

# Preliminary Training for Drug Evaluation and Classification Program

## “The Pre-School”

Participant Manual



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R5/13 Curriculum

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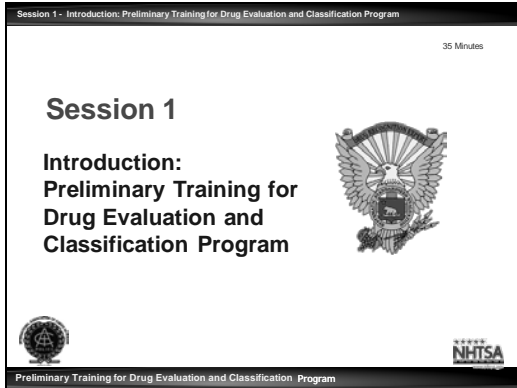
# Preface

The Drug Recognition Expert course is a series of three training phases that, collectively, prepare police officers and other qualified persons to serve as drug recognition experts (DRE). Throughout this manual, the terms “drug recognition expert” and “DRE” are used to designate an individual who is specially trained and has continued training to conduct examinations of drug-impaired drivers. This training, developed as part of the Drug Evaluation and Classification Program (DECP) under the auspices and direction of the International Association of Chiefs of Police (IACP) and the National Highway Traffic Safety Administration (NHTSA) has experienced remarkable success since its inception in the 1980s.

As in any educational training program, an instruction manual is considered a “living document” that is subject to updates and changes based on advances in technology and science. A thorough review is made of information by the DECP Technical Advisory Panel (TAP) of the Highway Safety Committee of the IACP with contributions from many sources in health care science, toxicology, jurisprudence, and law enforcement. Based on this information, any appropriate revisions and modifications in background theory, facts, examination and decision making methods are made to improve the quality of the instruction as well as the standardization of guidelines for the implementation of the Drug Recognition Expert Training Curriculum. The reorganized manuals are then prepared and disseminated, both domestically and internationally, to the DECP state coordinators.

Changes will take effect 90 days after approval by the TAP, unless otherwise specified or when so designated by a state coordinator.

# Participant Manual DRE Pre School - Session 1 – Introduction: Preliminary Training for Drug Evaluation and Classification Program



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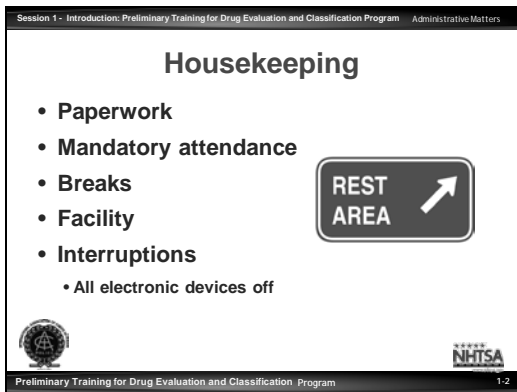
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*Welcoming Remarks*

*Faculty Introductions*



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*Paperwork*

*Attendance*

Attendance is mandatory at all sessions of this school.

*Breaks*



*Facility*

*Interruptions*

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## Participant Introductions

- Name
- Agency
- Affiliation
- Experience

Preliminary Training for Drug Evaluation and Classification Program 1-3

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Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## Introduction

**Goal: To prepare the participants to succeed in the 7-Day Drug Recognition Expert School**

Preliminary Training for Drug Evaluation and Classification Program 1-4

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*Preliminary Training Goal*


To prepare the participants to succeed in the 7-Day Drug Recognition Expert school.

This two-day Preliminary School won't make you DRE's, but it will make it easier for you to pass the 7-Day DRE School and successfully complete your certification training.

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## Course Learning Objectives

- Define the word "drug"
- Name the seven categories of drugs
- Identify the twelve components, or steps, used in the DRE drug influence evaluation
- Administer and interpret the psychophysical (or "divided attention") tests used by DREs during the drug influence evaluation



Preliminary Training for Drug Evaluation and Classification Program 1-5

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*Learning Objectives of the Preliminary Training*

- Define "Drug" and name the seven categories.
- Name the seven categories of drugs.
- Identify the twelve components or steps in the DRE drug influence examination.
- Administer and interpret the Psychophysical Tests used by DRE's during the drug influence evaluation.

### Course Learning Objectives (Cont.)

- List the vital signs utilized in the DRE examinations
- Check and measure a subject's vital signs
- List major signs and symptoms of impairment for each drug category
- Conduct eye examinations that are part of the drug influence evaluation
- Describe the history and physiology of alcohol as a drug



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- Check and measure a subject's vital signs.
- List the major signs and symptoms of each drug category.
- Conduct the eye examinations that are part of the drug influence evaluation.
- Describe the history and physiology of alcohol as a drug.

#### *Key Points of Emphasis*

This two-day school is only the first of three stages in your training as DREs.

Next will come the seven-day formal DRE School.

After that will come several weeks of supervised on-the-job training known as the "Certificate Phase".

#### *Preview of the remainder of the Pre-School*

#### *Certification Progress Logs*

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

### Session Learning Objectives

- State the goal and objectives of the course
- Define the term “drug” as it is used in the course
- Name the seven categories of drugs and give at least one example of each category

Preliminary Training for Drug Evaluation and Classification Program 1-7

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

- State the goal and objectives of the course.
- Define the term “drug” as it is used in the course.
- Name the seven categories of drugs and give at least one example of each category.

CONTENT SEGMENTS

- A. Welcoming Remarks and Objectives
- B. Definition and Categories of Drugs

LEARNING ACTIVITIES

Instructor-Led Presentations


**B. Definition and Categories of Drugs**



Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

### Drug Definition

- Webster's Seventh New Collegiate Dictionary
- Random House College Dictionary



Preliminary Training for Drug Evaluation and Classification Program 1-8

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*Alternative Definitions, drawn from Several Sources*

“a substance used as a medicine or in making medicines.”

*Source: Webster's Seventh New Collegiate Dictionary, 1971 edition.*

“a narcotic substance or preparation.”

*Source: Webster's. Ask participants if they agree that all drugs are narcotics.*

“a chemical substance administered to a person or animal to prevent or cure disease or otherwise to enhance physical or mental welfare.”

*Source: Random House College Dictionary, 1982 edition.*



“a habit-forming medicinal substance, especially a narcotic.”

*Source: Random House.*

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

### Drug Definition (Cont.)

- Medical Dictionary For the Non-Professional
- Los Angeles Police Department Drug Recognition Training
- LAPD



Preliminary Training for Drug Evaluation and Classification Program 1-9

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“a substance taken by mouth, injected or applied locally to treat a disorder (i.e., to ease pain).”

“a chemical substance introduced into the body to cause pleasure or a sense of changed awareness, as in the non-medical use of Lysergic Acid Diethylamide (LSD).

*Source: Medical Dictionary For the Non-Professional, Barrows Educational Series, Inc., Woodbury, NY. 1984.*

“any substance, natural or artificial that by chemical nature alters the structure or function of a living organism.”

*Source: Los Angeles Police Department Drug Recognition Training, May 1986.*



“any substance that, in small amounts, produces changes in the body, mind or both.”

*Source: LAPD*

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## DRE Working Definition of "Drug"

**"Any substance that, when taken into the human body, can impair the ability of the person to operate a vehicle safely"**

Preliminary Training for Drug Evaluation and Classification Program 1-10

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*A Simple, Enforcement-Oriented Definition of Drugs*

"any substance that, when taken into the human body, can impair the ability of the person to operate a vehicle safely."

Working definition derived from the 1985 California Vehicle Code.

Within this simple, enforcement-oriented definition, there are seven categories of drugs.



Each category consists of substances that impair a person's ability to drive.

The categories differ from one another in terms of how they impair driving ability and in terms of the kinds of impairment they cause.

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## DRE Working Definition of "Drug" (Cont.)

**"Any substance that, when taken into the human body, can impair the ability of the person to operate a vehicle safely"**

Preliminary Training for Drug Evaluation and Classification Program 1-11

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- Because the categories produce different types of impairment, they generate different signs and symptoms.
- With training and practice, you will be able to recognize the different signs of drug influence and determine which category is causing the impairment you observe in a subject.

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## Central Nervous System Depressants

- Barbiturates
- Alcohol
- Valium
- Chloral Hydrate



Preliminary Training for Drug Evaluation and Classification Program 1-12

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### *Central Nervous System Depressants*

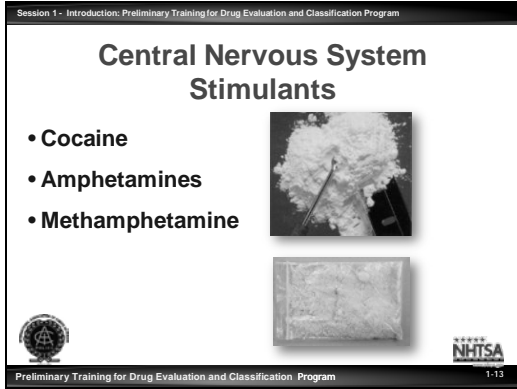
The category of CNS Depressants includes some of the most commonly abused drugs.

Alcohol – the most familiar drug of all – is abused by an estimated 40-50 million Americans.

- Slightly more than half of Americans age 12 or older reported being current drinkers of alcohol in 2010 (51.8% of the population). This translates to an estimated 131 million people. *Source: National Survey on Drug Use and Health (NSDUH, 2010)*
- Depressant drugs consistently rank among the most widely used and abused drugs in the U.S. and Canada. Over the past decade, an estimated 60 million prescriptions were processed for minor tranquilizers in U.S. pharmacies. *Source: Downers: A New Look at Depressant Drugs*

Depressants slow down the operation of the central nervous system (i.e., the brain, brain stem and spinal cord).

- Cause the user to react more slowly.
- Cause the user to process information more slowly.
- Relieve anxiety and tension.
- Induce sedation, drowsiness and sleep.
- In high enough doses, CNS depressants will produce general anesthesia, i.e. depress the brain's ability to sense pain. In very high doses, induce coma and death.



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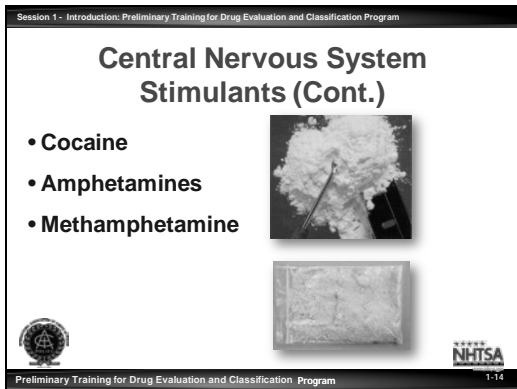
### Central Nervous System Stimulants

CNS Stimulants are a widely abused category of drugs.

- In 2008, 20.8 million Americans aged 12 or older (8.8 percent of persons in that age group) had used prescription type stimulants non-medically at least once in their lifetime. *Source: National Survey on Drug Use and Health (NSDUH), 2011.*
- In 2011, there were 1.4 million cocaine users aged 12 or older comprising 0.5 percent of the U.S. population. *Source: NSDUH Report, 2011.*

CNS Stimulants speed up the operation of the central nervous system, and of the various bodily functions controlled by the central nervous system.

- Cause the user to become hyperactive, extremely talkative.
- Speech may become rapid and repetitive.
- Heart rate increases.
- Blood pressure increases.



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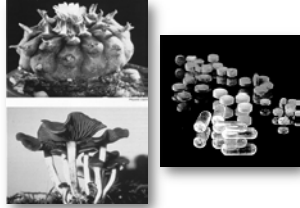
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- Body temperature rises, user may become excessively sweaty.
- Induce emotional excitement, restlessness, irritability.
- Can induce cardiac arrhythmia (unstable beating of the heart), cardiac seizures and death.

