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Higher Education Center
for Alcohol and Drug Abuse Prevention and Recovery
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- Conference discount
- Technical Assistance

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Alcohol Attributable Deaths in the United States, Annual Average, 2006-2010
- 87,798
- 3rd leading cause of preventable deaths
- Injury (including poisoning): 49,544
- Chronic disease: 38,253
- 5,754 alcohol attributable deaths are ages 18-24
- Nearly 4,358 injury deaths under 21

Sources: CDC, ARDI, 2014
### Alcohol Attributable Deaths: Acute Conditions 49,544

<table>
<thead>
<tr>
<th>Condition</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Vehicle Traffic</td>
<td>12,460</td>
</tr>
<tr>
<td>Homicide</td>
<td>7,756</td>
</tr>
<tr>
<td>Suicide</td>
<td>8,179</td>
</tr>
<tr>
<td>Falls</td>
<td>7,541</td>
</tr>
<tr>
<td>Poisoning (Not Alcohol)</td>
<td>8,404</td>
</tr>
<tr>
<td>Poisoning (Alcohol)</td>
<td>1,647</td>
</tr>
<tr>
<td>Fire Injuries</td>
<td>1,089</td>
</tr>
<tr>
<td>Drowning</td>
<td>963</td>
</tr>
<tr>
<td>Other</td>
<td>1,505</td>
</tr>
</tbody>
</table>

Source: CDC, ARDI, 2014

### CDC Reports Excessive Alcohol Consumption
- Costs the U.S. $250 billion in 2010 ($800 per person)
- 42% paid by excessive drinkers and their families
- 42% of costs paid by federal, state, and local government
- 16% paid by others in society
- Three quarters of costs result from binge drinking (exceeding NIAAA daily low-risk guidelines).
- 10% from underage drinking


### Low-Risk Drinking Limits
- 9% of population age 18+ exceeds both daily and weekly limits (20 million)
- 25% of people age 18-24 exceed both limits (7 million)

Sources: NIAAA, Rethinking Drinking: Alcohol and Your Health, 2009; National Epidemiologic Survey on Alcohol and Related Conditions

### Youth Ages 18-24 Are Most Likely to Exceed Low-Risk Drinking Limits
- 4% of the adult U.S. population met alcohol dependence criteria in the past year, representing 7.9 million people
- Youth are most affected
  - 12.5% of persons ages 18-20 (1.6 million)
  - 11% of persons ages 21-24 (1.8 million)
  - Total ages 18-24 (3.4 million)
- Youth 18-24 are:
  - 16% of the population age 18 and older
  - 43% of that population who met alcohol dependence criteria in the past year

Source: NIAAA, NESARC, 2002
Magnitude of Alcohol Problems on U.S. College Campuses

Hingson et al. (2002) J. Studies on Alcohol


- Among college students ages 18-24:
  - Unintentional alcohol-related injury deaths per 100,000 increased 3% from 1,538 in 1998 to 1,881 in 2005 but decreased to 1,794 in 2008, 1,762 in 2011, and 1,519 in 2014 (a 31% decline since 1998) per 100,000
  - The proportion who:
    - Drank 5+ drinks per occasion increased from 41.7% in 1999 to 44.7% in 2005 then declined to 41%, 40%, and 37% in 2008, 2011, and 2014
    - Drove under the influence increased 26.5% to 28.7% in 2005 then decreased to 24.7%, 19.8%, and 16.6% in 2008, 2011, and 2014
  - The highest proportions engaging in these behaviors are among 21-24 year olds, not 18-20 year olds

*updates for 2008, 2011, and 2014 submitted for publication

Alcohol: Trends in 2-Week Prevalence of 5 or More Drinks in a Row among College Students vs. Others 1-4 Years Beyond HS, 1980-2013

Source: Monitoring the Future, 2014
### NEXT Generation, Wave 4, 2013

<table>
<thead>
<tr>
<th>Problems experienced because of others drinking: Past 6 months</th>
<th>College Freshmen (N=915)</th>
<th>Same Age, Not in College (N=716)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulted/Humiliated</td>
<td>20%</td>
<td>16%</td>
</tr>
<tr>
<td>Serious argument</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Property damaged</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Babysit drinker</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Interrupted work/sleep</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Called ambulance, went to hospital</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Called police</td>
<td>20</td>
<td>16</td>
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### College Alcohol Study

The younger college students were when first drunk, the more likely they will experience in college:

- Alcohol Dependence
- Drive after drinking
- Alcohol related injury
- Unplanned and unprotected sex after drinking


### Youth Risk Behavior Survey, 2015

- Nearly 1 million high school students and nearly 2 million 12-20 year olds consume 5 or more drinks 6 or more times per month.

