product, such as:

- gaining an in-depth understanding of young people who drink and drive, their needs that are met by drinking and by alcohol-impaired driving;
- the benefits of the competitive choice (e.g. driving while impaired);
- the barriers that would keep people from switching to and using a new product (e.g. a new ride service);
- daily life processes within which the new product must be purchased and consumed;
- ideas for developing the ideal product with a focus on forms of transportation, times of delivery, incentives, and acceptable pricing.

Key insights emerged from a qualitative review of the transcripts. These included:

- Members of the target were aware that they should not drive while impaired, and would prefer not to do so, but generally had no easy alternative available to them.
- Members of the target would not leave their cars behind at the bar if they were offered a ride home. In order to take a ride home, the target first needed to get a ride to the bar, so their cars would not be available and the wrong choice could not be made. Members felt that they did not make good decisions after drinking, so they should not have the opportunity to behave badly.
- Members of the target reported that they drank while they drove, so any ride service would need to allow them to drink while riding.
- People would pay for a round trip ride at the beginning of the evening when they were sober, but might not have money left at the end of the evening.
- Vehicles used in the program needed to be as appealing as those owned by the target.
- The key negative of driving home while impaired was that as the evening wore on, people started to worry about their ability to drive, and this took the edge-off a fun evening.

These research insights led to a generic *Road Crew* concept that suggested giving rides to bars, between bars and home in

older luxury vehicles, at a cost of \$10 to \$15 for the evening. The program would run on Friday and Saturday evenings plus other times deemed locally appropriate. Patrons would be allowed to drink in the vehicles, consistent with local ordinances. Advertising would stress that riders did not need to worry about getting home at the end of the evening if they used the *Road Crew*, and could, therefore, continue to enjoy themselves all evening.

The specific programs developed in each treatment community combined:

- what had been learned in the research;
- the specific local knowledge brought to bear by the members of the community coalition (consisting of community leaders, bar owners, law enforcement, media representatives, and other interested players);
- the advice of each community's advisory group (consisting of 21–34-year-old men who frequented bars).

It was important that all strategic decisions based on the research and the coalition be approved and improved by the advisory committee, since they represented the group that ultimately needed to purchase the ride service. Each community was given several months to evaluate alternatives, and to develop the initial service. Over the first months of operation, the service was continuously refined based on coalition observations and advisory group input in order to accommodate the needs of the target and the community.

Trade-offs were made between the purity of a laboratory experiment where all variables can be controlled, and the reality of field research where each community acts upon different opportunities and constraints. The passion and knowledge of the local coalition and advisory group would be key to creating the best service for the community; local control would be analogous to a national service provider working with a local retailer. Details of the method, results, and implementation of the results of the focus groups can be found in the report submitted to NHTSA (Karsten and Rothschild, 2003).

## 2.2. Implementing the field experiment

The field experiment consisted of a pre- and post-test with treatment (*Road Crew* in three communities) and control (five communities). The experimental treatment lasted for 1 year, with dependent variable data collected at baseline, during the year, and after the year ended. It included three data collection processes to consider the potential effects of the treatment upon events relating to driving after drinking and whether alcohol-related crashes were avoided. Several methods were used to observe the target in ways relating to the absent behavior. These consisted of

- a count of all rides taken in the treatment communities;
- a self-report of behavior in the treatment and control communities, conducted just before and just after the treatment year;
- a post-test-only phone survey in the treatment communities.

### 2.2.1. Ridership count

Dispatchers in the communities kept a complete record of all rides taken during the treatment year. Each ride represented a potential crash that could not occur.

### 2.2.2. Self-report of behavior

These data, related to aspects of drinking and driving behavior, provided richness that allowed explanation of what occurred as ridership was growing.

**2.2.2.1. Sample.** Subjects were the patrons of taverns. There were 710 and 693 pre-test respondents in the treatment and control groups, with 573 and 371 respondents in the post-test. While the treatment had been developed to be most appealing to 21–34-year-old men, the research included, and the program served, all bar patrons.

**2.2.2.2. The data collection instrument.** At about 10 p.m. on the Friday evening of the weekend before and after the treatment year, bar wait staff distributed \$7 discount cards to patrons in the treatment and control communities. An attempt was made to have coupon distribution occur at this one time to minimize having patrons receive multiple coupons at multiple bars. Assuring patrons that their responses would be untraceable and anonymous, wait staff explained that the card, redeemable for nonalcoholic purchases, would be activated when patrons called the 800-number on the card and answered a few questions. Calls needed to be completed within 72 h. Questions focused on amount of alcohol consumed on the night the card was received, method of transportation on that night, number of incidents of alcohol-impaired driving in the 2-week period prior to the night of observation, as well as age and gender. Alcohol-impaired incidents that night were derived from the questions concerning amount consumed and method of transportation.

