

Understanding Alcohol

Noelle Melartin, LSW

Director, Office of Alcohol and Other Drug Program Initiatives

<https://aod.wellness.upenn.edu/>

Staff Clinician, CAPS

<https://caps.wellness.upenn.edu/>



October 2, 2020

What's Included

- Key principle around alcohol and sexual violence
- Understanding the science of how alcohol works in the body
- Understanding individual differences in intoxication experience
- Viewing the science of of alcohol intoxication in the context of the social environment

Alcohol and Sexual Violence

Alcohol is not the cause of sexual violence.

- Alcohol is **involved** in **many** cases of sexual violence, but **not all** of them
- Though alcohol is **not the cause** of sexual violence, it may be misused as a facilitating agent
- A person's intoxication **is not an excuse** for violations they committed while under the influence (e.g. violence, vandalism, theft, DUI)
- A person's **intoxication or incapacitation** is **not an invitation or an opportunity** for another individual to engage that person in a sexual act to which they **did not or could not consent**

Alcohol Use in the Social Environment

You might hear statements like:

- Everyone was wasted
- I blacked out
- We pregame the party and I remember walking there but nothing after we got in
- Someone told me that people were helping me walk and that I was throwing up
- I only had 4 drinks, but I got so drunk
- I didn't drink more than my friends, but I ended up way drunker than they did
- Normally I can hold my liquor, I'm not a lightweight
- I was having fun at first, but then I got really upset
- They suddenly seemed really angry and aggressive
- I texted a lot of things I don't remember texting, that I wish I could take back

What does this mean? Let's talk about the science of alcohol.

The Science of Alcohol

The Basics (part 1):

- An individual's level of intoxication is based on the number of drinks consumed per hour, the number of hours spent drinking, **weight**, and **biological sex**
 - Biological males produce more of the enzyme **alcohol dehydrogenase**, which is what metabolizes alcohol
 - If two people of the same biological sex but different weights drink the same number of drinks in the same amount of time, the **smaller person will end up more intoxicated**
 - If a biological male and biological female go **drink for drink**, the female will be more intoxicated

The Science of Alcohol

The Basics (part 2):

- An individual's level of intoxication is based on the **number of drinks** consumed per hour, the **number of hours** spent drinking, weight, and biological sex
 - It takes around **30 minutes** for a drink to be absorbed through the digestive tract and reach the brain, meaning feelings of intoxication may be delayed
 - It takes **one hour** for a drink to be eliminated from the bloodstream
 - **Other factors** that affect intoxication: food, water, sleep, sickness, medication
 - *"I didn't drink more than my friends, but I ended up way drunker than they did"*
 - Individual biological differences are a big factor in how different people experience alcohol

The Science of Alcohol

- Critical factor in managing intoxication level is to **pace, measure, and count** drinks
- Important consideration: **Standard drink sizes**



Beer: 12 oz



Wine: 5 oz



Liquor: 1.5 oz

The Science of Alcohol

- Critical factor in managing intoxication level is to **pace, measure, and count** drinks



- *“I only had 4 drinks, but I got so drunk”*
 - One drink does not equal one cup

The Social Culture of Alcohol

Social challenges to pacing, measuring, and counting



Social group is drinking straight from the liquor handle



Competitive drinking games



Lack of knowledge about how alcohol works in the body

*Let's
Get
Wasted*

Aspirational social culture that celebrates heavy drinking

Measuring Intoxication

- Blood alcohol content (BAC) is the measurement used to quantify intoxication levels
 - Refers to the percentage of alcohol in the blood
 - A BAC of .01, or 1/10 of 1%, means that there is a tenth of a gram of alcohol for every deciliter of blood
- BAC is based on the number of drinks consumed, how many hours were spent drinking, body weight, and biological sex
 - Average male reaches .08 after 5 drinks in a 2-hour period
 - Average female reaches .08 after 4 drinks in a 2-hour period
- Most accurate measure is via blood analysis