- Frequent binge drinkers compared to abstainers in high school were much more likely in the past month to:
  - Drink at school: 32% vs. 0%
  - Use marijuana at school: 53% vs. 15%
  - Earned mostly D's and F's in school within the past year: 18% vs. 3%

*Sources: Zeigler et al, Prev Med, 2005; Squeglia et al, Clin EEG Neurosci, 2009; Squeglia et al, J Stud Alcohol Drugs, 2012*


- Methods
  - Studied adolescents ages 16-18
    - Heavy episodic drinkers (HED), N=39
    - Non drinkers, N=26
  - 5th grade California standards
    - Test in language arts and mathematics comparable in both groups

- Results
  - Compared to non drinkers, HED performed worse, even after 4 weeks of sustained abstinence on:
    - Prospective memory
    - Cognitive switching
    - Inhibition task accuracy
    - Verbal memory
    - Visuospatial abilities
    - Language and achievement
  - This "may affect adolescents’ daily experiences in academic and occupational settings."

*Source: Winward et al.*
Studies Linking College Student Binge Drinking and Poor Academic Performance

- Parada et al., *Alcohol Clin Exp Res*, in press. (poorer performance on memory tests)
- Thombs et al., *JSAD* 70(5): 776-785, 2009. (Mean BAC of 0.05% vs. 0.0% linked to 1/5 letter grade lower.) (prospective study)
- Singleton & Wolfson, *JSAD* 70(3): 355-363, 2009. (prospective study on negative effects on GPA)
- Jennison, *Am J Drug Alcohol Abuse* 30(3): 659-684, 2004. (Binge drinkers in college were more likely to drop out, work in less prestigious jobs, and experience alcohol dependence 10 years later.) (national prospective study)

Studies Linking College Student Binge Drinking and Poor Academic Performance (cont.)

- Singleton, *JSAD* 70(3): 355-363, 2009. (prospective study on negative effects on GPA)

Conclusion

In the U.S. there is an urgent need to:

- Expand and improve prevention, screening and treatment programs and policies to reduce alcohol related harm
  - Persons under 21
  - Among college students
  - Persons of similar ages not in college
- Improve surveillance of alcohol-attributable mortality
  - Mortality data need college identifiers
  - All injury and poisoning deaths should be tested for alcohol

Alcohol Related Behaviors and Consequences of 18-24 Year Olds in the U.S. 2014 (Estimates)

<table>
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<tr>
<th></th>
<th>College</th>
<th>Non College</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Drank 5+ on an occasion past month</td>
<td>4.4 million (37%)</td>
<td>7.8 million (40%)</td>
<td>12.2 million</td>
</tr>
<tr>
<td>Past year drove under the influence of alcohol</td>
<td>1.9 million (19%)</td>
<td>3.1 million (16%)</td>
<td>5.0 million</td>
</tr>
<tr>
<td>Died of alcohol-related unintentional injury (2014)</td>
<td>1,558</td>
<td>2,532</td>
<td>4,090</td>
</tr>
</tbody>
</table>

Interventions

- Individually-oriented screening and brief intervention
- Social norms
- Web-Based
- Mandated web-based (AlcoholEdu)
- Family
- Environmental
- Comprehensive community interventions

http://www.collegedrinkingprevention.gov/CollegeAIM/
**NIAAA’s College AIM: Highly Effective Individually-Oriented Interventions**

- **Low cost**
  - Normative Re-Education
  - Electronic mailed/personalized feedback

- **Medium cost**
  - Skills training/alc goal setting
  - Skills training/alc plus general life skills

- **High cost**
  - Multi-component education
  - Health care professional delivered screening and behavioral treatment

- **Low cost**
  - Skills training self assessment and monitoring
  - Personalized feedback

- **Medium cost**
  - Brief motivational intervention
  - Personalized feedback

- **High cost**
  - Medications for alcohol use disorder

**NIAAA’s College AIM: Environmental Interventions**

- **Highly Effective**
  - Low cost
    - Retain 21 drinking age
    - Retain ban on Sunday sales
  - Medium cost
    - Enforce age 21 drinking age
    - Increase alcohol tax
  - High cost
    - Responsible beverage service training