**2.2.2.3. Analysis of self-report data.** Data from the treatment communities were combined, as were data from the control communities (groups). Gender (male or female) and year of study (year) represented additional two-level independent variables or factors, and age in years (age) was used as a continuous independent variable. The critical analysis considered the interaction between group and year, as this would show whether the treatment had an impact over time on any dependent variable. All analyses were performed both on the entire sample and on the 21–34-year-old primary target.

Dependent variables were:

- number of drinks consumed on the night of coupon distribution (integer dependent variable),
- method of transportation home on the night of coupon distribution (categorical data converted to binary dependent variable),

- alcohol-impaired driving on the night of coupon distribution (binary dependent variable derived from the previous two variables),
- number of instances of alcohol-impaired driving within the 2-week period preceding coupon distribution (integer dependent variable).

Generalized linear models of data analysis were employed.

### 2.2.3. Post-treatment phone survey

A post-treatment phone survey in the treatment communities gathered data from the general population, 21–34-year olds, community leaders, and bar owners and wait-staff. The phone survey considered awareness and attitudes toward the program, and perceptions of relevant behavior. These data are minimally presented in this paper, but are available in full at Karsten and Rothschild (2003).

## 3. Results

### 3.1. Rides taken

Across the three treatment communities, 19 757 rides were taken during the test year; 10 097 were taken by 21–34-year olds. These are direct observations of behavior. The remaining results come from the self-report data and provide detail concerning the observed ride behavior.

### 3.2. Drinking behavior

Fig. 1 and Table 1 show the number of drinks consumed on the night of coupon distribution before (2002) and after (2003) the first year of the ride program. Poisson regression and likelihood ratio tests were used to evaluate age, gender, year, group (treatment versus control communities), and group-by-year interaction effects. Analyses were run for all respondents and for persons 21–34 years old.

Data for all bar patrons show significant effects for age ( $\chi^2 = 27.3$ ;  $p < 0.001$ ), gender ( $\chi^2 = 133.3$ ;  $p < 0.001$ ), group ( $\chi^2 = 20.9$ ;  $p < 0.001$ ), and year ( $\chi^2 = 4.0$ ;  $p < 0.05$ ). There was no significant effect for the interaction between group and year ( $\chi^2 = 1.5$ ; ns).

Data for younger patrons show a similar pattern of results. There were significant effects for age ( $\chi^2 = 5.33$ ;  $p < 0.05$ ), gender ( $\chi^2 = 52.44$ ;  $p < 0.001$ ), and group ( $\chi^2 = 5.86$ ;  $p < 0.05$ ). There was no significant effect for year ( $\chi^2 = 0.48$ ; ns) and no interaction between group and year ( $\chi^2 = 0.002$ ; ns).

In summary, when controlling for the effects of age, gender, group, and year, the treatment did not have a significant effect upon the number of drinks consumed on the night of coupon distribution.

### 3.3. Mode of transportation used

To prepare the mode of transportation data for analysis with logistic regression, “drove myself home” and “someone else drove me home” were combined into a single category, “drove,” and all other modes of transportation, including the ride program, were entered into an “other” category, thus creating a binary response for mode of transportation. Gender, group, and year were the other variables in a logistic regression model for the analysis of the resulting data in Fig. 2 and Table 2. Logistic regression and likelihood ratio  $\chi^2$ -tests were used to evaluate age, gender, year, group, and group-by-year interaction effects.

Data for all patrons show a statistically significant effect for gender ( $\chi^2 = 8.93$ ;  $p < 0.01$ ), group ( $\chi^2 = 6.78$ ;  $p < 0.01$ ), year ( $\chi^2 = 27.87$ ;  $p < 0.001$ ), and group-by-year interaction ( $\chi^2 = 8.82$ ;  $p < 0.01$ ). There was no significant effect for age ( $\chi^2 = 0.18$ ; ns).

Data for younger patrons show significant effects for group ( $\chi^2 = 7.70$ ;  $p < 0.01$ ), year ( $\chi^2 = 20.61$ ;  $p < 0.001$ ), and group-by-year interaction ( $\chi^2 = 7.44$ ;  $p < 0.01$ ), but no significant effects for age ( $\chi^2 = 0.44$ ; ns) or gender ( $\chi^2 = 1.99$ ; ns).

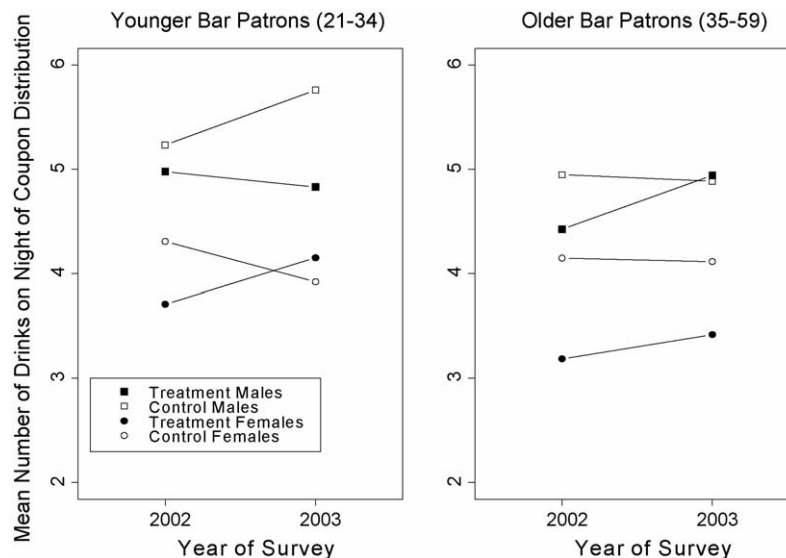


Fig. 1. Mean number of drinks on night of coupon distribution.

