

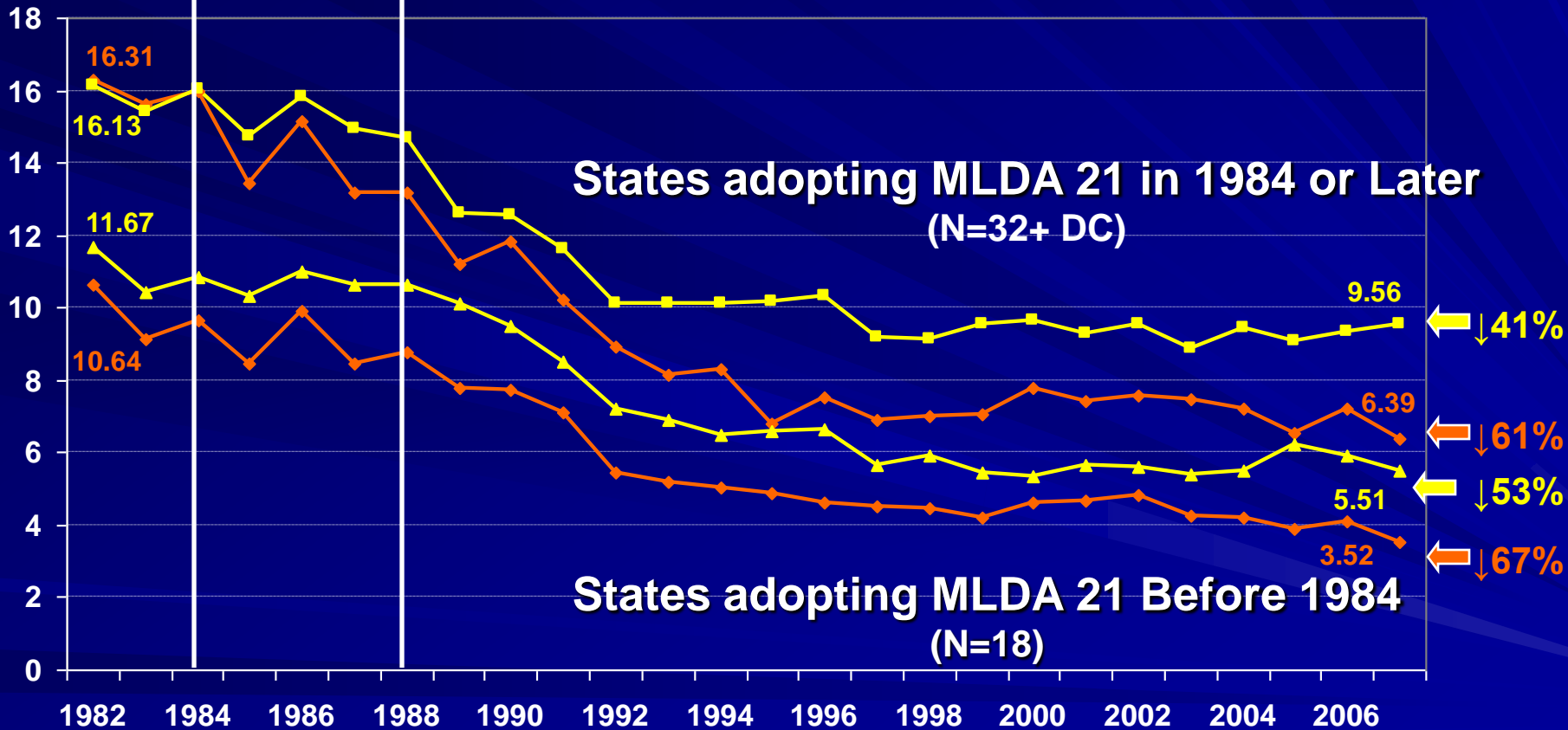


# Drivers in Fatal Crashes with Positive Blood Alcohol Concentrations, Rate per 100,000, Ages 18-20 vs. 21-24, 1982-2007, States adopting MLDA 21 Before 1984 vs. in 1984 or Later

National Institute on Alcohol Abuse and Alcoholism

U.S. MLDA Age 21 law

MLDA 21 in all 50 states



Sources: U.S. Fatality Analysis Reporting System, 2009; U.S. Census Bureau, 2009



# Legal Drinking Age Changes

- CDC reviewed 49 studies published in scientific journals
- Alcohol-Related Traffic Crashes:
  - Increased 10% when the drinking age was lowered
  - Decreased 16% when the drinking age was raised

