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House of Representatives
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

HOUSE DEMOCRATIC POLICY COMMITTEE HEARING
Topic: Alcohol Poisoning Prevention and Education
Temple University– Philadelphia, PA
April 26, 2018

AGENDA

10:00 a.m. Welcome and Opening Remarks

10:10 a.m. Panel One:

- Mary Ciammetti
  Founder
  The CTC Wellness Foundation dba "Don't Stall, Just Call"

- Dr. Robert McNamara
  Professor and Chair of Emergency Medicine
  Temple University's Lewis Katz School of Medicine

10:45 a.m. Panel Two:

- Stephanie Ives
  Dean of Students
  Temple University

- Eileen Behr
  Vice President of Public Safety/Chief of Police
  Drexel University

11:20 a.m. Closing Remarks

I am Stephanie Ives and I have been the Dean of Students here at Temple University since 2010.

For decades, alcohol and other drug use and abuse on college campuses across the nation has been a persistent and heartless enemy – withstanding many of our best efforts to make a difference and reverse the course of what many students think is just a rite of passage.

Both the federal government and our Commonwealth legislators have been important partners in keeping our communities focused on addressing and working to eliminate underage drinking, high risk alcohol use, and all substance abuse.

In this fight against substance abuse and addiction, no voice may be stronger or more important than that of a parent who has lost a child...and in this case Mary Ciammetti's voice and her perspective. She has clearly transformed personal tragedy – the loss of her beloved son Christian– into hope for others in their battles with substance abuse and addiction. Mrs. Ciammetti is a champion, a leader, and a hero.

I would like to share briefly with you some of the steps that Temple has taken to fight college student alcohol and other drug abuse, and in particular, the ways in which we have partnered with Mary Ciammetti and the CTC Wellness Foundation proudly and with true commitment.

Temple was an early pilot site for Don't Stall, Just Call. In 2015, it was our honor to be approached by Mrs. Ciammetti to serve as a first campus to promote this important campaign to educate students about alcohol poisoning and medical amnesty. Although Temple's medical amnesty policy had been in effect for many years, students needed a strong and meaningful campaign with a purpose, and an action-oriented slogan that was clear and easy to remember. Mrs. Ciammetti and the CTC Wellness Foundation did just that for Temple - and now for many other campuses - in creating Don't Stall, Just Call.

The effort to educate students about alcohol poisoning and medical amnesty begins before students even arrive for their first semester through Temple's Orientation program. The medical amnesty policy and Don't Stall, Just Call campaign is in the forefront of our educational programming for students as a means for keeping everyone safe, and decreasing the fear of getting in trouble.

Temple offers broad-based educational alcohol and other drug programming throughout the year, but because no one program meets the needs of all, we tailor our messages so that students are reminded of Don't Stall, Just Call, its educational tenants, and the medical amnesty policy in a number of ways - for example, through RA training, fraternity/sorority leadership training, and also ogeneral university messaging.

It's our responsibility to provide students with education throughout their college career. We make sure that Don't Stall, Just Call promotional items are distributed in the following ways to ensure complete saturation of our campus environment. We have:

1. Signage in residence halls with the DSJC logo and TUPD phone number
2. Magnets with DSJC logo and TUPD phone number which are distributed to off-campus blocks with a high volume of students as well as through various departments including Student Activities, Athletics, WRC, TUPD, ROTC and Student Health Services.
3. There are PSA videos shown at Temple football games and Mrs. Ciammetti has pushed for a greater presence of EMTs at football tailgates.
4. There's a variety of messaging through all forms of social media about medical amnesty, especially around high-risk times of the year
5. As mentioned, there are presentations customized for RAs, fraternities, sororities, student-athletes, and nursing students
6. And Temple's Wellness Resource Center has also met with Mrs. Ciammetti and is working to incorporate the DSJC messaging in their trainings for students around alcohol use.

Temple's partnership with the CTC Wellness Foundation goes beyond the Don't Stall, Just Call campaign. Together, we have held three vigils for members of the Temple community who have lost their lives to overdoses, suicide, and other causes. Giving our community a time to grieve together furthers the bonds we have and honors those lives lost. We also have sponsored the CTC Wellness Foundation 5Ks on Temple's Ambler campus.

Temple has worked hard to remove barriers for easier reporting, and training bystanders on the signs of alcohol poisoning is critical, but so is building trust with the student community that amnesty is real and that getting help for a friend should always be more important than the question of whether anyone would get into trouble.

Mary Ciammetti's devotion to this effort – that recognizing alcohol poisoning is critical and that overcoming barriers to calling for help is absolutely essential - and her unique commitment to this mission are to be commended and are truly special. We thank her for her work and we are very proud to be partners with her and the CTC Wellness Foundation. This undertaking is literally about life and death.

Thank you for the opportunity to speak with you today.

Democratic Policy Committee
Hearing.2 April 26, 2018

Good Morning Honorable Representatives. Thank you for the opportunity to speak with you today about a critical issue impacting our state, as well as our country. And this is it:

2,200 people die in the United States each year of alcohol poisoning - an average of 6 alcohol poisoning deaths every day, according to the Centers for Disease Control. (CDC)

My name is Mary Ciammetti, and I founded The CTC Wellness Foundation and Don't Stall, Just Call, an alcohol poisoning awareness program. For the past 3 years, I have been asked to present our mission to almost 15,000 people. Our presentations focus on the current binge drinking culture permeating our high schools and college campuses. We teach the signs of alcohol poisoning and encouraging young people to Don't Stall, Just Call when they identify someone showing the signs. Our goal is that no other college student in PA and beyond will ever be able to say "I didn't know" what to do again when someone is in need!

You may wonder why I am so passionate about these issues... I am the mother of Christian Ciammetti. My youngest child was 20 years old and a junior at Temple University studying Landscape Architecture when he died due to complications from alcohol poisoning from binge drinking in 2015. Yes, he is one of those 2,200 deaths. But I and my team are doing our best to tell Christian's story to everyone, and make sure his death is not just a statistic.

I have investigated and gathered research to help open the eyes & minds of students all over the Delaware Valley. I believe ALL young people need to learn this life-saving information so senseless deaths can be prevented in the future.

So what is alcohol poisoning? Alcohol poisoning occurs when large quantities of alcohol are consumed in a short amount of time. Our bodies can only process one unit of alcohol per hour, so when 4 or 5 drinks are consumed in a 2-hour period, mental confusion sets in, body coordination becomes dulled, and slurred speech occurs as the blood alcohol content increases. Symptoms look like: stumbling, mumbling, skin feels cool to touch, unresponsive, heart rate slows and vomiting can occur.

- people aged 12 to 20 years drink 11% of all alcohol consumed in the United States.[4] More than 90% of this alcohol is consumed in the form of binge drinks.[4]

- On average, underage drinkers consume more drinks per drinking occasion than adult drinkers.[5]

I believe EDUCATION can help stop alcohol poisoning deaths. In Health class or Phys Ed, teach about blood alcohol content levels and share the signs of alcohol poisoning—Add this to the Pennsylvania state curriculum for 7th through 12th grades. Then there would never be another college student from PA who could say, "I didn't know what to do!"

This life-saving information can be presented in a straightforward, simple ways, starting in 7th grade, so young people will know how this poisoning occurs. They will be aware of potential choices that could put their lives at risk. Layers of education, presented up through 12th grade, would provide a safety net for teens and their friends. Similarly, as they learned through the years that cigarette smoking is dangerous to your health, children then began discouraging family members to abstain. The result—smoking is down in our country. Let's start the positive ripple effect by teaching Pennsylvania youth the dangers of alcohol abuse and poisoning and hopefully the outcomes would be positive for all citizens in our state, thus reducing medical costs on these emergencies.

Since Christian's passing, I feel ill whenever I hear about tragic deaths of young people from alcohol. These deaths, in PA and throughout the US, appear to have a few common threads: alcohol consumed in large quantities, bystanders not being aware of dangerous alcohol poisoning symptoms, as well as friends hesitating to make a life-saving call due to potential fines or citations.

In the past, prospective students at many colleges were issued an alcohol education survey to secure room assignments at their new schools. The alcohol ED tool was what appeared to me as the institution's covering their backs… Future students would quickly, mindlessly fill out the form (while sitting at home) to get to the good part, finding out which dorm they would be assigned. Retaining potentially life-saving information from an online survey that was negligible & practically considered a joke with the incoming students was and is ineffective. This education piece is not enough. To retain this critical information, students need layers of education as the school year progresses. This applies high school and college students.

In the recent past, before we lost Christian, alcohol education was barely emphasized on many college campuses or in local high school curriculum. If anything, alcohol poisoning was quickly mentioned in orientation and then left alone, unless an accident occurred and was quickly covered up to avoid negative press. Many people couldn't imagine that binge drinking could life-threatening—my son and his friends thought they were invincible—they were not and are not. Drinking out of handles of alcohol, saying you're going to drink to black out, and being hammered remain commonplace on campuses today, which fuels the binge drinking episodes.... which then result in a multitude of alcohol poisonings each week.

Another key factor here is that no one wants to call an ambulance for fear of getting fined, parents finding out, suspended, cited, etc. I am here today to say that knowing the signs, calling an ambulance and saving a life is a much better outcome than the days, months and years of grief and loss, compounded by hearing another student died the same way. And another.

No one should be dying in 2018 due to lack of education.

In closing I believe that the current Medical Amnesty Policy (Senate Bill 448, amended on June 29, 2011) should be updated & amended to protect not only the "underage caller" of a true life-threatening medical emergency due to alcohol but also for the "underage victim" or the person in need of medical assistance.

We need to create a Medical Amnesty Policy for PA that blankets the state with the knowledge that our policy protects our underage citizens in the event of a life threatening medical emergency. This is by no means a free ticket to party endlessly at colleges, secluded farm fields and unchaperoned basements. This would be an opportunity to give all of our kids and grandchildren in the future, a knowledge that if a problem occurs, and someone needs help, a call can be made without delaying & debating the implications. As well, if the education piece is implemented in our kids 7th - 12th grade health curriculum, better education will result in better outcomes, thus reducing the emergency totals overall and the expense of accidents and potential deaths.

Having campuses that have our recommended Medical Amnesty is great, but then have the town adhere to a different policy is confusing. Penn State just changed their Medical Amnesty Policy to protect the underage caller and the victim for a life-threatening emergency on their campus. This is a great step in providing the Safety net which I recommend. The problem is that the surrounding town has a

different policy, thus creating mixed signals for the kids when an emergency presents itself- am I on this street? then i can call, if I'm over there, no...

Too many calls are not being made as fear of fines, citations and loss of driver's license sends the kids into basements, dorm rooms and apartments trying to steer clear of trouble. We need to get this amnesty policy amended throughout our state, and within sub groups as well, those teams and clubs that have zero tolerance policies for alcohol. We need to create a safety net for all of our underage citizens, who at times, due to their brain not being fully developed (especially for males until age 24 or 25)- we need to save all the lives that we can, while we can. People can learn from their mistakes, if they are alive. Education is the answer, then they will know.

Thank you.

https://www.cdc.gov/alcohol/fact-sheets/underage-drinking.htm

Julia Miller
Temple University 2016
BS in Neuroscience

Why alcohol education for 7th – 12th graders is important:

Nelson Mandela once said, "Education is the most powerful weapon which you can use to change the world." I've always believed that education can open doors, not only to continuing education and a career, but also to creating a better future. Upon reflecting on the last few years, it has become glaringly obvious that young college students are not aware of the dangers of drinking alcohol. A simple solution to this is education. Students are geared with information to solve equations, predict outcomes, and write about great works of literature, but most of this information will not help them in a life-threatening situation. If students are able to name characters in Shakespeare, they should also be able to recall the signs of alcohol poisoning in an emergency. Educating middle school students will prevent many deaths of high school students, as educating high school students will help prevent many college deaths. The earlier this life-saving information is taught, and retaught during these critical years, more students will understand it's importance and be able to recognize the signs, call for help, and ultimately save lives. This powerful information will help change the world, and the culture of drinking in our society today.

Why the PA medical amnesty needs to be universal, protecting the underage caller and the underage victim:

As a state, it is not only vital to have a consistent medical amnesty policy, but it is also vital that this policy clearly protects the underage call and the underage victim. Taking the college and universities in PA as case studies, it is clear that there is a lack of consistency through the state, and its campuses. Taking the Penn State death of Tim Piazza as a very highly published example, it demonstrates that not only do "zero tolerance" policies endanger students, but also that students do not feel confident enough to call for help. If policies statewide were similar to those at Temple and Drexel (to name a couple), calls and therefore lives would go up. Taking Drexel as a cause and effect sample, they have recently changed their medical amnesty policy and now protect the caller and victim. As a result of this change, calls have increased, and students' lives are being saved.

As someone who had to be taken to the hospital after a night of heavy drinking, I can attest to the importance of medical amnesty policies protecting both the caller and victim. A nursing student, who had been educated on Temple's medical amnesty policy, called Temple's police, because she knew I need medical attention, and that I would not be cited for underage drinking. When I went to my meeting with our dorm Director, she simply stated that medical amnesty had been called for me, so I would not have to pay fines, or face any other disciplinary actions. This was not only a relief then, but also empowered me to make the call for someone else a year later, when I was still underage. Because of my experience, I strongly believe that Temple's policy is a very good model for medical amnesty policies statewide. Priority should be on saving lives, not getting underage drinker in trouble.

House Democratic Policy Committee
April 26, 2018

Written Remarks Submitted for the Record
On Behalf of the Pennsylvania Liquor Control Board (PLCB)

Chairman Sturla and members of the House Democratic Policy Committee, thank you for the opportunity to provide written remarks on behalf of the Pennsylvania Liquor Control Board (PLCB). Underage and dangerous drinking is a critical public health issue, and the PLCB appreciates the committee's attention to this subject. While the PLCB is well known for its role as the Commonwealth's responsible seller and regulator of wine and spirits, the PLCB is also committed to alcohol education and prevention efforts through its Bureau of Alcohol Education (BAE).

The 27-member BAE staff is dedicated to preventing underage and dangerous drinking through partnerships and initiatives across Pennsylvania. Through a diverse range of alcohol education programs, the BAE engages with community organizations, government organizations, institutions of higher education, school districts, parents and other concerned citizens. The BAE also manages the Responsible Alcohol Management Program (RAMP), which provides training and resources to liquor licensees and their employees regarding the responsible sale of alcohol to consumers. In this past fiscal year, approximately 68,000 server/seller trainings and 6,000 owner/manager trainings were conducted online and in the classroom.