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## Hallucinogens

- LSD
- Peyote
- Ecstasy



Preliminary Training for Drug Evaluation and Classification Program

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### *Hallucinogens*

Hallucinogens are also widely abused. In recent years an increase in the abuse of LSD, Ecstasy (MDMA), and many new hallucinogens has been reported.

- It is estimated that approximately one million Americans abuse hallucinogens.
- Hallucinogens may create hallucinations. That is, they may create apparent perceptions of things not truly present.
- Hallucinogens may also create very distorted perceptions, so that the user sees, hears and smells things in a way quite different from how they really look, sound and smell.

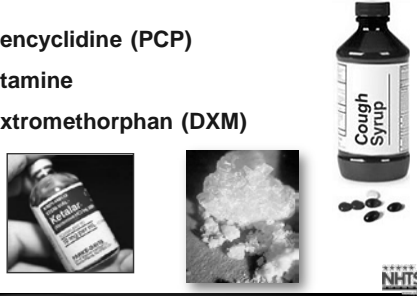
Instead, Hallucinogens cause the nervous system to send strange or false signals to the brain.

- Produce sights, sounds and odors that aren't real.
- Induce a temporary condition very much like psychosis or insanity.
- Can create a "mixing" of sensory modes, for example, the user "hears colors," "sees music," "tastes sounds," etc., referred to as "Synesthesia."

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## Dissociative Anesthetics

- Phencyclidine (PCP)
- Ketamine
- Dextromethorphan (DXM)



Preliminary Training for Drug Evaluation and Classification Program 1-16

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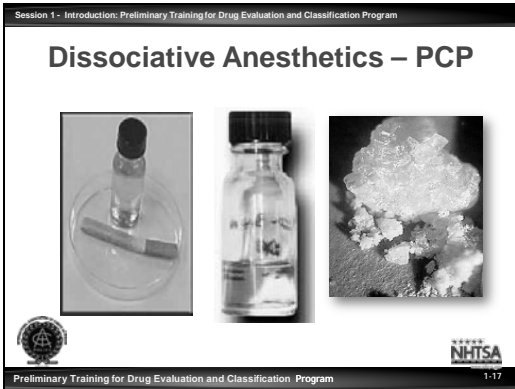
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### *Dissociative Anesthetics*

This category includes drugs such as PCP, its analogs and Dextromethorphan (DXM). These drugs generally inhibit pain by cutting off or “dissociating” the brain’s perception of the pain.

The medical community considers PCP to be a Hallucinogen. However, because of the symptomatology PCP presents, it is included in this category.



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PCP is a synthetic drug, i.e., it does not occur naturally but must be produced in a laboratory-like setting.

PCP is similar to CNS depressants in that it depresses brain wave activity.

- Slows down thought.
- Slows reaction time.
- Slows verbal responses.

But PCP is similar to CNS stimulants in that it activates the parts of the brain that control emotions, the heart and the other autonomic systems.

- Heart rate increases.
- Blood pressure increases.
- Adrenalin production increases.
- Body temperature rises.
- Muscles become rigid.

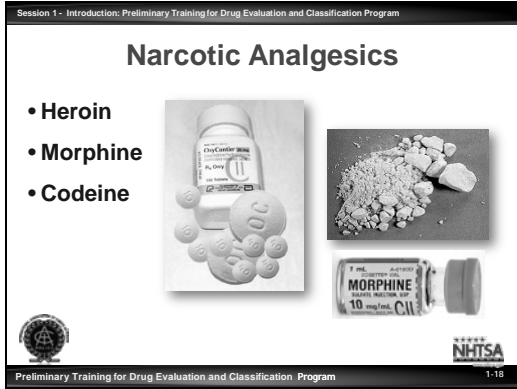
And PCP is similar to hallucinogens in that it distorts or “scrambles” signals received by the brain.

- Sight, hearing, taste, smell and touch may all be distorted.
- User’s perception of time and space may be distorted.
- User may become paranoid, feel isolated and depressed.
- User may develop a strong fear of and pre-occupation with death.
- User may become unpredictably violent.

PCP analogs include Ketamine, Ketalar, Ketajet and Ketaset.

Dextromethorphan (DXM) is an ingredient found in numerous over-the-counter cough and cold remedies.





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### *Narcotic Analgesics*

There are two subcategories of Narcotic Analgesics:

- Opiates are derivatives of Opium.
- Synthetics are produced chemically in the laboratory. They are not in any way derived from Opium but produce similar effects.

The word “Analgesic” means pain reliever. All of the drugs in this category reduce the person’s reaction to pain.

- According to the 2008 National Survey on Drug Use and Health report, approximately 1.5% of Americans have used heroin, however, those numbers are growing.
- Heroin is highly addictive.
- Many addicts support their habit by stealing property and converting it to cash.

In addition to reducing pain, they produce euphoria, drowsiness, apathy, lessened physical activity and sometimes impaired vision.

Persons under the influence of Narcotic Analgesics often pass into a semi-conscious type of sleep or near sleep.

- Persons “on the nod” may be awakened easily.
- They often are sufficiently alert to respond to questions effectively.

Higher doses of Narcotic Analgesics can induce coma, respiratory failure and death.



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*Inhalants*

Inhalants are fumes of certain substances that produce mind altering results.

There are three subcategories of inhalants:

- Volatile solvents (e.g., gasoline, glue, oil-based paint, cleaning fluids, paint remover, etc.)
- Aerosols (i.e., the propellant gases in spray cans, e.g., hair sprays, insecticides, etc.)
- Anesthetic Gases (e.g., nitrous oxide, ether, amyl nitrite, butyl nitrate, etc.)

Different inhalants produce different effects.

- Many produce effects similar to those of CNS depressants.
- A few produce stimulant like effects.
- Some produce hallucinogenic effects.

The inhalant abuser's attitude and demeanor can vary from inattentive, stuporous and passive to irritable, violent and dangerous.

The abuser's speech will often be slow, thick and slurred.



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*Cannabis*

The category “Cannabis” includes the various forms and products of the Cannabis Sativa plant.

The active ingredient in Cannabis is the substance known as “Delta-9 Tetrahydrocannabinol,” or “THC.”

Apart from alcohol, marijuana is one of the most commonly abused drugs.

Marijuana continues to be the most used illegal drug in the U.S. with 17.4 million Americans over the age of 12 reporting use in the past month. *Source: NSDUH, 2010.*

Cannabis appears to interfere with the attention process. Drivers under the influence of marijuana often do not pay attention to their driving.

Cannabis also produces a distortion of the user’s perception of time, an increased heart rate (often over 100 beats per minute) and a reddening of the conjunctiva.

### Frequency of Drug Use

- According to the NSDUH, 2011 18.1 million Americans aged 12 or older used marijuana at least once in the month prior to being surveyed
- Approximately 6.9 percent of the U.S. population admitted using marijuana on a regular basis (SAMHSA, 2010)
- In 2011, 22.5 million Americans aged 12 or older were current illicit drug users



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### Frequency of Drug Use

- According to the National Survey on Drug Use and Health, 2011, 18.1 million Americans aged 12 or older used marijuana at least once in the month prior to being surveyed.
- Approximately 6.9 percent of the U.S. population admitted using marijuana on a regular basis (SAMHSA, 2011).
- In 2011, an estimated 22.5 million Americans aged 12 or older were current illicit drug users. *Source: National Survey on Drug Use and Health (NSDUH, 2011).*

### Frequency of Drug Use (Cont.)

- In 2011 approximately 6.1 million people aged 12 years or older used psychotherapeutic drugs non-medically (NSDUH, 2011).





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- In 2011, approximately 6.1 million people aged 12 years or older used psychotherapeutic drugs non-medically.  
*Source: National Survey on Drug Use and Health (NSDUH, 2010).*
- The exact number of prescription drug users in the U.S. is unknown. However, in 2011 a record 4 billion drug prescriptions were written in the U.S.  
*Source: Medical News Today, September 18, 2012.*
- Among those aged 50 to 59, the rate of past month illicit drug use increased from 2.7 percent in 2002 to 5.8 percent in 2010. This trend may partially reflect the aging into this age group of the “Baby Boomer” generation, whose lifetime rate of illicit drug use is higher than those of older cohorts.
- Approximately 6.0 million Americans abuse prescription drugs each year.  
*Source: NSDUH Report, 2010.*
- In 2010, 10.6 million persons aged 12 or older reported driving under the influence of illicit drugs during the past year. This corresponds to 4.0 percent of the population aged 12 or older. In 2010, the rate was highest among young adults aged 18 to 25 (12.7 percent).

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## Frequency of Polydrug Use

- Though drug evaluation subjects may be under the influence of any one of the mentioned categories of drugs, it is not uncommon to find individuals who have taken several combinations of drugs
- Data being collected through the national DRE Database indicates that approximately 35% of all toxicology results indicate two or more drug categories
- The term “polydrug” use refers to instances where the subject has ingested drugs from two or more drug categories

Preliminary Training for Drug Evaluation and Classification Program 1-23

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### *Polydrug Use*

- Though drug evaluation subjects may be under the influence of any one of the mentioned categories of drugs, it is not uncommon to find individuals who have taken several combinations of drugs.
- Data being collected through the national DRE Database indicates that approximately 35% of all toxicology results indicate two or more drug categories.
- The term “polydrug” use refers to instances where the subject has ingested drugs from two or more drug categories.
- Most controlled prescription drug abusers are polydrug abusers. One study reported that approximately 75% of persons who abuse alcohol also abuse illicit drugs. *Source: “Under the Counter: The Diversion and Abuse of Controlled Prescription Drugs in the U.S.,” National Center on Addiction and Substance Abuse, July 2005.*

Session 1 - Introduction: Preliminary Training for Drug Evaluation and Classification Program

## QUESTIONS?




Preliminary Training for Drug Evaluation and Classification Program

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## **DRUG EVALUATION AND CLASSIFICATION PROGRAM**

### **GLOSSARY OF TERMS**

#### **ACCOMMODATION REFLEX**

The adjustment of the eyes for viewing at various distances. Meaning the pupils will automatically constrict as objects move closer and dilate as objects move further away.

#### **ADDICTION**

Habitual, psychological, and physiological dependence on a substance beyond one's voluntary control.

#### **ADDITIVE EFFECT**

One mechanism of polydrug interaction. For a particular indicator of impairment, two drugs produce an additive effect if they both affect the indicator in the same way. For example, cocaine elevates pulse rate and PCP also elevates pulse rate. The combination of cocaine and PCP produces an additive effect on pulse rate.

#### **AFFERENT NERVES**

See: "Sensory Nerves."

#### **ALKALOID**

A chemical that is found in, and can be physically extracted from, some substance. For example, morphine is a natural alkaloid of opium. It does not require a chemical reaction to produce morphine from opium.

#### **ANALGESIC**

A drug that relieves or allays pain.

#### **ANALOG (of a drug)**

An analog of a drug is a chemical that is very similar to the drug, both in terms of molecular structure and in terms of psychoactive effects. For example, the drug Ketamine is an analog of PCP.

**ANESTHETIC**

A drug that produces a general or local insensibility to pain and other sensation.

**ANTAGONISTIC EFFECT**

One mechanism of polydrug interaction. For a particular indicator of impairment, two drugs produce an antagonistic effect if they affect the indicator in opposite ways. For example, heroin constricts pupils while cocaine dilates pupils. The combination of heroin and cocaine produces an antagonistic effect on pupil size. Depending on how much of each drug was taken, and on when they were taken, the suspect's pupils could be constricted, or dilated, or within the DRE Average range of pupil size.

**ARRHYTHMIA**

An abnormal heart rhythm.

**ARTERY**

The strong, elastic blood vessels that carry blood away the heart.

**ATAXIA**

A blocked ability to coordinate movements. A staggering walk and poor balance may be caused by damage to the brain or spinal cord. This can be the result of trauma, birth defect, infection, tumor, or drug use.