**Literature Reviews Indicating Effectiveness of Screening and Brief Counseling Intervention Regarding Alcohol**

- U.S. Preventive Services Task Force, 2012 (adults in primary care)
- Tripodi et al., Arch Pediatr Adolesc Med, 2010 (adolescents ages 12-19)
- Jensen et al., J Consulting Clin Psychol, 2011 (adolescents)
- Larimer, Addict Behav, 2007 (college students)
- Carey et al., Addict Behav, 2007 (college students)
- Cronce & Larimer, Alcohol Res & Health, 2011 (college students)
- Seigers and Carey, J Am College Health, 2010 (college students at university health services)

**Literature Reviews (cont.)**

- Fachini et al., Subst Abuse Treat Prev and Policy, 2012 (college students, BASICS)
- O’Donnell et al., Alcohol & Alcoholism, 2013 (adults)
- Tanner-Smith et al., J Subst Abuse Treat, 2014 (adolescent young adults)
- Scott-Sheldon, J Clin and Consult Psych, 2014 (college students)

**Tanner-Smith & Lipsey, Brief alcohol interventions for adolescents and young adults: A systematic review and meta-analysis, J Subst Treat, 2014**

**Methods:**
- A comprehensive literature search yielded 185 experimental studies of brief alcohol interventions (universal, selective, or indicated) aimed at reducing alcohol use or alcohol-related problems among adolescents ages 11-18 and young adults ages 19-30

**Results:**
- Overall, brief alcohol interventions tied to significant reductions in:
  - Alcohol consumption
  - Alcohol-related problems
- Effects persist up to one year
- Effects did not vary across:
  - Participant demographics
  - Intervention length
  - Intervention format

**Tanner-Smith & Lipsey (cont.)**

**Results (cont.):**
- Adolescents already exhibiting heavy or hazardous consumption experienced larger intervention effects
- For adolescents, motivational enhancement treatment in high school setting in a single session of more than 15 minutes yielded the greatest drinking reduction
- For young adults, a self-administered computerized expectancy challenge conducted on a university campus, including the following yielded the greatest drinking reductions:
  - BAC information
  - Decisional balance
  - Goal setting
  - Money/cost information
Scott-Sheldon et al., Efficacy of Alcohol Interventions for First-Year College Students, *J Clin Consult Psych*, 2014

**Methods**
- Reviewed 41 studies with 62 individual or group interventions
- Results: Compared to control subjects
  - Recipients of interventions reduced alcohol consumption and related problems up to 4 years past intervention
  - Individual and group interventions yielded comparable results on most outcomes
  - Individual reduced heavy drinking more than group interventions
  - Computer and face-to-face were equally effective
  - Effective interventions components:
    - Personalized feedback
    - Protective strategies to moderate drinking
    - Setting alcohol-related goals
    - Challenging alcohol expectancies
  - Interventions with 4 or more components were most effective
  - Recommend routine screening all incoming college students


**Methods**
- Comprehensive literature search of 73 studies comparing effects of a single-session brief alcohol intervention with treatment as usual or no intervention
- Results
  - On average, single-session brief alcohol interventions moderately reduced alcohol use among heavy-drinking college students relative to comparison conditions
  - Minimal variability in effects and:
    - Study method and quality
    - Participant demographics
    - Outcome measure type
  - Motivational enhancement therapy
    - Motivational interviewing reported larger effects than cognitive behavioral therapy or psycho-educational therapy

Steinka-Fry et al., Effects of Brief Alcohol Interventions on Drinking and Driving among Youth: Meta-Analysis, *J Addict Prev*, 2015

**Method**
- The authors reviewed:
  - 17 experimental studies, 75% conducted in the U.S. (N=5,664; average age 17)
  - Motivational interviewing/motivational enhancement was studied in 44% and cognitive behavioral and motivational enhancement in 25%
  - Nearly half (44%) were delivered individually and 1/3 in groups
- **Results**
  - Compared with controls, intervention recipients exhibited:
    - Reduced driving while intoxicated
    - Reduce heavy episodic drinking

Young Adults at Risk for Excess Alcohol Consumption are Often Not Asked or Counseled About Drinking