Source: Shults et al., [American Journal of Preventive Medicine](#), 2001

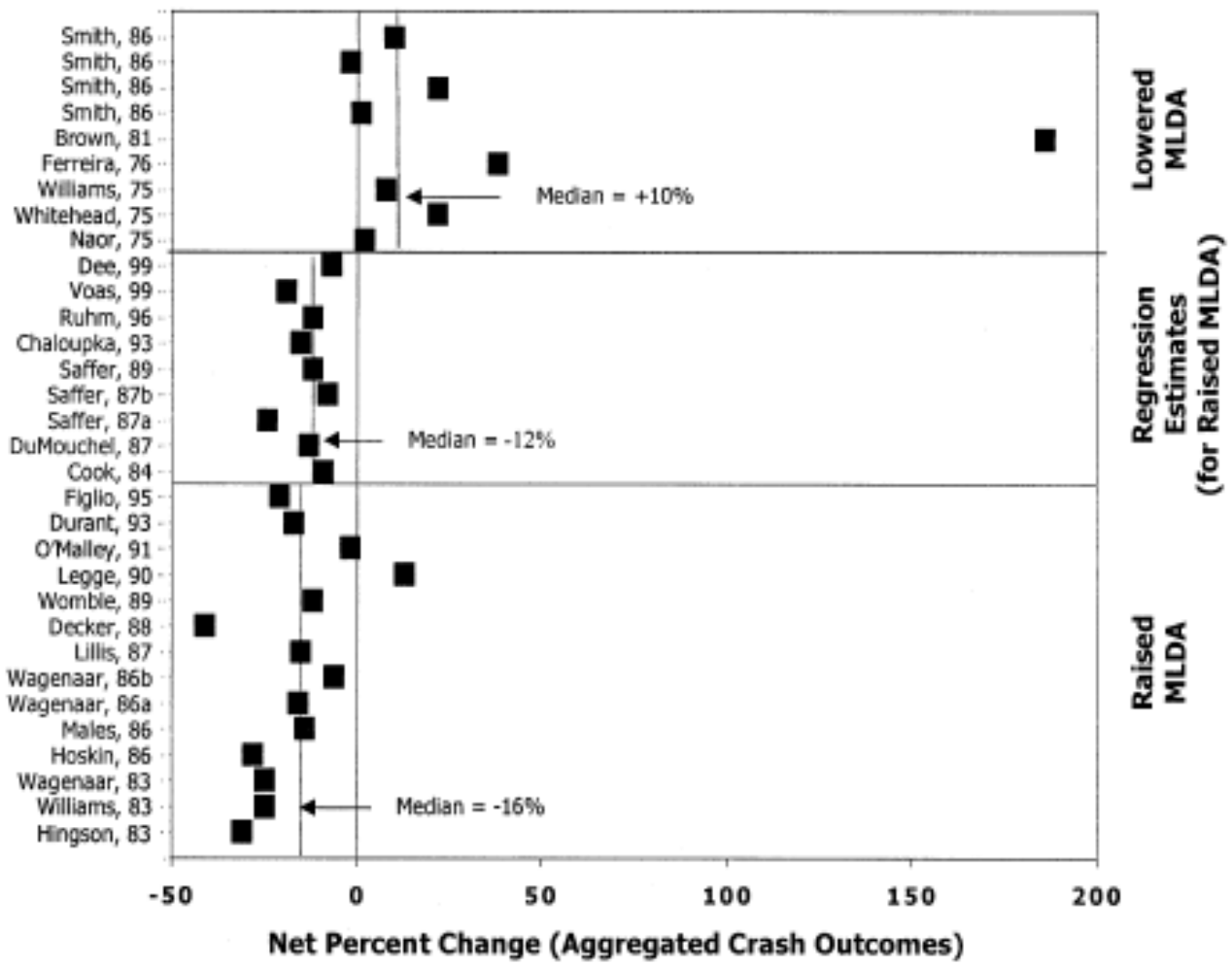


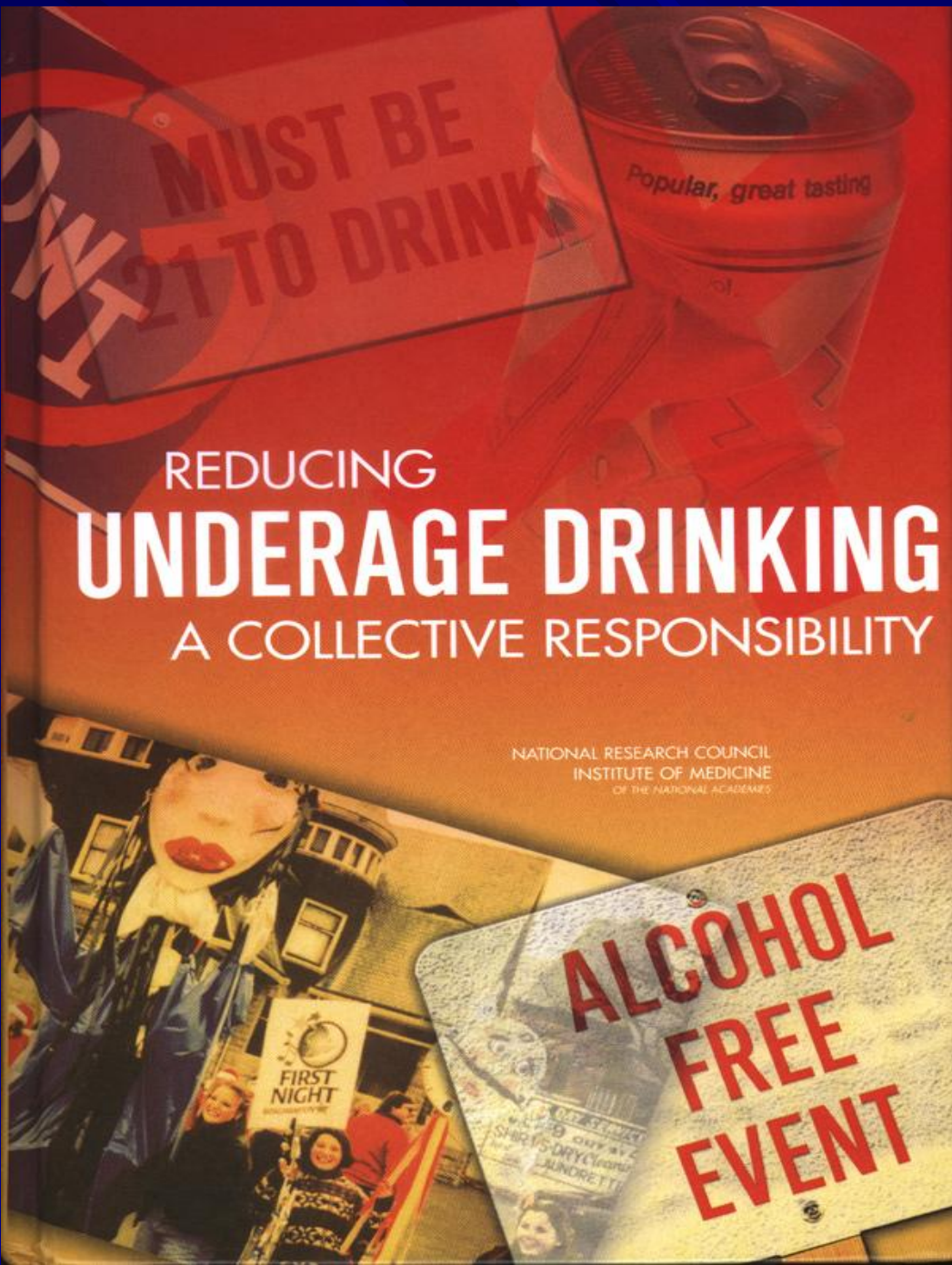
Figure 3. Percent change in aggregated crash outcomes after changes in the MLDA. The "a" and "b" in study names refer to the first or second study by the same author in that year, included in this review. Listed studies for which the author name and year are identical come from a single paper.<sup>60</sup>



## O'Malley & Wagenaar

# Effects of Minimum Drinking Age Laws on Alcohol Use Related Behaviors and Traffic Crash Involvement Among American Youth: 1976-1987 *J Stud Alcohol*, 1991

- **Methods:**
  - Analysis of Monitoring the Future surveys and the Fatality Analysis Reporting System
- **Key Findings:**
  - Persons who grew up in states with drinking ages of 21 drank less both when they were younger than age 21 and between ages 21 and 25
  - College students who were high school seniors in states with a minimum drinking age of 18 drank more in college than counterparts who were high school seniors with a drinking age of 21



REDUCING  
**UNDERAGE DRINKING**  
A COLLECTIVE RESPONSIBILITY

NATIONAL RESEARCH COUNCIL  
INSTITUTE OF MEDICINE  
OF THE NATIONAL ACADEMIES

**ALCOHOL  
FREE  
EVENT**

**...[A] substantial body of scientific evidence shows that raising the minimum drinking age reduced alcohol-related crashes and fatalities among young people (Cook and Tauchen, 1984; U.S. General Accounting Office, 1987; Wagenaar and Toomey, 2002) as well as deaths from suicide, homicide, and nonvehicle unintentional injuries (Jones et al., 