**AUTONOMIC NERVE**

A motor nerve that carries messages to the muscles and organs that we do not consciously control. There are two kinds of autonomic nerves, the sympathetic nerves and parasympathetic nerves.

**AXON**

The part of a neuron (nerve cell) that sends out a neurotransmitter.



**BAC**

(Blood Alcohol Concentration) - The percentage of alcohol in a person's blood.

**BrAC**

(Breath Alcohol Concentration) - The percentage of alcohol in a person's blood as measured by a breath testing device.

**BLOOD PRESSURE**

The force exerted by blood on the walls of the arteries. Blood pressure changes continuously, as the heart cycles between contraction and expansion.

**BRADYCARDIA**

Abnormally slow heart rate.

**BRADYPNEA**

Abnormally slow rate of breathing.

**BRUXISM**

Grinding the teeth. This behavior is often seen in person who are under the influence of cocaine or other CNS Stimulants.

**CANNABIS**

This is the drug category that includes marijuana. Marijuana comes primarily from the leaves of certain species of Cannabis plants that grow readily all over the temperate zones of the earth. Hashish is another drug in this category, and consists of the compressed leaves from female Cannabis plants. The active ingredient in both Marijuana and Hashish is a chemical called delta-9 tetrahydrocannabinol, usually abbreviated THC.

**CARBOXY THC**

A metabolite of THC (tetrahydrocannabinol).

## **CHEYNE- STOKES RESPIRATION**

Abnormal pattern of breathing. Marked by breathlessness and deep, fast breathing.

## **CNS (Central Nervous System)**

A system within the body consisting of the brain, the brain stem, and the spinal cord.

## **CNS DEPRESSANTS**

One of the seven drug categories. CNS Depressants include alcohol, barbiturates, anti-anxiety tranquilizers, and numerous other drugs.

## **CNS STIMULANTS**

One of the seven drug categories. CNS Stimulants include Cocaine, the Amphetamines, Ritalin, Desoxyn, and numerous other drugs.

## **CONJUNCTIVITIS**

An inflammation of the mucous membrane that lines the inner surface of the eyelids caused by infection, allergy, or outside factors. May be bacterial or viral. Persons suffering from conjunctivitis may show symptoms in one eye only. This condition is commonly referred to as "pink eye", a condition that could be mistaken for the bloodshot eyes produced by alcohol or Cannabis.

## **CONVERGENCE**

The "crossing" of the eyes that occurs when a person is able to focus on a stimulus as it is pushed slowly toward the bridge of their nose. (See, also, "Lack of Convergence".)

## **CRACK/ROCK**

Cocaine base, appears as a hard chunk form resembling pebbles or small rocks. It produces a very intense, but relatively short duration "high".

## **CURRICULUM VITAE**

A written summary of a person's education, training, experience, noteworthy achievements and other relevant information about a particular topic.

## **CYCLIC BEHAVIOR**

A manifestation of impairment due to certain drugs, in which the suspect alternates between periods (or cycles) of intense agitation and relative calm. Cyclic behavior, for example, sometimes will be observed in persons under the influence of PCP.

## **DELIRIUM**

A brief state characterized by incoherent excitement, confused speech, restlessness, and possible hallucinations.

## **DENDRITE**

The part of a neuron (nerve cell) that receives a neurotransmitter.

## **DIACETYL MORPHINE**

The chemical name for Heroin.

## **DIASTOLIC**

The lowest value of blood pressure. The blood pressure reaches its diastolic value when the heart is fully expanded, or relaxed (Diastole).

## **DIPLOPIA**

Double vision.

## **DISSOCIATIVE ANESTHETICS**

One of the seven drug categories. Includes drugs that inhibits pain by cutting off or disassociating the brain's perception of pain. PCP and its analogs are considered Dissociative Anesthetics.

## **DIVIDED ATTENTION**

Concentrating on more than one thing at a time. The four psychophysical tests used by DREs require the suspect to divide attention.

## **DOWNSIDE EFFECT**

An effect that may occur when the body reacts to the presence of a drug by producing hormones or neurotransmitters to counteract the effects of the drug consumed.

## **DRUG**

Any substance that, when taken into the human body, can impair the ability of the person to operate a vehicle safely.

## **DYSARTHIA**

Slurred speech. Difficult, poorly articulated speech.

## **DYSPNEA**

Shortness of breath.

## **DYSMETRIA**

An abnormal condition that prevents the affected person from properly estimating distances linked to muscular movements.

## **DYSPHORIA**

A disorder of mood. Feelings of depression and anguish.

## **EFFERENT NERVES**

See: "Motor Nerves".

## **ENDOCRINE SYSTEM**

The network of glands that do not have ducts and other structures. They secrete hormones into the blood stream to affect a number of functions in the body.

## **EXPERT WITNESS**

A person skilled in some art, trade, science or profession, having knowledge of matters not within knowledge of persons of average education, learning and experience, may assist a jury in arriving at a verdict by expressing an opinion on a state of facts shown by the evidence and based upon his or her special knowledge. (NOTE: Only the court can determine whether a witness is qualified to testify as an expert.)

## **FLASHBACK**

A vivid recollection of a portion of an hallucinogenic experience. Essentially, it is a very intense daydream. There are three types: (1) emotional -- feelings of panic, fear, etc.; (2) somatic -- altered body sensations, tremors, dizziness, etc.; and (3) perceptual -- distortions of vision, hearing, smell, etc.

## **GARRULITY**

Chatter, rambling or pointless speech. Talkative.

## **GENERAL INDICATOR**

Behavior or observations of the subject that are observed and not specifically tested for. (Observational and Behavioral Indicators)

## **HALLUCINATION**

A sensory experience of something that does not exist outside the mind, e.g., seeing, hearing, smelling, or feeling something that isn't really there. Also, having a distorted sensory perception, so that things appear differently than they are.

## **HALLUCINOGENS**

One of the seven drug categories. Hallucinogens include LSD, MDMA, Peyote, Psilocybin, and numerous other drugs.

## **HASHISH**

A form of cannabis made from the dried and pressed resin of a marijuana plant.

## **HASH OIL**

Sometimes referred to as “marijuana oil” it is a highly concentrated syrup-like oil extracted from marijuana. It is normally produced by soaking marijuana in a container of solvent, such as acetone or alcohol for several hours and after the solvent has evaporated, a thick syrup-like oil is produced with a high THC content.

## **HEROIN**

A powerful and widely-abused narcotic analgesic that is chemically derived from morphine. The chemical, or generic name of heroin is "diacetyl morphine".

## **HIPPUS**

A rhythmic change in the pupil size of the eyes, as they dilate and constrict when observed in darkness independent of changes in light intensity, accommodation (focusing), or other forms of sensory stimulation. Normally only observed with specialized equipment.

## **HOMEOSTASIS**

The dynamic balance, or steady state, involving levels of salts, water, sugars, and other materials in the body's fluids.

## **HORIZONTAL GAZE NYSTAGMUS (HGN)**

Involuntary jerking of the eyes occurring as the eyes gaze to the side.

## **HORMONES**

Chemicals produced by the body's endocrine system that are carried through the blood stream to the target organ. They exert great influence on the growth and development of the individual, and that aid in the regulation of numerous body processes.

## **HYDROXY THC**

A metabolite of THC (tetrahydrocannabinol).

## **HYPERFLEXIA**

Exaggerated or over extended motions.

## **HYPERGLYCEMIA**

Excess sugar in the blood.

## **HYPERPNEA**

A deep, rapid or labored breathing.

## **HYPERPYREXIA**

Extremely high body temperature.

## **HYPERREFLEXIA**

A neurological condition marked by increased reflex reactions.

## **HYPERTENSION**

Abnormally high blood pressure. Do not confuse this with hypotension.

**HYPOGLYCEMIA**

An abnormal decrease of blood sugar levels.

**HYPOPNEA**

Shallow or slow breathing.

**HYPOTENSION**

Abnormally low blood pressure. Do not confuse this with hypertension.

**HYPOTHERMIA**

Decreased body temperature.

**ICE**

A crystalline form of methamphetamine that produces a very intense and fairly long-lasting "high".

**INHALANTS**

One of the seven drug categories. The inhalants include volatile solvents (such as glue and gasoline), aerosols (such as hair spray and insecticides) and anesthetic gases (such as nitrous oxide).

**INSUFFLATION**

See "snorting".

**INTEGUMENTARY SYSTEM**

The skin and accessory structures, hair and nails. Functions include protection, maintenance of body temperature, excretion of waste, and sensory perceptions.



## **INTRAOCULAR**

"Within the eyeball".

## **KOROTKOFF SOUNDS**

A series of distinct sounds produced by blood passing through an artery, as the external pressure on the artery drops from the systolic value to the diastolic value.

## **LACK OF CONVERGENCE**

The inability of a person's eyes to converge, or "cross" as the person attempts to focus on a stimulus as it is pushed slowly toward the bridge of his or her nose.

## **MAJOR INDICATORS**

Physiological signs that are specifically assessed and are, for the most part, involuntary reflecting the status of the central nervous system (CNS) homeostasis (Physiological Indicators)

## **MARIJUANA**

Common term for the Cannabis Sativa plant. Usually refers to the dried leaves of the plant. This is the most common form of the cannabis category.

## **MARINOL**

A drug containing a synthetic form of THC (tetrahydrocannabinol). Marinol belongs to the cannabis category of drugs, but marinol is not produced from any species of cannabis plant.

## **MEDICAL RULEOUT**

A determination made by a DRE that the condition of a suspected impaired driver is more likely related to a medical issue that effected the person's ability to operate a vehicle safely.

## **METABOLISM**

The sum of all chemical processes that take place in the body as they relate to the movements of nutrients in the blood after digestion, resulting in growth, energy, release of wastes, and other body functions. The process by which the body, using oxygen, enzymes and other internal chemicals, breaks down ingested substances such as food and drugs so they may be consumed and eliminated. Metabolism takes place in two phases. The first step is the constructive phase (anabolism) where smaller molecules are converted to larger molecules. The second step is the destructive phase (catabolism) where large molecules are broken down into smaller molecules.

## **METABOLITE**

A chemical product, formed by the reaction of a drug with oxygen and/or other substances in the body.

## **MIOSIS**

Abnormally small (constricted) pupils.

## **MOTOR NERVES**

Nerves that carry messages away from the brain, to the body's muscles, tissues, and organs. Motor nerves are also known as efferent nerves.

## **MUSCULAR HYPERTONICITY**

Rigid muscle tone.

## **MYDRIASIS**

Abnormally large (dilated) pupils.

## **NARCOTIC ANALGESICS**

One of the seven drug categories. Narcotic analgesics include opium, the natural alkaloids of opium (such as morphine, codeine and thebaine), the derivatives of opium (such as heroin, dilaudid, oxycodone and percodan), and the synthetic narcotics.

## **NERVE**

A cord-like fiber that carries messages either to or from the brain. For drug evaluation and classification purposes, a nerve can be pictured as a series of "wire-like" segments, with small spaces or gaps between the segments.

## **NEURON**

A nerve cell. The basic functional unit of a nerve. It contains a nucleus within a cell body with one or more axons and dendrites.

## **NEUROTRANSMITTER**

Chemicals that pass from the axon of one nerve cell to the dendrite of the next cell, and that carry messages across the gap between the two nerve cells.

## **NULL EFFECT**

One mechanism of polydrug interaction. For a particular indicator of impairment, two drugs produce a null effect if neither of them affects that indicator. For example, PCP does not affect pupil size, and alcohol does not affect pupil size. The combination of PCP and alcohol produces a null effect on pupil size.

## **NYSTAGMUS**

An involuntary jerking of the eyes.

