

# Underage Hazardous Drinking and Failure to Graduate from High School: Results from the National Longitudinal Survey of Adolescent Health (Add Health)

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# Introduction

## Underage Drinking is a National Problem

- High rates among American youth (ages 12-20)
  - ❖ About 11 million (29%) reported alcohol use in the past month.
  - ❖ About 7 million (20%) reported binge drinking in the past month (drank 5+ drinks on the same occasion) (SAMHSA, 2004).
  
- Health and safety consequences are well known
  - ❖ Injury and death
  - ❖ Risky sexual behaviors
  - ❖ Other drug use
  - ❖ Learning and memory disruption
  - ❖ Functional neurological deficits (Ziegler et al., 2005)
  
- *Surgeon General's Call to Action to Prevent and Reduce Underage Drinking (2007)*

# Dropping Out of High School is also a National Problem

- High rates among American youths
  - ❖ About 5% of 10<sup>th</sup>-12<sup>th</sup> graders dropout each year.
  - ❖ 15% of adolescents will dropout overall (NCES, 2000).
- Dropping out is associated with poor labor and social outcomes including:
  - ❖ Decreased income and occupational status
  - ❖ Living in poverty and receiving public assistance
  - ❖ Unemployment
  - ❖ High crime (Child Trends, 2006)

# A Relationship between Drinking and Dropping Out?

## Cross-Sectional Studies

- Yes: a large number of cross-sectional studies have found a clear association between alcohol use and dropping out (Aloise-Young and Chavez, 2002; Fagan and Pabon, 1990).
- Methodology: Examine rates of substance use and other covariates in adolescent dropouts versus those still in school.
- Example: Fagan and Pabon (1990) found that, after controlling for a number of covariates, alcohol use was higher among inner city youths who dropped out versus those that did not drop out.
  - ❖ Results are limited to a community sample.
- Disadvantage of cross-sectional studies: difficult to determine if drinking caused dropping out or vice versa because it is unknown which came first.

# A Relationship between Drinking and Dropping Out?

## Longitudinal Studies

- Advantages: Permits researchers to examine causal pathways since the relative timing of alcohol use and dropping out is clear.
- Methodology: Examine alcohol use while adolescents are in school (t1) and whether they subsequently dropped out (t2).

# A Relationship between Drinking and Dropping Out?

## Longitudinal Studies

### ➤ Limited number of alcohol studies

- ❖ A recent review of articles from 1990-2006 found that only 8 of 24 longitudinal studies examined alcohol per se (Townsend et al., 2007).
- ❖ The other studies examined:
  - Marijuana or cigarette smoking exclusively.
  - Aggregated measures of “substance use” (mix of alcohol + other drugs)
    - Cannot determine the specific contribution of alcohol to dropping out.

# A Relationship between Drinking and Dropping Out?

## Longitudinal Studies

- Findings from alcohol studies are equivocal:
  - ❖ For example, Wichstrom (1998) found that frequency of alcohol intoxications significantly predicted subsequent dropping out in a nationally representative sample of Norwegian adolescents.
  - ❖ Ellickson et al. (1998), however, did not find a significant relationship between frequency of alcohol consumption and dropping out in a U.S. 7th grade community sample.

# A Relationship between Drinking and Dropping Out?

## Longitudinal Studies

- Methodological variations may impact risk of dropping out:
  - ❖ Varying measures of alcohol use
    - Any use vs. drinking patterns (intoxications/month)
  - ❖ Different threshold employed for various measures
    - Some alcohol use is quite normative.
    - Higher thresholds of use are more likely to be associated with dropping out.
  - ❖ Limited numbers and types of covariate controls
    - Significant results may become non-significant after controlling for key antecedents and potential mediators.



# A Relationship between Drinking and Dropping Out?

## Longitudinal Studies

- Limitations:
  - ❖ Use of community samples: results are not generalizable to the national population.
  - ❖ Use of older datasets (from the 1980's).