1992; Parker and Rebbun, 1995)...These findings reinforce the decision by Congress to act in 1984. In short, current national policy rests on the view, supported by substantial evidence, that delaying drinking reduces problem drinking and its consequences. The nation's legislators and public health leaders have reached the nearly uniform judgment that the benefits of setting it at 21 far exceed the costs of doing so.**



"I wish I had written this book. It is astute, inspiring, and full of fascinating ideas, and it shows precisely how success in public health is achieved."

ATUL GAWARDE

Surgeon, New Yorker staff writer, and author of *Better: A Surgeon's Notes on Performance*

**This natural experiment is the most well-studied alcohol control policy in U.S. history. At least forty-six high-quality studies find an inverse relationship between the drinking age and traffic crashes among youths 18 to 20 years old: when the drinking age goes down, traffic injuries and fatalities among youth go up, and vice versa. The relationship holds even when there has not been strong enforcement of the law and youth still have some access to alcohol. The National Highway Traffic Safety Administration estimates that traffic fatalities have fallen by over 800 deaths per year due to the higher drinking age. Raising the legal drinking age to 21 probably also reduced other injuries; one study found an 8 percent reduction in youth suicides when the drinking age rose from 18 to 21.**

**Lesson: Laws can have a beneficial impact, even when there is little enforcement and some people flout the law.**

James Fell et al.