Reducing dangerous and underage drinking is truly a community effort. In recognition of our responsibility related to these issues, the BAE provides more than $1 million annually in grants for alcohol education programs across the Commonwealth. In the current two-year grant cycle, 66 grants were awarded to community organizations, schools, colleges and universities, municipalities, and law enforcement organizations. These grants helped to fund targeted prevention programs such as Operation Buzzkill, which is an educational program regarding the dangers of alcohol misuse, and Mothers Against Drunk Driving's Power of Parents program. These grants also provided funding to law enforcement in local communities and at institutions of higher learning for increased training, enforcement patrols and equipment resources. Notably for this hearing, Drexel University Public Safety received a grant of more than $10,000 that provided funding for its Don't Stall, Just Call presentations, as well as for targeted

enforcement patrols, the purchase of a police bike, and attendance at the PLCB's annual alcohol education conference, discussed in more detail below.

College is a high-risk period for underage and dangerous drinking. One of the premier programs developed and managed by BAE is the nationally recognized and award-winning Resident Assistant Training Program. Students encounter unique challenges when attending college, and resident assistants are well positioned to help educate students about underage and dangerous drinking. The program highlights the science behind decision making in the adolescent brain; informs participants about the indications of alcohol poisoning; reviews the legal protections provided by Pennsylvania's medical amnesty law; and details the health, social and criminal consequences of high-risk and underage drinking. Alcohol education specialists tailor these training sessions for each campus and each university community. In 2015, this program received the award for Best Responsible Consumption Program from *StateWays* magazine, which is a national publication devoted to the issues impacting control state systems.

The PLCB's Town-Gown Program, funded by a grant from the National Alcohol Beverage Control Association (NABCA), is another example of how BAE partners with colleges and universities regarding the prevention of underage and dangerous drinking. This training program engages institutions of higher education and a broad range of community stakeholders in an assessment of current partnerships and areas of shared concern involving alcohol misuse. The assessment is used to develop a strategic plan that focuses on engendering closer working relationships between campuses and key community groups to achieve a long-term commitment to addressing underage and dangerous drinking.

The BAE also develops and promotes resources to reduce underage drinking, with a special focus on educating young people and key adult influencers. One of BAE's signature programs is our annual alcohol awareness poster contest for students in kindergarten through grade 12. Through this program, students are encouraged to produce creative posters that portray positive alternatives to underage drinking. Poster contest winners receive monetary prizes and are invited to Harrisburg for an awards ceremony each April, which is Alcohol Awareness Month.

Another significant educational program the BAE hosts is the PLCB's annual alcohol education conference that is attended by a diverse group of community

leaders including educators, non-profit professionals, prevention specialists and law enforcement. The conference brings together alcohol education and public health experts to lead workshops and conduct presentations regarding the latest developments in alcohol abuse prevention and strategies to decrease underage drinking.

Children's exposure to, and opportunities for, underage and dangerous drinking often begin long before parents believe alcohol and its risks are age appropriate topics for discussion with their kids. However, research shows that one in three children have tried alcohol by the age of 8, and by age 12 that number grows to two in three. Research also indicates that children who begin drinking before they turn 13 are four times more likely than other children to become alcohol dependent later in life. The good news is that children in these age ranges are also the most receptive to parents' feedback, so talking with children at an early age about how and why to avoid alcohol is critical to preventing underage drinking as they grow older. To facilitate and promote those conversations, the PLCB launched a new statewide advertising campaign in late 2017 entitled *Know When. Know How.*[SM]

This education and prevention campaign is designed to give parents of children who are 8 to 12 years of age the tools, resources and confidence they need to start having meaningful conversations with their children about alcohol. The campaign—which includes television and radio commercials, along with a heavy digital focus—directs parents to www.knowwhenknowhow.org, which presents information about alcohol in actionable and digestible bits and pieces for parents. Through this effort we hope to educate parents and other key influencers in children's lives about the facts regarding underage drinking; stress the importance of talking early and often with children about alcohol; encourage parents use their influence and keep in touch with their children's lives to prevent underage drinking; and consider how to secure alcohol in the home. The *Know When. Know How.*[SM] campaign is funded by a $1 million annual budgetary commitment by the PLCB.

The PLCB also produces a biennial Report on Underage and High-Risk Drinking, which is required by Act 85 of 2006. The last report, published in May 2017, provides an overview of alcohol abuse prevention, education, and enforcement activities undertaken by state agencies and community partners, as well as highlighting evolving trends and the latest research with respect to underage and

high-risk drinking. The report, as well as information about all of BAE's alcohol education programs, is available at www.lcb.pa.gov.

On a final note, by statute, the PLCB annually transfers funds from the State Stores Fund to the Pennsylvania State Police (PSP) for liquor enforcement efforts and to the Department of Drug and Alcohol Programs (DDAP) in support of DDAP's critical alcohol treatment programs. The PLCB is budgeted to transfer a total of $31.5 million to PSP and $2.5 million to DDAP in current fiscal year 2017-18.

Again, thank you for the opportunity to inform you of the PLCB's alcohol education efforts that relate to these important public safety issues.

Centers for Disease Control and Prevention

MMWR

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Assessment of Emergency Responders After a Vinyl Chloride Release from a Train Derailment — New Jersey, 2012

Kimberly Brinker, MSN, MPH[1,2], Margaret Lumia, PhD[3], Karl V. Markiewicz, PhD[4], Mary Anne Duncan, DVM[4], Chad Dowell, MS[2], Araceli Rey, MPH[2], Jason Wilken, PhD[1], Alice Shumate, PhD[1,3], Jamille Taylor, MPH[4], Renée Funk, DVM[2] (Author affiliations at end of text)

On November 30, 2012, at approximately 7:00 am, a freight train derailed near a small town in New Jersey. Four tank cars, including a breached tank car carrying vinyl chloride, landed in a tidal creek. Vinyl chloride, a colorless gas with a mild, sweet odor, is used in plastics manufacture. Acute exposure can cause respiratory irritation and headache, drowsiness, and dizziness; chronic occupational exposure can result in liver damage, accumulation of fat in the liver, and tumors (including angiosarcoma of the liver) (*1*). Because health effects associated with acute exposures have not been well studied, the New Jersey Department of Health requested assistance from the Agency for Toxic Substances and Disease Registry (ATSDR) and CDC. On December 11, teams from these agencies deployed to assist the New Jersey Department of Health in conducting an assessment of exposures in the community as well as the occupational health and safety of emergency personnel who responded to the incident. This report describes the results of the investigation of emergency personnel. A survey of 93 emergency responders found that 26% of respondents experienced headache and upper respiratory symptoms during the response. A minority (22%) reported using respiratory protection during the incident. Twenty-one (23%) of 92 respondents sought medical evaluation. Based on these findings, CDC recommended that response agencies 1) implement the Emergency Responder Health Monitoring and Surveillance (ERHMS) system (*2*) for ongoing health monitoring of the emergency responders involved in the train derailment response and 2) ensure that in future incidents, respiratory protection is used when exposure levels are unknown or above the established occupational exposure limits.

The CDC team created a self-administered survey based on the ATSDR toolkit for the assessment of chemical exposures (*3*) to assess health effects, use of personal protective equipment, and preparedness training among emergency responders who worked at the incident site at any time during November 30–December 7, 2012. The CDC team met with emergency response leaders and local responders during the period December 11–21. Emergency responders completed surveys during the meetings, and those who did not attend any meetings had the option of mailing in a survey; 93 completed surveys were received.

Responders were categorized by profession, including emergency medical services, firefighters, police officers, and hazardous material technicians, and by cumulative duration of exposure. Because a typical work shift lasts 12 hours, participants were categorized as working ≤12 hours or >12 hours at the incident site during the entire 8-day period.

Symptoms were grouped according to clinical presentation (i.e., neurologic [dizziness, weakness, and loss of balance], upper respiratory [runny nose, burning nose or throat, and

INSIDE

Continuing Education examination available at http://www.cdc.gov/mmwr/cme/conted_info.html#weekly.

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hoarseness], and lower respiratory [shortness of breath, chest tightness, wheezing, and burning chest sensations]). Coughing, increased congestion, and increased phlegm are presented separately from other respiratory indicators because their causes could be upper or lower respiratory in nature. Headache; nausea and vomiting; irritation, pain, or burning of the eyes and skin; and diarrhea were also reported.

Use of personal protective equipment, including respiratory protection, was assessed as well. In addition, respondents were asked questions to evaluate preparedness training. A bivariate analysis was conducted using statistical software.

A total of 93 surveys were completed, though not all questions were answered in all surveys. Of these, 72 were completed during meetings with emergency response leaders and local responders, and 21 were mailed in at a later time. Ninety-six percent of respondents were male and white, and the median age of respondents was 42 years (range = 19–78 years). Forty-eight percent (44 of 92) of respondents reported spending >12 hours at the site, and 52% (48 of 92) reported spending ≤12 hours at the site.

The most frequently reported symptoms were headache (26%), upper respiratory symptoms (26%), and lower respiratory symptoms (22%) (Table 1). Other symptoms reported included coughing; neurologic symptoms; nausea and vomiting; congestion or phlegm; irritation, pain, or burning of the eyes; irritation, pain, or burning of the skin; and diarrhea (Table 1). The prevalence odds ratios for lower and upper respiratory symptoms; irritation, pain, or burning of the eyes; and headache were significantly associated with an exposure >12 hours (Table 2).

Twenty-three percent (21 of 92) of respondents reported wearing no personal protective equipment (Figure). When asked a separate question about respirator types, 20 respondents (22%) reported donning a self-contained breathing apparatus during the response, although it is unclear when respiratory protection was used during the response. Of these 20 respondents, one was an emergency medical services worker, one was a police officer, two were hazardous material technicians, and 16 were firefighters. One reported using both a self-contained breathing apparatus and a powered air-purifying respirator, another reported using a full-face air-purifying respirator, and one reported using an air-purifying respirator but did not specify which type. Forty-nine percent (35 of 72) of respondents who reported they did not wear respiratory protection on initial arrival at the site stated that respiratory protection was not required for their work, 24% (17 of 72) stated none was available, 17% (12 of 72) stated they were not advised to wear respiratory protection, and 17% (12 of 72) stated they did not think they needed it. Eight percent (six of 72) of respondents reported they were told respiratory protection was not necessary, and 1% (one of 72) stated that it got in the way of work. Categories are not mutually exclusive.

Discussion

The Occupational Safety and Health Administration (OSHA) permissible exposure limit for vinyl chloride is 1 part per million, based on an 8-hour time-weighted average (*4*).

The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Report title]. MMWR Morb Mortal Wkly Rep 2014;63:[inclusive page numbers].

TABLE 1. Self-reported symptoms of emergency responders (N = 93) after a vinyl chloride release from a train derailment — New Jersey, 2012

Symptom*	No.	(%)
Headache	24	(26)
Upper respiratory	24	(26)
Lower respiratory	20	(22)
Coughing	15	(16)
Neurologic	14	(15)
Nausea or vomiting	14	(15)
Increased congestion or phlegm	11	(12)
Irritation, pain, or burning of eyes	11	(12)
Other	3	(3)
Irritation, pain, and burning of skin	2	(2)
Diarrhea	1	(1)

* Symptoms are not mutually exclusive.

TABLE 2. Odds of reporting selected symptoms, by hours worked in evacuation zone (>12 hours versus ≤12 hours), among emergency responders (N = 93) after a vinyl chloride release from a train derailment — New Jersey, 2012

Symptom*	Prevalence OR	95% CI
Lower respiratory	14.1	3.0–135.0
Irritation, pain, or burning of eyes	5.8	1.1–58.6
Upper respiratory	3.9	1.3–13.9
Headache	3.6	1.2–11.8
Coughing	3.2	0.8–15.2
Neurologic	3.2	0.8–15.2
Increased congestion or phlegm	2.8	0.6–18.0
Nausea or vomiting	2.2	0.6–9.1

Abbreviations: OR = odds ratio; CI = confidence interval.
* Symptoms are not mutually exclusive.

CDC recommends reducing vinyl chloride exposures to the lowest feasible concentration because it has been designated a potential occupational carcinogen (*5*). According to OSHA regulations, employees engaged in emergency response who have potential exposures to hazardous substances should wear a positive pressure respirator until the incident commander determines (through the use of air monitoring) that a decreased level of respiratory protection will not result in hazardous exposures to employees (*6*). During the emergency response described in this report, exposure monitoring was unavailable, and the majority of respondents did not use respiratory protection. The need for respirators and selection of particular respirator types are determined by an exposure risk assessment. The implementation of a respiratory protection program, including the use of exposure monitoring to determine when respirator use is required, might assist emergency responders in future events.

Symptoms were commonly reported by first responders, most frequently headache, upper respiratory irritation, and lower respiratory irritation. Because personal breathing zone measurements of responders' exposures to vinyl chloride were not collected, it is impossible to correlate vinyl chloride exposure levels with symptoms. On the basis of the OSHA and CDC guidance described previously, respiratory protection would likely have been required for many first responders. Proximity to the evacuation zone and assigned job task could be used as proxy indicators of the need for respirator use.

The findings in this report are subject to at least three limitations. First, complete rosters of emergency responders who worked in the evacuation zone and the period over which work shifts occurred were unavailable; therefore, the study was lacking a strong denominator. Selection bias likely occurred because the sample consisted of emergency responders who attended the scheduled meetings and completed the survey there or who obtained surveys from emergency response leaders and mailed them in; an accurate account of responders who arrived on the scene is not available so it is possible that there were a number of emergency responders who could not attend the meetings or were never given a survey. Second, personal breathing zone measurements of responders' exposures to vinyl chloride were not collected, so it is impossible to correlate vinyl chloride exposure levels with symptoms. Finally, the small number of participants who completed the survey made it impossible to meaningfully analyze the associations between respirator use and symptoms.

For ongoing health monitoring of the emergency responders involved in the train derailment response, and to prepare for future incidents, the response agencies involved should consider implementing the ERHMS system, a framework that includes recommendations and specific tools to protect

What is already known on this topic?

Vinyl chloride, a gas used to make plastics, is an acute respiratory irritant that can cause headache, drowsiness, and dizziness. Chronic exposure can damage the liver.