**2/3 of 18-39 year olds nationwide saw a physician in the past year**
- Only 14% of them:
  - Were asked about their alcohol consumption and
  - Given advice about what drinking patterns pose risk to health
- Persons 18-25:
  - Were most likely to exceed low-risk drinking guidelines (68% vs. 56%)
  - Were least likely to have been asked about their drinking (34% vs. 54%), especially those under age 21 (26%)

Hingson et al., Screening and Brief Alcohol Counseling of College Students and Persons Not in School, *JAMA Pediatrics*, 2015

**Methods**
- 2,140 respondents nationwide responded to web-based survey one year past high school
- Results
  - 42% enrolled in a 4-year college, 25% in community college, and 33% not in college
  - ½ in each group who saw a MD in the past year were asked about their drinking, smoking, and drug use
  - 45% college students advised about health risks of drinking, smoking, and drug use, compared to 53-55% of those not in college (p<0.05)
  - 14-15% of college students advised to reduce or stop drinking, smoking, and drug use, compared to 26-30% of those not in college (p<0.01)
  - 30% college students drank 6+ times in the past month asked to reduce or stop drinking, compared to 43% not in college

**Barriers to Screening**
- Time to ask questions
- Time to respond to questions
- Lack of training
- Lack of treatment centers for referral
- Reimbursement issues
Screening and Brief Intervention Studies for Drugs Not Showing Benefit – Drug Use

- White et al., J Stud Alcohol Drugs, 2006
- Marsden et al., Addiction, 2006
- Peterson et al., Psych Addict Behav, 2008
- Lee et al., Psychol Addict Behav, 2010
- Bogenschutz et al., JAMA, 2014
- Saltz et al., JAMA, 2014
- Roy-Byrne et al., JAMA, 2014

Screening and Brief Intervention Studies for Drugs that Show Some Benefit – Drug Use Screening

- Madras et al, Drug Alcohol Depend, 2009
- Magill et al., J Stud Alcohol Drugs, 2009
- Grossbard et al, J Subst Abuse Treat, 2010
- Kim-Harris et al, Pediatrics, 2012
- Humeniuk et al, Addiction, 2012
- Lee et al, J Consult Clin Psychol, 2013
- Schwartz et al., Addiction, 2014
- Winters, Psych Addiction, 2014
- Gelberg et al., Addiction, 2015

Screening and Brief Intervention Studies for Drugs that Show Some Benefit – Drug Use

- Bashir et al, Brit J Gen Practice, 1994
- Stephens et al., J Clin Consult Psychol, 2000
- McCambidge et al, Addiction, 2004
- Baker et al., Addiction, 2005
- Bernstein et al, Drug Alcohol Depend, 2005
- Srisurapanont et al., Am J Addictions, 2007
- Stephens et al, Addiction, 2007
- D’Amico et al., J Subst Abuse Treat, 2008

Tanner-Smith et al., Can Brief Alcohol Interventions for Youth also Address Concurrent Illicit Drug use? Results from a Meta-Analysis, J Youth Adol, 2015

Methods:
- A comprehensive literature review identified 30 eligible samples, average subject age 17
  - 7 brief interventions for alcohol only
  - 23 targeted both alcohol and drugs
- Most were U.S. randomized trials with low attrition and 6-month follow-up
- Most used motivational interview (motivational enhancement therapy), lasting 50-60 minutes
Tanner-Smith et al. (cont.)

**Results**
- Alcohol only interventions produced
  - Reductions in drinking
  - Little variability across studies
  - No effects on drug use
- Drug and alcohol interventions produced
  - Reductions in use of marijuana, other hard drugs, alcohol
- Alcohol reductions were comparable in both alcohol only interventions and in alcohol and drug interventions
  - The greatest reductions were for drugs other than marijuana

Foxcroft et al., Social Norms for Alcohol Misuse in University and College Students (Review), Cochrane Collaboration, 2015

**Methods**
- They reviewed 66 randomized trial studies (N=43,125) and did a meta-analysis of 59 studies conducted before May 2014 (N=40,951)
- Studies had to have a follow-up period of at least 4 months
- Of the studies, 52 were conducted in the United States
- Of the trials, 39 targeted high risk or mandated children and 26 included all students regardless of risk

Foxcroft et al. (cont.)

