Putting Adolescents at Risk: Riding With Drinking Drivers Who Are Adults in the Home

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ABSTRACT. Objective: Alcohol-related car crashes are a leading cause of adolescent death, and one in five U.S. adolescents reports recent riding in a car with a drinking driver. How often the driver is an adult in the home (e.g., parent) is unknown. Pediatric visits offer an opportunity to counsel families to reduce this risk. Our study aim was to determine the prevalence of recent riding with a drinking driver (RWDD) who was an adult in the home among adolescent primary care patients and to identify the demographic and environmental (substance use among family members) profiles of those at increased risk. **Method:** We recruited 12- to 18-year-olds arriving for routine medical care between 11/2005 and 10/2008 from nine practices in New England. Computer self-administered questionnaires assessed demographics, past-3-month

RWDD, driver characteristics, and parent/sibling substance use. We computed adjusted relative risk ratios using multiple logistic regression modeling. **Results:** Among 2,096 adolescents (86% participation rate; mean age = 15.8 years, *SD* = 2.0; 58% girls; 65% White non-Hispanic), 8.2% reported past-3-month RWDD who was an adult in the home (36.6% of those reporting any past-3-month RWDD). Risk was higher for girls, younger adolescents (<17 year olds), White non-Hispanic and Hispanic versus Black youth, those with non-college-graduate parents, and those with substance-involved parents. **Conclusions:** For a substantial proportion of adolescent primary care patients RWDD, the driver is a parent or other household adult, suggesting an important target for screening and counseling. (*J. Stud. Alcohol Drugs*, 78, 146–151, 2017)

MOTOR VEHICLE CRASHES are a leading cause of death in the United States, and alcohol is a major contributor. In 2013, one alcohol-impaired driving death occurred every 52 minutes on average, accounting for 31% of motor vehicle–related fatalities (National Center for Statistics and Analysis, 2015). Impaired drivers put not only themselves at risk, but also their passengers, often children and adolescents. A national survey found that nearly 1 in 20 drinking drivers drove with a child passenger under age 15 in their most recent drinking-driving episode (Moulton

et al., 2010), and such episodes account for 65% of motor vehicle fatalities in this age group (Quinlan et al., 2014).

Although there has been recent progress in reducing youth exposure to this serious risk, with national data showing a decline between 1991 and 2013 in the percentage of U.S. high school students reporting past-30-day riding with a drinking driver (RWDD) (39.9% to 21.9%), more than one in five adolescents remain at risk (Kann et al., 2014). In some cases, the driver may be the child/adolescent passenger's parent or other adult family member (Poulin et al., 2007), and studies show that having a child in the home does not decrease the likelihood that a person will drive while impaired (Boyd et al., 2009). However, it is difficult to determine the extent to which parents and other adult family members are putting youth passengers at risk by driving after drinking, as few studies to date have specified the identity of the drivers.

The purpose of this study was to determine the prevalence of adolescents riding in a car with a drinking adult who lives in their home, and to identify youth that may have heightened risk based on their demographic and environmental (i.e., having substance-using household members) profiles. This study was conducted in the primary care office, an opportune setting to screen for, and provide anticipatory guidance to, adolescents and their families to reduce this risk.

Received: May 11, 2016. Revision: August 23, 2016.

This study was supported by National Institute on Drug Abuse Grant R01DA018848 and by the Davis Family Charitable Foundation, the Carl Novotny & Judith Swahnberg Fund, the Ryan Whitney Memorial Fund, and the J. F. Maddox Foundation. Sion K. Harris was also supported by the Leadership Education in Adolescent Health Training Program T71 MC00009 (MCH/HRSA), and by National Institute on Alcohol Abuse and Alcoholism Grants 1R01AA021904, 1R34AA023026, and 1R01AA02243. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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TABLE 1. Items used to assess perceived sibling and parent substance use involvement

Parental substance use involvement
1. I have a parent who gets drunk or high
2. I have a parent who needs treatment for alcohol or drug problems
3. I have a parent whose use of alcohol or other drugs worries me
4. I have a parent who uses alcohol or drugs soon after getting up in the morning
Sibling substance use involvement
1. I have a brother or sister who gets drunk or high
2. I have a brother or sister who uses alcohol or drugs with me
3. I have a brother or sister who uses alcohol or drugs before school or during school
4. I have a brother or sister who uses marijuana

Note: Response scale for all items: *strongly disagree, disagree, agree, strongly agree*.