## Goal of the Present Study

- To extend the current literature by exploring whether hazardous drinking is associated with subsequent dropping out of high school using a dataset that is:
  - ❖ Recent
  - ❖ Nationally representative
  - ❖ Longitudinal
  - ❖ Comprehensive
    - Many important covariates can be measured
  - ❖ Large
    - Sufficient statistical power to allow for many covariates to be included in a single model

# Methods

## Data

- The National Longitudinal Study of Adolescent Health (Add Health)
  - ❖ Largest, most comprehensive survey of adolescents ever undertaken (CPC, 2005).
  - ❖ Initiated in 1994 under a grant from the National Institute of Child Health and Human Development (NICHD) with co-funding from 17 other federal agencies.
  - ❖ Longitudinal design using nationally representative data
  - ❖ Collects information on a wide range of adolescent behaviors and risk factors from adolescence into young adulthood.

# Data

## Sampling Frame

- School-based sampling frame:
  - ❖ Selected 80 high schools that are representative of US high schools with respect to region, urbanicity, size, type, and ethnicity.
  - ❖ Participating high schools identified 52 feeder junior high schools that sent at least five graduates to that high school.
  - ❖ 132 schools in the study

# Data

## Survey Design

- ❖ An initial school survey (1994-1995 school year)
  
- ❖ 3 home surveys:
  - Wave I (1995)
  - Wave II (1996)
  - Wave III (2001-2002)

# Data

## Study Sample

- Study sample includes respondents who participated in Waves I and III.
- Wave I: 6,355 interviewed (grades 7-12)
  - ❖ Sociodemographic variables and risk factors for dropping out assessed.
- Wave III: 4,786 (75%) were re-interviewed 7 years later
  - ❖ Information was collected to determine drop-out status (in-school status; receipt of diploma or GED).
- Exclusions:
  - ❖ Not in school at Wave I = 71
  - ❖ Still in high school at Wave III = 22
  - ❖ Missing drop-out status data = 53
- Final study sample (N=4,640)

# Measures

## ➤ Drop-out Status (Wave III)

- ❖ Graduated – with a high school diploma (coded 0)
- ❖ Dropped-out – did not receive high school diploma or received a GED (coded 1)

## ➤ Sociodemographic variables (Wave I)

- ❖ Gender
- ❖ Grade
- ❖ Race/ethnicity
- ❖ Parents receive public assistance (proxy for income)
- ❖ Parent education
  - Highest level attained of mother or father

# Measures

- 5 other classes of risk and protective factor variables (Wave I)
  - ❖ All have been theorized to be associated with dropping out and/or have received empirical support in the literature (Reiff, 1998):
    - Substance use
    - School-related
    - Child-parent relationship
    - Peer-related
    - Psychosocial



# Measures

## Substance Use

Variable Name	Question / Description
Binge Drinking (past year)	Frequency of drinking 5 or more drinks per occasion
Drug Use (days/month)	
Cigarette Smoking (days/month)	

# Measures

## School-Related

Variable Name	Question / Description
Coursework Grade Average	Mean of 4 subject items: English, Math, History/Social Studies, Science
Truant (past year)	
Repeated Grade (ever)	
Suspended or Expelled (ever)	
School Problems	Sum of 4 school-problem items (occurring $\geq$ once a week) (e.g., trouble getting along with teachers, with other students)
School Connectedness	Mean of 6 items (5-point Likert agreement scales) (e.g., feel close to people at school, feel part of school)
Child Expects to Attend College	"How likely is it you will go to college?" (5-point Likert scale)
Parent Expects Child to Graduate from High School	Mean of mom/dad ratings: "How disappointed would your [parent] be if you did not graduate from high school?" (5-point Likert scale)

# Measures

## Child-Parent Relationship

Variable Name	Question / Description
Parental Bond	Mean of 5 items (5-point Likert agreement scales) (e.g., warm and loving, satisfied with communication)
Parental Involvement (past month)	Sum of 11 activities with parent (e.g., gone to entertaining event, talk about school).