**Results**
- At 4 or more months follow-up, they observed:
  - Small significant reductions for web and face-to-face feedback on:
    - Alcohol-Related problems
    - Binge drinking or quantity consumed
    - Frequency of consumption
    - Peak BAC
  - No reductions for
    - Mailed feedback
    - Group face-to-face
    - Social norms marketing

**Conclusion**
- "The strength of the effects is small and unlikely to provide any advantages in practice."


**Results:**
- Fall Semester: Significant reductions (1/4-1/3)
  - Past 30-day alcohol use
  - Binge drinking
  - Alcohol problems:
    - Physiological (hangover, vomiting, passing out, etc.)
    - Social (trouble with police or school authorities)
    - Victimization (crime, sexual)
  - Differences not significant during spring semester

**Implications:**
- Fall semester of freshman year is a high-risk time for college alcohol problems
- Need to test booster sessions and strengthen intervention
- Need to integrate program into a comprehensive set of interventions

Paschall et al. (cont)

**Family Influences on Youth Drinking 12-20**

- Children of parents who binge, compared with abstainers, are twice as likely to
  - Binge (20% vs. 10%)
  - Meet alcohol dependence/abuse criteria (10% vs. 5%)

Source: SAMHSA, Findings From the 2002-2006 National Surveys on Drug Use and Health, 2008
Family Interventions

Iowa Strengthening Families Program

Goals:
- Improve parent/child relations
- Strengthen family communication skills
- Increase child coping skills

Implementation:
- 7 sessions at school
- 13 hours total
- Parent and child separately and together


Parent-Based Intervention on Drinking Behavior among College Freshmen

- Parent-Based Intervention (PBI)
  - Mid-July – August: Parents of 327 students, before starting college, mailed a parent handbook for students about alcohol developed by Turrisi (see Psych. Addict. Behav., 2001)
  - Parents asked to evaluate and rate the handbook (72%) compliance
  - Comparison parents sent 2 brochures
    - College alcohol policies and violation penalties
    - Statistics regarding college drinking


Parent-Based Intervention (PBI) (cont.)

- Results
  - PBI students
    - Less likely to transition from non-drinker to drinker
    - Drinkers less growth in drinking during freshman year


Environmental Policy Interventions

- Legislation to reduce drinking & driving
  - Criminal per se laws
  - Administrative license revocation laws
  - Mandatory assessment & treatment laws
  - Primary safety belt laws
  - Ignition interlock for first offenders
  - Lower legal blood alcohol limits for convicted offenders
  - 0.08% criminal per se BAC level laws
  - Zero tolerance laws
  - Use/lose laws
  - Graduated license laws

- Enhanced enforcement- publicized sobriety checkpoints

See also Colder et al., Addict Behav., 2017

Family Interventions

A randomized controlled trial with families of 6th graders:
- Iowa Strengthening Families Program (ISFP) (206 families)
- Preparing for Drug Free Years Program (PDFYP) (221 families)
- Control (221 families)

- Results Persist at age 21 (Spoth, 2009)


Methodology
- Reviewed 22 studies (cross-sectional and longitudinal) that examined the association between parental provision of alcohol to children and adolescent drinking outcomes

Results:
- Parental provision was generally associated with increased:
  - Adolescent alcohol use
  - Increased heavy episodic drinking
  - Higher rates of alcohol problems
- Data were “equivocal” that parental provision is protective on the face of other risk factors

See also Colder et al., Addict Behav., 2017

Kaynak et al., Providing Alcohol for Underage Youth: What messages Should We Be Sending Parents, J Stud Alcohol Drugs, 2014

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Source: National Institute on Alcohol Abuse and Alcoholism

Motor Home
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Environmental Policy Interventions

- Legislation to reduce availability of alcohol
  - Minimum legal drinking age
  - Reduce alcohol outlet density
  - Increase price

Environmental Approaches

Consumption of 10+ and 21+ Drinks on an Occasion At Least Once in the Past Year, 2013

Compared to Other Regions of the World

- Europe has the highest:
  - Per capita alcohol consumption: 11.9 liters pure alcohol vs. 6.2 liters worldwide
  - Percent of deaths that are attributable to alcohol: 6.5% vs. 3.2% worldwide
  - Alcohol-Attributable burden of disease (measured in disability-adjusted life years (DALYs)): 11.6% vs. 4% worldwide
  - Past year prevalence of alcohol use disorders:
    - 5.5% Western Europe
    - 10.9%, Eastern Europe
    - 3.6% worldwide