## **"ON THE NOD"**

A semi-conscious state of deep relaxation. Typically induced by impairment due to Heroin or other narcotic analgesics. The suspect's eyelids droop, and chin rests on the chest. Suspect may appear to be asleep, but can be easily aroused and will respond to questions.

## **OVERLAPPING EFFECT**

One mechanism of polydrug interaction. For a particular indicator of impairment, two drugs produce an overlapping effect if one of them affects the indicator but the other doesn't. For example, cocaine dilates pupils while alcohol doesn't affect pupil size. The combination of cocaine and alcohol produces an overlapping effect on pupil size: the combination will cause the pupils to dilate.

## **PALLOR**

An abnormal paleness or lack of color in the skin.

## **PARANOIA**

Mental disorder characterized delusions and the projection of personal conflicts, that are ascribed to the supposed hostility of others.

## **PARAPHERNALIA**

Drug paraphernalia are the various kinds of tools and other equipment used to store, transport or ingest a drug. Hypodermic needles, small pipes, bent spoons, etc., are examples of drug paraphernalia. The singular form of the word is "paraphernalium". For example, one hypodermic needle would be called a "drug paraphernalium".

## **PARASYMPATHETIC NERVE**

An autonomic nerve that commands the body to relax and to carry out tranquil activities. The brain uses parasympathetic nerves to send "at ease" commands to the muscles, tissues, and organs.

## **PARASYMPATHOMIMETIC DRUGS**

Drugs that mimic neurotransmitter associated with the parasympathetic nerves. These drugs artificially cause the transmission of messages that produce lower blood pressure, drowsiness, etc.

## **PDR (Physician's Desk Reference)**

A basic reference source for drug recognition experts. The PDR provides detailed information on the physical appearance and psychoactive effects of licitly-manufactured drugs.

## **PHENCYCLIDINE**

A contraction of PHENYL CYCLOHEXYL PIPERIDINE, or PCP. Formerly used as a surgical anesthetic, however, it has no current legitimate medical use in humans.

## **PHENYL CYCLOHEXYL PIPERIDINE (PCP)**

Often called "phencyclidine" or "PCP", it is a specific drug belonging to the Dissociative Anesthetics category.

## **PHYSIOLOGY**

Physiology is the branch of biology dealing with the functions and activities of life or living matter and the physical and chemical phenomena involved.

## **PILOERECTION**

Literally, "hair standing up", or goose bumps. This condition of the skin is often observed in persons who are under the influence of LSD.

## **POLYDRUG USE**

Ingesting drugs from two or more drug categories.

## **PSYCHEDELIC**

A mental state characterized by a profound sense of intensified or altered sensory perception sometimes accompanied by hallucinations.

## **PSYCHOPHYSICAL TESTS**

Methods of investigating the mental (psycho-) and physical characteristics of a person suspected of alcohol or drug impairment. Most psychophysical tests employ the concept of divided attention to assess a suspect's impairment.

## **PSYCHOTOGENIC**

Literally, "creating psychosis" or "giving birth to insanity". A drug is considered to be psychotogenic if persons who are under the influence of the drug become insane, and remain so after the drug wears off.

## **PSYCHOTOMIMETIC**

Literally, "mimicking psychosis" or "impersonating insanity". A drug is considered to be psychotomimetic if persons who are under the influence of the drug look and act insane while they are under the influence.

## **PTOSIS**

Droopy eyelids.

## **PULSE**

The expansion and contraction of the walls of an artery, generated by the pumping action of blood.

## **PULSE RATE**

The number of expansions of an artery per minute.

## **PUPILLARY LIGHT REFLEX**

The pupils of the eyes will constrict and dilate depending on changes in lighting.

## **PUPILLARY UNREST**

The continuous, irregular change in the size of the pupils that may be observed under room or steady light conditions.

## **REBOUND DILATION**

A period of pupillary constriction followed by a period of pupillary dilation where the pupil steadily increases in size and does not return to its original constricted size.

## **RESTING NYSTAGMUS**

Jerking of the eyes as they look straight ahead.

## **SCLERA**

A dense white fibrous membrane that, with the cornea, forms the external covering of the eyeball (i.e., the white part of the eye).

## **SENSORY NERVES**

Nerves that carry messages to the brain, from the various parts of the body, including notably the sense organs(eyes, ears, etc.). Sensory nerves are also known as afferent nerves.

## **SINSEMILLA**

The unpollinated female cannabis plant, having a relatively high concentration of THC.

## **SFST**

Standardized Field Sobriety Testing. There are three SFSTs, namely Horizontal Gaze Nystagmus (HGN), Walk and Turn, and One Leg Stand. Based on a series of controlled laboratory studies, scientifically validated clues of alcohol impairment have been identified for each of these three tests. They are the only Standardized Field Sobriety Tests for which validated clues have been identified.

## **SNORTING**

One method of ingesting certain drugs. Snorting requires that the drug be in powdered form. The user rapidly draws the drug up into the nostril, usually via a paper or glass tube. Snorting is also known as insufflation.

## **SPHYGMOMANOMETER**

A medical device used to measure blood pressure. It consists of an arm or leg cuff with an air bag attached to a tube and a bulb for pumping air into the bag, and a gauge for showing the amount of air pressure being pressed against the artery.

## **STETHOSCOPE**

A medical instrument used, for drug evaluation and classification purposes, to listen to the sounds produced by blood passing through an artery.

## **SYMPATHETIC NERVE**

An autonomic nerve that commands the body to react in response to excitement, stress, fear, etc. The brain uses sympathetic nerves to send "wake up calls" and "fire alarms" to the muscles, tissues and organs.

## **SYMPATHOMIMETIC DRUGS**

Drugs that mimic the neurotransmitter associated with the sympathetic nerves. These drugs artificially cause the transmission of messages that produce elevated blood pressure, dilated pupils, etc.

## **SYNAPSE (or Synaptic Gap)**

The gap or space between two neurons (nerve cells).

## **SYNESTHESIA**

A sensory perception disorder, in which an input via one sense is perceived by the brain as an input via another sense. An example of this would be a person "hearing" a phone ring and "seeing" the sound as a flash of light. Synesthesia sometimes occurs with persons under the influence of hallucinogens.



**SYSTOLIC**

The highest value of blood pressure. The blood pressure reaches its systolic value when the heart is fully contracted (systole), and blood is sent surging into the arteries.

**TACHYCARDIA**

Abnormally rapid heart rate.

**TACHYPNEA**

Abnormally rapid rate of breathing.

**THC (Tetrahydrocannabinol)**

The principal psychoactive ingredient in drugs belonging to the cannabis category.

**TOLERANCE**

An adjustment of the drug user's body and brain to the repeated presence of the drug. As tolerance develops, the user will experience diminishing psychoactive effects from the same dose of the drug. As a result, the user typically will steadily increase the dose he or she takes, in an effort to achieve the same psychoactive effect.

**TRACKS**

Scar tissue usually produced by repeated injection of drugs, via hypodermic needle, along a segment of a vein.

**VERTICAL GAZE NYSTAGMUS**

An involuntary jerking of the eyes (up-and-down) which occurs as the eyes are held at maximum elevation. The jerking should be distinct and sustained.

**VOIR DIRE**

A French expression literally meaning “to see, to say.” Loosely, this would be rendered in English as “To seek the truth,” or “to call it as you see it.” In a law or court context, one application of voir dire is to question a witness to assess his or her qualifications to be considered an expert in some matter pending before the court.

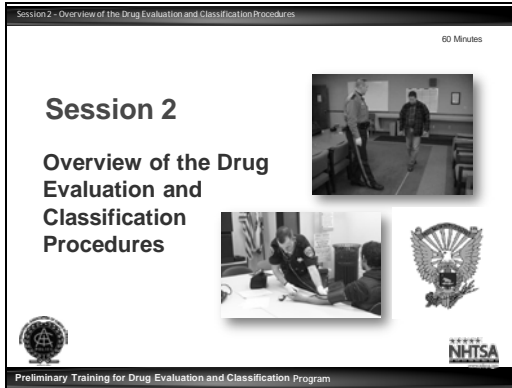
**VOLUNTARY NERVE**

A motor nerve that carries messages to a muscle that we consciously control.

**WITHDRAWAL**

This occurs in someone who is physically addicted to a drug when he or she is deprived of the drug. If the craving is sufficiently intense, the person may become extremely agitated, and even physically ill.

# Participant Manual DRE Pre School - Session 2 – Observation of the Eyes and Additional Tests for Drug Impairment



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

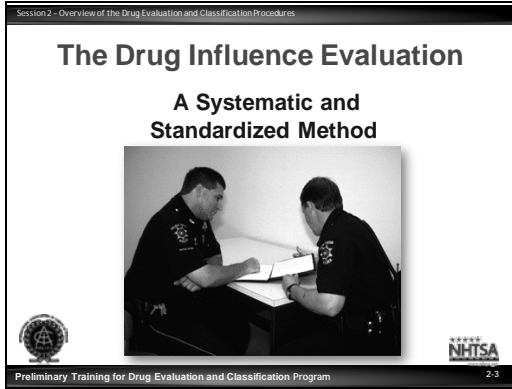
- Identify the 12 components of the DRE drug influence evaluation.
- Discuss the purposes of each component.

## CONTENT SEGMENTS

- A. Components of the Process
- B. Video/DVD Demonstrations

## LEARNING ACTIVITIES

- Instructor-Led Presentations
- Video/DVD Presentations



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## A. Components of the Process

### *The Drug Influence Evaluation*

The Drug Evaluation and Classification Process is a systematic and standardized method of examining a subject to determine:


- Whether the subject is impaired by a drug or combination of drugs.
- If the impairment is resulting from an injury, illness, or drug related.
- The category (or categories) of drugs that is (or are) the likely cause of the subject's impairment.

The process is systematic in that it is based on a careful assessment of a variety of observable signs and symptoms that are known to be reliable indicators of drug impairment.

Session 2 - Overview of the Drug Evaluation and Classification Process

## The Systematic Process

- Appearance
- Behavior
- Psychophysical Testing



Preliminary Training for Drug Evaluation and Classification Program 2-4

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Some of these observable signs and symptoms relate to the subject's appearance.

Some of the signs and symptoms relate to the subject's behavior.

Some relate to the subject's performance of carefully administered psychophysical tests.



- Drugs impair the subject's ability to control his or her mind and body.
- Psychophysical tests can disclose that the subject's ability to control mind and body is impaired.
- The specific manner in which the subject performs the psychophysical tests may indicate the type of impairment from which the subject is suffering. In turn, this may indicate the category or categories of drugs causing the impairment.

Some of the observable signs and symptoms relate to automatic responses of the subject's body to the specific drugs that are present.

Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Components of the Process

- **Autonomic responses of the body**
- **Standardization of evaluation**

Preliminary Training for Drug Evaluation and Classification Program 2-5

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All of these reliable indicators are examined and carefully considered before a judgment is made concerning what categories of drugs are affecting the subject. The process is standardized in that it is administered the same way, to every subject, by every drug recognition expert.

- Standardization helps to ensure that no mistakes are made.
- No examinations are left out.
- No extraneous or unreliable “indicators” are included.
- Standardization helps to promote professionalism among drug recognition experts.
- Standardization helps to secure acceptance in court

Session 2 - Overview of the Drug Evaluation and Classification Procedures

## 12 Step Process

Preliminary Training for Drug Evaluation and Classification Program 2-6

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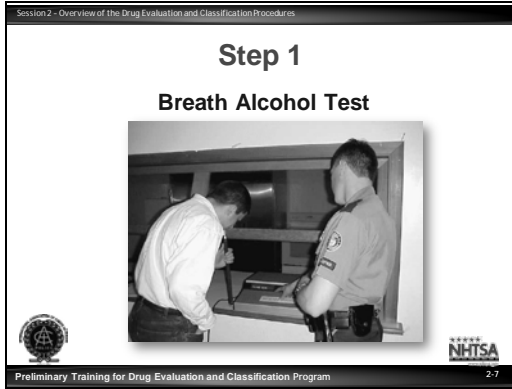
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### *12 Step Process*

The Drug Evaluation and Classification process has twelve components or steps.