## Peer-Related

Variable Name	Question / Description
Best Friend Does Not Attend School	
Best Friends Drink Alcohol	"Of your 3 best friends, how many drink alcohol at least once a month?"

# Measures

## Psychosocial

Variable Name	Question / Description
Depression (past week)	Sum of 19 items (3-point Likert frequency scales) (e.g., felt blue, poor appetite). Depressed cut-off (Shrier et al., 2002); Divided non-depressed into equal groups - Low, Medium, High.
Self-Esteem	Mean of 6 items (5-point Likert agreement scale) (e.g., proud, like self, do everything right)
Sensation Seeking	Mean of 2 items (5-point Likert agreement scale): try new things for thrills, look for excitement (Wave III)
Impulsive Decision Making	Mean of 4 items (5-point Likert agreement scale) (e.g., doesn't research solutions to problem, doesn't evaluate outcomes of decisions)
Delinquency (past year)	Sum of 15 items (non-substance use behaviors) (e.g., vandalism, shoplift)

## Analysis

- All continuous measures, except Parental Involvement, were transformed into categorical variables to facilitate interpretation and to show any non-linear relationships.
- The weighted prevalence of all variables was calculated.

## Analysis

- Bivariate cross-tabulations were run to determine the prevalence of dropping out by each predictor. Chi-squared tests were conducted to determine bivariate statistical significance.
- Significant variables were included in a single logistic regression model. Odd ratios (ORs) were estimated for each predictor, net of other predictors in the model.
- All analyses were conducted using SUDAAN to account for the complex sampling design of Add Health.

# Results

## Prevalence of Key Variables

### ➤ Dropout Status

- ❖ **17% of the sample dropped out by Wave III**
  - 9.9% dropped out with no high school diploma
  - 7.1% dropped out and later received a GED