Table 1  
Mean number of drinks on night of coupon distribution

Year	Age	Gender	Group	Mean	S.D.	N
2002	All	Male	Treatment	4.64	2.83	339
			Control	5.09	2.80	348
		Female	Treatment	3.37	2.72	241
			Control	4.22	2.69	254
	Younger	Male	Treatment	4.98	3.00	130
			Control	5.23	2.79	176
		Female	Treatment	3.71	2.79	86
			Control	4.31	2.67	120
	Older	Male	Treatment	4.43	2.71	209
			Control	4.95	2.82	172
		Female	Treatment	3.19	2.66	155
			Control	4.15	2.71	134
2003	All	Male	Treatment	4.90	2.72	295
			Control	5.23	2.62	171
		Female	Treatment	3.76	2.58	184
			Control	4.04	2.62	160
	Younger	Male	Treatment	4.83	3.02	106
			Control	5.76	2.46	67
		Female	Treatment	4.15	2.55	86
			Control	3.92	2.50	64
	Older	Male	Treatment	4.94	2.55	189
			Control	4.88	2.67	104
		Female	Treatment	3.42	2.58	98
			Control	4.11	2.70	96

The significant interaction between groups and year shows support for the hypothesis that the treatment reduced driving after drinking on the single night that coupons were distributed. Bar patrons were less likely to drive themselves or ride with someone else (other than through the ride program) after the ride service was offered. Table 3 demonstrates the strength of this effect by providing estimated odds ratios for the age, gender, and group factors of the study. Unadjusted and adjusted odds ratios are provided.

#### 3.4. Alcohol-impaired driving incidents on a single night

Fig. 3 and Table 4 show results for alcohol-impaired driving on the night of coupon distribution. Logistic regression and likelihood ratio  $\chi^2$ -tests were used to evaluate age, gender, year, group, and group-by-year interaction effects.

Data for all patrons show a statistically significant effect for gender ( $\chi^2=32.36$ ;  $p<0.001$ ). There were no significant effects for age ( $\chi^2=2.67$ ; ns), group ( $\chi^2=1.57$ ; ns), year

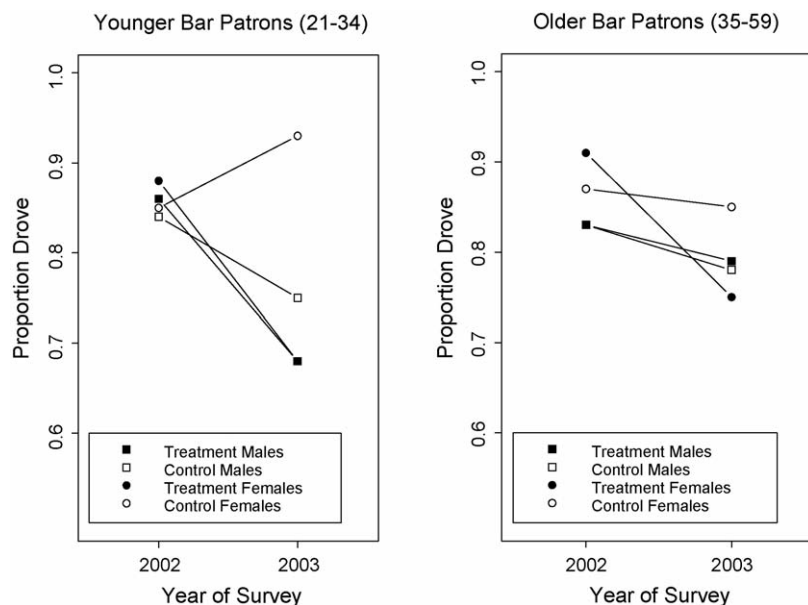


Fig. 2. Proportion either driving self or riding with someone else on the night of coupon distribution.