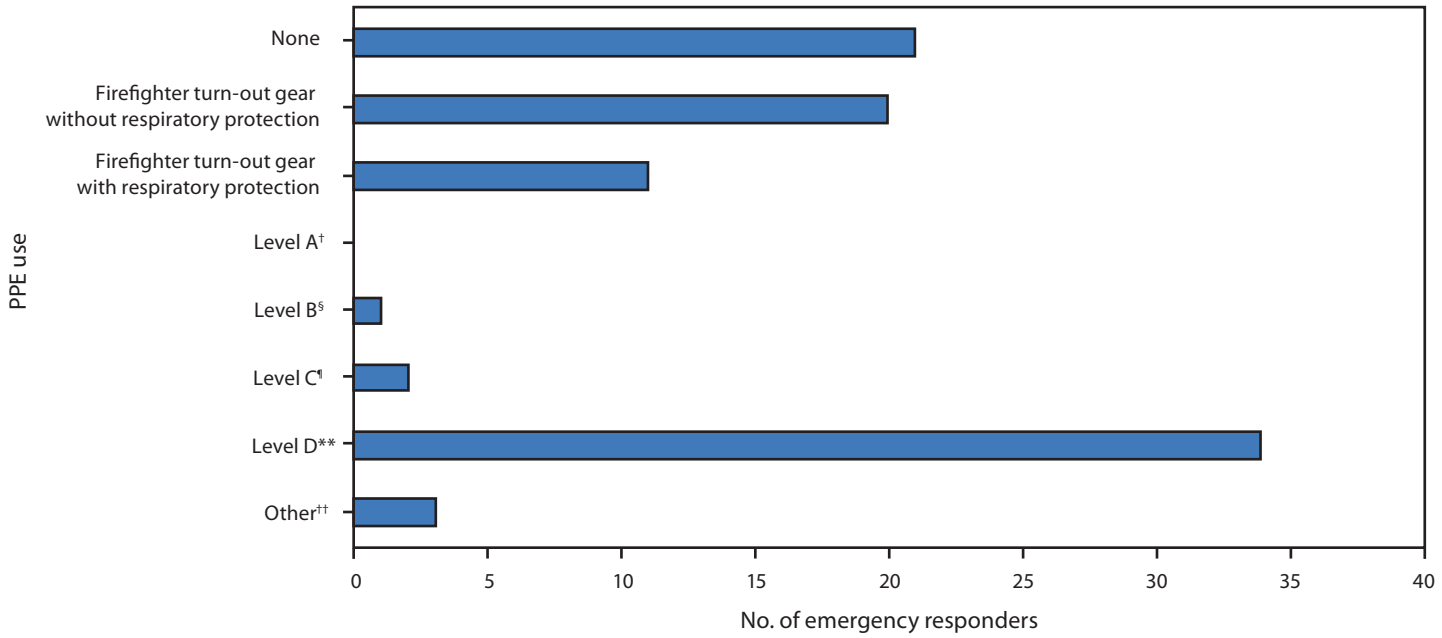
What is added by this report?

In December 2012, vinyl chloride was released from a breached tank car after a train derailment in New Jersey. A survey of 93 emergency responders found that 26% experienced headache and upper respiratory symptoms during the response. Only 22% reported using respiratory protection during the incident, and 23% sought medical evaluation. Most respondents reported having received some emergency responder training and felt they had sufficient instruction, indicating a possible gap in perception of risk.

What are the implications for public health practice?

In similar incidents, health officials are encouraged to implement a framework for health monitoring and surveillance of emergency responders, encourage use of respiratory protection until engineering controls and work practices can be implemented that reduce exposure to below the appropriate occupational exposure limit, and evaluate training needs for all emergency response roles.

FIGURE. Personal protective equipment (PPE)* use among emergency responders (N = 92) after a vinyl chloride release from a train derailment — New Jersey, 2012



* Information on PPE levels and risks available at https://www.cseppportal.net/csepp_portal_resources/ppe_factsheet.pdf and http://www.cdc.gov/niosh/docs/2008-132/pdfs/2008-132.pdf.
† Level A: Recommended when greatest potential for exposure to skin and respiratory system exists. Includes a pressure-demand, full face-piece; a self-contained breathing apparatus; and a fully-encapsulating, chemical-resistant suit.
§ Level B: Recommended when highest level of respiratory protection is indicated but skin at a lesser level. Includes a pressure-demand, full face-piece; a self-contained breathing apparatus; and chemical-resistant clothing.
¶ Level C: Recommended when concentration or type of substance is known and criteria for respiratory use are met. Includes a full face-piece or half-mask; an air-purifying, canister-equipped respirator; and chemical-resistant clothing.
** Level D: Recommended when minimum protection is required. Includes a simple work uniform.
†† Other forms of PPE include coveralls, gloves, safety glasses, composite-toed shoes, and hard hats.

emergency responders during all phases of a response, including pre-deployment, deployment, and post-deployment. Respiratory protection should be used until engineering controls and work practices that reduce employees' exposures to below the appropriate occupational exposure limit (OSHA-permissible exposure limit or CDC-recommended exposure limit) can be implemented. Implementation should follow the OSHA respiratory protection standard (*7*). A positive pressure respirator should be used when exposure levels are unknown and until they have been determined to be below the appropriate occupation exposure limit. Furthermore, the authority having jurisdiction and the various emergency response departments can refer to existing National Fire Protection Association standards (*8*).

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Vital Signs: Alcohol Poisoning Deaths — United States, 2010–2012

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On January 6, 2015, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

Abstract

Background: Alcohol poisoning is typically caused by binge drinking at high intensity (i.e., consuming a very large amount of alcohol during an episode of binge drinking). Approximately 38 million U.S. adults report binge drinking an average of four times per month and consuming an average of eight drinks per episode.

Methods: CDC analyzed data for 2010–2012 from the National Vital Statistics System to assess average annual alcohol poisoning deaths and death rates (ICD-10 codes X45 and Y15; underlying cause of death) in the United States among persons aged ≥15 years, by sex, age group, race/ethnicity, and state.

Results: During 2010–2012, an annual average of 2,221 alcohol poisoning deaths (8.8 deaths per 1 million population) occurred among persons aged ≥15 years in the United States. Of those deaths, 1,681 (75.7%) involved adults aged 35–64 years, and 1,696 (76.4%) involved men. Although non-Hispanic whites accounted for the majority of alcohol poisoning deaths (67.5%; 1,500 deaths), the highest age-adjusted death rate was among American Indians/Alaska Natives (49.1 per 1 million). The age-adjusted rate of alcohol poisoning deaths in states ranged from 5.3 per 1 million in Alabama to 46.5 per 1 million in Alaska.

Conclusions: On average, six persons, mostly adult men, die from alcohol poisoning each day in the United States. Alcohol poisoning death rates vary substantially by state.

Implications for Public Health Practice: Evidence-based strategies for preventing excessive drinking (e.g., regulating alcohol outlet density and preventing illegal alcohol sales in retail settings) could reduce alcohol poisoning deaths by reducing the prevalence, frequency, and intensity of binge drinking.

Introduction

Excessive alcohol use accounted for an average of one in 10 deaths among working-age adults (aged 20–64 years) in the United States each year during 2006–2010 (*1*), and cost the United States $223.5 billion in 2006 (*2*). Binge drinking, defined as consuming four or more drinks for women or five or more drinks for men on an occasion, was responsible for more than half of these deaths (*1*) and three fourths of the economic costs (*2*). Binge drinking also is responsible for many health and social problems, including alcohol poisoning (*3*). Yet, approximately 38 million U.S. adults report binge drinking an average of four times per month, and consume an average of eight drinks per binge episode (*4*). Most binge drinkers (90%) are not alcohol dependent (*5*).

Alcohol poisoning is typically caused by binge drinking at high intensity. Such drinking can exceed the body's physiologic capacity to process alcohol, causing the blood alcohol concentration to rise. The clinical signs and symptoms of alcohol intoxication are progressive, and range from minimal impairment, decreased judgment and control, slurred speech, reduced muscle coordination, vomiting, and stupor (reduced level of consciousness and cognitive function) to coma and death. However, an individual's response to alcohol is variable depending on many factors, including the amount and rate of alcohol consumption, health status, consumption of other drugs, and metabolic and functional tolerance of the drinker (*6,7*).

Reducing the proportion of adults engaging in binge drinking (objective SA-14.3) and reducing the number of deaths attributable to alcohol (objective SA-20), including deaths from alcohol poisoning, are among the objectives in *Healthy People 2020* (*8*). Reducing drug abuse and excessive alcohol use are also key components of the National Prevention Strategy (*9*).

Methods

CDC analyzed multiple cause-of-death mortality files for 2010–2012 from the National Vital Statistics System (*10*) to

Key Points

- An annual average of 2,221 alcohol poisoning deaths, or six deaths per day, occurred in the United States during 2010–2012.
- Alcohol poisoning is typically caused by binge drinking at high intensity (i.e., consuming a very large amount of alcohol during an episode of binge drinking).
- Three in four of those who died were adults aged 35–64 years, and three in four decedents were men.
- Almost 70% of the deaths were among non-Hispanic whites; however, the highest age-adjusted alcohol poisoning death rate was among American Indians/Alaska Natives (49.1 deaths per 1 million).
- The age-adjusted alcohol poisoning death rate in states ranged from 5.3 deaths per 1 million in Alabama to 46.5 deaths per 1 million in Alaska.
- Several evidence-based strategies effective in reducing excessive alcohol use and related harms have been identified and recommended.
- Additional information is available at http://www.cdc.gov/vitalsigns.

assess average annual alcohol poisoning deaths among persons aged ≥15 years in the United States. Alcohol poisoning deaths were defined as those with *International Classification of Diseases, 10th Revision* (ICD-10) underlying (i.e., principal) cause of death codes X45 (accidental poisoning by and exposure to alcohol) and Y15 (poisoning by and exposure to alcohol, undetermined intent). Alcohol poisoning death rates per 1 million were calculated by sex, age group, and race/ethnicity for persons aged ≥15 years using the U.S. Census bridged-race population for 2010–2012 as the denominator, and were age-adjusted to the 2000 U.S. Census standard population. State death rates also were calculated and age-adjusted to the 2000 U.S. Census standard population.

Selected conditions that might have directly contributed to alcohol poisoning deaths, including alcohol dependence (F10.2), hypothermia (X31, T68, T69.9), drug poisoning (T36–T50), and drug use mental disorders (F11–F16, F18, F19), also were assessed among persons who died of alcohol poisoning.

Results

During 2010–2012, there was an annual average of 2,221 alcohol poisoning deaths, an age-adjusted rate of 8.8 deaths per 1 million population, among persons aged ≥15 years in the United States (Table 1). Of these deaths, 1,681 (75.7%) were among adults aged 35–64 years, and 1,696 (76.4%) were among men. The highest death rate from alcohol poisoning was among men aged 45–54 years (25.6 deaths per 1 million). Although non-Hispanic whites accounted for the majority of alcohol poisoning deaths (67.5%; 1,500 deaths), the highest age-adjusted alcohol poisoning death rate was among American Indians/Alaska Natives (49.1 deaths per 1 million). A total annual average of 44 deaths (2.0%) involved persons aged 15–20 years, who were under the legal drinking age of 21.

The age-adjusted alcohol poisoning death rate in states ranged from 5.3 per 1 million in Alabama to 46.5 per 1 million in Alaska (Table 2). Twenty states had alcohol poisoning death rates greater than the overall national rate of 8.8 per 1 million, and two states (Alaska and New Mexico) had alcohol poisoning death rates >30 per 1 million. States with the highest death rates were located mostly in the Great Plains and western United States, but also included two New England states (Rhode Island and Massachusetts) (Figure).

Alcohol dependence was listed as a contributing cause of death in an annual average of 677 (30.4%) of the deaths from alcohol poisoning, and hypothermia was listed as a contributing cause of death in an annual average of 134 (6.0%) deaths. Drug poisoning and drug use mental disorders were listed as contributing causes of death in an annual average of 62 (2.8%) and 86 (3.9%) deaths from alcohol poisoning, respectively.

Conclusions and Comment

The results in this report indicate that during 2010–2012 there was an average of six deaths from alcohol poisoning each day among persons aged ≥15 years in the United States. Three in four of these deaths involved adults aged 35–64 years, and three in four of these deaths involved males. Nearly 70% of the deaths were among non-Hispanic whites; however, the highest alcohol poisoning death rate was among American Indians/Alaska Natives (49.1 deaths per 1 million).

The large proportion of alcohol poisoning deaths (75.7%) among adults aged 35–64 years is consistent with recent findings that two thirds (69%) of all average annual alcohol-attributable deaths in the United States involve adults aged 20–64 years (*1*). Alcohol-attributable deaths also result in substantial losses in workplace productivity and were responsible for >70% of the $223.5 billion in economic costs attributed to excessive drinking in the United States in 2006 (*2*). This finding also is consistent with the distribution of binge drinking episodes in the United States, most of which are reported by adults aged ≥26 years (*11*).

The large proportion of alcohol poisoning deaths among non-Hispanic whites is consistent with the high prevalence of binge drinking in this population (*4*). The high alcohol poisoning death rate among American Indians/Alaska Natives also is consistent with the high binge drinking intensity that has been

TABLE 1. Alcohol poisoning deaths,* by sex, age group, and race/ethnicity — National Vital Statistics System, United States, 2010–2012

Characteristic	Total			Male			Female		
	Average annual no. of deaths	% of total deaths	Age-adjusted rate†	Average annual no. of deaths	% of male deaths	Age-adjusted rate†	Average annual no. of deaths	% of female deaths	Age-adjusted rate†
Overall	**2,221**	**100.0**	**8.8**	**1,696**	**100.0**	**13.7**	**525**	**100.0**	**4.1**
Age group§ (yrs)									
15–24	113	5.1	2.6	85	5.0	3.8	28	5.4	1.3
25–34	288	13.0	6.9	228	13.4	10.9	60	11.4	2.9
35–44	476	21.4	11.7	370	21.8	18.2	106	20.2	5.2
45–54	747	33.6	16.7	564	33.3	25.6	183	34.8	8.1
55–64	458	20.6	12.2	352	20.7	19.3	107	20.3	5.5
≥65	139	6.3	3.3	98	5.8	5.4	41	7.9	1.8
Race/Ethnicity									
White, non-Hispanic	1,500	67.5	8.8	1,103	65.0	13.1	397	75.6	4.6
Black, non-Hispanic	191	8.6	6.2	149	8.8	10.6	42	8.1	2.6
Hispanic	338	15.2	9.0	296	17.5	15.6	41	7.9	2.4
American Indian/ Alaska Native	154	6.9	49.1	114	6.7	75.0	39	7.5	24.3
Asian/Pacific Islander	32	1.5	2.2	28	1.7	4.1	4	0.8	—¶

* Alcohol poisoning deaths included those occurring among persons aged ≥15 years in which alcohol poisoning was classified as the underlying (i.e., principal) cause of death based on *International Classification of Diseases, 10th Revision* (ICD-10) codes X45 (accidental poisoning by and exposure to alcohol) and Y15 (poisoning by and exposure to alcohol, undetermined intent).

† Rates per 1 million population for persons aged ≥15 years were calculated using U.S. Census bridged-race population for 2010–2012, and were age-adjusted to the 2000 U.S. Census standard population.

§ Age-specific rate.

¶ Number of deaths was too small to meet standards of reliability and precision to calculate age-adjusted death rate.

reported by binge drinkers in this population (*4*). A recent study found that American Indians/Alaska Natives were seven times more likely to die from alcohol poisoning than whites, reflecting both the higher intensity of binge drinking among binge drinkers in this population and other factors, such as geographic isolation and reduced access to medical care (*12*).