# The Impact of Underage Drinking Laws on Alcohol-Related Fatal Crashes of Young Drivers

## *Alcohol Clin Exp Res, 2009*

### ■ Methods

- Analysis of the Fatality Analysis Reporting System from 1982-2004
- Examined the effects of the minimum legal drinking age of 21 on the ratio of drinking to non-drinking drivers under age 21 in fatal crashes
- Controlled for:
  - Zero Tolerance Laws
  - Graduated License Night Restrictions
  - Use/Lose laws
  - Administrative License Revocation
  - .10, .08 BAC per se
  - Mandatory seat belt laws
  - Per capita beer consumption
  - Unemployment rate
  - Vehicle miles traveled
  - Frequency of sobriety checkpoints
  - Number of licensed drivers
  - Ratio of drinking to non-drinking drivers
  - Age 26+ in fatal crashes
  - Ratio of drinking to non-drinking drivers age 26+ in fatal crashes



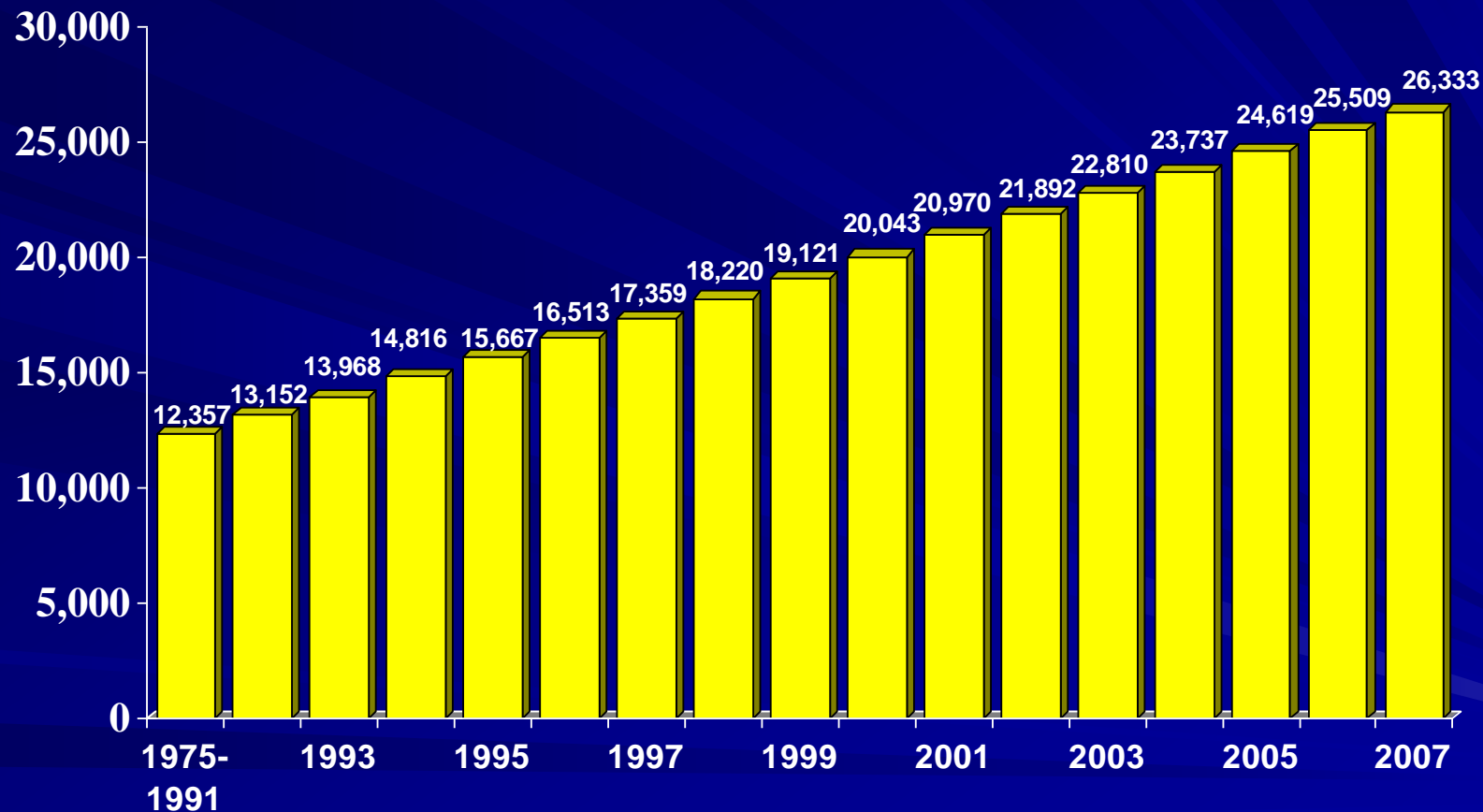
## ■ Results

- Minimum legal drinking age was independently associated with a 16% decline in the ratio of drinking to non-drinking drivers in fatal crashes under age 21
- Other laws that independently predicted lower involvement of drinking drivers under age 21 in fatal crashes:
  - Use/Lose laws ↓ 5%
  - Zero tolerance laws ↓ 5%
  - 0.08% BAC limit ↓ 8%
  - 0.10% BAC limit ↓ 7%
  - Administrative license revocation (ALR) ↓ 5%
  - Seat belt laws ↓ 3%

## ■ Conclusions

- Minimum legal drinking age of 21 reduced involvement of drinking drivers under 21 in fatal crashes (16%)
- Zero tolerance laws and Use/Lose laws targeted drivers under 21 also produced reductions
- Laws targeting drinking drivers of all ages also reduced involvement of drinking drivers under 21 in fatal crashes (0.08% and .10% BAC limits, ALR, seat belt laws)