Method

We analyzed baseline data from a trial of a computer-facilitated substance use screening and clinician brief advice intervention. Study procedures have been described previously (Harris et al., 2012b). Briefly stated, participants were consecutively recruited 12- to 18-year-old patients presenting for routine care at nine primary care practices in three New England states (one managed-care health center, one hospital-based adolescent clinic, one hospital-based family practice, two school-based health centers, two pediatric primary care practices, and two rural family medicine practices). Research assistants contacted families before the visit to explain the study purpose, procedures, and confidentiality protection, and instructed interested patients to arrive 30 minutes before their appointment. At the visit, research assistants obtained participant assent (<18 years) or consent (18 years), and parents gave consent either in person or by phone. All participants completed a computer self-administered assessment battery in a private space before seeing their provider. Participants received a \$15 merchandise gift card on completion. The institutional review boards of Boston Children's Hospital and all recruitment sites approved the study.

Measures

Demographic items included age, gender, race/Hispanic ethnicity, highest parental education level, number of parents in the home, and urbanicity of practice location. To assess RWDD, the first item asked, "In the past 3 months, how many times did you ride with a driver who had been drinking?" followed by four response options (*not at all, once, twice, three or more times*). Those answering "once" were asked, "Was the driver someone who lives with you?" and "Was the driver an adult age 21 or older?" "Yes" to both questions was categorized as riding with a drinking driver who was an adult in the home. For answers of "twice" or "three or more times," we used a branching pattern to ensure that riding with a drinking household member and riding with a drinking adult referred to the same riding instance(s)

and driver(s). We first asked, "How many of those times was the driver someone who lives with you?" (*never, once, twice, three or more times*). Those answering at least "once" were then asked, "How many of those times was the driver an adult, age 21 or older?" Those answering at least "once" to the latter question were categorized as riding with a drinking adult household member. We did not directly ask adolescents whether they had ridden with a "parent" who had been drinking because of ethical concerns regarding identifiability of secondary subjects. We did not assess whether the adolescent had a license allowing independent driving.

To better discern the identity of the "adult in the home," who could be an older sibling or other adult relative rather than a parent/guardian, we examined how strongly having substance-involved parents versus substance-involved siblings predicted riding with a drinking adult household member. We used eight items from the Personal Experience Inventory (Heniy & Winters, 1989) regarding perceived level of alcohol/other drug involvement of parents and siblings (e.g., "I have a parent who gets drunk or high," "I have a brother or sister who gets drunk or high") (see Table 1 for complete list). All items used a 4-point response scale (*strongly disagree, disagree, agree, strongly agree*). Internal consistency reliability was high for both measures in this sample (Cronbach's $\alpha = .86$ for both). Because of skewed data, we created dichotomous variables indicating the presence/absence of substance-involved parents and siblings. The risk was present if an adolescent agreed/strongly agreed with any item in each scale.

Data analysis

Because even one RWDD instance could result in tragedy, we computed risk for any past-3-month riding with a drinking adult household member by collapsing responses into "none" or "any." We computed a prevalence rate for the overall sample and used multiple logistic regression modeling with generalized estimating equations to generate an adjusted relative risk ratio (aRRR) for each predictor variable of interest (i.e., demographics and parental/sibling substance use), while adjusting for all other predictors and accounting

TABLE 2. Percentages and adjusted relative risk ratios for adolescents reporting riding with a drinking driver who was an adult in their home (RWDD-AH), by demographic characteristics and parental/sibling substance use

Demographics	<i>n</i>	RWDD-AH % (<i>n</i>)	Adjusted relative risk ratio ^a [95% CI]	<i>p</i>
Age, in years				.022
12–14	735	8.3 (61)	1.53 [1.04, 2.24]	
15–16	630	9.8 (62)	1.68 [1.14, 2.46]	
17–18	731	6.6 (48)	ref.	
Gender				.005
Girls	1,220	9.8 (120)	1.59 [1.15, 2.20]	
Boys	876	5.8 (51)	ref.	
Race				.037
White	1,353	9.1 (143)	2.57 [1.21, 5.46]	
Hispanic	230	9.6 (22)	2.35 [1.05, 5.27]	
Asian/other	296	5.7 (7)	1.53 [0.66, 3.58]	
Black	217	4.1 (9)	ref.	
Parental education				.015
No college degree	1,054	9.5 (100)	1.47 [1.08, 2.01]	
College degree	973	6.5 (63)	ref.	
Number of parents at home				.939
Two	1,424	7.9 (113)	ref.	
Other	635	8.8 (56)	0.99 [0.70, 1.38]	
Site location				.192
Urban	778	8.0 (62)	ref.	
Suburban	998	7.8 (78)	0.73 [0.51, 1.06]	
Rural	320	9.7 (31)	0.95 [0.60, 1.51]	
Parental use ^b				<.001
Yes	322	22.4 (72)	3.58 [2.63, 4.87]	
No	1,770	5.6 (99)	ref.	
Sibling use ^c				.623
Yes	392	11.7 (46)	1.10 [0.75, 1.63]	
No	1,700	7.3 (124)	ref.	