Source: Rehm J et al., Alcohol and Global Health, Lancet 373, 2223-2233, 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


### Fell et al., *Alcohol Clin Exp Res*, 2009 (cont)

- **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:
    - Zero Tolerance Laws: ↓5%
    - Use/Lose laws: ↓3%
    - .08% BAC limit: ↓8%
    - .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 0.10% BAC limits, ALR, seat belt laws)


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  - Increased 10% when the drinking age was lowered
  - Decreased 16% when the drinking age was raised


### Fell et al., *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
    - Use/Lose laws
    - Administrative License Revocation
    - .08% BAC per se
    - Mandated 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

### Case Closed: Research Evidence on the Positive Public Health Impact of the Age 21 Minimum Legal Drinking Age in the United States

[Case Closed text]

**Sources:**
- *Federal 21 Drinking Age*
- *U.S. MLDA Age 21 law*
- *U.S. Fatality Analysis Reporting System, 2015; U.S. Census Bureau, 2015*
Cumulative Estimated Number of Lives Saved by the Minimum Drinking Age Laws, 1975-2015

- 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

10 Reasons for Legal Drinking Age of 21

Examined 2 national surveys: 1992 & 2002 (N=33,869)

- Compared persons who grew up in states with legal drinking ages below 21 and 21
- Results:
  - Adults allowed to purchase before age 21 had higher odds of past-year:
    - Alcohol use disorder 1.31 (1.15, 1.46)
    - Drug use disorder 1.70 (1.19, 2.44)
  - (even in 30s and 40s)

Plunk et al., Impact of the Minimum Legal Drinking Age (MLDA) on Alcohol-Related Chronic Disease Mortality, Alcohol Clin Exp Res, 2016

- Data from the 1980-2010 U.S. multiple cause of death files was combined with data on the living population
- The authors examined people who turned 18 during the years 1967-1990.
- Controlled for age, sex, race, education, state per capita income, beer taxes, unemployment rate, wine/spirits privatization

- Results:
  - Compared to those who lived in states with a MLDA of 21, persons who grew up in states where they could legally drink alcohol before age 21 had increased risk of death from:
    - Effects were greatest amongst persons never attending college
      - 5% Alcohol liver disease
      - 6% Other liver disease
      - 5% Liporal/oral/aryngeal cancer

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

Source: National Highway Traffic Safety Administration, 2017

Source: Grant and Dawson (1997) J. Substance Abuse

Prevalence of Lifetime Alcohol Dependence According to Age of Drinking Onset
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

Hingson, Heeren and Winter 2006 Archives Pediatric and Adoles Med
Hingson, Heeren and Winter 2006 Pediatrics

Earlier drinking onset is also related to:

- Motor vehicle crashes (Hingson et al., 2002)
- Unintentional injuries (Hingson et al., 2006)
- Physical fights after drinking (Hingson et al., 2001)
- Injuring self and others under the influence (Hingson & Zha, 2009)
- Motor vehicle crash involvement because of drug use (Hingson et al., 2008)

Hingson, Heeren and Winter 2006 Archives Pediatric and Adoles Med
Hingson, Heeren and Winter 2006 Pediatrics

Why Are These Findings Important?

Injuries are the leading cause of death among youth 1-44
- Unintentional injuries #1 1-44
- Intentional injuries #2 8-34
- Alcohol is the leading contributor
- 44,000 injury deaths annually attributable to alcohol misuse

Sources: Centers for Disease Control and Prevention, 2009; Smith et al. 1999

Key Unanswered Legal Drinking Age Questions

- Exceptions: Depending on the state, it CAN be legal:
  - For persons under 21 to possess alcohol with parental/guardian consent and/or presence (24 States)
  - For a parent or guardian to furnish alcohol to a person under 21 (31 States)
  - In fact, only 31 States and DC explicitly prohibit consumption of alcohol by a person under age 21
  - In 47 states, people under 21 can serve alcohol


Key Unanswered Questions

Explore Effects of:

1) Removing loopholes and exceptions in age 21 MLDA laws
2) Keg registration laws
3) Social host liability laws
4) Minimum legal age children can be provided alcohol by parents
5) Raising age youth can serve alcohol
6) Impact of such changes on teen drug use
7) How to reduce extreme binge drinking
**Extreme Binge Drinking**