# Cumulative Estimated Number of Lives Saved by the Minimum Drinking Age Laws 1975-2007



Source: National Highway Traffic Safety Administration

# 10 Reasons for Legal Drinking Age of 21

- Alcohol-related traffic fatalities and injuries
- Other unintentional injuries (falls, drownings, burns)
- Homicide and assault
- Sexual assault
- Suicide
- STDs, HIV/AIDS
- Unplanned pregnancy
- Alcohol dependence
- Teen drug use
- Poor academic performance

# Prevalence of Lifetime Alcohol Dependence According to Age of Drinking Onset



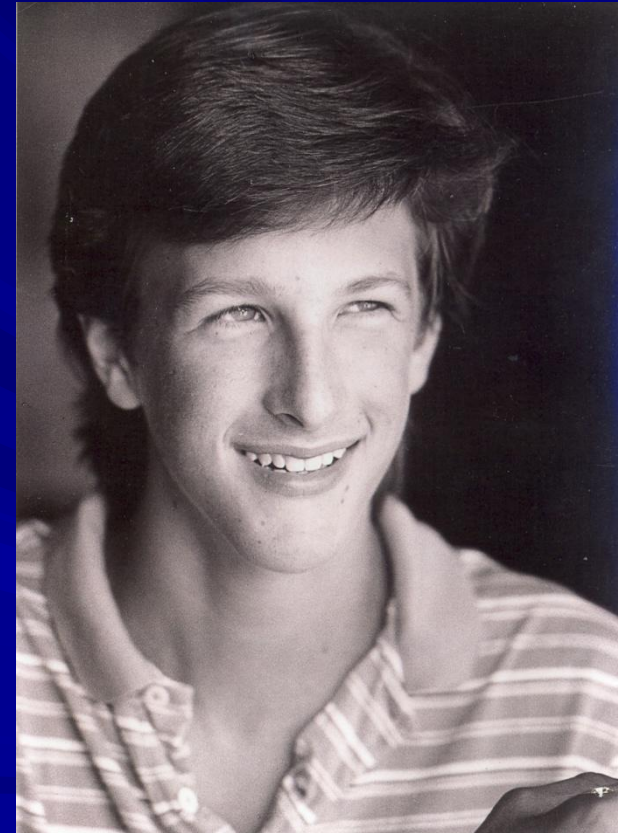
# Early Drinking Onset and Alcohol Dependence: Twin Study Results

- Early age of starting to drink is significantly associated with the development of alcohol dependence comparing twins when one began to drink earlier than the other  
(even among monozygotic “identical” twins, thus fully controlling for genetics)

J. Grant et al. *Psychological Medicine*, 2006

# Earlier Age Drinking Onset Also Related to:

- More rapid development of dependence
- Dependence by age 25
  - Of ever dependent
  - 47% before age 21
  - 2/3 before age 25
- Chronic Relapsing Dependence
  - Longer episodes
  - Multiple episodes
  - Past year dependence
  - More symptoms
  - Early dependents less likely to seek help



