

50 Minutes

SESSION II
DETECTION AND GENERAL DETERRENCE

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DETECTION AND GENERAL DETERRENCE

Upon successfully completing this session, the participant will be able to:

- o Describe the frequency of DWI violations and crashes.
- o Define General Deterrence.
- o Describe the Relationship between Detection and General Deterrence.
- o Describe a brief history of alcohol;
- o Identify common alcohol types;
- o Describe the physiologic processes of absorption, distribution and elimination of alcohol in the human body;

CONTENT SEGMENTS

- A. The DWI Problem
- B. The Concept of General Deterrence
- C. Relating Detection to Deterrence Potential
- D. Evidence of Effective Detection and Effective Deterrence
- E. Physiology of Alcohol

LEARNING ACTIVITIES

- o Instructor-Led Presentations
- o Reading Assignments



Display II-O (Session Objectives)



10 Minutes



Display II-1



Display II-2

II DETECTION & GENERAL DETERRENCE

A. The DWI Problem (Local, State and National)

1. Each year, an average of ___ people die in this state's traffic crashes.

2. Here and throughout the nation, alcohol continues to be the major contributor to traffic fatalities.
 - a. Prior to 1994, nearly half of the drivers who died in crashes had been drinking.

 - b. In 2002, alcohol-related fatalities rose to 17,419, representing 41 percent of all traffic fatalities.

Total Session Time:
Approximately 50 minutes.

Instructor please note: compute figures for the participants' state and/or community from traffic records data. Slide II-1(fill in appropriate information).

NHTSA 2002 FARS data.



Ask participants to suggest reasons why alcohol related crashes are more likely to result in death.

Some reasons:

- o drinking-drivers are more likely to be taking excessive risks (speeding, turning abruptly, etc.)

- o drinking-drivers may not react in enough time to slow down prior to crashing.

- o drinking-drivers are less likely to use their safety belts.



Display II-3



Display II-4

3. DWI violations and crashes are not simply the work of relatively few "problem drinkers" or "problem drug users": many people commit DWI, at least occasionally.

a. A survey of 9,028 drivers across the country revealed that 14 percent reported they had recently (within last 3 months) operated a motor vehicle "while close to or under the influence of alcohol." Only 2 percent of these drivers said they were stopped while driving after drinking.

b. Random survey of drivers stopped at all hours during one week; 12% had been drinking; 2% had Blood Alcohol Concentration of 0.10 or higher.

c. Random surveys of drivers stopped during late evening - early morning hours on weekends: approximately 10% had Blood Alcohol Concentrations of 0.10 or higher.

d. Special study of drivers leaving bars between 9 p.m. and 2 a.m., Friday and Saturday nights: one out of seven had Blood Alcohol Concentration of 0.10 or higher.

Gallup Survey, September, 1991

Sources: numerous roadside surveys conducted by Alcohol Safety Action Projects.

Source: NHTSA Study, Connecticut, 1976. This study prompted the need for selecting, developing and validating future roadside sobriety tests to be used by police officers.



Display II-5



Display II-6



5 Minutes



Display II-7



Display II-8

- e. It is conservatively estimated that the typical DWI violator commits that offense about 80 times per year.
- f. Miscellaneous Alcohol Facts

B. Concept of General Deterrence

1. General deterrence of DWI is based on the driving public's fear of being arrested.
 - a. If enough violators come to believe that there is a good chance that they will get caught, some of them (at least) will stop committing DWI at least some of the time.
 - b. Unless there is a real risk of being arrested, there will not be much fear of arrest.
2. Law enforcement must arrest enough violators to convince the public that they will get caught, if they continue to drive while impaired.



Pose this question to class: "How do we convince the public that there is a good chance of being arrested for DWI?" Gently guide the discussion to bring out the fact that an appreciable number of violators must be arrested if others are to believe there is a real risk that they will be arrested.



10 Minutes

C. Relating Detection to Deterrence Potential

1. How much deterrence is enough?
 - a. Question Number 1: How many DWI violators do we have to arrest in order to convince an appreciable proportion of them that there is a real risk that they will be arrested?
 - b. Question Number 2: Are we presently arresting enough violators in this state to convince them that there is a real risk of being caught?
2. Estimates from around the country: For every DWI violator arrested, there are between 500 and 2,000 undetected DWI violations.
 - a. Question Number 3: If the chances of being arrested are one in 2,000, do you believe that the average DWI violator will fear arrest?
 - b. Question Number 4: Why is the DWI arrest-to-violation ratio so low?



