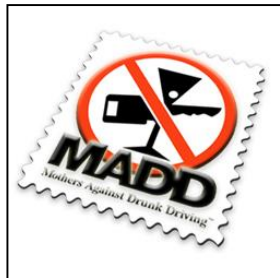


# The Impact of Childhood Symptoms of Conduct Disorder on Driving after Drinking in Adulthood



Christine M. Wickens, Robert E. Mann, Evelyn Vingilis,  
Anca Ialomiteanu, Patricia Erickson, Maggie E. Toplak,  
Nathan Kolla, Gina Stoduto, and Mark van der Maas

# Drink-Driving in Canada

- In 2010, 31% of fatally injured drivers in Canada had a blood alcohol concentration (BAC) over the legal limit of .08 (TIRF, 2013)
- 2,733 persons were seriously injured and 984 persons died in alcohol-related crashes
- Impact of substance use disorders on drink-driving has been well-researched
- Association between other mental health disorders and drink-driving has received less empirical attention



# Conduct Disorder (CD)

- Characterized by extreme externalizing behaviour
- Diagnosed based on a prolonged pattern of antisocial behaviour that involves the violation of the basic rights of others or major age-appropriate societal norms and rules
- Typically emerges early in childhood/adolescence



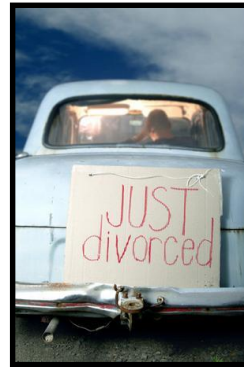
# Conduct Disorder (CD)

- Associated with 4 types of antisocial behaviour:
  - Aggressive conduct that causes or threatens physical harm to other people or animals
  - Nonaggressive conduct that causes property loss or damage
  - Deceitfulness or theft
  - Serious violations of rules
- Prevalence ranges from 2% to more than 10%, with a median estimate of 4%



# Conduct Disorder (CD)

- Associated with:
  - Earlier mortality
  - Lower educational attainment
  - Greater unemployment or financial difficulty
  - Greater involvement with criminal activity
  - Increased sexual risk-taking
  - Increased risk of separation/divorce
  - Lower levels of peer support, life satisfaction, coping skills, and global functioning



# CD and Driver Behaviour

- Cohort and longitudinal studies in New Zealand, Australia, and USA:
  - Young adults with a history of CD are more likely to drive above the speed limit, to drive more than 25 km/h above the speed limit, to be charged with a driving offence, and to be involved in a collision

(Begg et al., 1999; Fergusson et al., 2003; Nada-Raja et al., 1997; Thompson et al., 2007; Vassallo et al., 2007; Woodward et al., 2000)

- Quasi-experimental studies examining naturally-occurring groups of drivers:
  - Lifetime and current diagnoses of CD are associated with driving without a licence, crash-related injuries, traffic citations, and problems with driver aggression

(Barkley et al., 1993; Malta et al., 2005)



# CD and Driver Behaviour

- Population-level case-control study:
  - A history of disruptive behaviour disorders , including CD, was associated with a one-third increase in the relative risk of serious road trauma  
(Redelmeier et al., 2010)
- Population-level survey:
  - Symptoms of CD before age 15 years more than doubled the odds of perpetrated driver aggression as an adult, aged 18 years and older  
(Wickens et al., 2015)



# CD and Impaired Driving

- Increased consumption of alcohol is significantly related to a history of CD.
- Higher prevalence of lifetime CD found in repeat drink-driving offenders relative to the general population; prevalence rates rise with increasing numbers of drink-driving arrests.  
(Laplante et al., 2008; McCutcheon et al., 2009; Shaffer et al., 2007)
- A case-control study in Finland linked impaired driving charges to medical records of 18-21 year-olds; childhood and adolescence disorders, including CD, were associated with increased odds of alcohol- and drug-impaired driving.