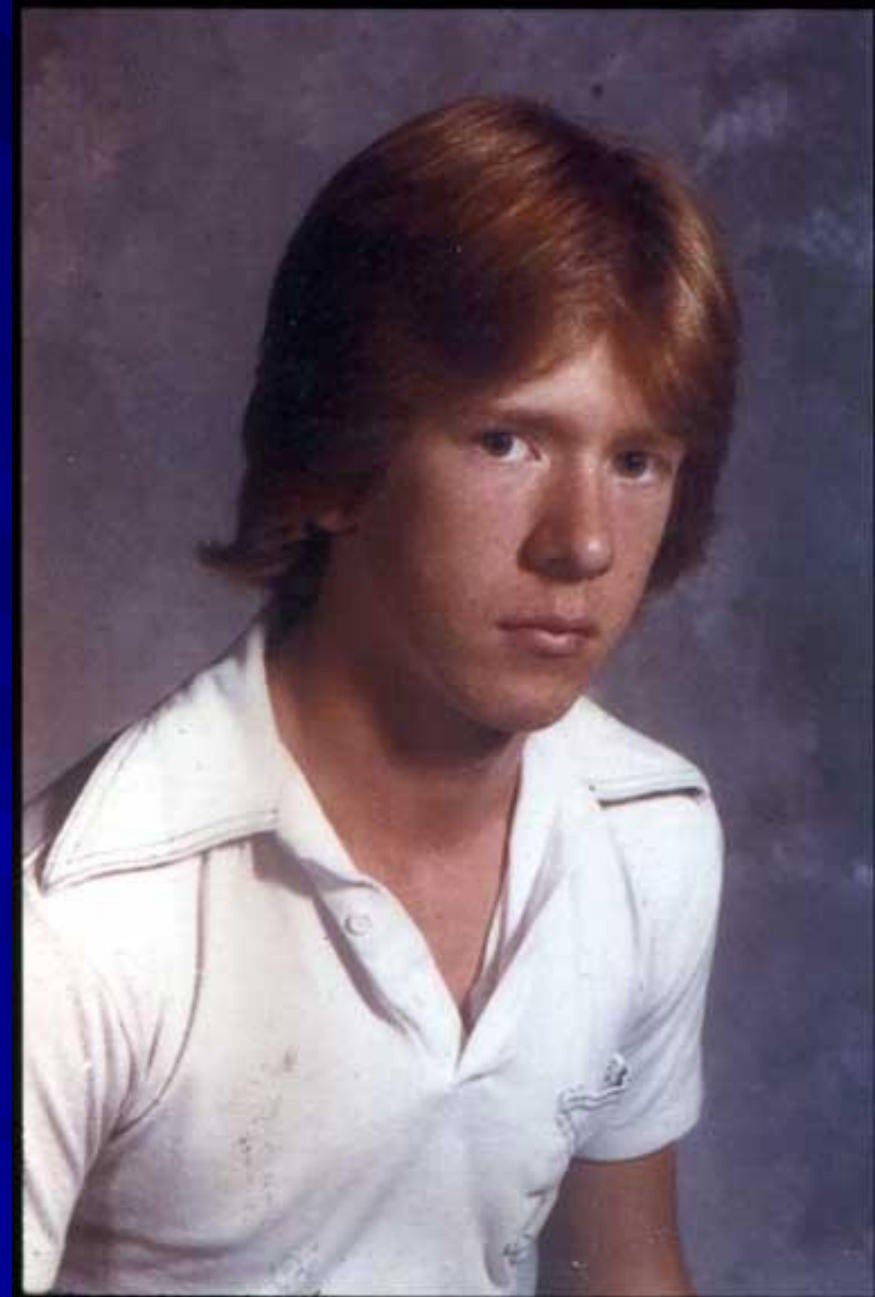
Brian Paul McKelvey

Hingson, Heeren and Winter 2006 *Archives Pediatric and Adol Med*

Hingson, Heeren and Winter 2006 *Pediatrics*

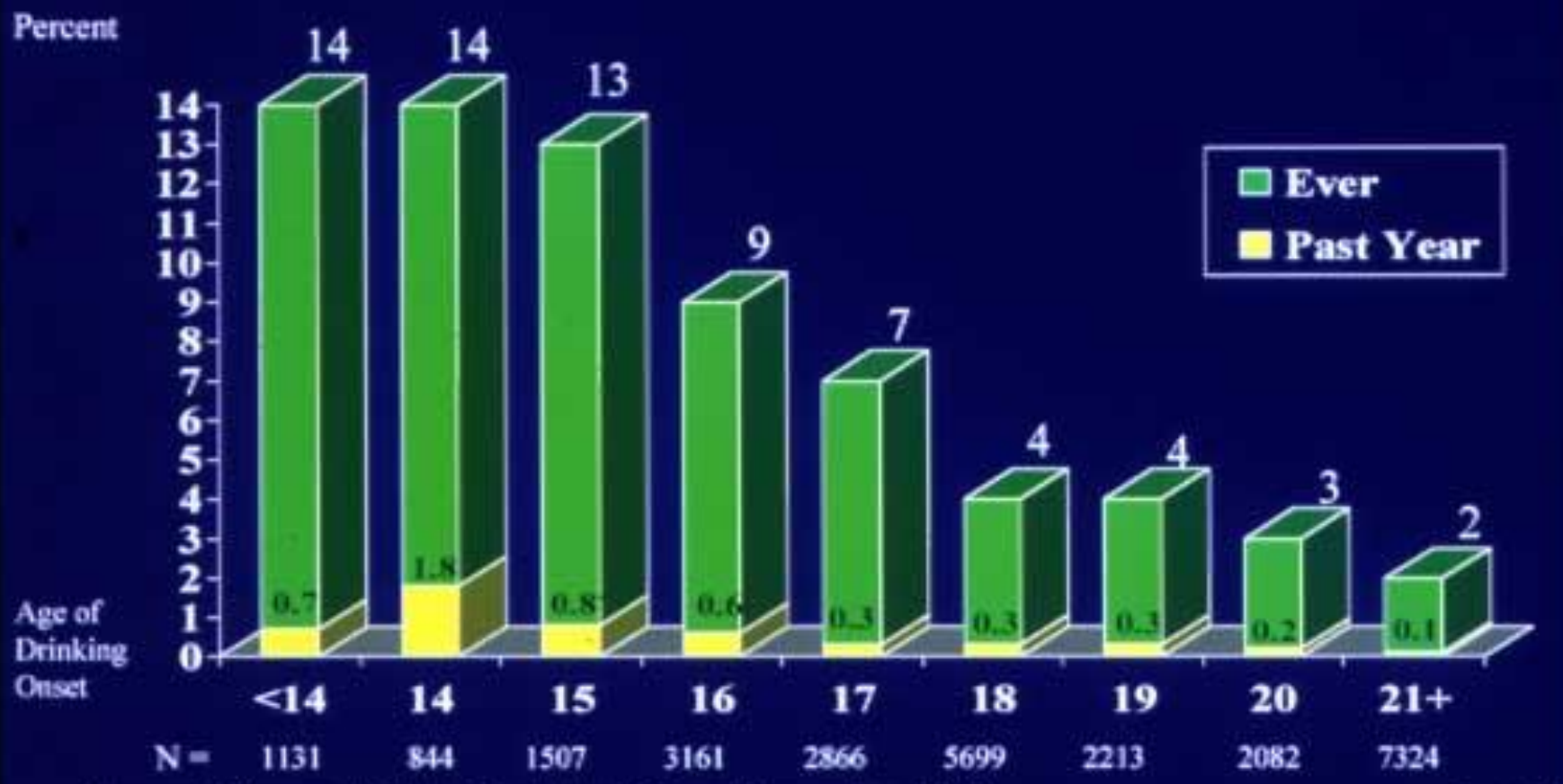
## Purpose is to assess whether earlier drinking onset is related to