### ➤ Binge Drinking

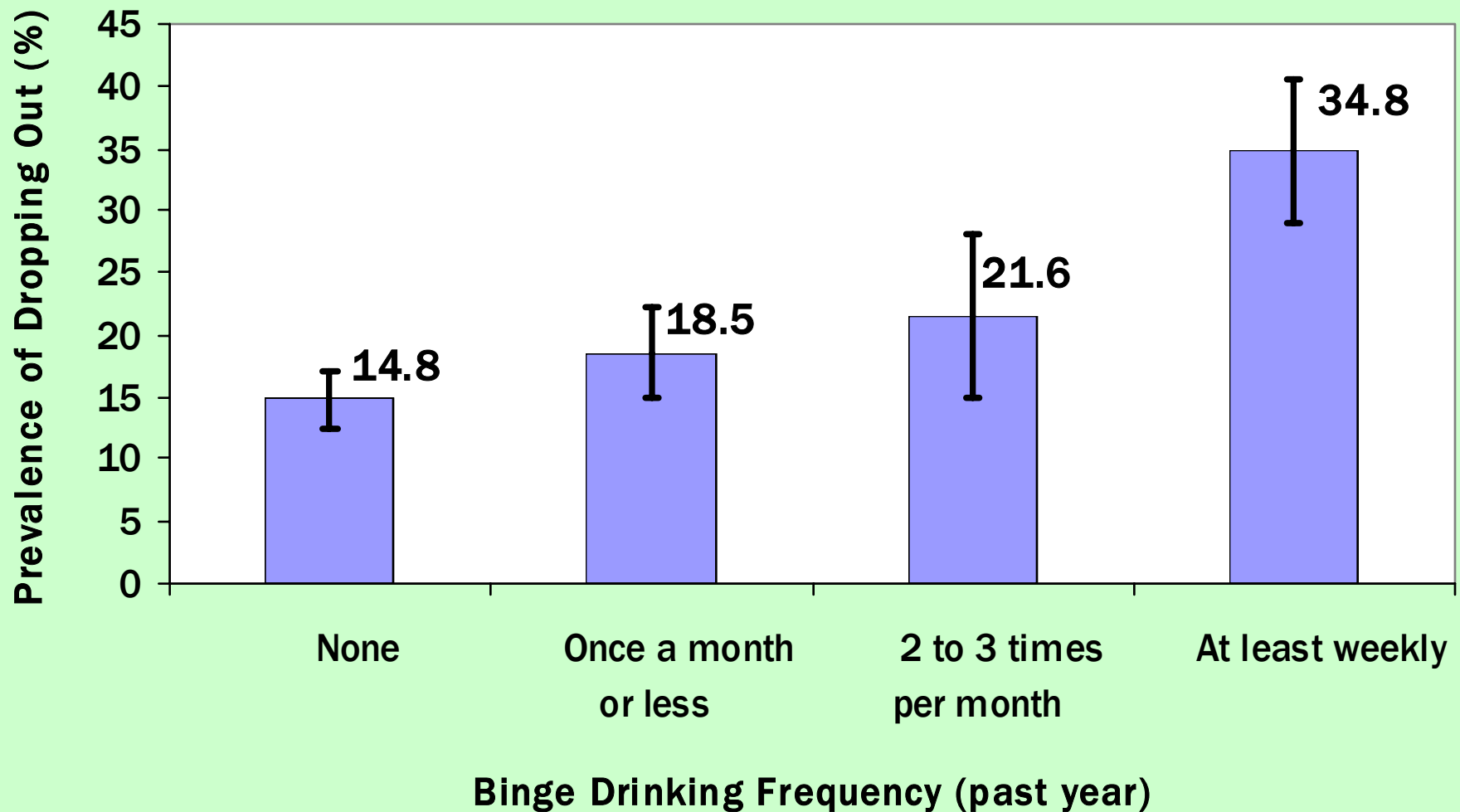
<u>Binge Drinking (frequency 5+ - past year)</u>	<u>N</u>	<u>%</u>	<u>SE</u>
None	3464	74.1	1.29
Less Than or Equal to Once a Month	668	15.0	0.83
2 to 3 Times per Month	199	4.6	0.40
At Least Weekly	266	6.4	0.53
<b>Total</b>	<b>4597</b>	<b>100.0</b>	<b>1.08</b>

## Bivariate Association Results

- All measures were significant bivariate predictors of dropping out ( $p < .05$ ) (in the expected directions),
  - ❖ Except Parental Bond ( $p = .35$ ) and Impulsive Decision Making ( $p = .53$ ).
- Prevalence of dropping out among Substance Use variables are as follows...