Table 2  
Proportion either driving self or riding with someone else on the night of coupon distribution

Year	Age	Gender	Group	Proportion	N	
2002	All	Male	Treatment	0.84	339	
			Control	0.84	348	
		Female	Treatment	0.91	241	
			Control	0.88	254	
		Younger	Male	Treatment	0.87	130
				Control	0.86	176
	Female		Treatment	0.91	86	
			Control	0.88	120	
	Older	Male	Treatment	0.82	209	
			Control	0.81	172	
		Female	Treatment	0.91	155	
			Control	0.88	134	
2003	All	Male	Treatment	0.73	295	
			Control	0.77	171	
		Female	Treatment	0.70	184	
			Control	0.89	160	
		Younger	Male	Treatment	0.68	106
				Control	0.75	67
	Female		Treatment	0.67	86	
			Control	0.94	64	
	Older	Male	Treatment	0.76	189	
			Control	0.79	104	
		Female	Treatment	0.72	98	
			Control	0.86	96	

( $\chi^2=0.67$ ; ns), or the group-by-year interaction ( $\chi^2=0.08$ ; ns). Aside from the finding that men were more likely than women to engage in alcohol-impaired driving, there were no obvious differences between groups across the years of the study.

Data for younger patrons show a similar pattern of results. There was a significant effect for gender ( $\chi^2=10.79$ ;  $p<0.01$ ), but no significant effects for age ( $\chi^2=0.64$ ; ns), group ( $\chi^2=0.53$ ; ns), year ( $\chi^2=0.004$ ; ns), or the group-by-year interaction ( $\chi^2=0.82$ ; ns).

Table 3  
Unadjusted and adjusted odds ratios from logistic regression for driving self/riding with someone else vs. using other mode of transportation on the night of coupon distribution

All patrons Factor	2002 (N=1182)		2003 (N=810)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (continuous)	0.99 (0.98–1.01)	0.99 (0.98–1.01)	1.02 (1.00–1.03)	1.02 (1.00–1.03)
Gender (male)	0.62 (0.43–0.87)	0.61 (0.43–0.87)	0.77 (0.55–1.08)	0.80 (0.57–1.12)
Group (treatment)	1.12 (0.80–1.56)	1.16 (0.83–1.62)	0.52 (0.37–0.74)	0.53 (0.38–0.76)
Younger patrons Factor	2002 (N=512)		2003 (N=323)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (continuous)	1.03 (0.97–1.10)	1.03 (0.96–1.10)	1.01 (0.95–1.07)	1.01 (0.95–1.07)
Gender (male)	0.81 (0.47–1.40)	0.81 (0.47–1.40)	0.65 (0.39–1.08)	0.66 (0.39–1.11)
Group (treatment)	1.16 (0.68–1.98)	1.15 (0.67–1.97)	0.40 (0.23–0.70)	0.40 (0.23–0.71)
Older patrons Factor	2002 (N=670)		2003 (N=487)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (continuous)	0.99 (0.96–1.02)	0.99 (0.96–1.03)	1.04 (1.00–1.07)	1.03 (1.00–1.07)
Gender (male)	0.51 (0.32–0.80)	0.51 (0.32–0.80)	0.86 (0.55–1.34)	0.90 (0.57–1.41)
Group (treatment)	1.14 (0.75–1.75)	1.17 (0.76–1.80)	0.62 (0.40–0.98)	0.66 (0.41–1.04)

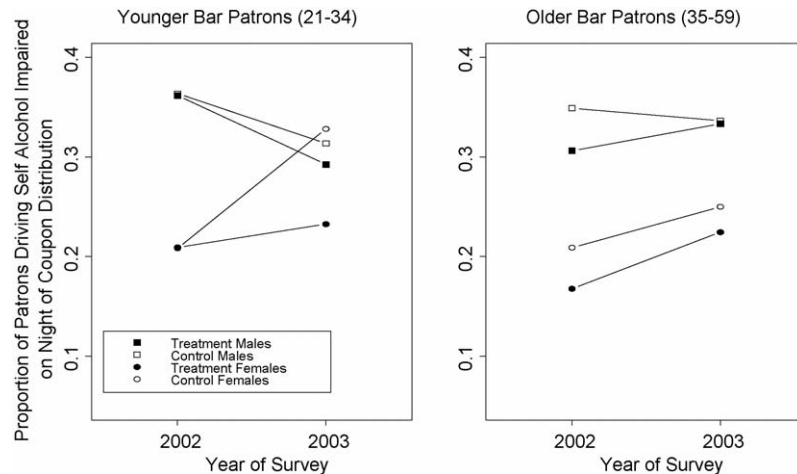


Fig. 3. Proportion of patrons driving self while alcohol-impaired on night of coupon distribution.

Since there is no interaction between groups and year, there is no support for the hypothesis that the treatment reduced alcohol-impaired driving on the single night that coupons were distributed.

### 3.5. Alcohol-impaired driving incidents over a 2-week period

Fig. 4 and Table 5 show the number of self-reported instances of alcohol-impaired driving during the 2-week period preceding coupon distribution. Poisson regression and likelihood ratio tests for all patrons showed a statistically significant effect for gender ( $\chi^2 = 237.4$ ;  $p < 0.001$ ) and year ( $\chi^2 = 10.4$ ;  $p < 0.05$ ). There were no significant effects for age ( $\chi^2 = 0.7$ ; ns),

group ( $\chi^2 = 0.8$ ; ns), or the group-by-year interaction ( $\chi^2 = 0.1$ ; ns).