- Motor vehicle crashes
- Unintentional injuries
- Physical fights after drinking



Michael Timothy Wilder

Figure 1. In a Motor Vehicle Crash Because of Drinking According to Age of Drinking Onset



Source: Hingson et al., *Accident Analysis and Prevention*, 2002

P < .001

## Figure 2. Injured Under the Influence of Alcohol According to Age of Drinking Onset

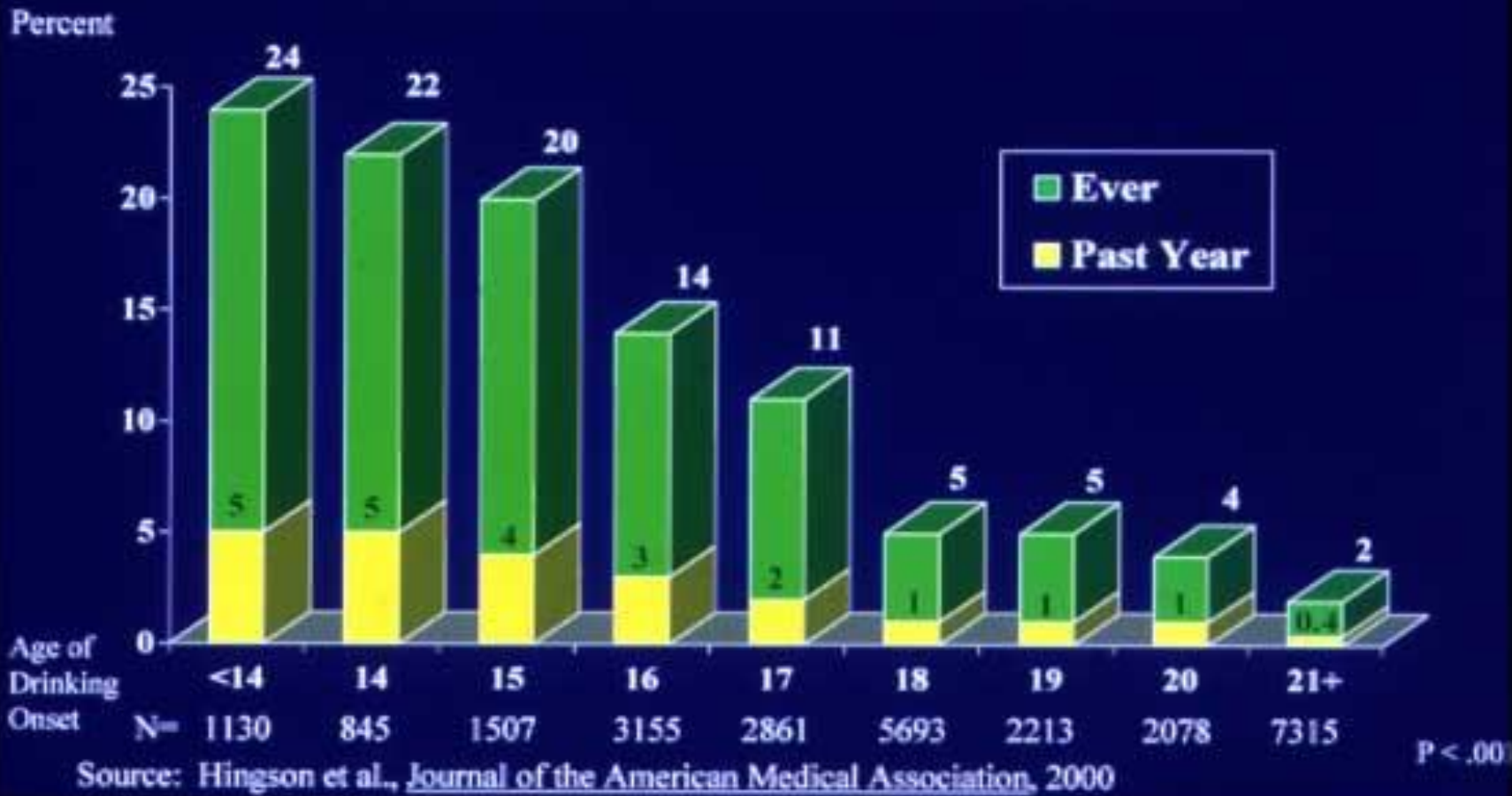


Figure 3. In a Physical Fight While or After Drinking According to Age Started Drinking, National Longitudinal Alcohol Epidemiologic Study