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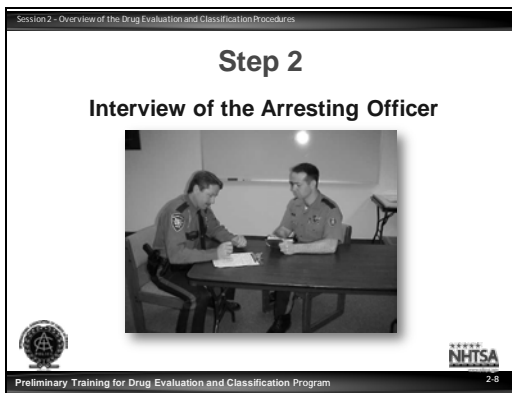
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*Breath Alcohol Test*

Breath Alcohol Test to determine Blood Alcohol Concentration (BAC).

- The purpose of the breath test is to determine whether the specific drug, alcohol, may be contributing to the impairment observable in the subject.
- Obtaining an accurate measurement of BAC enables the DRE to assess whether alcohol may be the sole cause of the observable impairment, or whether it is likely that some other drug or drugs, or other complicating factors are contributing to the impairment.



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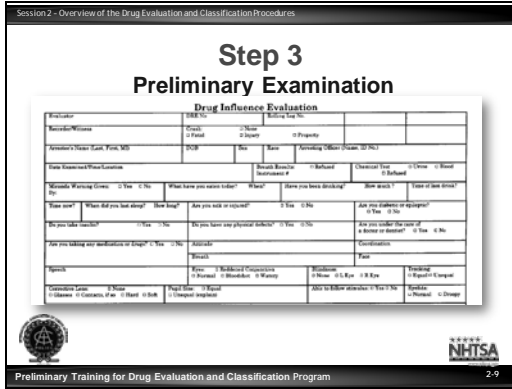
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*Interview of the Arresting Officer*

- In most cases, the subjects you will examine will not be people that you arrested.
- The arresting officer may have seen or heard things that would be valuable indicators of the kinds of drugs the subject has ingested.
- The arresting officer, in searching the subject, may have uncovered drug related paraphernalia, or even drugs themselves.
- The arresting officer also may be able to alert you to important information about the subject's behavior that could be very valuable for your own safety.



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### Preliminary Examination

- The preliminary examination is your first opportunity to observe the subject closely and directly.
- A major purpose of the preliminary examination is to determine if the subject may be suffering from an injury or some other medical condition not necessarily related to drugs.

Analogy: The preliminary examination is a “fork in the road.” It can help you decide whether to continue with the drug evaluation, or to pursue a possible medical complication, or to proceed with a DWI (alcohol) case.

Another major purpose of the preliminary examination is to begin systematically assessing the subject’s appearance, behavior and automatic bodily responses for signs of drug-induced impairment.

The preliminary examination consists of a series of questions dealing with possible injuries or medical problems; observations of the subject’s face, speech and breath; initial checks of the subject’s eyes; and, an initial examination of the subject’s pulse.

The initial examination of the eyes may reveal signs of injury or illness. A difference in pupil size of greater than 0.5 mm may indicate an injury or existing medical condition.





Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Step 4

### Examination of the Eyes

| HGN                    | Right Eye | Left Eye | Vertical Gaze Nystagmus?  |
|------------------------|-----------|----------|---|
| Lack of Smooth Pursuit |           |          | Yes <input type="checkbox"/> No <input type="checkbox"/>                    |
| Max. Deviation         |           |          | Convergence<br>Right Eye <input type="text"/> Left Eye <input type="text"/> |
| Angle of Onset         |           |          |   |

Preliminary Training for Drug Evaluation and Classification Program 2-10

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### Examinations of the Eyes

This is the time when DRE's will administer three tests of the subject's eyes; Horizontal Gaze Nystagmus, Vertical Gaze Nystagmus and Lack of Convergence.



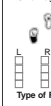
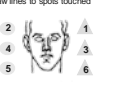
Certain drugs produce very easily observable effects on the eyes.

- One of the most dramatic of these effects is nystagmus, which means an involuntary jerking of the eyes.
- Persons under the influence of alcohol usually will exhibit Horizontal Gaze Nystagmus, which is an involuntary jerking of the eyes as the eyes gaze to the side.
- Alcohol is not the only drug that causes nystagmus.
- Horizontal Gaze Nystagmus is not the only observable effect on the eyes that will be produced by various drugs.

Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Step 5

### Divided Attention Tests

| <p>Balance Eyes Closed</p>  <p>Internal Clock: _____<br/>Estimated as 30 sec.</p>  | <p>Walk And Turn Test</p>  <p>Cannot keep balance _____<br/>Starts too soon _____</p> <table border="1" style="font-size: x-small;"> <thead> <tr> <th></th> <th>1st Nine</th> <th>2nd Nine</th> </tr> </thead> <tbody> <tr> <td>Stops Walking</td> <td></td> <td></td> </tr> <tr> <td>Misses Heel-Toe</td> <td></td> <td></td> </tr> <tr> <td>Steps Off Line</td> <td></td> <td></td> </tr> <tr> <td>Raises Arms</td> <td></td> <td></td> </tr> <tr> <td>Actual Steps Taken</td> <td></td> <td></td> </tr> </tbody> </table> <p>Describe Turn _____<br/>Cannot Do Test (explain) _____</p> |          | 1st Nine | 2nd Nine | Stops Walking |  |  | Misses Heel-Toe |  |  | Steps Off Line |  |  | Raises Arms |  |  | Actual Steps Taken |  |  |  |
|---|---|----------|----------|----------|---------------|--|--|-----------------|--|--|----------------|--|--|-------------|--|--|--------------------|--|--|--|
|   | 1st Nine  | 2nd Nine |          |          |               |  |  |                 |  |  |                |  |  |             |  |  |                    |  |  |  |
| Stops Walking   |   |          |          |          |               |  |  |                 |  |  |                |  |  |             |  |  |                    |  |  |  |
| Misses Heel-Toe   |   |          |          |          |               |  |  |                 |  |  |                |  |  |             |  |  |                    |  |  |  |
| Steps Off Line  |   |          |          |          |               |  |  |                 |  |  |                |  |  |             |  |  |                    |  |  |  |
| Raises Arms   |   |          |          |          |               |  |  |                 |  |  |                |  |  |             |  |  |                    |  |  |  |
| Actual Steps Taken  |   |          |          |          |               |  |  |                 |  |  |                |  |  |             |  |  |                    |  |  |  |
| <p>One Leg Stand:</p>  <p>Sways while balancing.<br/>Uses arms to balance.<br/>Hesitates.<br/>Puts foot down.<br/>Type of Footwear _____</p> | <p>Right Left<br/>Draw lines to spots touched</p>    |          |          |          |               |  |  |                 |  |  |                |  |  |             |  |  |                    |  |  |  |

Preliminary Training for Drug Evaluation and Classification Program 2-11

Notes: \_\_\_\_\_

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### Divided Attention Psychophysical Tests

All drugs that impair driving ability will also impair the subject's ability to perform certain carefully designed divided attention tests.

These tests are familiar to you in the context of examining alcohol impaired subjects.

- The same tests are very valuable for disclosing evidence of impairment due to drugs other than alcohol.

Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Step 6


### Examination of Vital Signs

**Pulse & Time**

1. \_\_\_\_\_ bpm / \_\_\_\_\_


2. \_\_\_\_\_ bpm / \_\_\_\_\_

3. \_\_\_\_\_ bpm / \_\_\_\_\_



**Blood Pressure**      **Temp**

\_\_\_\_\_ / \_\_\_\_\_ mmHg      \_\_\_\_\_ °



Preliminary Training for Drug Evaluation and Classification Program      2-12

Notes: \_\_\_\_\_

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### Examination of Vital Signs

Many categories of drugs affect the operation of the heart, lungs and other major organs of the body.

These effects show up during examination of the subject's vital signs.



- The vital signs that are reliable indicators of drug influence include blood pressure, pulse, and temperature.
- Blood pressure is measured with two medical instruments; a stethoscope and a sphygmomanometer.


Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Step 7

### Darkroom Examinations

| Pupil Size   | Room Light | Darkness | Direct            | Nasal Area  |
|--|------------|----------|-------------------|-------------|
| Left Eye   |            |          |                   | Oral Cavity |
| Right Eye  |            |          |                   |             |
| Rebound Dilation<br>Yes <input type="checkbox"/> No <input type="checkbox"/> |            |          | Reaction to Light |             |



Preliminary Training for Drug Evaluation and Classification Program      2-13

Notes: \_\_\_\_\_

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### Dark Room Examinations

Many categories of drugs affect how the pupils of the eyes will appear, and how they respond to light.

- Certain kinds of drugs will cause the pupils to grow larger, or dilate.
- Some other drugs cause the pupils to be smaller, or constrict.

By systematically changing the amount of light entering the subject's eyes, we can observe the pupils' appearance and reaction under controlled conditions.

We carry out these examinations in a dark room, using a penlight to control the amount of illumination entering the subject's eyes.



We use a device called a pupillometer to estimate the size of the subject's pupils.

Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Step 7

### Darkroom Examinations (Cont.)

| Pupil Size   | Room Light | Darkness | Direct            | Nasal Area  |
|--|------------|----------|-------------------|-------------|
| Left Eye   |            |          |                   | Oral Cavity |
| Right Eye  |            |          |                   |             |
| Rebound Dilation<br>Yes <input type="checkbox"/> No <input type="checkbox"/> |            |          | Reaction to Light |             |

Preliminary Training for Drug Evaluation and Classification Program 2-14

Notes: \_\_\_\_\_

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Other examinations are also conducted in the darkroom, using the penlight: i.e., examination of the nasal area and mouth for signs of drug use and for concealed contraband.


Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Step 8

### Examination for Muscle Tone

**MUSCLE TONE:**  
 Near Normal  Flaccid  Rigid

Comments: \_\_\_\_\_



Preliminary Training for Drug Evaluation and Classification Program 2-15

Notes: \_\_\_\_\_

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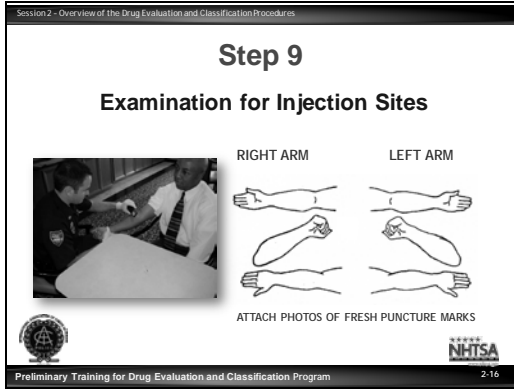
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### *Examination of Muscle Tone*

Certain categories of drugs can cause the user's muscles to become markedly tense, and rigid, while others can cause the muscles to be very flaccid, or loose and rubbery.

Evidence of muscle tone may come to light when the subject attempts to perform the divided attention test.

Evidence of muscle tone can also be observed when taking the subject's pulse and blood pressure.



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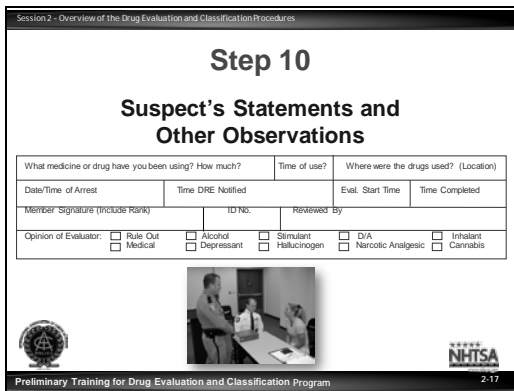
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### *Examination for Injection Sites*

Certain drugs are commonly injected by their users via hypodermic needles.