Looking at younger patrons, significant effects can be seen for age ( $\chi^2 = 4.88$ ;  $p < 0.05$ ), gender ( $\chi^2 = 107.69$ ;  $p < 0.001$ ), group ( $\chi^2 = 4.48$ ;  $p < 0.05$ ), and year ( $\chi^2 = 30.87$ ;  $p < 0.001$ ), as well as a significant group-by-year interaction ( $\chi^2 = 4.85$ ;  $p < 0.05$ ). The significant effect for the group-by-year interaction shows that the decrease in the reported number of alcohol-impaired driving incidents between 2002 and 2003 in the treatment communities was larger than the corresponding decrease in the control communities.

The ride program had an effect over time upon alcohol-impaired driving incidents for the target population of 21–34-year olds.

Table 4

Proportion of patrons driving self while alcohol-impaired on night of coupon distribution

Year	Age	Gender	Group	Proportion	N
2002	All	Male	Treatment	0.33	339
			Control	0.36	348
		Female	Treatment	0.18	241
			Control	0.21	254
	Younger	Male	Treatment	0.36	130
			Control	0.36	176
		Female	Treatment	0.21	86
			Control	0.21	120
	Older	Male	Treatment	0.31	209
			Control	0.35	172
		Female	Treatment	0.17	155
			Control	0.21	134
2003	All	Male	Treatment	0.32	295
			Control	0.33	171
		Female	Treatment	0.23	184
			Control	0.28	160
	Younger	Male	Treatment	0.29	106
			Control	0.31	67
		Female	Treatment	0.23	86
			Control	0.33	64
	Older	Male	Treatment	0.33	189
			Control	0.34	104
		Female	Treatment	0.22	98
			Control	0.25	96

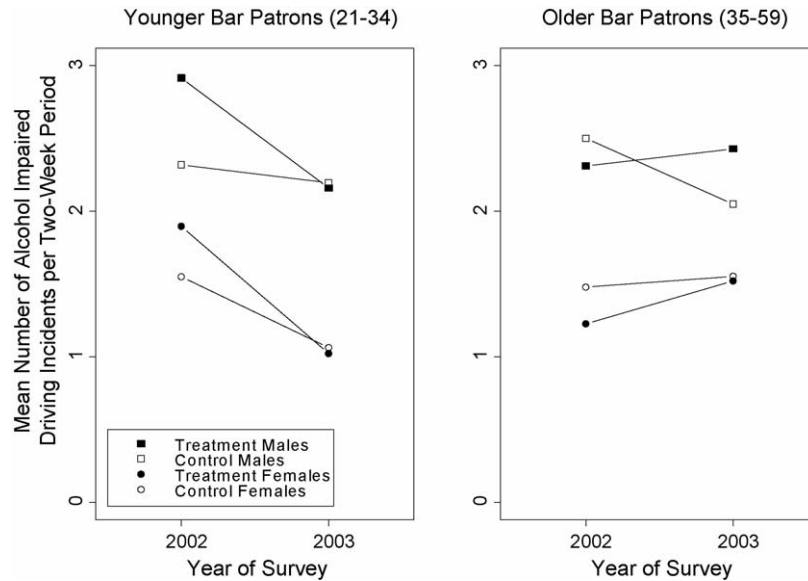


Fig. 4. Mean number of alcohol-impaired driving incidents per 2-week period.

Table 5

Mean number of alcohol-impaired driving incidents per 2-week period

Year	Age	Gender	Group	Mean	S.D.	N
2002	All	Male	Treatment	2.54	2.33	339
			Control	2.41	2.40	348
		Female	Treatment	1.46	1.96	241
			Control	1.51	1.84	254
	Younger	Male	Treatment	2.92	2.44	130
			Control	2.32	2.37	176
		Female	Treatment	1.90	2.21	86
			Control	1.55	1.93	120
		Older	Treatment	2.31	2.22	209
			Control	2.50	2.44	172
	Older	Male	Treatment	1.23	1.77	155
			Control	1.48	1.76	134
All		Treatment	2.33	2.11	295	
		Control	2.11	2.11	171	
Female		Treatment	1.29	1.62	184	
		Control	1.36	1.63	160	
2003	All	Male	Treatment	2.16	1.94	106
			Control	2.19	2.08	67
		Female	Treatment	1.02	1.37	86
			Control	1.06	1.36	64
	Younger	Male	Treatment	2.43	2.19	189
			Control	2.05	2.14	104
		Older	Treatment	1.52	1.78	98
			Control	1.55	1.77	96

#### 4. Discussion

Ride data show that *Road Crew* ride programs were effective, as 19757 rides were taken to, between, and home from the bars. While each ride represented a potential crash which no longer could occur, not all rides eliminated a drunk driver. As the evening passed more riders would have been drunk, but casual conversation with the target and with bar workers would lead us to believe that a high percentage of people had already begun to drink before going to the first bar of the evening.