- Monitoring the Future, 2005-2011
  - 20% drank 5+ drinks in the past 2 weeks (declined 2005-2011)
  - 5% drank 15+ drinks in the past 2 weeks (no change)
  - 15+ drinks in 4 hours—BAC
    - No food: .30% men, .45% women
    - Full Stomach: .20% men, .30% women
  - 50/50 chance of blackout at .22%
  - 500 increased odds fatal crash among 16-20 year old driver .15%+
  - .30%-.35% suppress brain stem, reflexes, gagging, and breathing
  - 15+ drinkers 3-times more likely than non-bingers to use other drugs (64% vs. 22%)

Sources: Patrick et al. and Hingson et al., *JAMA Pediatrics*, 2013

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- Fatal crash methods
  - Examined state-level traffic fatality data from FARS, 1975-2005
  - Examined fatalities ages 18-20 where alcohol was involved and where no alcohol was present
  - Compared 33 states that adopted social host liability laws between 1975 and 2005
  - Controlled for:
    - Minimum legal drinking age
    - 0.08% BAC limits
    - Zero Tolerance laws
    - Seat belt laws
    - Graduated licensing

Results:
- Social Host Liability laws reduced drunk driving fatalities between 5% and 9%

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**Fell et al., Impact of 20 Underage Drinking Laws, *J Stud Alcohol and Drugs*, 2016**

- Methods:
  - Examined the ratio of drinking to non-drinking drivers in the U.S. in all states from 1982-2012 using the Fatality Analysis Reporting System data
  - Used structure equation modeling to compare drivers age 20 versus 26+
  - Controlled for:
    - per capita beer consumption
    - per se 0.10 and 0.08% laws
  - Results:
    - Nine underage drinking laws produced significant alcohol-related traffic deaths involving drivers under age 21

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**Fell et al. (continued)**

Results (cont.):

<table>
<thead>
<tr>
<th>Law</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possession of alcohol</td>
<td>-7.7</td>
</tr>
<tr>
<td>Purchase of alcohol</td>
<td>-4.2</td>
</tr>
<tr>
<td>Use/lose</td>
<td>-7.9</td>
</tr>
<tr>
<td>Zero tolerance</td>
<td>2.9</td>
</tr>
<tr>
<td>Age of bar tender ≥21</td>
<td></td>
</tr>
<tr>
<td>State responsible for beverage service</td>
<td>3.8</td>
</tr>
<tr>
<td>Dram shop liability</td>
<td>2.5</td>
</tr>
<tr>
<td>Social host laws</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Collectively, the 9 laws prevent 1,135 lives per year
- 210 more lives would be saved annually if all states passed these laws

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**Is Passing Laws Enough?**

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**Potential Process of Change After a Drinking Age Increase**

- Police and Enforcement
- General Legal Determination
- Reduction in Drinking & Driving
- Alcohol-Related Fatal Crash Reductions
- Changes in Public Perception about Alcohol
- Legal Drinking Age Increase
- Court Enforcement
- Public Education
- Who
  - Minors
  - Alcohol Outlets
  - What
  - Reasons for Law
  - Enforcement
Successful Comprehensive Community Interventions

- Saving Lives Program, Hingson (1996)
- Project Northland, Perry (1996)
- Communities Mobilizing for Change, Wagenaar (2002)
- Community Trials, Holder (2000)
- Fighting Back, Hingson (2005)
- Sacramento Neighborhood Prevention, Treno, (2007)
- State Coalitions to Reduce Underage Drinking, Wagenaar (2007)
- Neighborhoods Engaging with Students (NEST), Saltz (2009)
- College community program, McCartt et al. (2009)
- Communities That Care, Hawkins et al. (2009)
- Safer California Universities, Saltz et al. (2010)
- Study to Prevent Alcohol Related Consequences (SPARC), Wolfson et al. (2011)
- Cherokee Nation, Komro et al. (2017)

Comprehensive community interventions address college age and underage drinking at multiple levels

- Coordinate multiple city departments
- Clear measurable Objectives and Strategic Plans
- Combine Education and Law Enforcement
- Include screening and early interventions
- Use Data to Plan and Evaluate
- Involve Private Citizens – Be Inclusive
- Involve Youth

Intervention:

- Targeted times and places where drinking to intoxication was common
- Social host party campaign
- Compliance check surveys to reduce alcohol sales to minors
- Driving while intoxicated checkpoints
- Police patrols targeting college student parties providing alcohol to minors and disturbing the peace
- Social host ordinances penalizing hosts of parties that stimulated community complaints