Heroin is probably most commonly associated with injection, but several other types of drugs also are injected by many users.

Uncovering injection sites on a subject provides powerful evidence that he or she may be under the influence of specific types of drugs.



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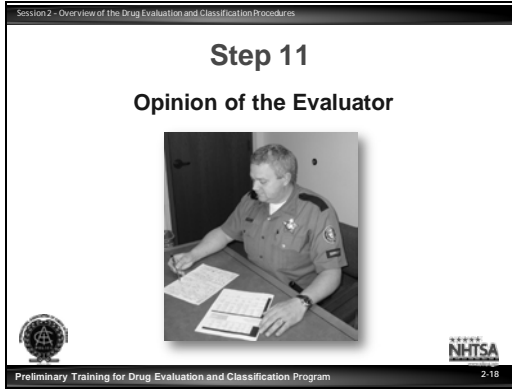
### *Suspect's Statements and Other Observations*

At this point in the evaluation, the trained DRE should have reasonable grounds to believe that the subject is under the influence of a drug or drugs.

The DRE should also have at least an articulable suspicion as to the category or categories of drugs causing the impairment.

The DRE should proceed to interview the subject to confirm his or her suspicion/opinions concerning the drug or drugs involved.

The DRE must carefully record the subject's statements and any other observations that may constitute relevant evidence of drug induced impairment.



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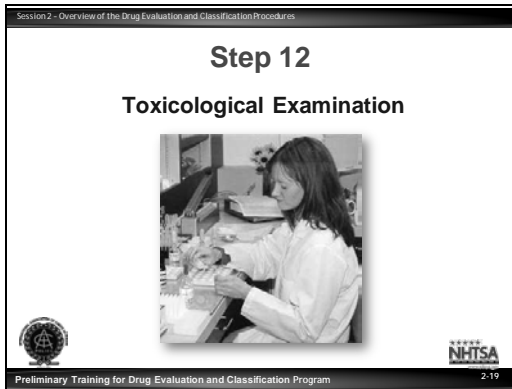
### *Opinion of the Evaluator*

Based on all of the evidence and observations gleaned from the preceding ten steps, the DRE must reach an informed conclusion as to:

Whether the subject is under the influence of a drug or drugs.

If so, the probable category or categories of drugs causing the impairment.

The DRE must record a narrative summary of the facts forming the basis for his or her conclusions.



Notes: \_\_\_\_\_  
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### *Toxicological Examination*



The toxicological examination is a chemical test or tests designed to obtain scientific, admissible evidence to substantiate the DRE's conclusions.

Departmental policy and procedures must be carefully and completely followed in requesting, obtaining and handling the chemical sample.

Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Drug Influence Evaluation Checklist

1. **Breath alcohol test**
2. **Interview of arresting officer (Note: gloves must be worn from this point on)**
3. **Preliminary examination and first pulse**
4. **Eye Examinations**
5. **Divided attention tests:**
  - Modified Romberg Balance
  - Walk and Turn
  - One Leg Stand
  - Finger to Nose

Preliminary Training for Drug Evaluation and Classification Program 2-20

Notes: \_\_\_\_\_

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### *Review of Drug Influence Evaluation Checklist*

Session 2 - Overview of the Drug Evaluation and Classification Procedures

## Drug Influence Evaluation Checklist (Cont.)

6. **Vital signs and second pulse**
7. **Dark room examinations and ingestion examination**
8. **Check for muscle tone**
9. **Check for injection sites and third pulse**
10. **Interrogation, statements and other observations**
11. **Opinion of evaluator**
12. **Toxicological examination**

Preliminary Training for Drug Evaluation and Classification Program 2-21

Notes: \_\_\_\_\_

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### **B. Video Demonstrations**

Session 2 - Overview of the Drug Evaluation and Classification Procedures

# QUESTIONS?

Preliminary Training for Drug Evaluation and Classification Program 2-22

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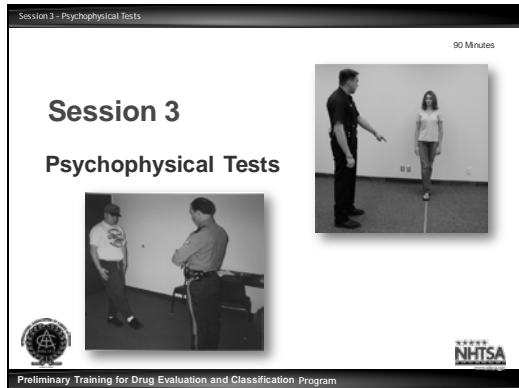
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# Drug Influence Evaluation Checklist

- \_\_\_\_\_ 1. Breath Alcohol Test
- \_\_\_\_\_ 2. Interview of Arresting Officer  
(NOTE: *Gloves must be worn from this point on*)
- \_\_\_\_\_ 3. Preliminary Examination  
-first pulse, initial estimation of angle of onset, and initial estimation of pupil size
- \_\_\_\_\_ 4. Eye Examination
- \_\_\_\_\_ 5. Divided Attention Tests:
  - \_\_\_\_\_ *Romberg Balance*
  - \_\_\_\_\_ *Walk and Turn*
  - \_\_\_\_\_ *One Leg Stand*
  - \_\_\_\_\_ *Finger to Nose*
- \_\_\_\_\_ 6. Vital signs and Second Pulse
- \_\_\_\_\_ 7. Dark Room Check of Pupil Size and Ingestion Exam
- \_\_\_\_\_ 8. Check of Muscle Tone
- \_\_\_\_\_ 9. Check for Injection Sites and Third Pulse
- \_\_\_\_\_ 10. Interrogation, Statements, and Other Observations
- \_\_\_\_\_ 11. Opinion of Evaluator
- \_\_\_\_\_ 12. Toxicological Examination

## Participant Manual DRE Pre School - Session 3 – Psychophysical Tests



Notes: \_\_\_\_\_

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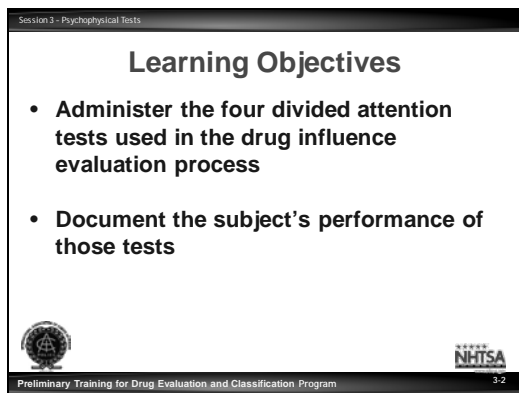
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Upon successfully completing this session the participant will be able to:

- Administer the four divided attention tests used in the drug influence evaluation process.
- Document the subject's performance of those tests.

### CONTENT SEGMENTS

- Modified Romberg Balance Test
- Walk and Turn
- One Leg Stand
- Finger to Nose

### LEARNING ACTIVITIES

- Instructor-Led Presentations
- Participant-Led Demonstrations
- Hands-on Practice

- Four divided attention psychophysical tests are administered in the DRE evaluation – Modified Romberg Balance Test, Walk and Turn, One Leg Stand and Finger to Nose.
- The Walk and Turn and One Leg Stand as well as HGN have been scientifically validated by conducting controlled research to demonstrate their reliability. The Modified Romberg Balance Test and Finger to Nose have not been subjected to that sort of scrutiny; however, if properly administered and recorded they are very credible evidence of impairment.



Session 3 - Psychophysical Tests

## Modified Romberg Balance Test

### Diagram

Modified Romberg Balance

Approx. Approx.

Internal Clock:  
Estimated as 30 sec.

NHSTA

Preliminary Training for Drug Evaluation and Classification Program 3-3

Notes: \_\_\_\_\_

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### A. Modified Romberg Balance Test

The Modified Romberg Balance Test is the first divided attention test that is administered during the drug influence evaluation.

- The test requires the subject to stand with the feet together and the head tilted back slightly and with the eyes closed.
- The test also requires that the subject attempt to estimate 30 seconds; the subject must be instructed to open the eyes and tilt the head forward and say “stop” when they think thirty seconds has elapsed.

Session 3 - Psychophysical Tests

## 30 Seconds

- Internal timing estimate
- Some drugs tend to speed up or slow down the subject's internal clock

NHSTA

Preliminary Training for Drug Evaluation and Classification Program 3-4

Notes: \_\_\_\_\_

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Session 3 – Psychophysical Tests

## Modified Romberg Balance Test

- Divided attention
- Internal Clock



Preliminary Training for Drug Evaluation and Classification Program 3-5

Notes: \_\_\_\_\_

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- The DRE must record how much time actually elapsed from the start of the test until the subject opened the eyes.
- If the subject continues to keep the eyes closed for 90 seconds, the DRE should stop the test and record the fact that it was terminated at 90 seconds.

Session 3 – Psychophysical Tests

## Modified Romberg Balance Test Administration

- Tell the subject to stand straight with the feet together and the arms down at the sides
- Tell the subject to maintain that position while you give the instructions (Ask the subject if he or she understands so far)
- Tell the subject when you instruct them to begin the test, they must tilt their head back and close their eyes
- Tell the subject that when you say "Start", they must keep their head tilted back with their eyes closed until they think that 30 seconds have gone by
- Tell the subject that, when they think the 30 seconds have gone by, they must bring their head forward, open their eyes, and say "Stop"



Preliminary Training for Drug Evaluation and Classification Program 3-6

Notes: \_\_\_\_\_

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*Administrative Procedures and Instructions*

- Tell the subject to stand straight with the feet together and the arms down at the sides.
- Tell the subject to maintain that position while you give the instructions. Emphasize that he or she must not start the test until told to start.
- Ask the subject if he or she understands so far.
- Tell the subject when you instruct them to begin the test, they must tilt their head back and close their eyes.
- Tell the subject that when you say "Start", they must keep their head tilted back with their eyes closed until they think that 30 seconds have gone by. **DO NOT** tell the subject to "count to thirty seconds" or to use any other specific procedure to keep track of time. But on the other hand, **DO NOT** tell the subject that they are not allowed to count to thirty seconds. **SIMPLY SAY**, "keep your head tilted back with your eyes closed until you think that thirty seconds have gone by".
- Tell the subject that, when they think the 30 seconds have gone by, they must bring their head forward, open their eyes, and say "Stop".

Session 3 – Psychophysical Tests

### Modified Romberg Balance Test Administration (Cont.)

- Ask the subject if they understand
- Look at your timing device and pick a convenient time to start the test
- Tell the subject to tilt their head back and close their eyes
- Tell the subject to begin or start the test
- Keep track of time while the subject performs the test
- When the subject opens the eyes, ask them "how much time was that?"
- If 90 seconds elapse before the subject opens their eyes, stop the test



Preliminary Training for Drug Evaluation and Classification Program 3-7

Notes: \_\_\_\_\_

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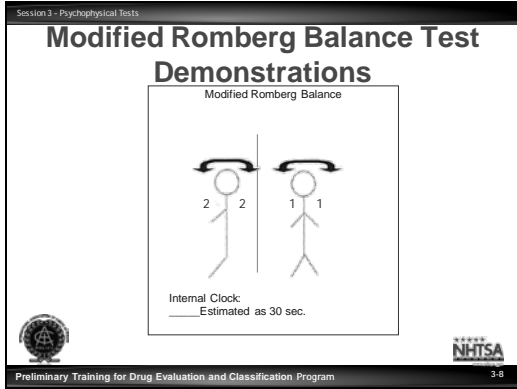
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- Ask the subject if they understand.
- Look at your timing device and pick a convenient time to start the test.
- Tell the subject to tilt their head back and close their eyes.
- Tell the subject to begin or start the test.
- Keep track of time while the subject performs the test.
- When the subject opens the eyes, ask them "how much time was that?"
- If 90 seconds elapse before the subject opens their eyes, stop the test.
- Instructor-to-instructor demonstrations.
- Instructor-to-participant demonstration.