This section considers the insights that can be garnered by combining the observed ride data, the self-report data, and data found in the public record. Actual crash data were not available for several reasons; this point is discussed in Section 5 below.

##### 4.1. Impact on alcohol consumption

A concern among community leaders and public health representatives was that a ride program would lead to increased alcohol consumption. In the focus groups completed during the

treatment development, men felt that a ride program would not lead to more consumption, as they already were drinking as much as they could. The field experiment showed that alcohol consumption did not change significantly as a result of the ride program (Fig. 1 and Table 1).

#### 4.2. Impact on driving behavior

During the study, there was no significant increase in drinking behavior in treatment communities (Fig. 1 and Table 1), but there was a shift in driving habits as seen in the 19 757 rides taken, and in the mode of transportation used (Fig. 2 and Tables 2 and 3). The data show that there was little change in the percentage of patrons who were driving impaired on the specific night of receiving the bar coupon (Fig. 3 and Table 4), but when asked about a 2-week period, the frequency of driving while impaired had decreased significantly at the individual level (Fig. 4 and Table 5). One can conclude from these findings that the people who were driving impaired before the program began were still doing so, but they were doing so less often. There may be occasions when it is important to have a vehicle, and other occasions when it is not. This logic would lead to use of the ride program and a lower frequency of impaired driving, even though most individuals still saw some need to drive while impaired.

Among 21–34-year-old men in the treatment community, there was a large drop between 2002 and 2003 in the percentage who drove themselves home and a similar increase in those reporting that they had used a ride service. Among 21–34-year-old women in the treatment community, there was a large drop between 2002 and 2003 in the percentage who rode home with someone else and many women reported using the ride service. There were no similar drop-offs from other modes of transportation or in the control communities.

In the treatment and control communities, men are more likely to be the drivers. In treatment communities, men could shift from driving themselves to using the *Road Crew*, while women would have been less likely to drive themselves and more likely to have been driven by a man. A goal of the project was to get young people to shift from driving themselves home or from having an impaired other driver take them home to using the ride service. The data suggest that this is what happened.

#### 4.3. Potential crashes avoided because of the Road Crew

Exhibit 1 derives an estimate of potential crashes avoided, percentage drop in potential crashes, and the economic impact of the unrealized crashes. Input to Exhibit 1 comes from this project as well as from the Wisconsin Department of Transportation, the National Highway Traffic Safety Administration, and the U.S. Census Bureau (as noted in the exhibit). The goal of Exhibit 1 is to aid in the consideration of the impact of the field experiment in the greater community; it is necessary to do so in this manner here as well as in Section 4.4 due to the lack of crash data (discussed in Section 5).

From these derivations, it is estimated that 15 crashes were avoided in the three small communities, for a 17% decrease in crashes after the first year of operation. A potential drop

of 17% of the crashes might be large enough to be noticed in the communities, and, indeed, it was. Phone survey responses (Karsten and Rothschild, 2003) from various community segments showed a recurring feeling that the roads were now safer and that alcohol-impaired driving had decreased. For example, 78% of 75 community leaders felt that this program kept people from drinking and driving.

#### 4.4. Economic benefit of the Road Crew

Exhibit 1 also derives an estimate of the direct out-of-pocket costs per alcohol-related crash in Wisconsin in 2000 as being about \$56 000. These costs include emergency and acute health care costs, long-term care and rehabilitation, police and judicial services, property damage, insurance, disability and workers compensation, lost productivity, and social services for those who cannot return to work and support their families (U.S. Department of Transportation, 2001). The amortized variable cost of maintaining the *Road Crew* is about \$15 300 per crash avoided. Costs included here are those directly attributable to managing *Road Crew* in the three communities, but do not include one-time upfront costs such as the research and administration needed to begin the project. As ride revenues move the programs toward self-sustainability, the use of government funds is eliminated.

#### 4.5. Why did the Road Crew succeed?

Two components of social marketing are *social* and *marketing*. Marketing is important for product development and implementation, while social relies upon community collaboration, coalition building and problem solving to design, staff and sustain a program. Strength in each can lead to success.

##### 4.5.1. The importance of marketing in social marketing

4.5.1.1. *Marketing versus education.* Most programs to reduce AID use messages to tell people how they ought to behave. These campaigns are good at raising awareness and at convincing those who are already prone to behave appropriately to do so, but most people are already knowledgeable about the societal norm that they are not to drive while impaired. The problem addressed in this project is that some part of the target is unlikely to behave appropriately, even if it believes it is the right thing to do. Marketing fits here as it helps change the environment to provide immediate benefits for exhibiting the right behavior and to remove barriers in the way of such behavior. By the end of the treatment year, *Road Crew* had become a fun and easy part of the evening.