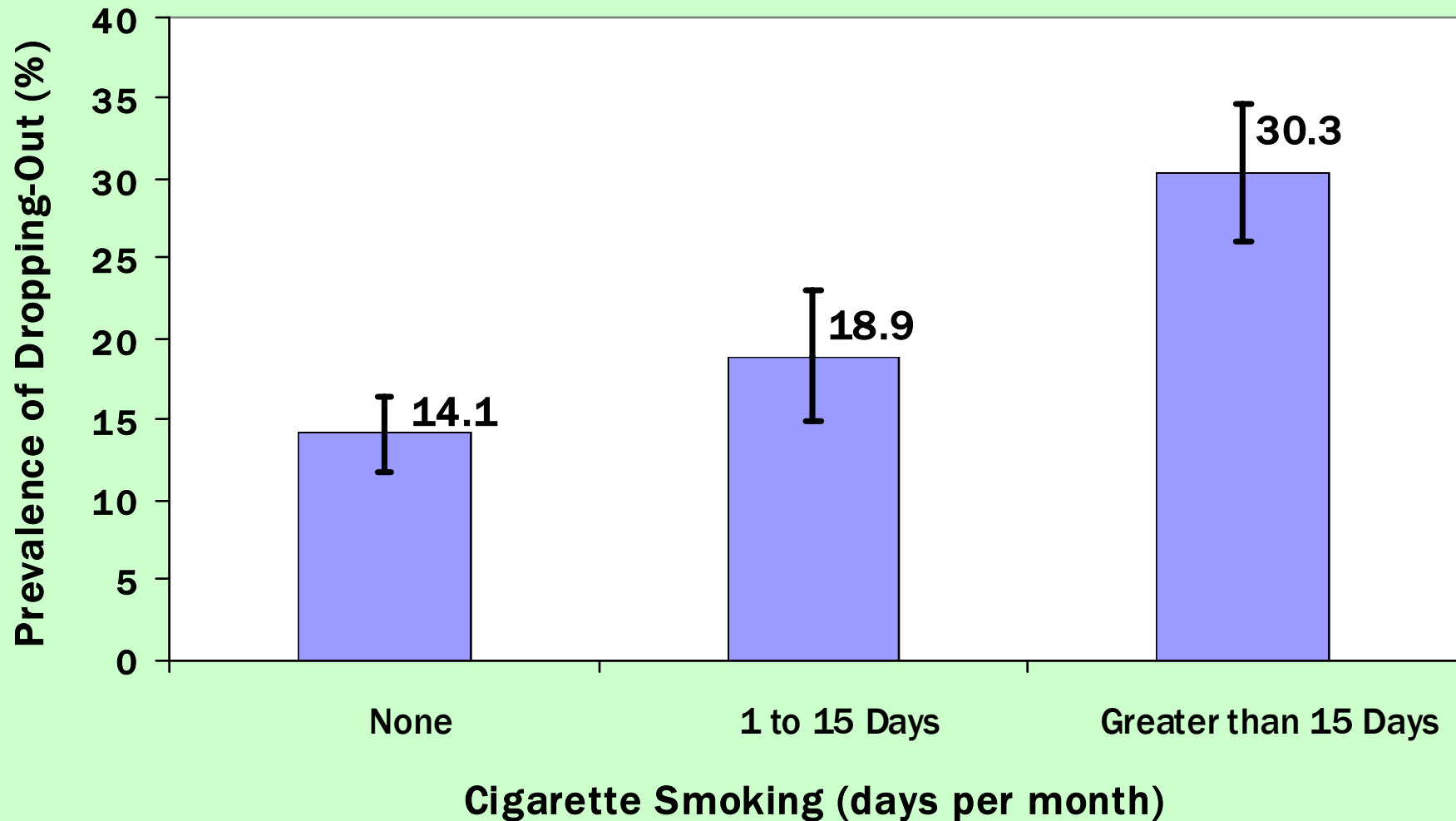


## Prevalence of Dropping Out by Binge Drinking Frequency



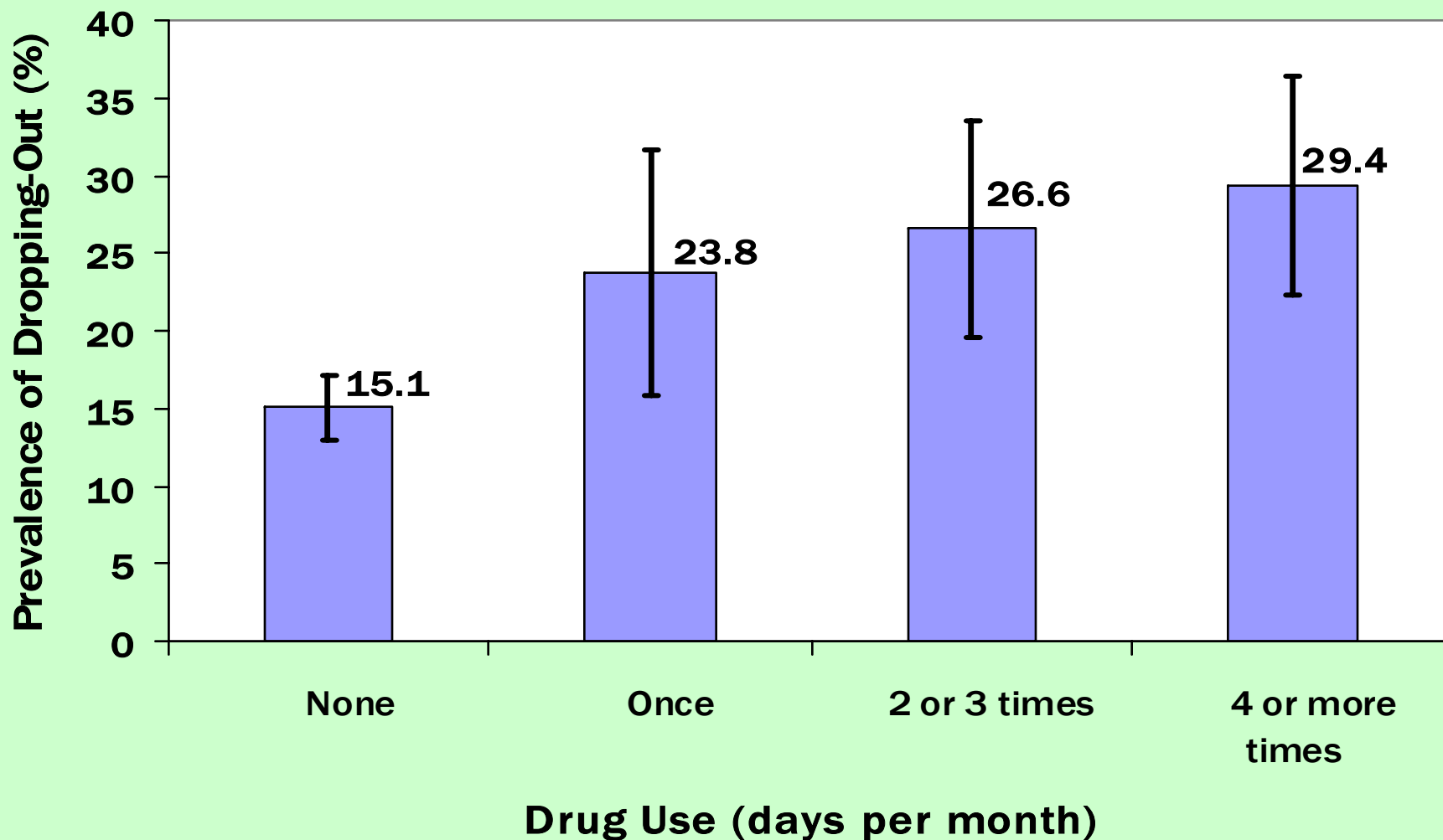
- Weekly binge drinkers were 2.4 times more likely to dropout than non-binge drinkers.

## Prevalence of Dropping Out by Cigarette Smoking Frequency



- Heavy smokers (15+ days/month) were 2.2 times more likely to dropout than non-smokers.

## Prevalence of Dropping Out by Drug Use Frequency



- Heavier drug users (4+ days/month) were 1.9 times more likely to dropout than non-drug users.