Measuring Intoxication

MEN

YOUR BAC AFTER ONE HOUR OF DRINKING

		BODYWEIGHT (LBS)								
		120	140	160	180	200	220	240	260	280
TOTAL NUMBER OF DRINKS	1	.02	.01	.01	.01	.00	.00	.00	.00	.00
	2	.05	.04	.03	.03	.02	.02	.02	.01	.01
	3	.08	.06	.05	.05	.04	.04	.03	.03	.02
	4	.11	.09	.08	.07	.06	.05	.05	.04	.04
	5	.14	.12	.10	.09	.08	.07	.06	.06	.05
	6	.17	.14	.12	.11	.10	.09	.08	.07	.06
	7	.20	.17	.15	.13	.12	.10	.09	.08	.08
	8	.23	.20	.17	.15	.13	.12	.11	.10	.09
	9	.27	.23	.19	.17	.15	.14	.12	.11	.10
	10	.30	.25	.22	.19	.17	.15	.14	.13	.12

WOMEN

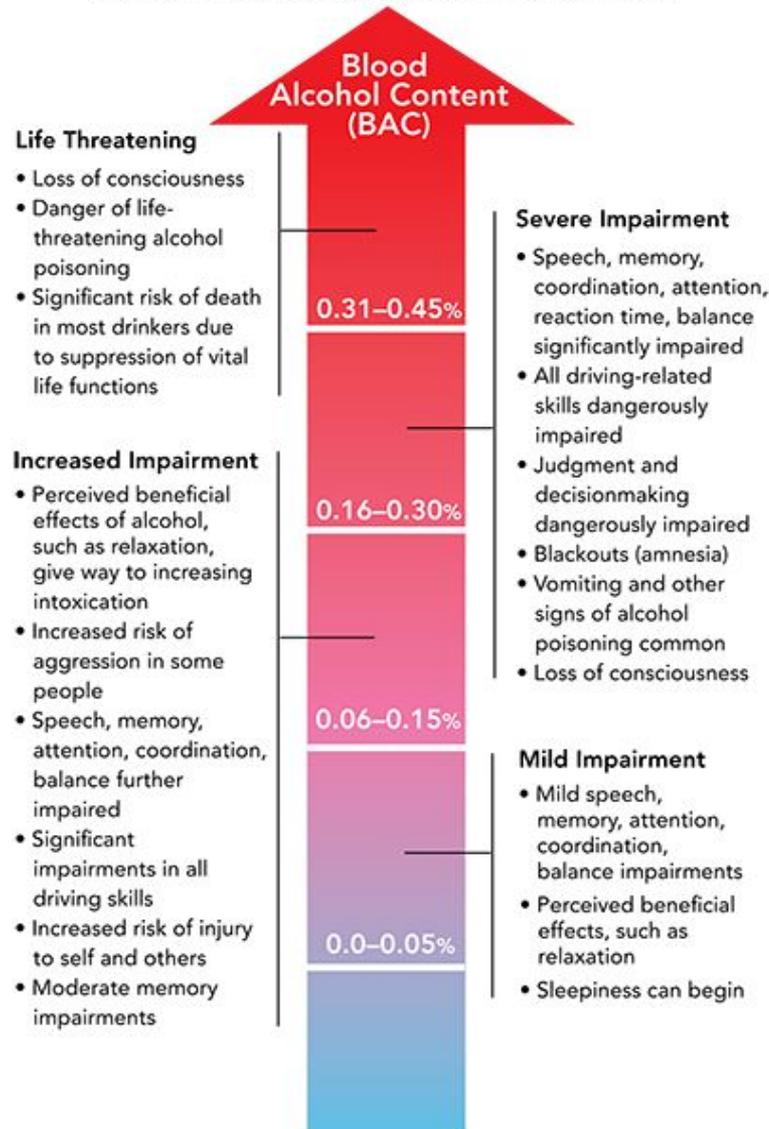
YOUR BAC AFTER ONE HOUR OF DRINKING

		BODYWEIGHT (LBS)								
		100	120	140	160	180	200	220	240	260
TOTAL NUMBER OF DRINKS	1	.03	.02	.02	.01	.01	.01	.00	.00	.00
	2	.07	.06	.05	.04	.03	.03	.02	.02	.02
	3	.12	.10	.08	.07	.06	.05	.05	.04	.04
	4	.16	.13	.11	.10	.08	.07	.07	.06	.05
	5	.21	.17	.14	.12	.11	.10	.09	.08	.07
	6	.25	.21	.18	.15	.13	.12	.11	.10	.09
	7	.30	.25	.21	.18	.16	.14	.13	.12	.11
	8	.34	.28	.24	.21	.18	.16	.15	.13	.12
	9	.39	.32	.27	.24	.21	.19	.17	.15	.14
	10	.43	.36	.31	.27	.23	.21	.19	.17	.16

- BAC can be estimated using a BAC chart
 - Caution: most charts do not distinguish biological sex and none of them account for time spent consuming or metabolizing alcohol
- More accurate estimate via online BAC calculator which has inputs for these factors
 - (e.g. <https://www.alcohol.org/bac-calculator/>)

Measuring Intoxication

As BAC Increases, So Does Impairment



Specific Effects

- **Blackouts**

- Start at 0.2-0.25 BAC
- Hippocampus impaired; **not recording long-term memory**
- May be active and communicating with no knowledge of blackout
- Two typical ways: rapid consumption in a short time, or steady consumption over several hours
- *“We pregame the party and I remember walking there but nothing after we got in”*
- *“I texted a lot of things I don't remember texting, that I wish I could take back”*

- **Biphasic Effect**

- Explains why **euphoric feelings spiral into negative feelings**
- Up to 0.06 BAC: warm, happy, buzzy zone
- After 0.06 BAC: depressant takes effect; emotions are amplified, while judgment and inhibitions become impaired