##### 4.5.1.2. Use of new product development marketing research.

In order to develop a ride program that would meet the needs of the target market, extensive research was done prior to developing the program. This research paralleled the work that the marketing department of a firm would do in developing a new brand. It investigated why the target “bought” the competitive brand (“I can drive myself home, no matter how drunk I am”), what the benefits were of this brand, what people disliked about

the brand, what benefits they would like to see in a new brand (a ride program), what barriers would keep them from becoming users, and what decisions they made during the day that led them to end up at a bar at closing time, drunk and with a vehicle. The research also considered emotions and feelings related to the choices that the target made, so that the ride service would fit into their life styles and values.

*4.5.1.3. Reconsidering the assumptions and definition of marketing.* In order to succeed at marketing, perceived value needs to be created, communicated, and distributed. *Road Crew* offered a way to have more fun during an evening out. This position was communicated through bar posters and advertising, and the service was made easily available for use. When people go out for an evening of drinking and partying, their self-interest is in having fun and escaping the realities of daily life. Moralistic messages may not have much impact on the target segment of drinkers who are neither prone nor resistant to those messages. The behavior of driving drunk has been tested over many years by the target and is generally seen as acceptable. To compete

in such an environment with little power to force the desired behavior, ride-service benefits that exceed the benefits of the current behavior must be developed. This conceptual logic was the motivation behind the *Road Crew*.

#### *4.5.2. The importance of social in social marketing*

*4.5.2.1. Strong involvement of the target at all stages of development.* From a marketing perspective, the target is the focus. In this project the target was integral in early developmental research, in branding and positioning research, in the development of each community's program, and in making changes to improve the programs over time.

For example, the target reported that if they were going to take a ride home, they first would need a ride to the bar. They told us that they did not make very good decisions at 1:00 a.m., and if they had their cars available, they would drive them home, but that if they had left their vehicles at home, they would need to take a ride. This is one example of a product development breakthrough that came as a result of strong target involvement.

### DERIVATION OF ALCOHOL-RELATED CRASHES AVOIDED

In 2000, there were

- (A) 37 508 OWI arrests<sup>WISDOT2001</sup>, and  
(B) 9 096 alcohol-related crashes in Wisconsin<sup>WISDOT2001</sup>

In a NHTSA analysis, researchers concluded that in the United States in 1995 there were

- (C) 1 arrest for every 90 episodes of driving above the legal limit of alcohol consumption<sup>NHTSA2000</sup>, and  
(D) 1 arrest for every 790 episodes of driving within two hours of any alcohol consumption<sup>NHTSA2000</sup>.

Using the above, one can derive that there are

- (E)=(B/A)xC 1 crash for approximately every 371 episodes of driving while legally intoxicated [E = 1/371] and  
(F)=(B/A)xD 1 crash for every 3 258 episodes of driving within two hours of any alcohol consumption [F = 1/3 258].

Based on the bar coupon research in the taverns (Self reports of number of drinks consumed and mode of transportation home on the night of the research. Alcohol impairment was judged to be 5 or more drinks for a man and 4 or more drinks for a woman.):

- (G) 28% of respondents were alcohol-impaired drivers

And based on ride counts, we know that

- (H) 19 757 rides were taken

Given the above we can begin to make estimates of the number of crashes that were avoided by giving these rides. At one extreme, if all riders were legally intoxicated then we avoided:

- (I)=H x E 53 alcohol-related crashes

At the other extreme, if all riders rode within two hours of any level of alcohol consumption, then we avoided:

- (J)=H x F 6 alcohol-related crashes

Based on the bar coupon data (G), we can estimate that we avoided

- (K)=H x E x G **15 alcohol-related crashes**

### DERIVATION OF POTENTIAL IMPACT IN THE THREE COMMUNITIES

The population of Wisconsin in 2 000 was approximately

$$(L) 5\,364\,000^{\text{USCENSUS2000}}$$

The population of our three communities was about

$$(M) 50\,000^{\text{USCENSUS2000}}$$

And represented about

$$(N)=M/L \quad .93\% \text{ of the state's population.}$$

If crashes and fatalities are spread evenly across the state, then one would expect about

$$(O)=N \times B \quad 85 \text{ crashes per year in these three communities.}$$

If our program eliminated the possibility for 15 (K) of these crashes to occur, then the program can be seen to have had the following impact in the three communities:

$$(P)=K/O \quad \mathbf{17.6\% \text{ reduction in alcohol-related crashes}}$$

### DERIVATION OF COST / BENEFIT ANALYSIS

In 2 000, there were

$$(B) 9\,096 \text{ alcohol-related crashes.}$$

It is estimated that the total direct out-of-pocket cost of alcohol-related crashes in Wisconsin in 2000 was

$$(Q) \text{ about } \$512 \text{ million}^{\text{WISDOT2001; U.S.DOT2001}}$$

This leads to

$$(R)=Q/B \quad \text{about } \mathbf{\$56\,000 \text{ cost per crash,}}$$

And the value of avoiding 15 crashes would be

$$(S)=R \times K \quad \text{about } \$840\,000.$$

The direct funds allocated to the three communities include the grant awards, the fare collections for rides, community fund raising, payments made to staff for time committed to community work (as opposed to research and other non-direct community work). The total of these funds is estimated as

$$(T) \text{ about } \$230\,000$$

This leads to

$$(U)=T/K \quad \text{about } \mathbf{\$15\,300 \text{ cost per crash avoided}}$$

And a savings to all those impacted upon by crashes of

$$(V)=S-T \quad \text{about } \$610\,000$$

Exhibit 1. (Continued).