Differences in alcohol poisoning death rates in states reflect known differences in state binge drinking patterns, which are strongly influenced by state and local laws governing the price and availability of alcohol (*13*), as well as other cultural and religious factors (*14*). A recent study that examined the relationship between various subgroups of state alcohol policies and binge drinking among adults found that a small number of policies that raised alcohol prices and reduced its availability had the greatest impact on binge drinking in states (*15*). However, other factors, in addition to differences in binge drinking rates, also might be important contributors to differences in alcohol poisoning death rates. For example, living in geographically isolated rural areas might increase the likelihood that a person with alcohol poisoning will not be found before death or that timely emergency medical services will not be available.

Although alcohol dependence was a contributing cause of death in 30% of alcohol poisoning deaths, the majority of these deaths involved persons for whom alcohol dependence was not listed as a contributing cause of death. This result is consistent with the results of a recent study that found that nine in 10 adults who drink excessively were not alcohol dependent, including more than two thirds of those who reported binge drinking ≥10 times per month (*5*).

The findings in this analysis are subject to at least three limitations. First, alcohol-attributable deaths, including alcohol poisoning, are underreported (*16–18*). Second, this study was restricted to deaths in which alcohol poisoning was the underlying cause of death, and did not include deaths in which alcohol poisoning was a contributing cause of death. A previous study found that there were three times as many deaths in which alcohol poisoning was a contributing, rather than underlying cause of death (*19*). Finally, mortality data might underestimate the actual number of deaths for American Indians/Alaska Natives (*12*) and certain other racial/ethnic populations (e.g., Hispanics) because of misclassification of race/ethnicity of the decedents on death certificates (*20*).

There are several recommended evidence-based, population-level strategies to reduce excessive drinking and related harms, such as regulating alcohol outlet density (i.e., the concentration of retail alcohol establishments, including bars and restaurants and liquor or package stores, in a given geographic area) and preventing illegal alcohol sales in retail settings (e.g., commercial host [dram shop] liability) (*21*,*22*). The status of each state's policies related to some of these recommendations are available from CDC online (at http://www.cdc.gov/psr/alcohol). Screening and brief intervention for excessive alcohol use, including binge drinking, among adults has also been recommended

TABLE 2. Average annual number of alcohol poisoning deaths,* by state — National Vital Statistics System, United States, 2010–2012

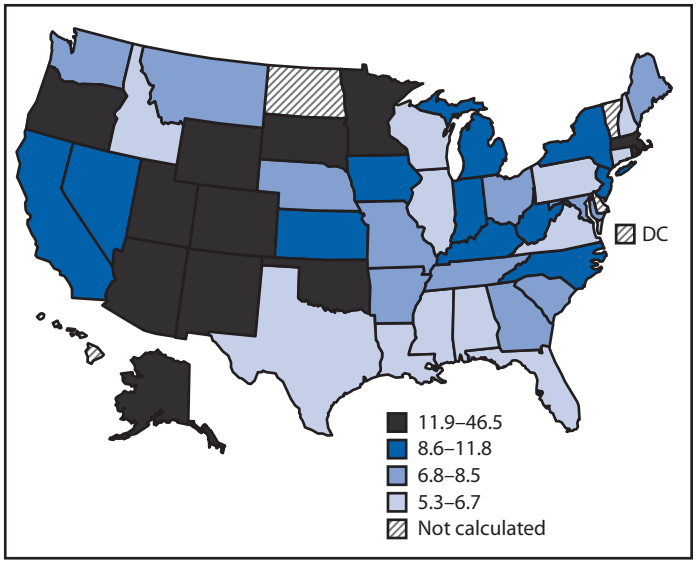
State†	Average annual no. of deaths	Age-adjusted rate§
Quartile 1 (5.3–6.7 death rate)		
Alabama	20	5.3
Texas	109	5.4
Illinois	57	5.6
Virginia	40	5.9
Wisconsin	28	6.0
Idaho	8	6.1
Louisiana	22	6.2
Pennsylvania	68	6.5
Connecticut	19	6.6
Florida	103	6.7
Mississippi	15	6.7
New Hampshire	8	6.7
Quartile 2 (6.8–8.5 death rate)		
Ohio	64	6.9
South Carolina	28	7.4
Missouri	38	7.7
Tennessee	41	7.8
Georgia	62	7.8
Arkansas	17	7.8
Maryland	37	7.8
Washington	46	8.1
Maine	9	8.1
Nebraska	11	8.1
Montana	7	8.5
Quartile 3 (8.6–11.8 death rate)		
Indiana	43	8.6
North Carolina	68	8.6
New York	143	8.8
Kentucky	32	9.1
Kansas	22	9.6
Iowa	23	9.7
Michigan	77	9.7
Nevada	21	9.8
New Jersey	74	9.9
California	299	9.9
West Virginia	17	11.2
Quartile 4 (11.9–46.5 death rate)		
Massachusetts	67	11.9
Oklahoma	37	12.6
Oregon	42	12.7
Colorado	60	14.4
Minnesota	73	16.4
Utah	33	16.7
South Dakota	11	17.0
Wyoming	8	17.7
Arizona	93	18.7
Rhode Island	21	22.8
New Mexico	52	32.7
Alaska	27	46.5

* Alcohol poisoning deaths included those occurring among those aged ≥15 years in which alcohol poisoning was classified as the underlying (i.e., principal) cause of death based on *International Classification of Diseases, 10th Revision* (ICD-10) Codes: X45 (Accidental poisoning by and exposure to alcohol), Y15 (Poisoning by and exposure to alcohol, undetermined intent).

† The average annual number of alcohol poisoning deaths in Delaware, District of Columbia, Hawaii, North Dakota, and Vermont was less than seven and therefore, did not meet standards of reliability and precision to calculate age-adjusted death rates.

§ Rates per 1 million population for persons aged ≥15 years were calculated using U.S. Census bridged-race population for 2010–2012, and were age-adjusted to the 2000 U.S. Census standard population.

FIGURE. Age-adjusted alcohol poisoning* death rates,† by state§ — National Vital Statistics System, United States, 2010–2012



* Alcohol poisoning deaths included those occurring among those aged ≥15 years in which alcohol poisoning was classified as the underlying (i.e., principal) cause of death based on *International Classification of Diseases, 10th Revision* (ICD-10) codes X45 (accidental poisoning by and exposure to alcohol) and Y15 (poisoning by and exposure to alcohol, undetermined intent).

† Rates per 1 million population for persons aged ≥15 years were calculated using U.S. Census bridged-race population for 2010–2012, and were age-adjusted to the 2000 U.S. Census standard population.

§ The average annual number of alcohol poisoning deaths in Delaware, District of Columbia, Hawaii, North Dakota, and Vermont was less than seven and therefore, did not meet standards of reliability and precision to calculate age-adjusted death rates.

(*23*). However, a recent study found that only one in six U.S. adults overall, one in five current drinkers, and one in four binge drinkers in 44 states and the District of Columbia reported ever discussing alcohol use with a doctor or other health professional. Furthermore, 65.1% of those who reported binge drinking ≥10 times in the past month had never had this dialogue (*24*).

Death from alcohol poisoning is a serious and preventable public health problem in the United States. A comprehensive approach to the prevention of excessive drinking that includes evidence-based community and clinical prevention strategies is needed to decrease alcohol poisoning deaths and other harms attributable to excessive alcohol use.

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Notes from the Field

Acute Flaccid Myelitis Among Persons Aged ≤21 Years — United States, August 1–November 13, 2014

Division of Viral Diseases, National Centers for Immunization and Respiratory Diseases, CDC; Division of Vector-Borne Diseases, Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, CDC; Children's Hospital Colorado; Council of State and Territorial Epidemiologists

In August 2014, physicians at Children's Hospital Colorado in Aurora, Colorado, noted a cluster of cases of acute limb weakness among children (*1*). Most patients were found to have distinctive abnormalities of the central spinal cord (i.e., gray matter) on magnetic resonance imaging, and most reported a respiratory or febrile illness preceding the onset of neurologic symptoms. On September 12, the Colorado Department of Public Health and Environment alerted CDC about this cluster. These cases coincided with a national outbreak of severe respiratory disease among children caused by enterovirus D68 (EV-D68) (*2*).

On September 26, CDC issued a health advisory requesting state and local health departments to report cases and send specimens to CDC for testing (*3*). A case was defined as acute onset of focal limb weakness occurring on or after August 1, 2014, and a magnetic resonance image showing a spinal cord lesion largely restricted to gray matter in a patient aged ≤21 years.

As of November 13, CDC had verified reports of 88 cases in 32 states (Figure). The median age of patients was 7.6 years (range = 5 months–20 years), and 54 (61%) were males. Limb weakness was asymmetrical in most patients. Cranial nerve motor dysfunction was reported in 30 (34%) cases. Six (7%) patients had altered mental status, and three (3%) had seizures. Most patients reported a respiratory illness (81%), a febrile illness (68%), or both, occurring before neurologic symptom onset; 8% had neither condition. Among 86 patients for whom past medical history was reported, 65 (76%) were previously healthy, and 21 (24%) had underlying illnesses, most commonly asthma (nine [10%]). All but one patient was hospitalized because of neurologic illness, and 17 (19%) required ventilator support. Among 80 patients from whom cerebrospinal fluid was obtained, 68 (85%) showed a moderate pleocytosis and normal or mildly elevated protein. Information regarding current clinical status was reported for 77 patients (median follow-up = 19 days). Of those, 49 (64%) reported some symptom improvement, and 28 (36%) showed no improvement; none were fully recovered. No deaths were reported.

Among 71 patients with cerebrospinal fluid testing performed by their health care providers, state and local public health departments, or CDC, no enteroviruses or other pathogens have been confirmed to date. Among 41 patients whose upper respiratory tract samples were available for enterovirus/rhinovirus testing at CDC, 17 (41%) tested positive: eight (20%) for EV-D68 and nine (22%) for eight other enterovirus/rhinovirus types. Of the 19 patients whose upper respiratory tract samples were obtained <14 days from respiratory illness onset, 10 (53%) were positive: seven (37%) for EV-D68 and three (16%) for rhinoviruses. Laboratory testing for other pathogens is ongoing.

On November 7, CDC published interim clinical management considerations, summarizing expert opinion based on current evidence on management and care of children with acute flaccid myelitis (*4*). CDC continues to collaborate with partners nationally to investigate reported cases, risk factors, and possible etiologies of this condition. Although the specific causes of this illness are still under investigation, and causal relationship to EV-D68 has not yet been substantiated, being up to date on all recommended vaccinations is essential to prevent a number of severe diseases. Vaccine-preventable diseases include poliomyelitis, which is caused by poliovirus; infection with this enterovirus can present with acute flaccid paralysis. There are also numerous other vaccine-preventable diseases that can result in severe illness. Prevention of viral infections includes general hygienic measures, such as frequent hand washing with soap and water, avoiding close contact with sick persons, and disinfecting frequently touched surfaces. Additional information is available at http://www.cdc.gov/flu/protect/habits/index.htm. If a child appears to have a sudden onset of weakness in arms or legs, caregivers should contact a health care provider to have the child assessed for possible neurologic illness. Health care providers are encouraged to report patients meeting the case definition to their state or local health department. Health departments should report patients with illness meeting the case definition to CDC using a brief patient summary form* and may contact CDC by e-mail to arrange further laboratory testing (limbweakness@cdc.gov). Additional information is available at http://www.cdc.gov/ncird/investigation/viral/sep2014.html.

* Available at http://www.cdc.gov/ncird/downloads/patient-summary-form.pdf.

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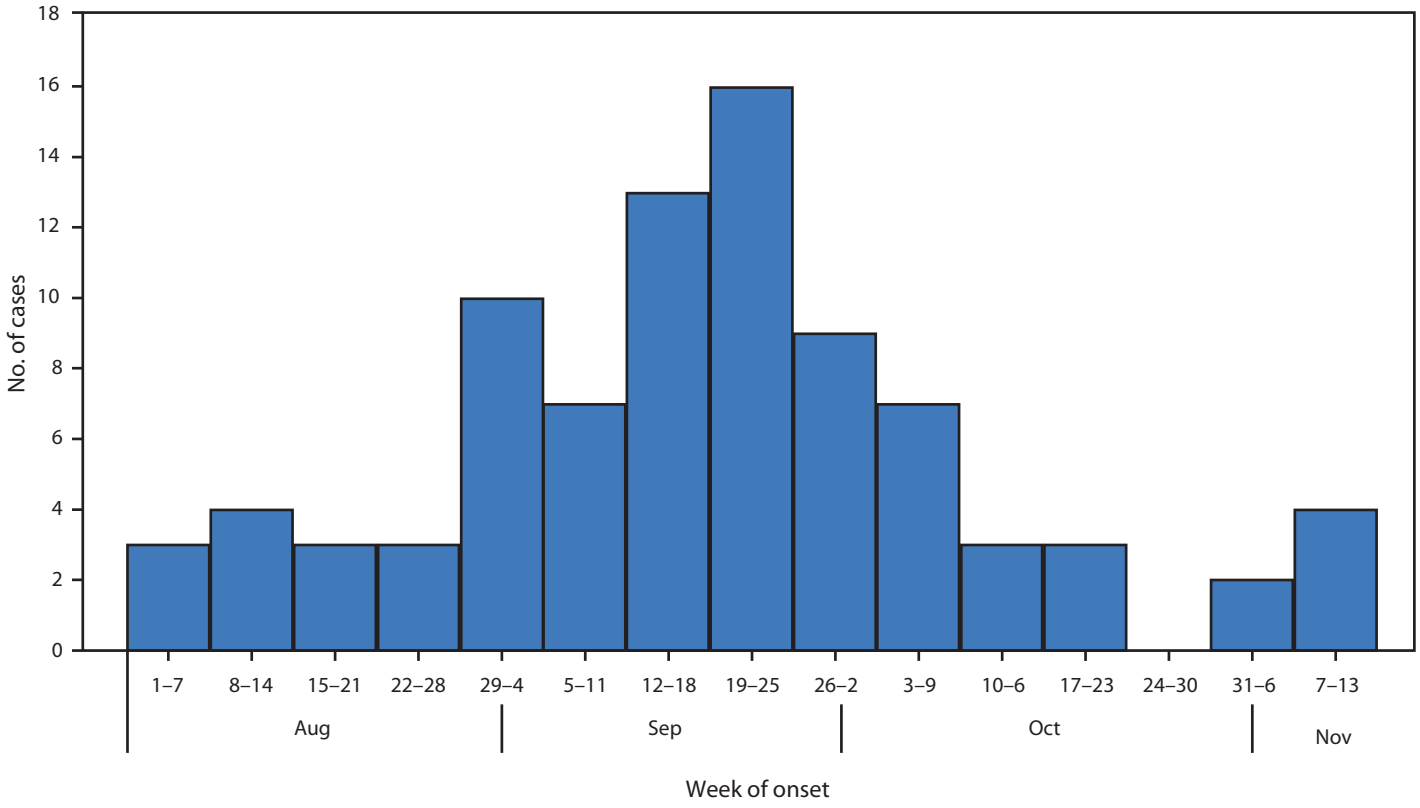
FIGURE. Number of confirmed cases of neurologic illness with limb weakness (N = 87), by week of onset — United States, August 1–November 13, 2014*



* Exact onset date was not reported for one case (for this case the neurologic symptom onset was reported in an unspecified date during the last week of September).