## Logistic Regression Results

- Variables from 4 of the 6 classes were significantly associated with dropping out:
  - ❖ Sociodemographic characteristics
  - ❖ School-related variables
  - ❖ Parent-related variables
  - ❖ Substance use variables
- Not significant classes:
  - ❖ Peer-related variables
  - ❖ Psychosocial variables

# Logistic Regression Model: Significant Predictors of Dropping Out

Variable Category	Variable	Dropped-out	
		OR	95% CI
Sociodemographic	<u>Grade</u>		
	7	1 (referent)	
	8	0.95	0.63 – 1.44
	9	0.75	0.48 – 1.16
	10	0.39	0.25 – 0.61
	11	0.23	0.14 – 0.36
	12	0.12	0.06 – 0.23
	<u>Parents Receive Public Assistance</u>		
	No	1 (referent)	
	Yes	1.61	1.09 – 2.38
	<u>Parent Education</u>		
	Less than high school	1 (referent)	
	GED or high school diploma	0.53	0.37 – 0.74
Associates degree or some college	0.40	0.26 – 0.61	
College or graduate degree	0.30	0.20 – 0.44	

Blue highlight (p<.05)

# Logistic Regression Model: Significant Predictors of Dropping Out

Variable Category	Variable	Dropped-out	
		OR	95% CI
School-Related	<u>Coursework Grade Average</u>		
	D or lower	1 (referent)	
	C	0.41	0.26 – 0.66
	B	0.24	0.15 – 0.38
	A	0.13	0.06 – 0.25
	<u>Truant (past year)</u>		
	No	1 (referent)	
	Yes	1.65	1.29 – 2.11
	<u>Repeated Grade (ever)</u>		
	No	1 (referent)	
	Yes	2.39	1.89 – 3.03
	<u>Suspended or Expelled (ever)</u>		
	No	1 (referent)	
	Yes	1.74	1.25 – 2.43

Blue highlight (p<.05)

# Logistic Regression Model: Significant Predictors of Dropping Out

Variable Category	Variable	Dropped-out	
		OR	95% CI
School-Related	<u>Child Expects to Attend College</u>		
	Strongly disagree	1 (referent)	
	Disagree	0.60	0.29 – 1.22
	Neither agree or disagree	0.64	0.39 – 1.05
	Agree	0.41	0.23 – 0.71
	Strongly agree	0.41	0.24 – 0.68
	<u>Parent Expects Child to Graduate from High School</u>		
	Low	1 (referent)	
	Medium	2.49	1.19 – 5.22
	High	1.03	0.64 – 1.64

Blue highlight (p<.05)

# Logistic Regression Model: Significant Predictors of Dropping Out

Variable Category	Variable	Dropped-out	
		OR	95% CI
Parent-Related	Parental Involvement (# activities - past month)	0.93	0.87 – 0.99
Substance Use	<u>Cigarette Smoking (times per month)</u>		
	None	1 (referent)	
	1 to 15 Days	0.89	0.59 – 1.34
	Greater than 15 Days	1.56	1.07 – 2.29
	<u>Binge Drinking (frequency past year)</u>		
	None	1 (referent)	
	Once a month or less	0.99	0.70 – 1.41
2 to 3 times per month	1.06	0.58 – 1.92	
At least weekly	2.00	1.24 – 3.20	

Blue highlight (p<.05)



# Conclusion

- **Weekly binge drinking among adolescents doubles their risk for subsequent failure to complete high school, even after taking into account a multitude of confounding factors.**
- **Dropout prevention efforts can be tailored to target the specific risky characteristics and behaviors found in the present study.**

# Limitations and Future Directions

- The present study found an association between binge drinking and subsequent dropping out. However, it did not reveal how binge drinking might cause dropping out to occur.
- Dropping out is a complex phenomenon
  - ❖ There is a “bewildering number and diversity” of determinants (Rosenthal, 1998: p.422).
  - ❖ Potentially complex interplay between them

- **Several mediators between substance use and dropping out have been found in the longitudinal literature, including:**
  - ❖ **Decreased motivation**
  - ❖ **Social sanctions (suspended/expelled)**
  - ❖ **Age-appropriate adoption of social roles (marriage/pregnancy) (Kaplan et al., 1994)**
  
- **Future studies should investigate other potential mediators that might reveal the mechanisms underlying the significant relationships found in the present study.**
  - ❖ **The authors are beginning a study with this aim using Wave II Add Health data.**

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