Random Assignment:

<table>
<thead>
<tr>
<th>Intervention Sites</th>
<th>Comparison Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU Chico</td>
<td>Cal Poly SLO</td>
</tr>
<tr>
<td>Sacramento State</td>
<td>San Jose State</td>
</tr>
<tr>
<td>CSU Long Beach</td>
<td>CSU Fullerton</td>
</tr>
<tr>
<td>UC Berkeley</td>
<td>UC Irvine</td>
</tr>
<tr>
<td>UC Davis</td>
<td>UC Los Angeles</td>
</tr>
<tr>
<td>UC Riverside</td>
<td>UC San Diego</td>
</tr>
<tr>
<td>UC Santa Cruz</td>
<td>UC Santa Barbara</td>
</tr>
</tbody>
</table>

Results:

- Lowered percent alcohol purchase attempts resulting in sales
- Reduced %s with illegal BACs (college students and others) (measure in roadside surveys)

During the fall semester, at each intervention campus, there were on average:

- 900 fewer students intoxicated at off-campus parties
- 600 fewer students intoxicated at bars and restaurants
- 6,000 fewer incidents of intoxication at off-campus parties
- 4,000 fewer incidents of intoxication at bars and restaurants
10 North Carolina universities were randomized into intervention or comparison groups (11,000+ students/school)

Intervention:
- Campus/community organized/coalitions
- Assessment/strategic planning
- Campus policies:
  - Sanctions for student alcohol violations
  - Benefits for students in good standing
  - Alcohol flyer ban in residence halls
  - Restriction of alcohol paraphernalia
  - Party patrols (2 schools)
  - Compliance checks (2 schools)
  - DWI patrols/checkpoints (5 schools)
  - Social norms marketing (3 schools)
  - Safe Rides Program (1 school)
  - Preferential housing/parking tied to clean alcohol records

Results:
- 4 annual e-mail college students surveys, 2003-2006
- Significant decline in intervention schools in:
  - Severe consequences of students’ drinking 
  - Index of medical treatment, DUI ticket, motor vehicle crashes, physical fights, trouble with police, crime victimization, regrettted sex, coerced sex as either victim/perpetrator
  - 328 fewer students/school/month
- 107 students/school/year

Conclusions
- Research indicates reductions in underage and college age drinking and related problems can be achieved with interventions that focus on
  - Individuals
  - Social norms
  - Web-Based
  - Mandatory web-based
- Interventions targeting multiple levels are more effective/Multi-Component community

Key Unanswered Questions:
1) Will a combination of
   - environmental interventions to reduce alcohol availability and enforce alcohol policy, e.g. DWI and drinking age laws
   - increased alcohol screening and early intervention achieve greater problem reduction than either alone?
2) Are programs that target both underage youth and young adults more effective in reducing youth alcohol problems than underage oriented programs only?
3) Will programs that reduce youth consumption produce carry over alcohol problem reduction in adult life?
4) Will programs that reduce youth alcohol misuse also reduce drug use?
5) How can effective comprehensive community interventions be sustained over time?
6) What types of community interventions are most effective in reducing youth alcohol problems with the least cost?

Key Unanswered Questions: Comprehensive Community Interventions to Reduce Youth Alcohol Problems

Alcohol- vs. Non-Alcohol-Related Traffic Fatalities, Rate Per 100,000, Ages 18-24, United States, 1982-2014

U.S. MLDA Age 21 law

Sources: U.S. Fatality Analysis Reporting System, 2015; U.S. Census Bureau, 2015
Upcoming Events

Join the Recovery Learning Collaborative!

WEBINARS

1. College Recovery Perspectives on Exploring the Neurobiology of Addiction
2. Helping煋s through a Mental Health Crisis: A Journey From Relapse to Recovery
3. Normalizing the Stigma of Mental Health
4. Understanding the Role of Culture and Language in Understanding and Addressing Substance Use
5. Prevention and Recovery Strategies for Mental Health and Substance Use Disorders: A Guide for Campus Health Professionals
6. Preventing Suicide: What You Need to Know
7. Preventing Suicide: What You Need to Do
8. Preventing Suicide: How You Can Help
9. Preventing Suicide: When to Get Help

Save the Date

Recovery Month Twitter Chat
Tuesday, September 26 at 2:00 p.m. EST
#StudentsDoRecover

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