Notes: Ref. = reference. ^aMultiple logistic regression model adjusted for all significant demographic covariates (age, gender, race, parent education level), parental risk, and sibling risk; ^bparental use: *agree* or *strongly agree* to any of four items about parental substance use; ^csibling use: *agree* or *strongly agree* to any of four items about sibling substance use.

for the multisite sampling design. We used SUDAAN v. 11.0.1 software (RTI International Inc., 2014) for analyses.

Results

Sample characteristics

Of 2,435 invited, 2,096 adolescents (86%) participated in the study. Participant mean age was 15.8 (*SD* = 2) years; 58% were female; 65% were White non-Hispanic; 68% lived with two parents; 46% had at least one college-graduate parent; and 88% were at their annual well-child visit. Nearly one in six adolescents (15.4%) reported substance-involved parents, and nearly one in five (18.7%) reported substance-involved siblings, with moderate overlap between the two (35.5% reporting substance-involved parents also reported substance-involved siblings).

Risky riding

Of 2,096 participants, 470 (22.4%) reported any past-3-month RWDD. Of these 470 participants, 190 (40.4%)

reported riding on any of these occasions with someone living in their home, and 90.5% of those (172/190) more specifically characterized this household member as an adult at least 21 years old. Therefore, the overall prevalence of RWDD that was an adult in the home (RWDD-AH) in the sample was 8.2% (172/2,096), or 1 in 12 adolescents. The drinking driver was an adult household member for more than one third (172/470, 36.6%) of those reporting any past-3-month RWDD.

Demographic factors

Age, gender, race/Hispanic ethnicity, and parental education level were all associated with RWDD-AH risk (Table 2). Not surprisingly, adolescents younger than 16 years old, who are less likely to be able to drive themselves, had significantly higher risk than 17- to 18-year-olds. Girls had higher risk than boys, White non-Hispanic or Hispanic adolescents had higher risk than Black non-Hispanic youth, and those with parents who did not graduate college had higher risk than those with college-graduate parents. Site urbanicity was not a significant predictor.

Parental/sibling substance use

Adolescents reporting substance-involved parents had more than three times the risk of RWDD-AH than those who did not, even after controlling for demographics and sibling substance use ($aRRR = 3.58$, 95% CI [2.63, 4.87]) (Table 2). Although the sibling variable was a significant predictor without the parent variable in the model ($aRRR = 1.45$, 95% CI [1.02, 2.07]), it lost significance after inclusion of the parent variable ($aRRR = 1.10$, 95% CI [0.75, 1.63]), suggesting that parental substance use is the stronger predictor of RWDD-AH risk. We found no interaction effect between the parental and sibling variables (adjusted Wald $F = 1.04$, $p = .31$).

Discussion

This study is among the first to document the substantial involvement of adult household members in adolescent primary care patients' risk of RWDD. More than one in five adolescents in this sample reported past-3-month RWDD, and one third of these youth reported the driver as being an adult household member. Although not identified directly, study results suggest that this driver was likely a parent/guardian rather than an older sibling, since having a substance-involved parent was a strong predictor in adjusted analyses, whereas having substance-involved siblings was not. Of note is that our measure of parental substance involvement asked about a parent appearing noticeably "drunk" or "high," or that the adolescent found worrisome or warranted treatment. The strong association between this measure and adolescent reports of RWDD-AH suggests that those incidents likely involved parental drivers with more substantial levels of drinking, rather than low levels (e.g., no more than a glass of wine with dinner).

Although several prior studies examined adolescents' RWDD (Kann et al., 2014; Li et al., 2014; Poulin et al., 2007; Vaca et al., 2016), we found only one other study that specified riding with an *adult* drinking driver. In 2006, an anonymous survey of 2,594 Canadian 10th–12th graders found a lifetime prevalence of more than 50% reporting ever riding in a car with a drinking driver who was older than age 25 (Leadbeater et al., 2008). Whether the driver was an adult in the home was not discerned.

Girls had more than 50% higher RWDD-AH risk than boys in our study. Prior studies show mixed findings regarding adolescent gender and riding risk, with one study of Canadian adolescents finding higher past-12-month "riding with a drunk driver" rates among girls (Poulin et al., 2007), whereas another in the United States found no increased risk (Vaca et al., 2016). However, a study examining driver licensure trends by gender found that, among individuals younger than age 45, more males held licenses than females (Sivak & Schoettle, 2012), suggesting that fe-

males may be more reliant on other drivers than males. On the one hand, because we did not assess driver licensure, we are unable to determine its contribution to the gender difference. On the other hand, being too young for a driver's license is a likely explanation for greater RWDD-AH risk among younger adolescents.