Pose question #1, and solicit responses from representative participants.



Pose question #2, and solicit responses from representative participant.



Pose question #3 to class. Draw an analogy - compare with attempting to house-break a puppy by punishing the puppy only once every 2,000 times it "messes" on the carpet.



Pose question #4 to the class. Gently guide the discussion to bring out two possibilities:

- o DWI violators vastly outnumber police officers.

Aids

Lesson Plan

Instructor Notes



Display II-9



Display II-10



5 Minutes



Display II-11

- c. Police officers sometimes fail to recognize and arrest a DWI violator.
- d. Ft. Lauderdale (Florida) BAC study (1975): only 22% of traffic violators with BACs between 0.10 and 0.20 were arrested for DWI.

- e. Implication: For every DWI violator actually arrested three others are contacted by police officers, face-to-face, but are released without arrest.

- f. Significant improvement in arrest rate could be achieved if officers were more skilled at DWI detection.

D. Evidence of Effective Detection and Effective Deterrence

- 1. Several enforcement programs have succeeded in achieving significant DWI deterrence.

- a. Weekend Enforcement Program, Stockton, California (late 1970's):
 - o arrests up 500%.
 - o crashes down 34%.

- o Some officers not well trained in DWI detection.

Instructor please note: In the Ft. Lauderdale study, breath tests were administered to traffic violators by research staff members, after police officers had completed their investigations of the violators. Officers failed to detect 78% of the DWI violators they investigated.

POINT OUT HERE: THIS STUDY WAS THE REASON FOR NHTSA DEVELOPING THIS COURSE.

Summarize Stockton program effectiveness.

Point out that this level of deterrence was achieved with an arrest/violation ratio of about 1-in-400.

- o DWI drivers down from 9% on road to 6% on road.

2. This same, or better, degree of effectiveness can happen here.

Point out that the keys to success are:

- (a) Better training in detection skills.
- (b) Willingness to arrest every DWI violator who is detected.

Solicit participants' questions concerning general deterrence.



20 Minutes



**Display
II-12**

E. Physiology of Alcohol

1. A Brief Overview of Alcohol
 - a. The word "Alcohol" refers to a number of distinct but similar chemicals.
 - (1) Each of the chemicals that is called an "alcohol" is composed of the three elements, hydrogen, carbon and oxygen.
 - (2) Each type of "alcohol" is a drug within the scope of our definition.
 - (3) But only one can be tolerated by the human body in substantial quantities.

Clarification: All "alcohols" are chemicals that impair driving ability.

Clarification: Most "alcohols" are highly toxic, and will cause blindness or death if consumed in significant quantities.

Only one is intended for human consumption.



Display
II-13

b. Three of the more commonly-known "alcohols" are Methyl, Ethyl and Isopropyl.

(1) Methyl Alcohol, also known as Methanol, or "wood alcohol".

(2) Ethyl Alcohol, also known as Ethanol, or "beverage alcohol".

(3) Isopropyl Alcohol, also known as isopro-panol, or "rubbing alcohol".

c. Ethanol is the type of alcohol on which we will focus, because it is the only type intended for human consumption.

(1) Ethanol is the active ingredient in beer, wine, whiskey and other alcoholic beverages intended for drinking.

(2) Like all "alcohols", ethanol is composed of hydrogen, carbon and oxygen.

(3) Chemists use a number of different symbols to represent ethanol.



ASK PARTICIPANTS:
What are the names of some of the chemicals that are "alcohols"?

EMPHASIZE: Ethanol is the only kind of alcohol that humans can tolerate in significant quantities.



Display
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Display
II-15

- d. We will use the symbol "ETOH".
- e. Ethanol has been around for a long time. People drank it long before they learned to write.
- f. Ethanol is a naturally-occurring drug. That is, it is produced in nature through a process called fermentation.
- (1) In fermentation, spores of yeast, carried by the wind, come in contact with fruit or grain that has fallen to the ground.
 - (2) Sugars in the fruit or grain chemically react with the yeast, and produce ethanol.
- g. Today, most fermentation takes place on purpose, under controlled conditions.
- h. Through the process of fermentation, we can produce a beverage that has, at most, about 14% ethanol.

Instructor, for your information: The "ET" represents "ethyl", and the "OH" represents an oxygen atom and hydrogen atom, bonded together in what the chemists refer to as the "hydroxy radical". All alcohols have an hydroxy radical in their molecules.