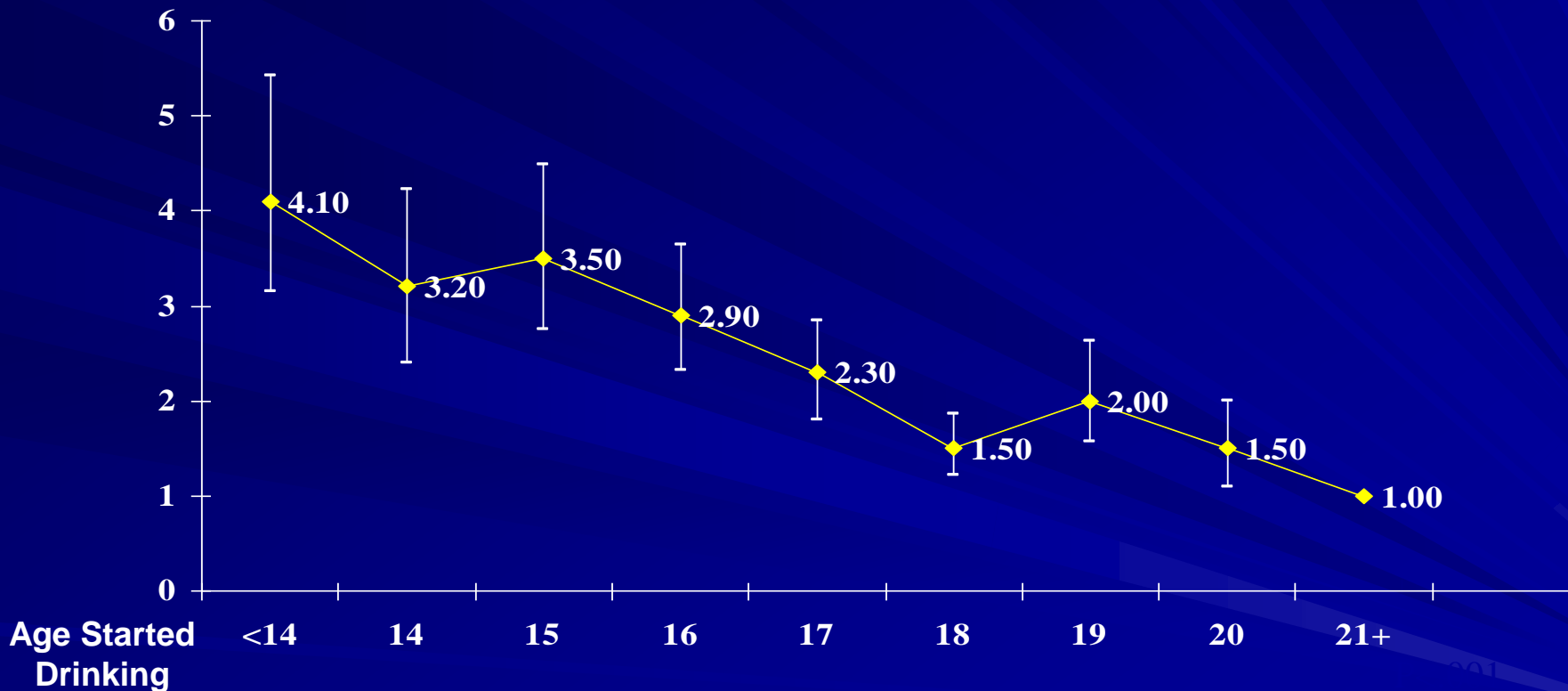


Source: Hingson et al., *Pediatrics*, 2001

P < .001

# Ever in a Physical Fight While or After Drinking According to Age of Drinking Onset, National Longitudinal Alcohol Epidemiologic Survey

## Odds Ratio and Confidence Intervals



Controlling for age, gender, black, non hispanic, Hispanic, other, education, marital status, current, past, never smoke current, past, never use drugs, family history of alcoholism, current, past, never alcohol dependent, frequency drank 5+ during respondent's period heaviest drinking

# Age of Drinking Onset and Suicide

- Preteen drinkers were 3.0 (1.7, 5.6) times more likely to have attempted suicide

(controlling for age, gender, race/ethnicity, heavy episodic drinking, other substance use, peer drinking, depression, impulsivity, peer delinquency, and parental monitoring).

**Source: Swahn et al., Pediatrics, 2008.**



# Early Age of Drinking Onset also Associated with:

- Injuring other people in traffic crashes and other ways after drinking
  - Hingson & Zha, *Pediatrics*, in press
- Violent behavior, including predatory violence
  - Blitstein et al., *Health Educ Behav*, 2005; Ellickson, et al., *Pediatrics*, 2003
- Dating violence/victimization
  - Ramisetty-Mikler et al., *J Sch Health*, 2006
- Criminal behavior
  - Eaton, J. *Interpers Violence*, 2007; Allan et al., *S. Afr Med J*, 2007.
- Prescription drug ,misuse
  - Hermos et al., *J. Addict Med.*, 2008
- Unplanned and unprotected sex after drinking
  - Hingson et al., *Pediatrics*, 2003