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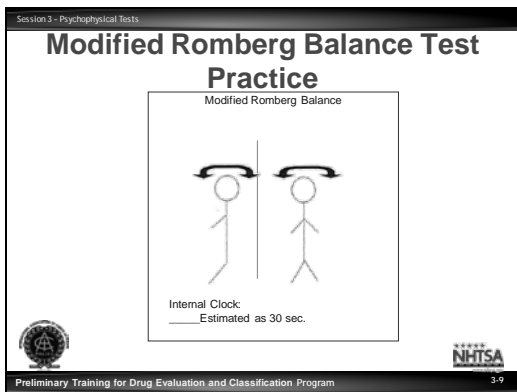
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### Participant-Led Demonstrations

The major items that need to be recorded for the Modified Romberg Balance test are:

- The amount that the subject sways.
- The actual amount of time that the subject keeps the eyes closed.
- To record swaying, the DRE must estimate how many inches the subject sways, either front-to-back or left-to-right, or both.

Example: If the subject sways approximately two inches toward the left and approximately two inches toward the right, the DRE should write the number “2” on each side of the “stick figure” that shows left-to-right movement. To record the subject’s time estimate, simply write the number of seconds that the subject kept his or her eyes closed.



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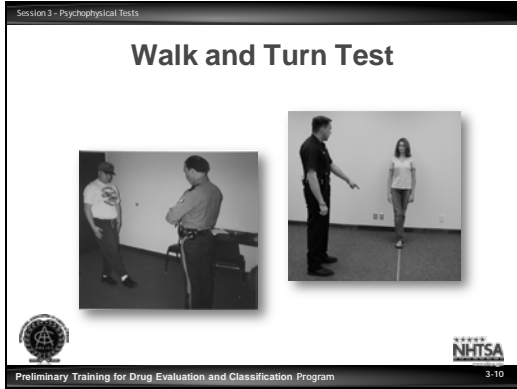
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### Hands-On Practice



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## **B. Walk and Turn**

Walk and Turn is the second divided attention test administered during the drug influence evaluation.

The test is administered the same way that we have used it for Standardized Field Sobriety Testing purposes.

- Monitor the practice and offer coaching and constructive criticism, as appropriate.
- Review of Walk and Turn administrative procedures.

The test has two stages: the instructions stage and the walking stage.

- During the instructions stage the subject must stand heel-to-toe, with the right foot ahead of the left foot with the heel of the right foot against the toe of the left foot, and keeping the arms at the sides.
- Demonstrate the stance that the subject must maintain during the instructions stage. If the subject fails to maintain the starting position during your instructions, discontinue the instructions and direct the subject back to the starting position before continuing.
- The subject is told to not start walking until told to do so.
- The subject must be told to take nine heel-to-toe steps on the line, to turn around keeping the front or lead foot on the line and to turn by taking a series of small steps with the other foot, and to return nine heel-to-toe steps down the line.

Session 3 - Psychophysical Tests

## Walk and Turn Test Diagram

Walk And Turn Test

Describe Turn

Cannot keep balance \_\_\_\_\_

Starts too soon \_\_\_\_\_

|                    | 1st Nine | 2nd Nine |
|--------------------|----------|----------|
| Stops Walking      |          |          |
| Misses Heel-Toe    |          |          |
| Steps Off Line     |          |          |
| Raises Arms        |          |          |
| Actual Steps Taken |          |          |

Cannot Do Test (explain)

Preliminary Training for Drug Evaluation and Classification Program 3-11

- The subject must be told to watch his or her feet while walking, and to count the steps out loud.
- The subject must be told to keep their arms at the sides at all times.
- The subject must be told not to stop walking until the test is completed.
- The subject should be asked if he/she understands the instructions.
- Once the subject acknowledges his/her understanding of the instructions, instruct the subject to begin the test.
- If the subject stops or fails to count out loud or watch his/her feet, remind him/her to perform these tasks. This interruption will not affect the validity of the test and is essential for evaluating divided attention.

Session 3 - Psychophysical Tests

## Walk and Turn Test

- **Instructor – Participant demonstration**
- **Participant – Participant demonstration**

Preliminary Training for Drug Evaluation and Classification Program 3-12

Notes: \_\_\_\_\_

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*Instructor-to-participant demonstration*

*Participant-to-Participant Demonstration*

Session 3 - Psychophysical Tests

## Walk and Turn Recording Results

Walk And Turn Test

Describe Turn

Cannot keep balance \_\_\_\_\_

Starts too soon \_\_\_\_\_

|                    | 1st Nine | 2nd Nine |
|--------------------|----------|----------|
| Stops Walking      |          |          |
| Misses Heel-Toe    |          |          |
| Steps Off Line     |          |          |
| Raises Arms        |          |          |
| Actual Steps Taken |          |          |

Cannot Do Test (explain)

Preliminary Training for Drug Evaluation and Classification Program 3-13

Notes: \_\_\_\_\_

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### *Recording Results of the Walk and Turn Test*

- We record the very same clues on this test that we use for Standardized Field Sobriety Testing purposes.

Instruction stage clues:

- Cannot maintain balance while listening to instructions (feet break away from the heel-to-toe stance). Draw a slash mark at an angle in the direction the subject stepped out of the instruction position.
- Starts too soon (i.e., subject starts walking before told to do so).

Session 3 – Psychophysical Tests

## Walk and Turn Test Diagram

Walk And Turn Test

Describe Turn \_\_\_\_\_

Cannot keep balance \_\_\_\_\_  
Starts too soon \_\_\_\_\_

|                    | 1st Nine                            | 2nd Nine                 |
|--------------------|-------------------------------------|--------------------------|
| Stops Walking      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Misses Heel-Toe    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Steps Off Line     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Raises Arms        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Actual Steps Taken | 15                                  |                          |

Cannot Do Test (explain) \_\_\_\_\_

Preliminary Training for Drug Evaluation and Classification Program

3-14

Notes: \_\_\_\_\_

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Walking stage clues:

- Stops while walking
- Does not touch heel-to-toe (distance 1/2")
- Steps off the line
- Uses arms to balance (distance 6")
- Improper turn
- Incorrect number of steps

During the walking stage, clues should be marked in the following manner:

- On the lines indicate the number of times the clue occurred. Draw a slash mark at an angle in the direction the step was taken.
- Indicate by a check the number of times the subject stops, misses heel-to-toe, steps off line, or raises arms.
- Record the actual number of steps taken.
- If the subject stops walking a slash mark should cross between the feet and be labeled with an "S."
- The "S" indicates "stopped."



Session 3 - Psychophysical Tests

## Walk and Turn Test Diagram (Cont.)

Walk And Turn Test

Describe Turn \_\_\_\_\_

Cannot keep balance \_\_\_\_\_  
Starts too soon \_\_\_\_\_

|                    | 1st Nine                            | 2nd Nine                 |
|--------------------|-------------------------------------|--------------------------|
| Stops Walking      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Misses Heel-Toe    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Steps Off Line     | <input type="checkbox"/>            | <input type="checkbox"/> |
| Raises Arms        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Actual Steps Taken | 15                                  | <input type="text"/>     |

Cannot Do Test (explain) \_\_\_\_\_

Preliminary Training for Drug Evaluation and Classification Program 3-15

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- If the subject steps off the line, indicate with a half of slash mark at an angle in the direction the step was taken.
- If the subject misses heel-to-toe, indicate with a slash mark between the feet and label with an "M".
- "The "M" indicates "missed."

Session 3 - Psychophysical Tests

## Walk and Turn Test Diagram Practice

Walk And Turn Test

Describe Turn \_\_\_\_\_

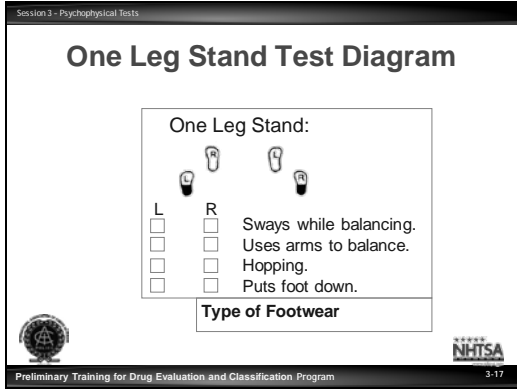
Cannot keep balance \_\_\_\_\_  
Starts too soon \_\_\_\_\_

|                    | 1st Nine                 | 2nd Nine                 |
|--------------------|--------------------------|--------------------------|
| Stops Walking      | <input type="checkbox"/> | <input type="checkbox"/> |
| Misses Heel-Toe    | <input type="checkbox"/> | <input type="checkbox"/> |
| Steps Off Line     | <input type="checkbox"/> | <input type="checkbox"/> |
| Raises Arms        | <input type="checkbox"/> | <input type="checkbox"/> |
| Actual Steps Taken | <input type="text"/>     | <input type="text"/>     |

Cannot Do Test (explain) \_\_\_\_\_

Preliminary Training for Drug Evaluation and Classification Program 3-16

### Hands-On Practice



Notes: \_\_\_\_\_

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**C. One Leg Stand**

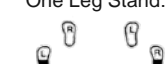
One Leg Stand is the third divided attention test administered during the drug influence evaluation.

- For drug evaluation purposes, One Leg Stand is given twice to the subject.
- First, the subject is required to perform the One Leg Stand while standing on the left foot.
- Note: The One Leg Stand is administered twice to test both the left and right legs to assist the DRE in making comparisons and identify potential medical conditions that may be present.
- Next, they are required to perform the test while standing on the right foot.
- Otherwise, One Leg Stand is used in the same fashion as in Standardized Field Sobriety Testing.



Session 2 – Psychophysical Tests

## One Leg Stand Test Administration

One Leg Stand:



|  |   |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
|--|---|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|--|------------------------|-----------------------|-----------------|-----------------|--|------------------|
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">L</td> <td style="width: 50%; text-align: center;">R</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table> </td> <td style="width: 50%; vertical-align: top;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Sways while balancing.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Uses arms to balance.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Hopping.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Puts foot down.</td> </tr> </table> </td> </tr> </table> | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">L</td> <td style="width: 50%; text-align: center;">R</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table> | L | R                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>   | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Sways while balancing.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Uses arms to balance.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Hopping.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Puts foot down.</td> </tr> </table> | Sways while balancing. | Uses arms to balance. | Hopping.        | Puts foot down. | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border: 1px solid black; padding: 2px;">Type of Footwear</td> </tr> </table> | Type of Footwear |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">L</td> <td style="width: 50%; text-align: center;">R</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>  | L   | R | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Sways while balancing.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Uses arms to balance.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Hopping.</td> </tr> <tr> <td style="width: 50%; text-align: center;">Puts foot down.</td> </tr> </table> | Sways while balancing.   | Uses arms to balance.  | Hopping.              | Puts foot down. |                 |  |                  |
| L  | R   |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| <input type="checkbox"/>   | <input type="checkbox"/>  |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| <input type="checkbox"/>   | <input type="checkbox"/>  |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| <input type="checkbox"/>   | <input type="checkbox"/>  |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| <input type="checkbox"/>   | <input type="checkbox"/>  |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| Sways while balancing.   |   |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| Uses arms to balance.  |   |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| Hopping.   |   |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| Puts foot down.  |   |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |
| Type of Footwear   |   |   |                          |                          |                          |                          |                          |                          |                          |                          |  |  |                        |                       |                 |                 |  |                  |

Preliminary Training for Drug Evaluation and Classification Program 3-18

Notes: \_\_\_\_\_

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### *Review of One Leg Stand Administrative Procedures*

Two instructors should be used for this demonstration, one as the “subject” and the other as the examiner.