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Notes from the Field

Occupationally Acquired HIV Infection Among Health Care Workers — United States, 1985–2013

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(Author affiliations at end of text)

Case investigations of human immunodeficiency virus (HIV) infection in health care workers (HCWs) possibly acquired by exposure to HIV in the workplace are conducted by state health department HIV surveillance staff members with assistance from CDC. Since 1991, reports of occupationally acquired HIV in HCWs have been recorded by the National HIV Surveillance System following a standardized case investigation protocol. HCWs are defined as all paid and unpaid persons working in health care settings with the potential for exposure to infectious materials (e.g., blood, tissue, and specific body fluids) or contaminated medical supplies, equipment, or environmental surfaces. HCWs can include but are not limited to physicians, nurses, dental personnel, laboratory personnel, students and trainees, and persons not directly involved in patient care (e.g., housekeeping, security, and volunteer personnel). In 1987, CDC recommended the use of "universal precautions," which became a part of "standard precautions" in 1995, to prevent occupational HIV exposures. Since 1996, occupational postexposure prophylaxis with antiretrovirals to prevent infection has been recommended.

A confirmed case of occupationally acquired HIV infection requires documentation that seroconversion in the exposed HCW is temporally related to a specific exposure to a known HIV-positive source. An HCW should immediately report an exposure event to a supervisor or facility-designated person in accordance with the institution's infection control procedures. The serostatus of the source patient and of the exposed HCW should be documented at the time of the exposure and, exposed HCWs should be counseled on risk and offered postexposure prophylaxis as appropriate.

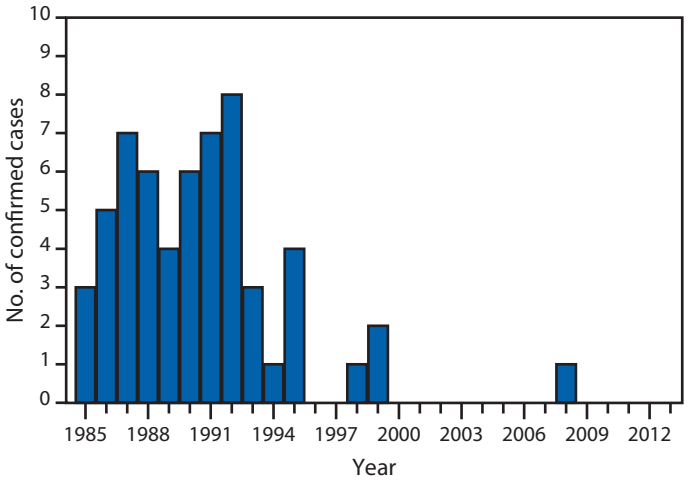
A possible case of occupationally acquired HIV infection is defined as an infection in an HCW whose job duties might have exposed the HCW to HIV but who lacks a documented workplace exposure. If the HIV status of the source patient is unknown or the HCW's seroconversion after exposure was not documented as temporally related, occupational acquisition of HIV infection is possible but cannot be confirmed.

During 1985–2013, 58 confirmed and 150 possible cases of occupationally acquired HIV infection among HCWs were reported to CDC; since 1999, only one confirmed case (a laboratory technician sustaining a needle puncture while working with a live HIV culture in 2008) has been reported (*1*; Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC, unpublished data, 2014) (Figure). Among the 58 confirmed cases, the routes of exposure resulting in infection were: percutaneous puncture or cut (49 cases), mucocutaneous exposure (five), both percutaneous and mucocutaneous exposure (two), and unknown (two). A total of 49 HCWs were exposed to HIV-infected blood, four to concentrated virus in a laboratory, one to visibly bloody fluid, and four to unspecified body fluids. Occupations of the HCWs with confirmed or possible HIV infection have varied widely (Table).

CDC recommends the use of standard precautions to prevent exposure of HCWs to potentially infectious body fluids when working with any patient, whether known to be infected with HIV or not (*2*). HCWs should assume that body fluids from all patients are infectious even if the patients are not known to be infected with HIV. Proper implementation of standard precautions (e.g., use of safety devices and barriers such as gloves and goggles) minimizes exposure risk. To prevent unintentional puncture injuries, CDC recommends a comprehensive prevention program consistent with requirements of the Occupational Safety and Health Administration's bloodborne pathogens standard.* Medical devices engineered for sharps† protection (e.g., needleless systems) should be used. Used devices such

* 29 CFR 1910.1030.
† Needles, blades, broken glass, and other sharp objects.

FIGURE. Number of confirmed cases (N = 58) of occupationally acquired HIV infection among health care workers reported to CDC — United States, 1985–2013



Abbreviation: HIV = human immunodeficiency virus.
Source: Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC.

TABLE. Number of confirmed or possible cases of occupationally acquired HIV infection among health care workers reported to CDC — United States, 1985–2013

	Confirmed (N = 58)		Possible (N = 150)	
Occupation	**No.**	**(%)**	**No.**	**(%)**
Nurse	24	(41.4)	37	(24.7)
Laboratory technician, clinical	16	(27.6)	21	(14.0)
Physician, nonsurgical	6	(10.3)	13	(8.7)
Laboratory technician, nonclinical	4	(6.9)	—	—
Housekeeper/maintenance	2	(3.4)	14	(9.3)
Technician, surgical	2	(3.4)	2	(1.3)
Embalmer/morgue technician	1	(1.7)	2	(1.3)
Hospice caregiver/attendant	1	(1.7)	16	(10.7)
Respiratory therapist	1	(1.7)	2	(1.3)
Technician, dialysis	1	(1.7)	3	(2.0)
Dental worker, including dentist	—	—	6	(4.0)
Emergency medical technician/paramedic	—	—	13	(8.7)
Physician, surgical	—	—	6	(4.0)
Technician/Therapist, other	—	—	9	(6.0)
Other health care occupations	—	—	6	(4.0)

Abbreviation: HIV = human immunodeficiency virus.
Source: Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC.

as syringes or other sharp instruments should be disposed of in sharps containers without any attempt to recap needles. HCWs should immediately wash hands and other skin surfaces after contact with blood or body fluids. Although preventing exposures to blood and body fluids is the most important strategy for preventing occupationally acquired HIV, when occupational exposures do occur, appropriate postexposure management is critical. Guidelines for the management of occupational exposures to HIV and recommendations for postexposure prophylaxis have been published (*3*).

Documented occupational acquisition of HIV infection in HCWs has become rare in the United States. Few confirmed cases have been reported since the late 1990s. Whereas the paucity of cases could be the result of underreporting, it might indicate the effectiveness of more widespread and earlier treatment to reduce patient viral loads, combined with prevention strategies such as postexposure management and prophylaxis as well as improved technologies and training to reduce sharps injuries and other exposures. All cases of suspected occupationally acquired HIV infection in HCWs need to be promptly reported to state health department HIV surveillance staff and the CDC coordinator for Cases of Public Health Importance, Division of HIV/AIDS Prevention, at 404-639-0934 or 404-639-2050.

[1]Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC; [2]Division of Healthcare Quality Promotion, National Center for Emerging and Zoonotic Infectious Diseases, CDC (Corresponding author: M. Patricia Joyce, pjoyce@cdc.gov, 404-639-0934)

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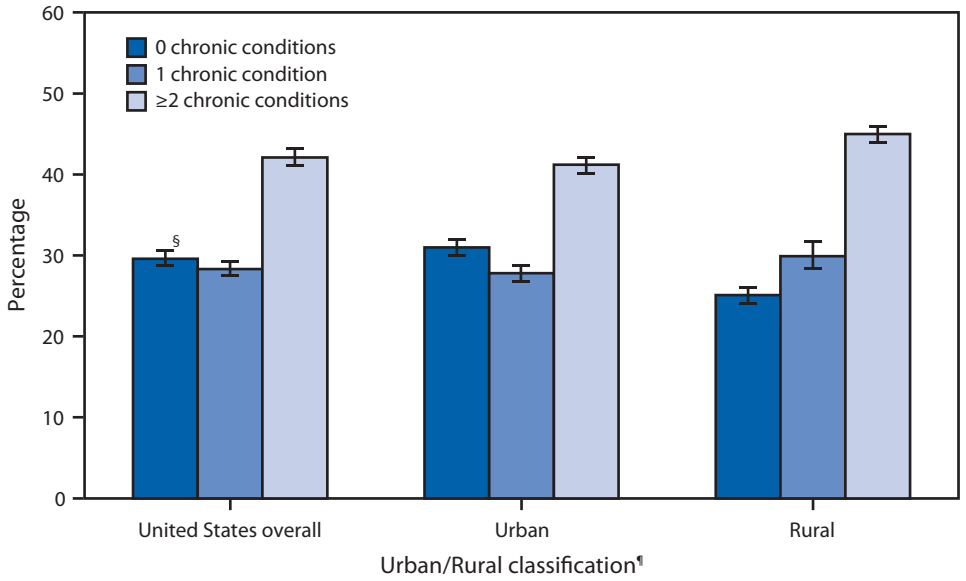
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Aged ≥45 Years with Selected Diagnosed Chronic Conditions,* by Number of Conditions and Urban/Rural Classification — National Health Interview Survey, 2013†



* The 10 selected chronic conditions are hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, hepatitis, chronic obstructive pulmonary disease (COPD), weak or failing kidneys during the past 12 months, currently having asthma. COPD was defined as having emphysema or chronic bronchitis during the past 12 months, or both. Unless a timeframe is otherwise noted, chronic conditions are based on ever being told by a doctor or other health professional that the respondent has the condition.

† Estimates are based on household interviews of a sample of the noninstitutionalized U.S. civilian population and are derived from the National Health Interview Survey sample adult component.

§ 95% confidence interval.

¶ The 2000 U.S. Census definition was used in this classification, where adults residing in a core of census tracts and/or census blocks with a population of 2,500 persons or more were considered living in an urban area. Adults living in census tracts and/or census blocks with fewer than 2,500 were considered living in a rural area.

In 2013, 29.6% of U.S. adults aged ≥45 years had none of the 10 selected diagnosed chronic conditions, 28.3% had one condition, and 42.1% had multiple (two or more) conditions. A higher percentage of adults aged ≥45 years living in rural areas had multiple chronic conditions compared with adults in urban areas (45.0% versus 41.2%), whereas a lower percentage had none (25.1% versus 31.0%).

Source: National Health Interview Survey, 2013 data. Available at http://www.cdc.gov/nchs/nhis.htm.

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RESEARCH ARTICLE

Annual Total Binge Drinks Consumed by U.S. Adults, 2015

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Introduction: Binge drinking (four or more drinks for women, five or more drinks for men on an occasion) accounts for more than half of the 88,000 U.S. deaths resulting from excessive drinking annually. Adult binge drinkers do so frequently and at high intensity; however, there are known disparities in binge drinking that are not well characterized by any single binge-drinking measure. A new measure of total annual binge drinks was used to assess these disparities at the state and national levels.

Methods: Behavioral Risk Factor Surveillance System 2015 data (analyzed in 2016) were used to estimate the prevalence, frequency, intensity, and total binge drinks among U.S. adults. Total annual binge drinks was calculated by multiplying annual binge-drinking episodes by binge-drinking intensity.

Results: In 2015, a total of 17.1% of U.S. adults (37.4 million) reported an annual average of 53.1 binge-drinking episodes per binge drinker, at an average intensity of 7.0 drinks per binge episode, resulting in 17.5 billion total binge drinks, or 467.0 binge drinks per binge drinker. Although binge drinking was more common among young adults (aged 18–34 years), half of the total binge drinks were consumed by adults aged ≥35 years. Total binge drinks per binge drinker were substantially higher among those with lower educational levels and household incomes than among those with higher educational levels and household incomes.

Conclusions: U.S. adult binge drinkers consume about 17.5 billion total binge drinks annually, or about 470 binge drinks/binge drinker. Monitoring total binge drinks can help characterize disparities in binge drinking and help plan and evaluate effective prevention strategies.
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INTRODUCTION

Excessive alcohol use is responsible for 88,000 deaths in the U.S. each year, including one in ten deaths among working-age adults,[1] and cost the U.S. $249 billion, or $2.05 per drink, in 2010.[2] Binge drinking, defined as consuming four or more drinks per occasion for women or five or more drinks per occasion for men,[3] accounts for half of these deaths,[1] and three quarters of the estimated economic costs.[2] Binge drinking typically results in acute impairment, and is a risk factor for a number of health and social problems, including unintentional injuries, interpersonal violence, suicide, alcohol poisoning, high blood pressure, heart disease and stroke, cancer, liver disease, and severe alcohol use disorder.[4] Additionally, more than half of all the alcohol sold in the U.S. is consumed while binge drinking.[5] Reducing binge drinking among adults is also a leading health indicator in *Healthy People 2020*.[6]

Binge drinking is common among U.S adults, and adult binge drinkers do so frequently and at high intensity.[7] However, there are important disparities in binge drinking at the state and national levels based on sociodemographic characteristics (e.g., race/ethnicity, education, and income) that are not well characterized by any single binge-drinking measure.[7] For example, the prevalence of binge drinking is known to be significantly higher among adults with higher household incomes compared with

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https://doi.org/10.1016/j.amepre.2017.12.021

those with lower household incomes, but the frequency and intensity of binge drinking are significantly higher among binge drinkers with lower household incomes compared with those with higher household incomes.[7] A comprehensive measure of binge drinking is also needed to more fully characterize the public health impact of this behavior, including the risk of binge-drinking–related harms, which typically increases with the number of drinks consumed[8–10]; and to plan and evaluate evidence-based binge-drinking prevention programs and policies in states and communities.[11]

The objectives of this study are, therefore, to use a new measure of binge drinking among U.S. adults—total binge drinks—to assess disparities in binge drinking and the public health impact of this behavior at the state and national levels.

METHODS

Study Sample

The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based, random-digit-dial landline and cellular telephone survey of noninstitutionalized, civilian U.S. adults aged ≥18 years that is conducted monthly in all states, the District of Columbia, and U.S. territories. BRFSS collects data on leading health conditions and risk behaviors, including binge drinking. States conduct telephone interviews during each calendar month, thus yielding a representative sample for the entire year. Details of the sampling, purpose, and analysis of BRFSS data have been published previously.[12]

The median BRFSS survey response rate for all states, territories, and District of Columbia, in 2015 was 47.1% (range, 33.9% −61.1%).[13] After excluding people with missing information on binge drinking (n=29,582, 5.8%), age (n=4,213, 1.0%), and respondents from U.S. territories, data from 408,800 respondents in the 50 states and District of Columbia were used in the analysis (conducted in 2016), including respondents aged 18–20 years who are under the legal drinking age.