4.5.2.2. *Strong retail development with passionate local leaders.* There often is a strong top-down component to experimental projects, wherein the treatment is developed far from the location of implementation. As with many retail services, final development needs a bottom-up approach. A key to *Road Crew* success came from strong, passionate local control over service development so that retail operations were the responsibility of the local coalition.

4.5.2.3. *Strong partners and partnerships.* There were several broad coalitions of players that contributed at many levels with unique insights, expertise, and resources, so that the end product would work well:

- *Private/public partners.* In this project, private sector support from Miller Brewing Company, the Tavern League of Wisconsin, and Lindsay, Stone, and Briggs (advertising agency) was invaluable. Without them, it would have been difficult for the Department of Transportation to gain access to the taverns or to the target, or to gain support for the program itself.

- *State/local partners.* Each set of players brought unique expertise to the table. The state brought the research that described the target and product options, as well as a conceptual base of social marketing. The local partners brought a detailed level of knowledge about the opportunities and constraints within each community, as well as the ability to tap local leaders and resources.
- *Community coalitions of bar owners, law enforcement agents, drinkers, public health workers and community leaders.* The breadth of the coalition leadership insured that people who normally might not interact on favorable terms worked together to meet a common goal for community good.

### 5. Limitations

This project sold almost 20 000 rides in 1 year; these behaviors were observable. To yield insights and depth in support of the behavior, trade-offs with limitations were accepted in the field experiment and the self-report data. Observing changes in the number of actual crashes from the beginning to the end of

the project was not feasible because:

- the geographic regions covered in the program did not match any of the geographic reporting units in the state;
- the geographic regions covered in the program changed with time as the communities learned how better to serve their regions, and as contiguous regions asked to be included in the program;
- given the low numbers of crashes in these small rural communities, it would be difficult to observe a substantial reduction.

Since there would not be any usable crash data, the project needed to consider how to document the absence of an event (that is, the absence of a crash). In order to collect meaningful data, other factors needed to be considered.

Because this was a field experiment, all variables could not be perfectly controlled. For example, to create the most appropriate ride program, each community designed its program to fit its own opportunities and constraints. As described above, the similarities across communities exceeded the differences, but this project cannot be considered to have the controls of a laboratory experiment. Nevertheless, the authors know of no outside issues that would have had an impact on the observation of the group-by-year interaction.

The number of rides taken shows that many drunks were assisted. In order to understand whose behavior changed and why it changed, self-report data were collected. Asking drunk drivers to report accurately is fraught with peril, but the collection method was established in a manner to assure the respondents that their reports would be anonymous. Nevertheless, when bar owners were shown the data, they felt that respondents had understated the amount they drank. This means that conclusions of this paper relative to crashes avoided also would be conservatively understated.

A second potential limitation may exist if callers differed from non-callers. While this may be, such bias is probably similar between the pre- and post-test, and between the treatment and control conditions, and therefore would have minimal impact on the reported results.

While there is a temptation to generalize from the successful results, this should be done with care. This program was designed for rural areas and small communities with limited forms of public transportation. The program could have a similar impact on any small community that does not have alternative rides available, but might have less impact in larger communities where alternative rides and public transportation are more readily available. Given that much of the nation is comprised of small communities, replication of this program could offer a strong highway safety impact for many rural localities. While the marketing methods used here would apply to any community, the specific tactics may need to be adapted before being used in larger communities.

## 6. In sum

In the past, public health managers have often equated social marketing with message campaigns. Marketing, though, is based

on exchanges of value, on changing the environment so that desirable choices are available, and on removing barriers that would impede their selection. In a free society, people make choices based on their perception of self-interest within the set of options that they easily see. A message strategy can convince some people to change, but more people will change when they see that it is in their self-interest to do so. The *Road Crew* is an example of how new product development can offer choice and reduce the barriers that might impede the selection of that choice.

Alcohol-impaired driving is a major public health and transportation safety issue in the United States. Past strategies used to combat this issue have focused on education and the force of law. This paper shows another way of attacking the problem.

## 7. Coda

This paper is being written 2 years after the grant support ended and the communities began to operate independently. Two of the three communities still are operating successfully, are self-funded from ride revenues and tavern contributions, and use no government funding. The state has recently recruited four new communities in order to slowly expand the program; the long-range plan is to add three communities per year.

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