(Karjalainen et al., 2013)





# CD and Impaired Driving

- In a roadside survey in Brazil , antisocial personality disorder (APD) was associated with substance use while driving.
  - Some cases of CD persist into adulthood, developing into APD

(Faller et al., 2012)



# Purpose of the Current Study

- Despite informative findings within the existing research:
  - Outcomes are typically assessed only up to age 21 years
  - Few studies examine this association using population-level data
- Study Purpose: To assess relationship between symptoms of CD during childhood and risk of engaging in drink-driving behaviour during adulthood, using a population-level dataset.
- Analysis Included:
  - Variables previously identified as risk factors for drink-driving (i.e., demographic variables, problem substance use)
  - Screening measure for possible ADHD (commonly comorbid with CD)

# Sample: CAMH Monitor

- 2011-2013 cycles of CAMH Monitor
- A repeated cross-sectional telephone survey of Ontario adults aged 18 years and older
- Employs random-digit-dialling methods via Computer Assisted Telephone Interviewing, by which it accesses landline and cellular telephones, including newly listed and unlisted numbers.
- Uses regional stratification and consists of independent quarterly samples of approximately 750 completions each
- The response rate varied from 48 to 51%
- Sample included responses from 5,299 respondents who reported having driven a vehicle in the past year



# Outcome Variable

- Self-Reported Drink-Driving Behaviour:
  - “During the past 12 months, have you driven a motor vehicle after having two or more drinks in the previous hour?”  
(coded no/yes)



# Predictor Variables

- Demographics (sex, age, marital status, education, region of residence)
- Weekly driving distance
- Alcohol Use Disorders Identification Test (AUDIT)
- Adult ADHD Self-Report Scale – V1.1



# Predictor Variables: Childhood Symptoms of CD

- Symptoms of CD were assessed with 5 items taken from the DSM-IV-TR assessment for APD
  - A diagnosis of APD requires evidence of CD with onset before age 15 years.
- “Before you were 15 years old, did you:
  - (1) repeatedly skip school or run away from home overnight?
  - (2) repeatedly lie, cheat, or steal?
  - (3) start fights or bully, threaten, or intimidate others?
  - (4) deliberately destroy things or start fires?
  - (5) deliberately hurt animals or people?
- Participants who responded ‘yes’ to at least 2 questions were classified as likely having had CD as a child.



# Analyses

- Design-based analyses were conducted using Taylor Series Linearization found in STATA11 software. Thus, all estimates and statistical tests were corrected for the sampling design.
- Item missing data (i.e., “don’t know” responses and refusals) were excluded listwise from all analyses.
- The weighted sample size was used when reporting percentages
  - The estimates are representative of the population surveyed.



# Univariate Results

- Prevalence of probable CD before age 15 years: 7.4%
- Prevalence of drink-driving: 5.6%



**DRINK  
DRIVE**

# Univariate Analyses

- Self-reported drink-driving was more prevalent among males.
- Marginally significant finding suggesting that drink-driving was more prevalent among the youngest drivers aged 18-34 years and those who were previously married

Variable	<i>n</i>	Drink-driving (% Yes)	95% CIs
Sex		***	
Female	3014	1.78	1.27, 2.50
Male	2265	9.43	8.08, 10.98
Age			
18-34 years	642	7.34	5.39, 9.93
35-54 years	1960	5.38	4.30, 6.71
55+ years	2582	4.90	4.01, 5.97
Marital Status			
Married/partner	3507	5.00	4.23, 5.90
Previously married	1055	7.61	5.38, 10.66
Never married	667	6.86	4.80, 9.71

# Univariate Analyses

- Motorists who self-identified as engaging in drink-driving behaviour reported a greater number of kilometres driven weekly.
- Drink-driving was more prevalent among those reporting harmful or hazardous levels of alcohol consumption, and among those reporting 2 or more childhood symptoms of CD.