Measures

BRFSS includes four questions assessing alcohol consumption during the past 30 days: (1) number of drinking days, (2) average number of drinks consumed during days in which alcohol was consumed, (3) number of binge-drinking episodes, and (4) largest number of drinks consumed on any one occasion. Current drinking was defined as consumption of one or more drinks of any alcoholic beverage during the past 30 days. Binge drinking was defined as women consuming four or more drinks, and men consuming five or more drinks per drinking occasion. Heavy drinking was defined as women consuming eight or more drinks/week or men consuming ≥15 drinks/week.[14] Average annual number of binge-drinking episodes among binge drinkers was calculated by multiplying the frequency of binge-drinking episodes reported during the past 30 days by 12. Because BRFSS interviews a representative sample of state residents each month,[12] combining monthly estimates of binge-drinking episodes among BRFSS respondents who reported binge drinking, yields a representative sample for the entire year, and accounts for seasonal variations in binge-drinking frequency. The total number of annual binge-drinking episodes was then calculated by summing the annual number of binge-drinking episodes among all binge drinkers. Among binge drinkers, binge-drinking intensity was assessed by using the largest number of drinks consumed during any occasion in the past 30 days. Total annual binge drinks was calculated by multiplying the total annual binge-drinking episodes by binge-drinking intensity of each binge drinker. Total binge drinks consumed per adult was calculated by dividing total annual binge drinks by the weighted population estimate of U.S. adults. Finally, total binge drinks consumed per binge drinker was calculated by dividing total annual binge drinks by the weighted population estimate of U.S. binge drinkers.

Statistical Analysis

Binge-drinking prevalence, frequency, intensity, and total annual binge drinks among U.S. adults and per binge drinker were assessed overall and by sociodemographic characteristics for the U.S. and by state. Binge drinking among U.S. adults who consumed alcohol was stratified by sex, sociodemographic characteristics (age group, race/ethnicity, education level, annual household income), and drinking patterns.

The data were weighted to each state's adult population and to the respondent's probability of selection.[15] SAS-callable SUDAAN software, release 11.0.0 with SAS, version 9.3, were used to account for the complex sampling design of BRFSS and to calculate weighted estimates of binge-drinking prevalence, the number of binge drinkers, average annual frequency of binge-drinking episodes, and the binge-drinking intensity per binge episode, as well as 95% CIs for the prevalence of binge drinking. To identify statistically significant differences in binge-drinking prevalence within demographic groups t-tests were used ($p<0.05$). Binge-drinking prevalence was age-adjusted to the 2000 projected U.S. population[16] both overall and among groups of respondents stratified by sex, race/ethnicity, education, household income, heavy drinking status, and state.

RESULTS

In 2015, a total of 17.1% of all U.S. adults (37.4 million) reported binge drinking (Table 1). Each binge drinker reported an average of 53.1 binge-drinking episodes annually, or about one episode per week. This resulted in a total of 1.9 billion episodes of binge drinking annually, or an average of 8.4 binge-drinking episodes per U.S. adult per year. Adult binge drinkers also consumed an average of 7.0 drinks per binge-drinking episode. As a result, there were 17.5 billion total binge drinks consumed annually, or 76.6 total binge drinks per U.S. adult per year.

The prevalence of binge drinking among men (22.2%) was about twice that of women (12.1%, $p<0.0001$), and men accounted for 72% (1.4 billion) of the total annual binge-drinking episodes in 2015. Men also consumed an estimated 14.0 billion (80%) of the 17.5 billion total binge drinks in 2015. Although the prevalence of binge drinking was significantly higher among those aged 18–24 years (25.1%) and 25–34 years (25.7%) compared with older age groups ($p<0.0001$), more than half (9.0 billion)

Table 1. Binge-drinking Prevalence,[a,b] Frequency,[c] Intensity,[d] and Total Binge Drinks[e] Among Adults Aged ≥18 Years,[f] by Selected Characteristics, U.S.,[g] 2015

Characteristics	Sample size, *n*	Binge-drinking prevalence, % (95% CI)	Weighted total population of binge drinkers	Frequency of binge-drinking episodes among binge drinkers, *n* (95% CI)	Total annual binge-drinking episodes[h]	Binge-drinking intensity among binge drinkers, *n* (95% CI)	Total annual binge drinks	Total binge drinks per adult
Overall	404,800	17.1 (16.9, 17.4)	37,445,243	53.1 (51.8, 54.4)	1,914,250,943	7.0 (6.9, 7.1)	17,487,732,196	76.6
Sex								
Men	170,957	22.2 (21.9, 22.6)	24,086,058	59.7 (57.9, 61.4)	1,378,146,019	8.0 (7.9, 8.1)	13,985,243,459	126.4
Women	233,843	12.1 (11.8, 12.4)	13,359,185	40.8 (39.4, 42.3)	536,104,923	5.3 (5.2, 5.3)	3,502,488,736	29.8
Age group								
18–24 years	21,887	25.1 (24.2, 26.1)	7,352,722	47.7 (45.2, 50.2)	350,668,989	8.3 (8.1, 8.6)	3,657,207,174	124.9
25–34 years	38,919	25.7 (24.9, 26.4)	10,190,154	46.8 (44.3, 49.2)	476,447,257	7.8 (7.6, 8.0)	4,824,906,952	121.5
35–44 years	46,443	19.6 (19.0, 20.3)	7,279,466	50.1 (47.4, 52.7)	364,479,489	7.3 (7.1, 7.4)	3,348,140,167	90.4
45–64 years	154,820	13.7 (13.3, 14.0)	10,509,977	56.2 (54.1, 58.3)	590,817,927	6.5 (6.4, 6.7)	4,738,388,745	61.6
≥65 years	142,731	4.6 (4.4, 4.9)	2,112,925	62.4 (57.8, 67.0)	131,837,281	5.7 (5.5, 5.9)	919,089,157	20.2
Race/ethnicity								
Whites, non-Hispanic	316,507	19.2 (18.9, 19.5)	25,178,519	54.0 (52.6, 55.3)	1,325,569,876	7.1 (7.0, 7.2)	12,253,593,176	83.2
Blacks, non-Hispanic	30,975	13.0 (12.3, 13.8)	3,384,546	52.2 (47.6, 56.9)	172,736,838	6.3 (6.1, 6.6)	1,343,075,786	51.8
Hispanics	27,564	16.0 (15.3, 16.7)	6,055,502	46.9 (41.3, 52.6)	266,068,476	6.9 (6.7, 7.2)	2,442,794,941	70.9
American Indians/ Alaska Natives	5,992	17.9 (15.7, 20.4)	392,230	77.7 (56.0, 99.3)	26,883,978	7.8 (7.1, 8.4)	225,073,872	100.5
Asian/Pacific Islanders	9,077	10.0 (8.9, 11.1)	1,270,693	50.2 (56.0, 99.3)	51,642,021	6.5 (5.3, 7.8)	436,207,300	39.2
Education level								
<High school diploma	30,105	14.0 (13.2, 14.9)	4,109,555	66.3 (60.4, 72.2)	270,351,407	8.2 (7.8, 8.5)	2,973,342,420	94.1
High school diploma	112,103	17.4 (16.9, 17.9)	10,362,055	60.0 (57.5, 62.5)	609,174,728	7.4 (7.2, 7.5)	5,790,769,522	90.6
Some college	111,418	17.5 (17.0, 18.0)	12,363,435	52.2 (49.9, 54.6)	608,537,620	6.9 (6.8, 7.1)	5,311,411,583	74.2
College graduate	150,236	19.0 (18.6, 19.5)	10,561,742	42.0 (40.6, 43.4)	423,876,739	6.3 (6.2, 6.4)	3,402,064,818	56.0
Annual household income								
<$25,000	88,134	14.1 (13.6, 14.6)	7,392,019	61.2 (57.6, 64.8)	418,440,991	7.2 (7.0, 7.4)	3,934,615,131	73.6
$25,000–$49,999	86,078	17.4 (16.9, 18.0)	7,678,760	54.9 (52.1, 57.6)	409,284,139	7.1 (7.0, 7.3)	3,912,209,130	83.5
$50,000–$74,999	55,580	19.4 (18.7, 20.2)	5,573,948	53.6 (50.1, 57.1)	283,371,160	7.2 (7.0, 7.4)	2,536,861,342	84.8

(continued on next page)

Table 1. Binge-drinking Prevalence,[a,b] Frequency,[c] Intensity,[d] and Total Binge Drinks[e] Among Adults Aged ≥18 Years,[f] by Selected Characteristics, U.S.,[g] 2015 *(continued)*

Characteristics	Sample size, *n*	Binge-drinking prevalence, % (95% CI)	Weighted total population of binge drinkers	Frequency of binge-drinking episodes among binge drinkers, *n* (95% CI)	Total annual binge-drinking episodes[h]	Binge-drinking intensity among binge drinkers, *n* (95% CI)	Total annual binge drinks	Total binge drinks per adult
≥$75,000	110,408	21.7 (21.1, 22.2)	13,174,928	48.0 (45.8, 50.2)	610,115,567	6.9 (6.8, 7.0)	5,520,266,456	87.4
Heavy drinkers								
Yes	20,964	77.8 (76.8, 78.7)	10,125,470	105.8 (102.0, 109.0)	1,067,347,054	9.1 (8.9, 9.3)	11,503,953,017	895.8
No	180,193	25.2 (24.8, 25.7)	26,320,767	29.5 (28.9, 30.2)	768,417,851	6.2 (6.1, 6.2)	5,418,241,212	51.8

[a]Age-adjusted to 2000 U.S. projected population (distribution #9[16]), except for age-specific results.
[b]Total number of respondents who reported at least one binge-drinking episode during the past 30 days divided by the total number of respondents.
[c]Average number of binge-drinking episodes reported by all binge drinkers.
[d]Average largest number of drinks consumed by binge drinkers on any occasion during the past 30 days.
[e]Total binge drinks was calculated by multiplying the frequency of binge drinking (i.e., total annual number of binge-drinking episodes) by the binge-drinking intensity of each binge drinker (i.e., the largest number of drinks consumed by binge drinkers on any occasion). Total binge drinks per adult was calculated by dividing total binge drinks by the weighted total population.
[f]Including respondents aged 18–20 years who are under the legal drinking age.
[g]Respondents were from all 50 states and the District of Columbia.
[h]Total number of annual binge-drinking episodes was calculated by summing the annual number of binge-drinking episodes among all binge drinkers.

of the total binge drinks were consumed by those aged ≥35 years. The prevalence of binge drinking was significantly higher among non-Hispanic whites (19.2%) and American Indians/Alaska Natives (17.9%) compared with other race/ethnicity groups ($p<0.0001$). Non-Hispanic whites also accounted for most (73%) of the total binge drinks consumed. However, American Indians/Alaska Natives had the highest annual number of total binge drinks (100.5 binge drinks/adult). Adults with less than a high school education had significantly lower prevalence of binge drinking (14.0%) compared with college graduates (19.0%, $p<0.0001$), but they reported consuming 1.7 times the annual number of total binge drinks (94.1 vs 56.0 binge drinks/adult). Respondents with a household income <$25,000 also had a significantly lower prevalence of binge drinking (14.1%) than those with a household income ≥$75,000 (21.7%, $p<0.0001$), and consumed fewer total annual binge drinks (73.6 binge drinks/adult) than those with a household income ≥$75,000 (87.4 binge drinks/adult). Finally, heavy drinkers (i.e., those reporting high weekly alcohol consumption) reported much higher binge-drinking prevalence (77.8%) than non–heavy drinkers (25.2%, $p<0.0001$). Heavy drinkers also reported an average of 105.8 binge-drinking episodes annually (or about two episodes/week) and consumed an average of 9.1 drinks per binge-drinking episode, resulting in 11.5 billion (68%) of the total annual binge drinks consumed.

Among current drinkers, 31.4% reported at least one episode of binge drinking in the past 30 days and current drinkers who reported binge drinking consumed an average of 467.0 binge drinks per year (Table 2). The prevalence of binge drinking among current drinkers was higher among those aged 18–24 years (49.7%) and 25–34 years (41.8%), and then gradually decreased with increasing age ($p<0.0001$). However, binge drinkers aged ≥65 years reported consuming an average of 435.0 total binge drinks annually, even though the prevalence of binge drinking among current drinkers in this age group was substantially lower (11.4%, $p<0.0001$) than in other age groups. Over half (55.2%) of adult male drinkers aged 18–24 years also reported binge drinking, and these binge drinkers reported consuming an average of 621.0 total binge drinks annually. Among both men and women who were current drinkers, the prevalence of binge drinking and total binge drinks consumed annually decreased with increased education and household income. Binge drinkers with less than a high school education consumed over twice as many total binge drinks annually as binge drinkers who were college graduates (723.5 vs 322.1 drinks, respectively), and binge drinkers with household incomes <$25,000 reported 21% more total binge drinks annually than binge drinkers with household incomes of

Table 2. Binge Drinking Among Adults Aged ≥18 Years[a] Who Consumed Alcohol by Sex, U.S.,[b] 2015