- *“I was having fun at first, but then I got really upset”*
- *“They suddenly seemed really angry and aggressive”*

- **Alcohol poisoning**

- Collection of symptoms which may include:
 - vomiting repeatedly; incoherence; unresponsiveness; decreased body temperature, heart rate, and breathing rate; pale appearance, unconsciousness
- *“Someone told me that people were helping me walk and that I was throwing up”*

Individual Differences

- **Tolerance:** needing more substance to get the same desired effect
 - One of the DSM-V diagnostic criteria for **alcohol use disorder**
 - *“Normally I can hold my liquor, I’m not a lightweight”*
- **Danger of high tolerance:** Increased consumption for same intoxication effect leads to **higher BAC**
 - Some intoxication effects are a natural deterrent, e.g. vomiting, hangovers. With a higher tolerance, these are not felt until a higher BAC is reached, if at all, so signals to stop drinking may be missed
 - The higher the BAC, the higher the risk for most severe medical impact

Individual Differences

Factors that impact tolerance

- Genetics
- **Frequency and quantity** of alcohol consumption over extended period of time
- Classical Conditioning
 - **CNS is conditioned to activate** and compensate for alcohol's depressant effects in familiar surroundings
 - In unfamiliar surroundings (e.g. spring break), CNS activation is not triggered and symptoms of intoxication are more severe

Takeaways

- The way alcohol works in the body is a science
- Social and cultural expectations among young adults can foster high-risk drinking
 - *“Everyone was wasted”*
- High-risk incidents are more likely when inhibitions are lowered, judgment is impaired, emotions are amplified, and social pressures are at play
- Alcohol can be misused as a facilitating agent in individual incidences of sexual violence, but is not the cause of sexual violence

Questions? Comments?

Noelle Melartin, LSW

melartin@upenn.edu

Office of Alcohol and Other Drug Program Initiatives

3535 Market St, Mezzanine

(215) 573-3525

<https://aod.wellness.upenn.edu/>

