Alcohol
In Depth: Alcohol

- Alcohols are chemical compounds characterized by a hydroxyl group
- In common usage, beverages containing ethanol made from fermented fruits, vegetables, or grains
What Does One Drink Look Like?
In Depth: Alcohol (cont.)

- What is moderate alcohol intake?
  - A drink is defined as the amount of a beverage that provides $\frac{1}{2}$ fluid ounce of pure alcohol
  - Proof is a measurement of alcohol content
  - Moderate alcohol intake is defined as the consumption of up to one drink per day for women, and up to two drinks per day for men
• Benefits of moderate consumption include
  • Stress and anxiety reduction
  • Appetite improvement
  • Lower rates of heart disease
  • Possible lower risks for diseases such as diabetes, heart disease, and liver disease
In Depth: Alcohol (cont.)

• Concerns about moderate alcohol intake include
  • Women appear to be at higher risk of breast cancer
  • Increased risk of hypertension
  • Higher rates of bleeding in the brain
  • Relatively high Calorie content
  • Potential risk of adverse drug interactions
Metabolism of Alcohol

Alcohol → ADH → ALDH

Liver

Converted to fatty acids

Metabolized for energy

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# Myths About Alcohol Metabolism

## TABLE 1  Myths about Alcohol Metabolism

<table>
<thead>
<tr>
<th>The Claim</th>
<th>The Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity, such as walking around, will speed up the breakdown of alcohol.</td>
<td>Muscles don’t metabolize alcohol; the liver does.</td>
</tr>
<tr>
<td>Drinking a lot of coffee will keep you from getting drunk.</td>
<td>Coffee intake simply leaves you both wired and drunk.</td>
</tr>
<tr>
<td>Using a sauna or steam room will force the alcohol out of your body.</td>
<td>Very little alcohol is lost in sweat; the alcohol will remain in your bloodstream.</td>
</tr>
<tr>
<td>Herbal and nutritional products are available that speed up the breakdown of alcohol.</td>
<td>No commercial supplement is effective in increasing the rate of alcohol metabolism.</td>
</tr>
</tbody>
</table>
Alcohol

• Alcohol use disorder (AUD)
  • Medical diagnosis for problem drinking that has become severe and is characterized by either abuse or dependence
In Depth: Alcohol (cont.)

• Types of alcohol abuse:
  • **Alcohol abuse** is excessive intake of alcohol
  • **Binge drinking** is consumption of five or more drinks per occasion
  • **Alcoholism** is a disease characterized by chronic dependence on alcohol
Effects of alcohol abuse:

- A hangover is a consequence of drinking too much alcohol; symptoms include headache, fatigue, dizziness, muscle aches, and nausea.
- Even at low intakes, alcohol impairs reasoning and judgment.
- Alcohol poisoning is a potentially fatal metabolic state involving cardiac or respiratory failure.
- Alcohol abuse can lead to traumatic injury from falls, drownings, assaults, and traffic accidents.
Effects of Alcohol on Mortality Risk

- Increased risk for mortality
- Lowered risk for mortality

Number of alcoholic drinks per day
Effects of Alcohol on Brain Activity

As BAC Increases, So Does Impairment

Blood Alcohol Concentration (BAC)

Life Threatening
- Loss of consciousness
- Danger of life-threatening alcohol poisoning
- Significant risk of death in most drinkers due to suppression of vital life functions

Severe Impairment
- Speech, memory, coordination, attention, reaction time, balance significantly impaired
- All driving-related skills dangerously impaired
- Judgment and decision making dangerously impaired
- Blackouts (amnesia)
- Vomiting and other signs of alcohol poisoning common
- Loss of consciousness

Increased Impairment
- Perceived beneficial effects of alcohol, such as relaxation, give way to increasing intoxication
- Increased risk of aggression in some people
- Speech, memory, attention, coordination, balance further impaired
- Significant impairments in all driving skills
- Increased risk of injury to self and others
- Moderate memory impairments

Mild Impairment
- Mild speech, memory, attention, coordination, balance impairments
- Perceived beneficial effects, such as relaxation
- Sleepiness can begin

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In Depth: Alcohol (cont.)

- Effects of alcohol abuse:
  - When the rate of alcohol intake exceeds the ability of the liver to break alcohol down, liver cells are damaged or destroyed
    - Fatty liver is an early but reversible sign of liver damage
    - Alcohol hepatitis results in loss of appetite, nausea and vomiting, abdominal pain, and jaundice
    - Cirrhosis of the liver involves permanent scarring after years of alcohol abuse
Cirrhosis of the Liver
In Depth: Alcohol (cont.)

• Effects of alcohol abuse:
  • Chronically high intake increases risk of
    • Impaired bone health
    • Pancreatic injury and diabetes
    • Cancer
    • Abdominal obesity
    • Malnutrition
Alcohol-Related Malnutrition

Alcohol

Direct toxicity to liver

Empty calories

Direct toxicity to stomach and intestines

Malnutrition

- Impaired utilization of nutrients
- Increased degradation of nutrients
- Decreased transport of nutrients

Loss of body functions

- Maldigestion
- Malabsorption
In Depth: Alcohol (cont.)

- Fetal and infant health problems include
  - **Fetal alcohol syndrome (FAS)**, a set of serious, irreversible birth defects, including physical, emotional, behavioral, and developmental problems
  - **Fetal alcohol effects (FAE)**, subtler consequences that may be exhibited later, including hyperactivity, attention deficit disorder, and impaired learning abilities
Fetal Alcohol Syndrome (FAS)
In Depth: Alcohol (cont.)

• You should be concerned about your alcohol intake if you engage in binge drinking or drink at inappropriate times

• Speak with a trusted friend, coach, teacher, counselor, or healthcare provider
Assignment 3:

Please provide your answer in a thought-out, coherent essay and use complete sentences.

Twenty-one-year-old Max was driving home from a post-football game party last night when he was pulled over by the police. The officer said he was driving erratically and asked how many drinks he had had. Max told him that he had only had three beers and explained that he was pretty tired from the game. Then, just to prove he was fine, he offered to count backwards from a hundred. The officer thought he sounded sober and did not make him do it. Max couldn’t believe the officer thought he was driving drunk. However, he had second thoughts about what he did and wondered if drinking three beers after a game is perhaps too much.

A) Is it physiologically possible that Max's driving was impaired even though he had consumed only three beers? Factor in Max's height of 5’8” and weight of 200 pounds (91 kg), as well as that he has just played a long game of football.

B) What other factors influence the rate of alcohol absorption or breakdown that could have affected Max's BAC?

C) How can all of these factors influence a decision about whether or not “three beers after a game is really too much?”