Race/ethnicity and parental education level were also significant predictors of RWDD-AH risk. Being White non-Hispanic or Hispanic, or having parents who did not complete college, conferred greater risk in our sample. These findings may reflect demographic differences in adult substance use. Previous studies found higher drinking levels among White and Hispanic compared with Black adults (Fesahazion et al., 2012; Pacek et al., 2012), and higher substance use disorder prevalence among non-college graduates compared with college graduates (Substance Abuse and Mental Health Services Administration, 2012). In keeping with this pattern, more White non-Hispanic and Hispanic youth in our sample reported having substance-involved parents compared with other youth (17.3% vs. 9.4%, $df = 1$, $p < .01$, unpublished data). Interestingly, residence urbanicity did not affect RWDD-AH risk in this study, similar to other studies (Leadbeater et al., 2008; Vaca et al., 2016).

Addressing adolescent riding risk is crucial for preventing both current and future harm. A recent longitudinal study of a nationally representative cohort of U.S. 10th graders found that past-12-month riding with an impaired driver predicted a fourfold increase in the odds of riding with an impaired driver in the future, as well as 21-times increased odds of driving while impaired in 12th grade, after potential confounders were adjusted for (Li et al., 2014; Vaca et al., 2016).

Primary care clinicians are well positioned to address riding risk with their adolescent patients and their families. The clinic visit may be one of the few occasions when the adolescent has dedicated confidential time with a responsible adult who can specifically focus on health- and safety-related issues. Similarly, with access to the parent during the clinic visit, clinicians have the opportunity to identify and discuss with the parent familial risks such as maternal depression or parental substance use that may adversely affect their child, as recommended by the American Academy of Pediatrics (Hagan et al., 2008). One study found that one in nine parents bringing his or her child for routine pediatric care screened positive for problematic drinking, and the majority of those parents were accepting of being screened during such visits (Wilson et al., 2008). Thus, clinicians should feel empowered to ask parents about their alcohol use and driving behaviors and can embed a brief screener in a broader environmental risk screening questionnaire.

The CRAFFT, a widely used adolescent substance use screener (Dhalla et al., 2011; Harris et al., 2016; Knight et al., 2002), offers a quick, practical method for screening adolescents for riding risk. A CRAFFT item asks, "Have you

ever ridden in a CAR driven by someone (including yourself) who was 'high' or had been using alcohol or drugs?" This question can help initiate a discussion with the adolescent, exploring with whom and how often. If the adolescent is positive for RWDD-AH, the provider can confidentially explore with the adolescent safe options for discussing the risky drinking-and-driving behavior with the adult household member. Patients can also be advised to call an alternate trusted adult for help when an adult household member is unable to provide safe transportation. To proactively stimulate communication between parents and adolescents about riding and driving risk, and creation of a plan for safe transportation, providers can give the Contract for Life (Students Against Destructive Decisions, 2005) (available at www.crafft.org/contract). This document serves as a contract between parents and adolescents whereby the adolescent pledges to never drive after drinking or ride with a drinking driver, and parents pledge to do the same and ensure the adolescent safe transportation home. A preliminary primary care-based study found that this approach showed promise for reducing adolescents' self-reported rates of RWDD (Harris et al., 2012a).

Study results should be viewed with some caveats. The study was conducted in New England primary care practices; thus, results may not be representative of other areas or other adolescent populations. Data relied on self-report, which may be prone to social desirability or recall bias. However, study participants self-administered the items on a laptop computer in a private space, and prior studies have shown that computer self-administration is associated with higher adolescent disclosure of sensitive behaviors (Brenner et al., 2003). The recall timeframe used was 3 months, which may be more prone to recall error than shorter timeframes (e.g., past 30 days). Finally, the riding risk items asked about a driver "who had been drinking" and did not specify timing of the drinking relative to the driving, amount of drinking, or level of impairment from drinking.

In conclusion, for a substantial proportion of adolescent primary care patients riding with a drinking driver, the driver is a parent or other household adult, suggesting an important target for screening and counseling by pediatric care providers. More studies are needed to determine generalizability of these findings and to identify effective practical strategies for providers to mitigate this risk and prevent tragedy. The development of such strategies is increasingly important in light of recent evidence that adult drugged-driving rates are on the rise (Berning et al., 2015).

Acknowledgments

The authors thank the following members of the Boston Children's Hospital Center for Adolescent Substance Abuse Research, Boston, MA, for their role on the original study from which these data derive: John Rogers Knight, Jr., M.D. (grant principal investigator) and Shari Van Hook,

P.A., M.P.H. (program manager). We thank the physicians and staff of the New England Partnership for Substance Abuse Research for assistance with study implementation (each practice received compensation for study involvement), and the adolescent patients who agreed to participate and their parents who gave permission. Sion K. Harris had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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