Characteristics	Total (n=203,752)			Males (n=99,178)			Females (n=104,574)		
	Binge-drinking prevalence[c] among current drinkers[d] % (95% CI)	Total annual binge drinks per current drinker[e]	Total annual binge drinks per binge drinker[f]	Binge-drinking prevalence[c] among current drinkers,[d] % (95% CI)	Total annual binge drinks per current drinker[e]	Total annual binge drinks per binge drinker[f]	Binge-drinking prevalence[c] among current drinkers,[d] % (95% CI)	Total annual binge drinks per current drinker[e]	Total annual binge drinks per binge drinker[f]
Total	31.4 (31.0, 31.8)	146.6	467.0	36.8 (36.2, 37.4)	215.4	580.6	24.8 (24.3, 25.4)	64.5	262.2
Age group									
18–24 years	49.7 (48.2, 51.2)	247.2	497.4	55.2 (53.2, 57.1)	342.5	621.0	43.2 (40.9, 45.4)	132.9	307.9
25–34 years	41.8 (40.8, 42.9)	198.0	473.5	48.1 (46.7, 49.6)	282.5	587.0	33.6 (32.2, 35.0)	88.2	262.3
35–44 years	34.6 (33.6, 35.6)	159.1	459.9	41.2 (39.8, 42.6)	238.2	578.2	26.4 (25.1, 27.7)	60.9	230.7
45–64 years	26.0 (25.4, 26.6)	117.1	450.8	31.3 (30.5, 32.2)	174.3	556.1	19.7 (19.0, 20.5)	50.9	257.7
≥65 years	11.4 (10.8, 11.9)	49.4	435.0	14.4 (13.6, 15.3)	79.3	550.2	8.0 (7.4, 8.7)	16.6	207.5
Race/ethnicity									
Whites, non-Hispanic	31.9 (31.5, 32.4)	147.6	486.7	37.4 (36.8, 38.0)	221.2	610.8	25.5 (24.9, 26.1)	63.9	270.4
Blacks, non-Hispanic	28.3 (26.9, 29.7)	116.4	396.8	33.2 (31.1, 35.4)	166.4	491.8	23.0 (21.2, 24.8)	63.3	258.0
Hispanics	35.8 (34.3, 37.3)	158.5	403.4	41.3 (39.3, 43.3)	217.9	482.4	26.9 (24.8, 29.1)	63.7	212.9
American Indians/ Alaska Natives	43.7 (39.4, 48.2)	256.3	573.8	50.0 (44.5, 55.6)	396.9	783.8	34.5 (28.5, 41.1)	62.2	170.6
Asian/Pacific Islanders	22.3 (20.1, 24.6)	90.2	343.3	24.9 (22.0, 28.0)	124.2	436.2	18.3 (15.4, 21.6)	43.1	185.6
Education level									
<High school diploma	40.5 (38.6, 42.3)	296.5	723.5	45.3 (43.0, 47.6)	392.9	851.8	30.7 (27.9, 33.7)	107.1	346.7
High school diploma	36.0 (35.1, 36.8)	200.8	558.8	41.6 (40.4, 42.7)	284.1	666.6	27.5 (26.2, 28.8)	82.4	311.7
Some college	30.4 (29.6, 31.1)	134.1	429.6	35.8 (34.8, 36.9)	199.6	535.1	24.5 (23.5, 25.5)	64.9	261.9
College graduate	27.2 (26.6, 27.8)	83.8	322.1	31.6 (30.7, 32.4)	119.4	403.9	22.8 (22.1, 23.5)	46.0	206.9
Annual household income									
<$25,000	34.7 (33.7, 35.7)	194.0	532.3	40.9 (39.4, 42.4)	282.7	664.1	27.9 (26.6, 29.3)	99.7	333.1
$25,000–$49,999	33.0 (32.0, 33.9)	165.8	509.5	38.8 (37.4, 40.1)	240.9	626.2	25.6 (24.4, 26.9)	73.0	289.5

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Table 2. Binge Drinking Among Adults Aged ≥18 Years[a] Who Consumed Alcohol by Sex, U.S.,[b] 2015 *(continued)*

	Total (n=203,752)			Males (n=99,178)			Females (n=104,574)		
Characteristics	**Binge-drinking prevalence[c] among current drinkers[d] % (95% CI)**	**Total annual binge drinks per current drinker[e]**	**Total annual binge drinks per binge drinker[f]**	**Binge-drinking prevalence[c] among current drinkers,[d] % (95% CI)**	**Total annual binge drinks per current drinker[e]**	**Total annual binge drinks per binge drinker[f]**	**Binge-drinking prevalence[c] among current drinkers,[d] % (95% CI)**	**Total annual binge drinks per current drinker[e]**	**Total annual binge drinks per binge drinker[f]**
$50,000–$74,999	31.7 (30.6, 32.8)	142.1	455.1	37.8 (36.3, 39.4)	209.3	557.0	24.0 (22.5, 25.5)	57.8	248.8
≥$75,000	31.6 (30.9, 32.3)	126.8	419.0	36.5 (35.6, 37.5)	185.8	525.1	25.0 (24.0, 26.1)	49.8	211.2
Heavy drinkers									
Yes	77.8 (76.8, 78.7)	895.8	1,136.1	86.3 (85.1, 87.3)	1,341.1	1,533.1	68.5 (66.9, 70.1)	386.1	559.8
No	25.2 (24.8, 25.7)	51.8	205.9	30.4 (29.9, 31.0)	76.6	250.0	18.9 (18.4, 19.5)	22.2	119.2

[a]Including respondents aged 18–20 years who are under the legal drinking age.
[b]Respondents were from all 50 states and the District of Columbia.
[c]Age-adjusted to 2000 U.S. projected population (distribution #9[16]), except for age-specific results.
[d]Total number of respondents who reported at least one binge-drinking episode during the past 30 days divided by the total number of respondents reporting consumption of ≥1 drinks of any alcoholic beverage during the past 30 days.
[e]Total annual binge drinks per current drinker was calculated by multiplying the frequency of binge drinking (i.e., total annual number of binge-drinking episodes) by the binge-drinking intensity of each binge drinker (i.e., the largest number of drinks consumed by binge drinkers on any occasion), then dividing by the weighted total population of current drinkers.
[f]Total annual binge drinks per binge drinker was calculated by multiplying the frequency of binge drinking (i.e., total annual number of binge-drinking episodes) by the binge-drinking intensity of each binge drinker (i.e., the largest number of drinks consumed by binge drinkers on any occasion), then dividing by the weighted total population of binge drinkers.

Table 3. Binge-drinking Prevalence,[a,b] Frequency,[c] Intensity,[d] and Total Binge Drinks[e] Among Adults Aged ≥18 Years[f] by State, U.S., 2015

State	Binge-drinking prevalence, % (95% CI)	Frequency of binge-drinking episodes among binge drinkers	Total annual binge-drinking episodes[g]	Binge-drinking intensity	Total annual binge drinks	Total annual binge drinks per adult	Total annual binge drinks per binge drinker
Alabama	12.2 (11.1, 13.5)	59.8	23,217,261	7.3	215,130,596	57.3	525.3
Alaska	20.0 (17.8, 22.3)	56.4	5,656,725	7.8	62,353,929	112.9	594.2
Arizona	15.0 (13.7, 16.4)	56.9	36,815,789	7.1	332,224,029	63.8	483.4
Arkansas	15.2 (13.1, 17.4)	69.6	20,791,529	8.3	253,486,160	111.5	841.0
California	16.7 (15.9, 17.6)	48.0	202,969,409	6.5	1,744,778,272	58.1	391.8
Colorado	18.1 (16.9, 19.3)	48.6	32,082,519	6.6	282,191,317	67.2	423.8
Connecticut	18.3 (17.1, 19.5)	55.2	23,497,017	7.0	258,815,692	91.6	593.6
Delaware	15.8 (13.9, 17.8)	48.6	5,168,982	7.0	43,135,014	58.2	412.8
District of Columbia	24.4 (21.8, 27.3)	46.1	5,576,820	6.2	43,879,257	79.2	316.9
Florida	17.2 (15.9, 18.6)	52.1	118,113,079	6.8	1,037,830,998	64.2	453.1
Georgia	15.8 (14.2, 17.5)	58.4	63,065,616	6.9	514,273,516	66.7	466.8
Hawaii	19.8 (18.3, 21.3)	65.1	12,160,323	7.6	120,381,961	107.4	611.7
Idaho	14.8 (13.4, 16.5)	58.1	8,630,314	7.4	82,338,810	67.4	504.8
Illinois	20.8 (19.3, 22.4)	50.6	94,986,862	7.1	866,676,037	87.5	453.2
Indiana	16.6 (15.0, 18.2)	53.1	39,397,102	7.2	404,893,463	80.3	541.3
Iowa	21.3 (19.8, 22.9)	55.1	21,842,807	7.6	202,142,522	84.4	449.2
Kansas	16.5 (15.8, 17.2)	54.4	15,910,168	7.0	135,312,443	61.7	428.8
Kentucky	16.1 (14.6, 17.7)	72.8	32,975,801	7.8	321,470,006	94.2	652.8
Louisiana	18.0 (16.3, 19.7)	58.4	30,947,527	7.6	303,589,086	85.4	543.9
Maine	20.2 (18.7, 21.8)	57.5	9,829,393	7.4	88,357,485	82.4	489.5
Maryland	14.7 (13.2, 16.3)	59.3	33,973,891	6.6	272,678,552	58.5	444.5
Massachusetts	18.7 (17.5, 20.0)	52.7	47,288,417	6.5	417,282,007	77.2	488.3
Michigan	19.8 (18.7, 21.1)	60.3	77,429,336	7.3	775,554,320	100.5	575.8
Minnesota	20.5 (19.7, 21.4)	47.8	36,321,935	7.2	325,795,877	77.5	419.3
Mississippi	12.5 (11.1, 14.1)	64.3	16,661,059	7.6	210,378,008	92.9	831.8
Missouri	17.7 (16.2, 19.2)	64.5	43,445,143	7.8	397,708,743	84.8	533.0
Montana	21.3 (19.6, 23.2)	55.4	8,150,629	7.2	67,490,635	83.7	445.6
Nebraska	20.4 (19.3, 21.5)	50.3	12,763,532	7.2	118,457,501	83.1	447.5
Nevada	14.5 (12.4, 16.9)	64.7	15,837,027	7.2	137,824,102	62.0	468.6
New Hampshire	17.8 (16.2, 19.5)	49.8	8,245,356	6.4	70,267,911	65.9	425.6
New Jersey	17.0 (15.7, 18.4)	43.2	44,184,772	6.9	366,271,396	52.6	354.9
New Mexico	13.6 (12.1, 15.2)	49.8	9,151,667	7.2	82,012,459	51.6	425.9
New York	17.6 (16.6, 18.7)	47.9	107,790,058	6.8	875,103,091	56.2	369.8
North Carolina	14.6 (13.5, 15.7)	52.1	50,169,400	6.4	424,768,408	54.8	422.6
North Dakota	24.9 (23.1, 26.7)	50.5	6,746,882	7.7	75,169,030	128.9	564.3
Ohio	19.5 (18.1, 21.0)	51.4	77,616,428	7.7	919,978,898	102.4	591.7
Oklahoma	13.6 (12.3, 15.1)	62.5	20,239,289	7.5	178,841,984	60.6	493.2
Oregon	17.7 (16.2, 19.2)	52.0	24,832,806	6.3	186,307,663	58.8	384.6
Pennsylvania	18.5 (17.0, 20.0)	48.9	76,331,864	7.0	706,904,786	69.9	441.8
Rhode Island	17.0 (15.4, 18.8)	54.0	6,370,912	7.0	63,035,011	74.6	504.9
South Carolina	16.3 (15.3, 17.5)	61.9	32,140,181	7.4	305,869,730	80.4	561.7
South Dakota	17.9 (16.3, 19.6)	47.0	4,963,768	7.6	43,633,055	67.4	416.6
Tennessee	10.9 (9.5, 12.4)	63.9	30,964,037	7.0	249,954,016	49.0	509.8
Texas	16.1 (14.9, 17.3)	51.7	150,284,697	7.2	1,386,402,139	68.4	472.8
Utah	11.4 (10.7, 12.2)	55.9	11,610,783	7.3	96,298,123	46.2	418.2

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Table 3. Binge-drinking Prevalence,[a,b] Frequency,[c] Intensity,[d] and Total Binge Drinks[e] Among Adults Aged ≥18 Years[f] by State, U.S., 2015 *(continued)*

State	Binge-drinking prevalence, % (95% CI)	Frequency of binge-drinking episodes among binge drinkers	Total annual binge-drinking episodes[g]	Binge-drinking intensity	Total annual binge drinks	Total annual binge drinks per adult	Total annual binge drinks per binge drinker
Vermont	19.0 (17.6, 20.6)	55.2	4,432,492	6.8	41,339,473	81.7	501.5
Virginia	17.0 (15.8, 18.2)	52.5	51,026,215	7.1	488,627,713	75.0	483.9
Washington	16.6 (15.7, 17.5)	50.1	40,870,916	6.2	316,195,086	56.9	378.3
West Virginia	11.8 (10.7, 13.1)	53.2	7,822,466	7.9	74,714,179	51.0	500.5
Wisconsin	24.4 (22.7, 26.2)	51.3	49,266,263	7.2	471,484,200	105.3	488.4
Wyoming	16.9 (15.1, 18.9)	56.7	3,683,677	7.0	28,123,508	62.9	413.9

[a]Age-adjusted to 2000 U.S. projected population (distribution #9[16]).
[b]Total number of respondents who reported at least one binge-drinking episode during the past 30 days divided by the total number of respondents.
[c]Average number of binge-drinking episodes reported by all binge drinkers.
[d]Average largest number of drinks consumed by binge drinkers on any occasion during the past 30 days.
[e]Total annual binge drinks was calculated by multiplying the frequency of binge drinking (i.e., total annual number of binge-drinking episodes) by the binge-drinking intensity of each binge drinker (i.e., the largest number of drinks consumed by binge drinkers on any occasion). Total annual binge drinks per adult was calculated by dividing total binge drinks by the weighted total population. Total annual binge drinks per binge drinker was calculated by dividing total annual binge drinks by the weighted total population of binge drinkers.
[f]Including respondents aged 18–20 years who are under the legal drinking age.

≥$75,000 (532.3 vs 419.0 drinks, respectively). Men who reported heavy drinking (i.e., consuming >15 drinks/week) reported an average of 1,533.1 binge drinks/year, or about 29 binge drinks/week.

In 2015, the total annual binge drinks per adult in the states ranged from 46.2 in Utah to 128.9 in North Dakota, while the total annual binge drinks per binge drinker ranged from 316.9 in the District of Columbia to 841.0 in Arkansas (Table 3). The highest annual number of total binge drinks per binge drinker was reported in Arkansas (841.0), Mississippi (831.8), Kentucky (652.8), and Hawaii (611.7). Notably, total annual binge drinks per binge drinker (Figure 1) and per adult (Appendix Figure 1, available online) were generally higher in the Mississippi River Valley than in other regions. By contrast, age-adjusted binge-drinking prevalence was generally higher in the Midwest and New England than in other regions (Appendix Figure 2, available online).

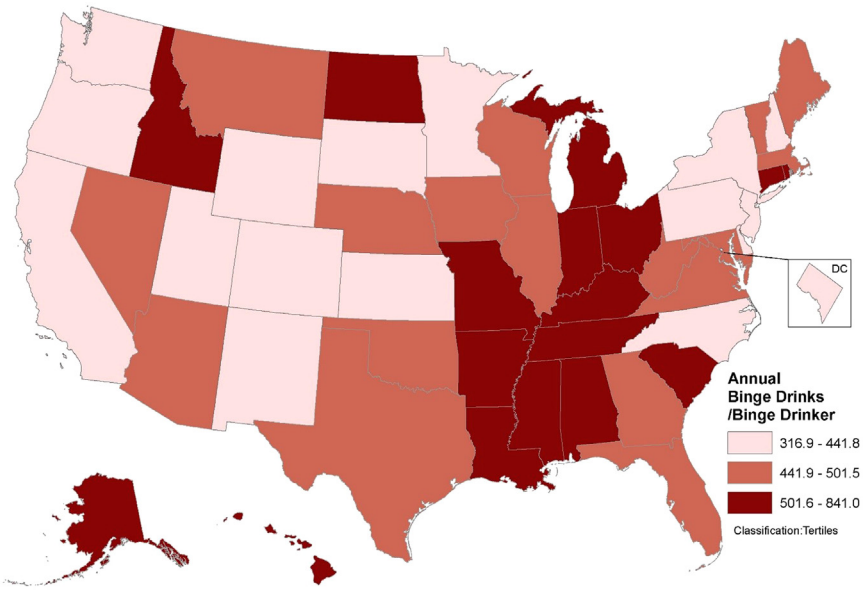

Figure 1. Total annual binge drinks per binge drinker[a] aged ≥18 years by state, U.S., 2015.
[a]Calculated by dividing the state-specific summation of total annual binge drinks by the estimated number of binge drinkers in each state. Total annual binge drinks was calculated as the number of annual binge-drinking episodes multiplied by the binge-drinking intensity (i.e., the average largest number of drinks consumed on any occasion in the past 30 days for each binge drinker).