Selectively reveal the first part of the overhead only.

POINT OUT that humans almost certainly first encountered ethanol that had been produced accidentally in this fashion.



ASK PARTICIPANTS:
"Why can't fermentation produce a higher ethanol concentration than 14%?"

Aids

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- (1) When the ethanol concentration reaches 14% yeast dies so fermentation stops.
- (2) If we want to have a higher concentration ethanol beverage, we have to use another step in the production.
 - i. Distillation is the process used to produce a higher concentration of ethanol.
 - (1) In distillation, a fermented beverage is heated to the point where the ethanol begins to boil.
 - (2) The ethanol vapor is collected and allowed to cool until it turns back into a liquid.
 - (3) By repeating the process of heating the liquid and collecting and cooling the vapors, higher and higher concentrations of ethanol can be produced.
 - (4) Ethanol beverages that are produced by distillation are called distilled spirits.
 - j. Over the centuries in which people have produced ethanol, some standard-sized servings of different beverages have evolved.

Reveal the lower part of Overhead II-15.

POINT OUT that ethanol starts to boil at a lower temperature than does water.



ASK PARTICIPANTS to name some "distilled spirits" (e.g., whiskey; vodka; gin; rum; etc.)

Aids

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Display
II-16

(1) Beer is usually served in 12-ounce cans or bottles. Since beer averages an alcohol concentration of four percent, a can or bottle contains a bit less than one-half ounce of pure ethanol.

(2) Wine typically is served in a four-ounce glass. At an alcohol concentration of 12 percent, the glass of wine also has just a bit less than one-half ounce of pure ethanol.

(3) Whiskey and other distilled spirits are dispensed in a "shot" glass, which usually contains one and one-quarter ounces of liquid.

(4) Since whiskey usually has an alcohol concentration of 40%, a "shot" of whiskey has exactly one-half ounce of pure ethanol.

k. Standard-sized servings of beer, wine and whiskey all pack the same "punch".

2. Physiologic Processes

a. Alcohol is the most abused drug in the United States.

b. Alcohol is a central nervous system depressant:

Reveal only the "beer" part of the overhead.

Reveal the "wine" part of Overhead II-16.

Reveal the "whiskey" part of Overhead II-16.

POINT OUT that the "proof" of a distilled spirit is equal to twice the ethanol concentration.

SOLICIT participants comments and questions on this overview of alcohol.

Display



II-17

Aids

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Instructor Notes

- (1) It doesn't impair until it gets into the brain.
- (2) It can't get into the brain until it first gets into the blood.
- (3) It can't get into the blood until it first gets into the body.
- c. There are a number of ways in which alcohol can get into the body.
 - (1) It can be injected into a vein, via hypodermic needle.
 - (2) It can be inhaled, i.e., alcohol fumes can be brought into the lungs, and some molecules will pass into the blood.
 - (3) But the vast majority of times that alcohol gets into the body, it gets there via drinking.
- d. Once the alcohol is in the stomach, it will take two routes to get into the blood.

POINT OUT that a person would have to inhale concentrated alcohol fumes for a prolonged period of time in order to develop a significant blood alcohol concentration.

POINT to that "route of passage" on Overhead II-18.



Display
II-18

- (1) One interesting thing about alcohol is that it is able to pass directly through the stomach walls.

- (2) Under normal conditions, about 20% of the alcohol a person drinks gets into the blood by diffusing through the walls of the stomach.
 - (3) But most of the alcohol usually passes through the base of the stomach into the small intestine, from which it passes quickly into the blood.
- e. Another interesting thing about alcohol is that it does not have to be digested before it can move from the stomach to the small intestine.
- (1) When a person eats food, the food must remain for a time in the stomach.
 - (2) Acids and enzymes in the stomach must begin to break down the food to prepare it to pass to the lower portion of the gastrointestinal tract.
 - (3) While the initial digestive process is underway, a muscle at the base of the stomach will constrict, and shut off the passage to the small intestine.

POINT to that "route of passage" on Overhead II-18.

(4) That muscle is called the pylorus, or pyloric valve.

f. Since alcohol doesn't have to be digested, the pylorus does not constrict when alcohol enters the stomach.

(1) If we drink on an empty stomach, the pylorus stays wide open.

(2) The alcohol will pass immediately through the base of the stomach, into the small intestine, and quickly move into the bloodstream.

g. But what will happen if there is food in the stomach when the person drinks alcohol?