Variable	<i>n</i>	Drink-driving (% Yes)	95% CIs
Km driven-typical week (100s) <sup>e</sup>		*	
mean (SD) Drink-driving <sup>a</sup> No	4433	2.89	2.74, 3.03
Drink-driving <sup>a</sup> Yes	254	4.14	3.04, 5.24
Alcohol (AUDIT)		***	
Not hazardous or harmful	4590	3.20	2.63, 3.89
Hazardous or harmful	542	21.30	17.33, 25.89
Probable CD before age 15 years		***	
No (< 2 symptoms)	4882	5.08	4.35, 5.92
Yes (2+ symptoms)	341	12.18	8.43, 17.29

# Multivariate Analyses

- A binary logistic regression analysis with simultaneous entry of all variables
- Males had an almost 4-fold increase in the odds of reporting drink-driving behaviour.
- Previously married drivers faced odds of drink-driving that were more than double those of married drivers.
- Age was not a significant predictor, but it is possible that age and marital status accounted for common variance in drink-driving behaviour.

Variable	Drink-driving OR	95% CIs
Sex (ref. = female)	3.72***	2.46, 5.63
Marital Status (ref. = married)		
Previously married	2.52***	1.59, 3.99
Never married	.98	.57, 1.68
Alcohol (AUDIT) (ref = not hazardous or harmful)	5.81***	4.03, 8.38
Probable CD before age 15 years (ref. = no)	1.67*	1.00, 2.79

# Multivariate Analyses

- Problem drinkers faced an almost 6-fold increase in the odds of drink-driving.
- Drivers reporting childhood symptoms of CD faced a 67% increase in the odds of self-reported drink-driving relative to drivers without CD symptoms.
- Thus, aggression in childhood and antisocial behaviour in adolescence represent a behavioural pattern that can later manifest itself in drink-driving during adulthood.

Variable	Drink-driving OR	95% CIs
Sex (ref. = female)	3.72***	2.46, 5.63
Marital Status (ref. = married)		
Previously married	2.52***	1.59, 3.99
Never married	.98	.57, 1.68
Alcohol (AUDIT) (ref = not hazardous or harmful)	5.81***	4.03, 8.38
Probable CD before age 15 years (ref. = no)	1.67*	1.00, 2.79



# Limitations

- Data are derived from a cross-sectional population survey; cause-and-effect conclusions cannot be drawn.
- Data were collected through self-report, which may have introduced bias:
  - Underreporting of drink-driving due to socially desirable responding
  - Difficulty recalling incidents of conduct problems prior to age 15 years, particularly among older participants for whom more time had passed
- Telephone surveys are limited by the unavoidable exclusion of certain groups



# Implications

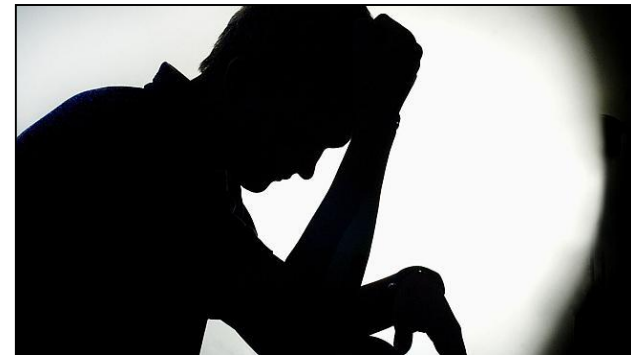
- Interventions for CD are diverse (e.g., home, school, and community-based programs)
- Special attention within any selected treatment should be paid to impaired driving.
- Given the antisocial nature of individuals with CD, and their disdain for the law and authority, curriculum delivered by authority figures (e.g., police officers) may not be effective for this group.
  - Instead, a mixture of strategies may be needed to maximize effectiveness.



# Future Directions

- Pennsylvania researchers published a secondary analysis of data from a randomized control trial that examined an intervention for drivers who screened positive for risky driving and problem drinking.
  - Using SEM, these researchers examined relationship between conduct behaviour problems before and after age 15 years, depressive symptoms, sleep, problem drinking, and a combination of risky driver behaviours.
  - Final models were very complex, but highlighted depressive symptoms as an intermediary pathway between conduct problems and drink-driving.

(McDonald et al., 2015)



# Future Directions

- Thus, future research needs to consider variables that may mediate the relationship between CD and drink-driving behaviour, including personality and other symptoms of psychopathology.
- Also valuable to determine if the observed impact of CD on both driver aggression and drink-driving seen in the CAMH Monitor dataset translates into an increase in MVCs.