DISCUSSION

To the authors' knowledge, this is the first study to assess total binge drinks consumed by U.S. adults, using a new measure to assess disparities in binge drinking. Adult binge drinkers are doing so frequently and with great intensity, resulting in about 17.5 billion total binge drinks in 2015, significantly increasing the risk for alcohol-attributable harms to themselves and others. Although binge drinking was most common among young adults aged 18–34 years, most of the total binge drinks were consumed by those aged ≥25 years, and over half were consumed by adults aged ≥35 years, underscoring that binge drinking is a problem across the lifespan. In addition, four of five total binge drinks were consumed by men. Binge drinking was also significantly more common among people with higher educational attainment and household incomes. However, the total annual number of binge drinks per binge drinker was substantially higher among those with lower educational levels and household incomes than among those with higher educational levels and household incomes, emphasizing the usefulness of total binge drinks for assessing disparities in binge drinking. States with higher total binge drinks per binge drinker per year were also widely distributed across geographic regions in the U.S.

The finding that over three quarters of total binge drinks were consumed by adults aged ≥25 years is consistent with the findings of a previous study that found about 70% of binge-drinking episodes were reported by those aged ≥26 years.[17] This finding is also consistent with the age distribution of alcohol-attributable deaths in the U.S. About 95% of the 88,000 average annual alcohol-attributable deaths in the U.S. involve adults aged ≥21 years,[1] and three quarters of the 2,200 average annual alcohol-poisoning deaths in the U.S., which typically are caused by binge drinking at high intensity, involve adults aged 35–64 years.[10]

The observed disparities in total binge drinks by race/ethnicity and SES also reflects known disparities in alcohol-attributable outcomes and life expectancy. For example, non-Hispanic whites, who reported almost three quarters of the total binge drinks, account for the majority of alcohol poisoning deaths in the U.S. However, American Indians/Alaska Natives, who had the highest total binge drinks per binge drinker per year (573.8 binge drinks annually), have the highest age-adjusted alcohol poisoning death rate in the U.S.[10] Similarly, the substantially higher rate of total binge drinks per binge drinker per year for those with less than a high school education and household incomes of <$25,000 relative to college graduates and those with household incomes of ≥$75,000, respectively, may help explain reported differences in life expectancy by SES,[18] particularly because excessive drinking (including binge drinking) is responsible for one in ten total deaths among working-age adults aged 20–64 years in the U.S.[1] This emphasizes the importance of reducing total binge drinks in order to reduce health disparities, including differences in mortality, among adults by race/ethnicity and SES.

Most heavy drinkers (i.e., those reporting high weekly alcohol consumption), especially men, were found to binge drink frequently and at high intensity, as reflected by the high rate of total binge drinks per binge drinker per year. The substantial overlap between these two patterns of alcohol consumption highlights the usefulness of a single-question screen for identifying excessive drinkers in clinical settings.[19] Alcohol screening with a brief intervention has been shown to be an effective strategy for reducing excessive drinking in clinical settings.[20] In addition, a recent systematic review found that providing screening and brief intervention for excessive drinking using electronic tools (e.g., computers and cell phones) can reduce binge-drinking intensity by 24% among those participating in these interventions.[21]

The observed differences in the prevalence of binge drinking and total binge drinks in states reflect, in part, differences in state alcohol policies.[22] A recent study that examined the relationship between various subgroups of state alcohol policies and binge drinking among adults found that a small number of alcohol policies that raised alcohol prices and reduced its availability had the greatest impact on binge drinking.[23] However, these differences probably also reflect other social and cultural factors in states—including racial and ethnic composition, SES, and religious affiliation—that can influence binge drinking as well.[24]

Previous studies have found that nine in ten adults who binge drink are not alcohol dependent,[25] thus, ensuring access to effective treatment will not be sufficient to decrease harms from excessive drinking at the population level. Therefore, strategies to address excessive drinking must also include, in addition to clinically based strategies (e.g., screening and brief interventions), evidence-based policies, such as those recommended by The Community Preventive Services Task Force.[11] These include increasing alcohol taxes, regulating alcohol outlet density, and commercial host liability. However, recent reports have shown that these interventions may be underutilized by states relative to their potential effectiveness.[26–28] In fact, the total federal and state taxes on alcoholic beverages were about $0.14 per drink (in 2011),[29] whereas the economic cost of excessive drinking was about $2.05 per drink (in 2010), and binge drinking is responsible about three quarters of these costs.[2] Additionally, recent studies suggest that populations with

lower income and educational levels may pay less on a per-capita basis following an alcohol tax increase than populations with higher income and education levels, as they generally have a lower prevalence of current drinking and binge drinking than more affluent populations.[30]

Limitations

Findings are subject to several limitations. First, BRFSS data are self-reported; alcohol consumption generally, and excessive drinking in particular, is underreported in surveys because of recall bias, social desirability response bias, and nonresponse bias[31]; these biases could vary among states and by respondent. Second, the median response rate for BRFSS was low, which could increase response bias. Third, the BRFSS measure of the largest number of drinks among binge drinkers may have resulted in higher estimates of binge-drinking intensity than other survey methods because the largest number of binge drinks consumed may be greater than the average number of binge drinks consumed by those who binge drink on multiple occasions.[32] However, a recent study found that binge-drinking intensity is quite consistent across binge-drinking episodes among young adults,[33] though this has not been assessed among other age groups. BRFSS estimates of binge drinking among adults are also substantially lower than estimates from other surveys,[34] and the BRFSS only identifies 22%−32% of presumed alcohol consumption in states based on alcohol sales data.[35] In addition, the underreporting of alcohol consumption tends to be greater among binge drinkers than non-binge drinkers, and tends to increase with binge-drinking intensity.[36] Therefore, the prevalence, frequency, and intensity of binge drinking are likely to have been substantially underestimated in this study. Additional research is needed to improve survey measures for binge drinking to enhance their usefulness for public health surveillance. Similarly, additional research is needed to assess the prevalence of high-intensity binge drinking across demographic groups, and the relationship between high-intensity binge drinking and various alcohol-attributable harms (e.g., heart disease and cancer).

CONCLUSIONS

To date, binge-drinking prevalence is the most commonly used measure of binge drinking and reducing binge drinking is a leading health indicator in *Healthy People 2020*.[6] However, there are important disparities in binge-drinking behavior that are not apparent based on an assessment of binge-drinking prevalence alone. Monitoring total binge drinks consumed annually and total binge drinks per binge drinker could help overcome some of these limitations, and provide a more sensitive and specific way to plan, implement, and evaluate community and clinical preventive strategies for reducing binge drinking and related harms.

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D Kanny, TS Naimi, and RD Brewer conceptualized the study and D Kanny led the drafting of the article. Y Liu performed data analysis and H Lu preformed GIS mapping. All authors contributed to the interpreted findings, reviewed and edited drafts of the article, and approved the final version.

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SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at https://doi.org/10.1016/j.amepre.2017.12.021.

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Community Preventive Services Task Force

Preventing Excessive Alcohol Consumption: Increasing Alcohol Taxes

Task Force Finding

Intervention Definition

Alcohol excise taxes affect the price of alcohol, and are intended to reduce alcohol-related harms, raise revenue, or both. Alcohol taxes are implemented at the state and federal level, and are beverage-specific (i.e., they differ for beer, wine and spirits). These taxes are usually based on the amount of beverage purchased (not on the sales price), so their effects can erode over time due to inflation if they are not adjusted regularly.

Task Force Finding (June 2007)*

The Community Preventive Services Task Force recommends increasing taxes on the sale of alcoholic beverages, on the basis of strong evidence of the effectiveness of this policy in reducing excessive alcohol consumption and related harms. Public health effects are expected to be proportional to the size of the tax increase.

In formulating this recommendation, the Task Force considered several aspects of the effects of this policy intervention. The relationship between alcohol price and overall consumption was reviewed, as was the relationship between price and individual consumption. Also reviewed were effects of alcohol prices or taxes on several alcohol-related health outcomes, including motor-vehicle crashes that involved alcohol-impaired driving, non–motor-vehicle mortality outcomes, and violence outcomes. The reviewed studies provided consistent evidence that increases in alcohol prices and alcohol taxes are associated with decreases in both excessive alcohol consumption and related harms. Although these effects were not restricted to a particular demographic group, there is some evidence that they are applicable to groups with a high prevalence of excessive alcohol consumption (e.g., young men).

*From the following publication:
Task Force on Community Preventive Services. Increasing alcohol beverage taxes is recommended to reduce excessive alcohol consumption and related harms. *Am J Prev Med* 2010;38(2):230-2.

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Community Preventive Services Task Force

Preventing Excessive Alcohol Consumption: Privatization of Retail Alcohol Sales

Task Force Finding and Rationale Statement

Intervention Definition

The *privatization* of retail alcohol sales is the repeal of government (i.e., nation, state, county, city, or other geo-political unit) control over the retail sales of one or more types of alcoholic beverages, thus allowing commercial retailing of those beverages. States with government control of alcohol sales are referred to as *control* states, and states with privatized sale are referred to as *license* states. The privatization of retail alcohol sales generally applies only to *off-premises* alcohol outlets--retail locations, such as liquor stores, where alcoholic beverages are sold for consumption elsewhere. Privatization does not generally affect the retail sales of alcoholic beverages at *on-premises* alcohol outlets--locations such as bars and restaurants, where alcoholic beverages are sold for consumption on-site. *Re-monopolization* of retail alcohol sales is the re-establishment of government control over the retail sale of one or more types of alcoholic beverage.

Task Force Finding (March 2011)

Based on its charge to identify effective disease and injury prevention measures, the Community Preventive Services Task Force recommends against the further privatization of alcohol sales in settings with current government control of retail sales. This finding is based on strong evidence that privatization results in increased per capita alcohol consumption, a well-established proxy for excessive consumption and related harms.

Rationale

The Task Force finding includes evidence from 18 studies. Seventeen of these studies assessed the impact of privatizing alcohol sales on per capita consumption of the privatized beverage. Nine of the 17 studies also examined the effects of privatization on per capita consumption of alcoholic beverages that were not privatized. Following privatization, consumption of privatized beverages within the jurisdiction that underwent privatization increased substantially (median relative increase of 44.4%; interquartile interval [IQI]: 4.5% to 122.5%), and there was little effect on per capita consumption of nonprivatized beverages within jurisdictions that underwent privatization (median decrease of 2.2%; IQI: -6.6% to -0.1%), resulting in substantial net increases in per capita alcohol consumption. Most of the reviewed studies assessed the effect of privatization on per capita alcohol consumption as indicated by alcohol sales or tax data. One study (in Finland) found that the increases in consumption occurred among drinkers at all consumption levels. The 18th study, conducted in Sweden, found that re-monopolizing the sale of medium-strength beer was associated with a general reduction in alcohol-related harms.

According to the Single Distribution Theory, patterns, or distributions of alcohol consumption are similar across many societies, such that most people drink a small or moderate amount and some people drink a large amount. Because of this pattern, when per capita--or average--consumption changes in a society, consumption changes across the board, but mostly among those who drink excessively. There is extensive evidence supporting the Single Distribution Theory, which allows the inference made in this review that when privatization results in substantial per capita increases in consumption, there are at the same time substantial increases in excessive consumption. One study in the body of evidence on privatization exemplifies the single distribution theory: a cohort study in Finland found that, following the

privatization of medium-strength beer, there were increases in alcohol consumption at all levels, including excessive consumption.

Only two studies in the body of evidence on privatization assessed the effects of privatization on alcohol-related harms (i.e., cirrhosis mortality and motor vehicle fatalities). However, these studies had several methodological limitations (e.g., poor exposure measurement, short follow-up time, and weak proxy outcome measures) and yielded mixed, statistically non-significant results. The only available study of re-monopolization assessed the effects of this policy change on medium-strength beer consumption in Sweden and found decreases (most statistically non-significant) in rates of hospitalization for a variety of alcohol-related harms.

Most of the evidence regarding the effects of privatization is from Canada and multiple U.S. states. Although the specifics of privatization differ across U.S. states, consistent results across locations indicate that these findings are likely to apply broadly to U.S. control states.

The privatization of retail alcohol sales may lead to an increase in per capita alcohol consumption by several means. Privatization commonly results in increases in the number of off-premises outlets and of days and hours of sale, all of which have been shown in previous Community Guide reviews to lead to increases in excessive alcohol consumption and related harms. Increased alcohol outlet density is also associated with increases in social harms, including interpersonal violence and vandalism. Privatization may be associated with increased alcohol advertising, increases in the number of brands sold, and more lax enforcement of sales regulations, including enforcement of the minimum legal drinking age. In contrast, privatization also has generally been associated with an increase in the price of privatized beverages, which may be expected to lead to a decrease in consumption.

Barriers to maintaining government control of retail alcohol sales include commercial interests, consumer interest in greater choice and greater convenience with privatization, and the perception by governments that they may benefit economically from privatization (e.g., through sale of licenses), at least in the short term. One peer-reviewed study evaluating the economic effects of this intervention in Canada concluded that the healthcare and law enforcement costs and costs of lost productivity due to disability and premature mortality outweigh the potential gains in tax and mark-up revenues from the privatization of alcohol sales. However, no specific information on potential revenue gains from privatization was provided.

In the United States, as of 2010, two states (Utah and Pennsylvania) and Montgomery County, Maryland retained exclusive government control over off-premises wine retail sales. Those states and eleven others (Alabama, Idaho, Maine, Montana, New Hampshire, North Carolina, Ohio, Oregon, Vermont, Virginia, and Washington) and Montgomery County, Maryland retain exclusive government control of off-premises retail sales of distilled spirits.

This Task Force finding is based solely on evidence related to the public health consequences of privatization, which may be one of several factors considered in making decisions on whether to privatize retail alcohol sales. The maintenance of government control of off-premises sale of alcoholic beverages is one of many effective strategies to prevent or reduce excessive consumption which is one of the leading causes of preventable death and disability.

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