(1) Food will cause the pylorus to constrict.

(2) While the pylorus is closed, nothing will move from the stomach to the small intestine.

(3) Any alcohol that is in the stomach will be "trapped" there, along with the food.

POINT to the pylorus on Overhead II-18.



POSE this question to the class.



Display
II-19

(4) The alcohol will not get into the blood as quickly, and the blood alcohol concentration will not get as high, as if the drinking had been done on an empty stomach.

(5) While the alcohol is trapped in the stomach, the acids and enzymes will start to react with it and break it down.

(6) By the time the pylorus opens, some of the alcohol will have been chemically changed, so there will be less available to get into the blood.

h. Once alcohol gets into the blood, the blood will carry it to the various tissues and organs of the body.

(1) Alcohol is attracted to water. The blood will deposit the alcohol in all the parts of the body where water is found.

(2) Parts of the body that have a lot of water will receive a lot of alcohol.

(3) Parts of the body that have only a little water will receive little alcohol.

SOLICIT participants' comments and questions about the absorption of alcohol into the blood.

Reveal top part of overhead only.

Now reveal lower part of Overhead II-19.



Display
II-21

(3) Since fatty tissue has very little water, the average female, pound-for-pound, has less water than the average male.

(4) This means that the average woman has fewer places in her body in which to deposit the alcohol she drinks.

n. The woman's blood alcohol concentration will be higher than the man's, because she has less water in which to distribute the alcohol.

o. As soon as alcohol gets into the body, the body begins working to get rid of it.

(1) Some alcohol is simply **expelled directly** from the body, i.e., on the breath, in the sweat, in urine, etc.

(2) Relatively little of the alcohol we drink is directly expelled from the body.

(3) The body eliminates most of the alcohol by chemically breaking it down.



ASK PARTICIPANTS:
Suppose a woman and a man who weigh exactly the same drink exactly the same amount of alcohol under exactly the same conditions. Who will reach the higher BAC?

Solicit participants' comments and questions about the distribution of alcohol in the body.

Reveal only the top part of the overhead.

Reveal the middle part of the overhead.

Clarification: Only about 2-10% of the alcohol we consume is directly excreted in the breath, urine, etc.



ASK PARTICIPANTS:
What organ in the body is primarily responsible for chemically breaking the alcohol down?

Aids

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Display
II-22

(4) The liver is primarily responsible for breaking down, or metabolizing, the alcohol.

p. Metabolism of alcohol actually consists of a slow, controlled **burning** of the alcohol.

(1) In the burning process, the alcohol combines with oxygen.

(2) The liver has an enzyme called **alcohol dehydrogenase**, which helps to speed up the reaction of oxygen with the alcohol.

(3) The reaction of alcohol with oxygen ultimately produces carbon dioxide and water, which can be directly expelled from the body.

Reveal the bottom part of the overhead.

Instructor, for your information: Some metabolism of alcohol also takes place in other parts of the body, including the brain. But the liver does the vast majority of the job.

Reveal the first "bullet" of the overhead.

Reveal the second "bullet" of the overhead.

Clarification: The enzyme does not react with the alcohol itself, but simply makes it easier for the oxygen to react with the alcohol. The technical term for something that helps a chemical reaction while not itself taking part in the reaction is a **catalyst**. Alcohol dehydrogenase is a catalyst for the metabolism of alcohol.

Reveal the third "bullet" of the overhead.

(4) The speed with which the liver burns alcohol varies from person to person, and will change from time to time for any particular person.

(5) **BUT ON THE AVERAGE:** Due to metabolism, a person's BAC will drop by about 0.015 per hour.

q. For the average male, a BAC of 0.015 is equal to the alcohol content of about two-thirds of a "standard drink".

(1) i.e., about two-thirds of a can of beer.

(2) or about two-thirds of a glass of wine, or two-thirds of a shot of whiskey.

r. For the average woman, a BAC of 0.015 is equal to the alcohol content of only one-half of a "standard drink".

(1) So the average male can "burn up" about two-thirds of a drink in an hour.

(2) But the average female can only burn up about one-half of a drink in an hour.

(3) If an average man

Reveal the final "bullet" of the overhead.



POSE this problem to the class: Suppose a person reaches a peak BAC of 0.15. How long will it take for his or her body to eliminate all of the alcohol?
Answer: ten hours $[0.15 - (X \text{ hours})(0.015/\text{hour}) X = 10]$

Note: The term BAC is used in the manual. However, it should be understood to refer to either Blood Alcohol Concentration (BAC) or Breath Alcohol Concentration (BrAC) depending on the legal requirements of the jurisdiction.



Display
II-23

drinks a can of beer, it will take him about an hour and one-half to burn up that alcohol; if a woman does the same thing, it will take her about two hours.

s. How can we speed up the metabolism of alcohol?

(1) We can't speed it up.

(2) Drinking coffee won't help.

(3) A cold shower won't help.

(4) Exercise won't help.

t. The liver takes its time burning up the alcohol.

3. Dose-Response Relationships

a. What does "**Blood Alcohol Concentration**" mean?

(1) Blood alcohol concentration means the number of **grams** of alcohol that are found in every **100 milliliters** of a person's blood.

(2) A gram is a measure of weight; it takes almost 500 grams to make a pound.



POSE this question to the class.


Solicit participants' comments and questions about the elimination of alcohol from the body.

Reveal only the question at the top of the overhead.

Solicit participants' responses.

Reveal the middle part of Overhead II-23.

Instructor, for your information: It actually takes 454 grams to make a pound.

	<p>(3) A milliliter is a measure of <u>volume</u>. It takes about 500 milliliters to make a pint.</p> <p>(4) The so-called "illegal limit" of BAC in all states is 0.08.</p> <p>(5) If a person has a BAC of 0.08, it means there are 0.08 grams of pure ethanol in every 100 milliliters ("percent") of his/her blood.</p> <p>b. How much alcohol does a person have to drink to reach a BAC of 0.08?</p> <p>(1) Take an average male weighing 175 pounds and in reasonably good physical shape.</p> <p>(2) Assume he does his drinking on an empty stomach.</p> <p>(3) It is estimated that a person would have to consume four cans of beer, four glasses of wine or four shots of 80-proof whiskey in a fairly short period of time to reach a BAC of 0.08.</p>	<p>Example: A 12-ounce can of beer has about 350 milliliters.</p> <p>Reveal the bottom part of Overhead II-23.</p> <p>The term "percent" is sometimes informally used because the concentration is determined in units of one hundred. However, instead of being a true "percent", the actual units are measured in mass (grams) of ethanol per volume (milliliters) of blood.</p> <p> POSE this question to the class.</p> <p>NOTE: There are numerous physiological variables that can affect BAC such as gender, weight, stomach contents, medical/health, metabolic rate, etc.</p>
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	<p>(4) Review questions are located at end of Session II (Optional Test).</p> <p>(5) In terms of pure ethanol, that would amount to just about two and one-half fluid ounces, or about two shot glasses.</p> <p>(6) If one of the shot glasses was filled with pure ethanol and the other half-filled, there would be enough of the drug to bring an average man's BAC to 0.08.</p> <p>(7) So answer this: Does it take a <u>lot</u> of ethanol to impair a person, or only a <u>little</u>?</p> <p>c. In one respect, it certainly doesn't take much ethanol to impair: Just two full shot glasses will more than do the trick for a full-sized man.</p> <p>d. BUT COMPARED TO OTHER DRUGS, it takes an enormous quantity of ethanol to cause impairment.</p> <p>Physiology of Alcohol Participant Review</p> <p>- Name three different chemicals that are alcohols.</p>	<p>DISPLAY two standard-sized shot glasses, filled with water.</p> <p>HOLD up the two shot glasses while posing the next question.</p> <p>Solicit participants' responses to the question.</p> <p>HOLD up the glasses again.</p> <p>Methyl, Ethyl and Isopropyl. (or, Methanol, Ethanol and Isopropanol.) (or, Wood Alcohol, Beverage Alcohol, and</p>

Aids

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	<ul style="list-style-type: none"> - Which of these is beverage alcohol, intended for human consumption? - What is the chemical symbol for beverage alcohol? - What is the name of the chemical process by which beverage alcohol is produced naturally? - What is the name of the process used to produce high-concentration beverage alcohol? - Multiple Choice: "Blood alcohol concentration is the number of _____ of alcohol in every 100 milliliters of blood." <ul style="list-style-type: none"> A. grams B. milligrams C. nanograms - True or False: Pound-for-pound, the average woman contains more water than does the average man. - What do we mean by the "proof" of an alcoholic beverage? - Every chemical that is an "alcohol" contains what three elements? 	<p>Rubbing Alcohol.)</p> <p>Ethanol is the beverage alcohol, intended for human consumption.</p> <p>The four-letter chemical symbol is ETOH.</p> <p>Fermentation</p> <p>Distillation</p> <p>Correct answer is <u>A</u>, "grams".</p> <p>The statement is <u>false</u>. The average woman actually has a good deal less water, pound-for-pound, than does the average man. She is about 55% water, he is about 68%.</p> <p>"Proof" means <u>twice</u> the ethanol percentage of the beverage. For example, 80-proof vodka is 40% ethanol.</p> <p>The three elements common to all alcohols are: carbon, hydrogen and oxygen.</p>
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	<ul style="list-style-type: none">- True or False: Most of the alcohol that a person drinks is absorbed into the blood via the small intestine. - What is the name of the muscle that controls the passage from the stomach to the lower gastrointestinal tract? - True or False: Alcohol can pass directly through the stomach walls and enter the bloodstream. - Multiple Choice: Suppose a man and a woman who both weigh 160 pounds arrived at a party and started to drink at the same time. And suppose that, two hours later, they both have a BAC of 0.10. Chances are A. he had more to drink than she did. B. they drank just about the same amount of alcohol. C. he had less to drink than she did. - In which organ of the body does most of the metabolism of the alcohol take place? - What is the name of the enzyme that aids the metabolism of alcohol?	<p>The statement is <u>true</u>. Under normal conditions, about 80% of the ethanol in the stomach will pass through the pyloric valve into the small intestine, from which it will quickly move into the bloodstream.</p> <p>The muscle is called the pylorus, or pyloric valve.</p> <p>The statement is <u>true</u>. Usually, about 20% of the ethanol a person drinks diffuses through the stomach walls to enter the blood.</p> <p>Correct answer is <u>A</u>, "more".</p> <p>The liver is where most metabolism takes place.</p> <p>Alcohol dehydrogenase is the enzyme that serves as a catalyst for alcohol's metabolism in the liver.</p>
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- Multiple Choice: Once a person reaches their peak BAC, it will drop at a rate of about ___ per hour.

- A. 0.025
- B. 0.015
- C. 0.010

- True or False: It takes about thirty minutes for the average 175-pound man to "burn off" the alcohol in one 12-ounce can of beer.

Correct answer is B, "0.015"
(But remember: This is an average value, with wide variations among individuals.)

The statement is false. The average 175-pound man will need 90 minutes to metabolize the alcohol.

TEST YOUR KNOWLEDGE

INSTRUCTIONS: Complete the following sentences.

1. The average DWI violator commits that violation ____ times a year.
2. In typical enforcement jurisdictions one DWI violation in ____ results in arrest.
3. In the Fort Lauderdale study, police officers arrested ____ percent of the drivers they contacted whose BACs were .10 to .20.
4. Name three different chemicals that are **alcohols**. Which of these is **beverage alcohol**, intended for human consumption? What is the chemical symbol for beverage alcohol?
5. What is the name of the chemical process by which beverage alcohol is produced **naturally**? What is the name of the process used to produce **high-concentration** beverage alcohol?
6. Multiple Choice: "Blood alcohol concentration is the number of _____ of alcohol in every 100 milliliters of blood."
 - A. grams
 - B. milligrams
 - C. nanograms
7. True or False: Pound-for-pound, the average woman contains more water than does the average man.
8. What do we mean by the "proof" of an alcoholic beverage?
9. Every chemical that is an "alcohol" contains what three elements?
10. True or False: Most of the alcohol that a person drinks is absorbed into the blood via the small intestine.
11. What is the name of the muscle that controls the passage from the stomach to the lower gastrointestinal tract?
12. True or False: Alcohol can pass directly through the stomach walls and enter the bloodstream.

13. Multiple Choice: Suppose a man and a woman who both weigh 160 pounds arrived at a party and started to drink at the same time. And suppose that, two hours later, they both have a BAC of 0.10. Chances are
- A. he had more to drink than she did.
 - B. they drank just about the same amount of alcohol.
 - C. he had less to drink than she did.
14. In which organ of the body does most of the metabolism of the alcohol take place?
15. What is the name of the enzyme that aids the metabolism of alcohol?
16. Multiple Choice: Once a person reaches his or her peak BAC, it will drop at a rate of about _____ per hour.
- A. 0.025
 - B. 0.015
 - C. 0.010
17. True or False: It takes about thirty minutes for the average 175-pound man to "burn off" the alcohol in one 12-ounce can of beer.