- The test has two stages, the instructions stage and the balance and counting stage.
- During the instructions stage, the subject must stand with the feet together, arms at the side, facing the examiner.
- Demonstrate the stance that the “subject” is required to maintain.
- The subject must be told that they will have to stand on the left foot, and raise the right foot approximately 6 inches off the ground, with the right leg held straight and the raised foot parallel to the ground.
- The examiner must demonstrate the one-leg stance.
- Emphasize that the subject must maintain the foot elevation throughout the test.
- If the subject lowers his/her foot, he/she should be instructed to raise it.
- The subject must be told that they must look at the elevated foot during the test.
- Emphasize that the examiner should not look at his or her own foot while giving the instructions; for safety reasons, the examiner must keep the eyes on the subject at all times.

Session 2 – Psychophysical Tests

## One Leg Stand Test Administration (Cont.)

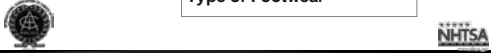
One Leg Stand:

L

R

Sways while balancing.  
 Uses arms to balance.  
 Hopping.  
 Puts foot down.

Type of Footwear



Preliminary Training for Drug Evaluation and Classification Program 3-19

Notes: \_\_\_\_\_

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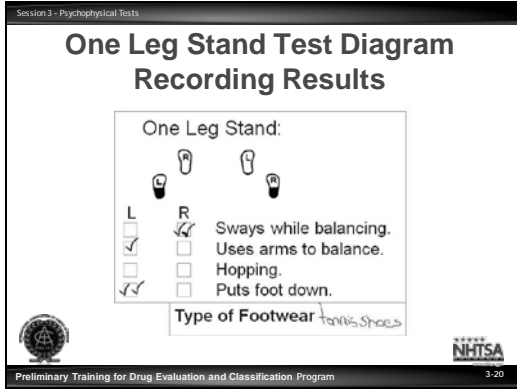
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- The subject must be told that they will have to count out loud in the following manner: “one thousand one, one thousand two, one thousand three” and so on until told to stop.
- After giving the instructions, the examiner should ask the “subject” if they understand.
- Note: If the subject puts the foot down, remind the subject to pick the foot up again and continue counting from the point at which the foot touched.
- After the subject has completed the test on the left foot, they must be told to repeat the test on the right foot.



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### Recording Results of the One Leg Stand

For drug evaluation purposes, we use the same clues on the One Leg Stand that we use for Standardized Field Sobriety Testing.

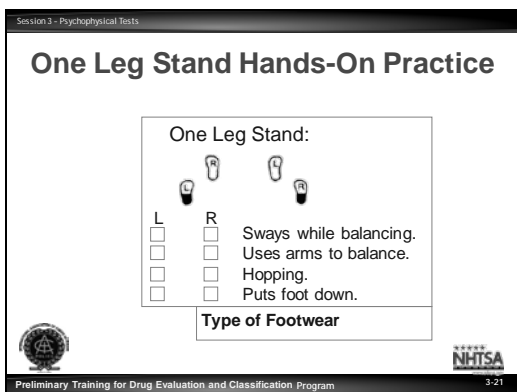
The One Leg Stand clues:

- Sways while balancing
- Uses arms to balance
- Hopping
- Puts foot down

Indicate above the feet the number they were counting when they put their foot down.

Check marks should be made to indicate the number of times the subject swayed, used arms for balance, hopped or put their foot down.

The subject's actual count during the 30 seconds should be documented in the top area of the box above the foot on which the subject was standing.



Notes: \_\_\_\_\_

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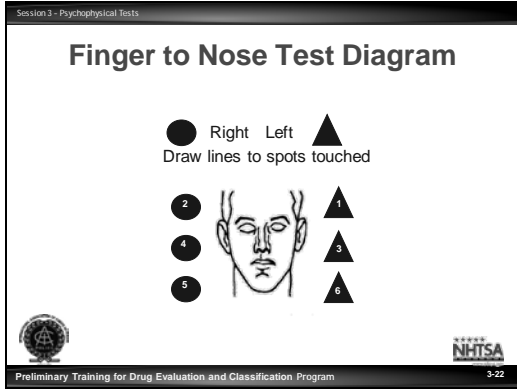
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### Hands-On Practice



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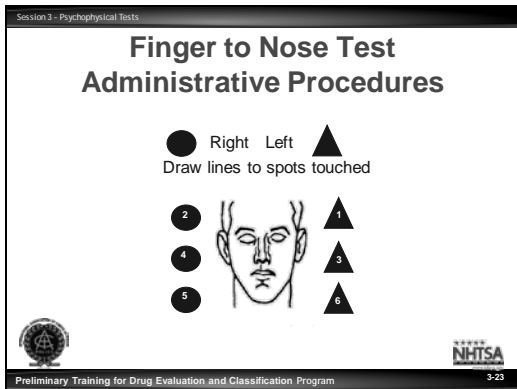
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**D. Finger to Nose**

The Finger to Nose is the final divided attention test used in the drug influence evaluation.

Finger to Nose differs from the other three tests in that the examiner must continue to give instructions to the subject throughout the test.



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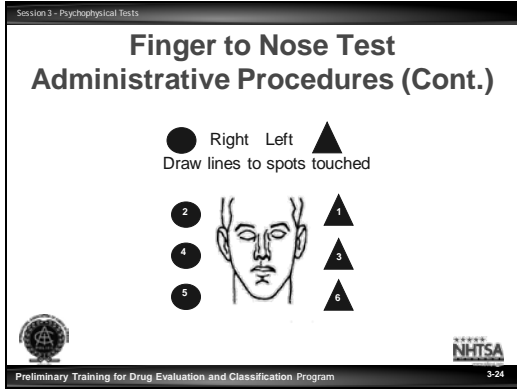
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*Administrative Procedures for Finger to Nose*

- The subject must be told that he/she will be given a series of commands, i.e., “left, right, etc.” to indicate which fingertip is to be brought to the tip of the nose.
- The subject must be told to stand with feet together, arms down at the sides, facing the examiner.
- The examiner should demonstrate the stance.
- The subject must be told to close his/her hands, rotate the palms forward and then to extend the index fingers from the closed hands.
- The examiner must tell subject that they will be asked to touch the tip of the index finger to the tip of the nose.
- The examiner must demonstrate to the subject how they are expected to touch the fingertip to the nose. (Without actually touching the nose.)



Notes: \_\_\_\_\_

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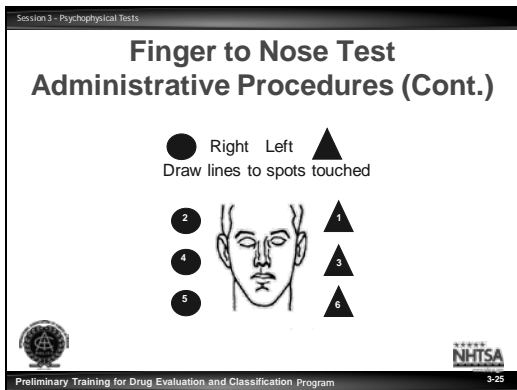
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- Demonstrate: “When I say ‘left,’ touch the tip of your left index finger to the tip of your nose.
- The examiner must tell the subject that they are expected to return the arm to the side immediately after touching the fingertip to the nose.
- Demonstrate the movement of the fingertip to the nose by standing at an angle to the “subject” so that he/she can see the proper method for touching the nose.
- The subject must be told to tilt the head back slightly and to close the eyes, and keep them closed until the examiner says to open them.
- Note: The subject’s head should be tilted back in the same fashion as in the Modified Romberg Balance test.
- The examiner should demonstrate the stance with head tilted back, arms at the sides with index fingers extended. Remind the participants that they should not close their eyes during the instructions for safety reasons.



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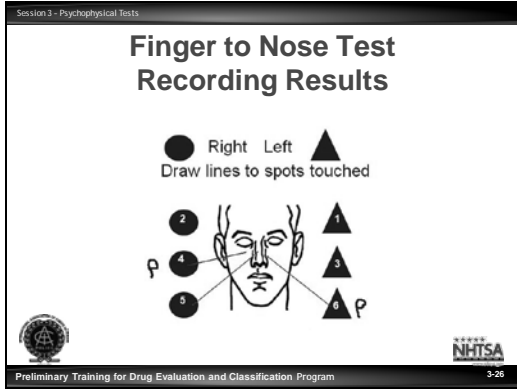
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*Instructor-Led Demonstrations*

- Instructor-to-instructor demonstration.
- Instructor-to-participant demonstration.

*Participant-Led Demonstrations*



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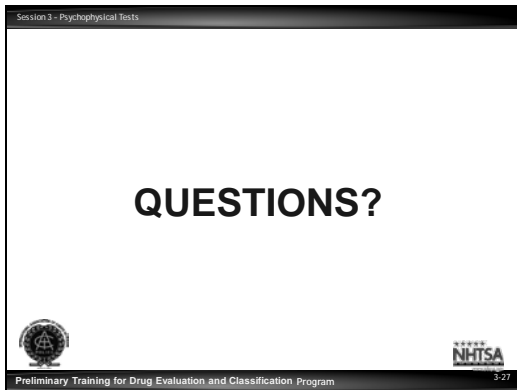
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### *Recording Results of the Finger to Nose Test*

- The results of Finger to Nose test are recorded by drawing a “map” showing where the fingertips landed on each attempt.
- A line should be drawn to the appropriate triangle to indicate where the subject touched their nose.
- Suggestion: If the DRE draws the line from the place where the subject touches to the appropriate triangle, it enables them to draw a straighter line.

### *Hands-on Practice*



Notes: \_\_\_\_\_

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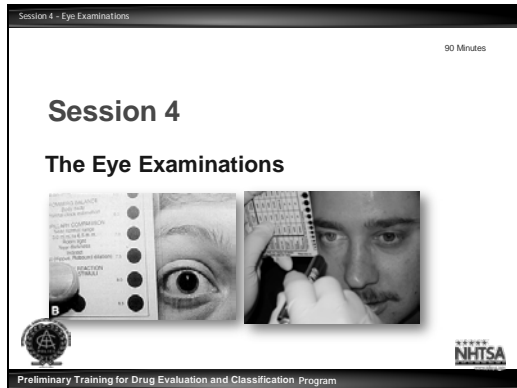
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## Participant Manual DRE Pre School - Session 4 – The Eye Examinations



Notes: \_\_\_\_\_

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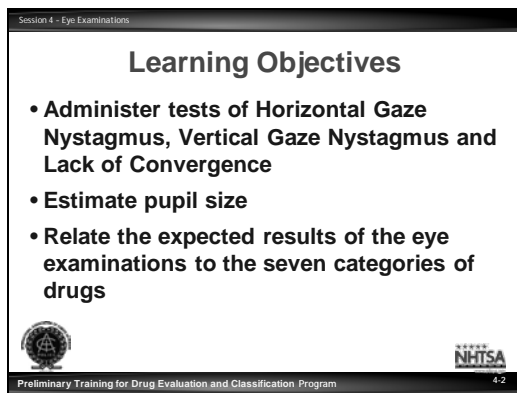
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Upon successfully completing this session the participant will be able to:

- Administer tests of Horizontal Gaze Nystagmus, Vertical Gaze Nystagmus and Lack of Convergence.
- Estimate pupil size.
- Relate the expected results of the eye examinations to the seven categories of drugs.

### CONTENT SEGMENTS

- A. Purposes of the Eye Examinations
- B. Procedures and Clues
- C. Demonstrations
- D. Relationship of Drug Categories to the Eye Examinations

### LEARNING ACTIVITIES

- Instructor-Led Presentations
- Instructor-Led Demonstrations
- Hands-on Practice

Session 4 - Eye Examinations

## Eye Examination Purpose

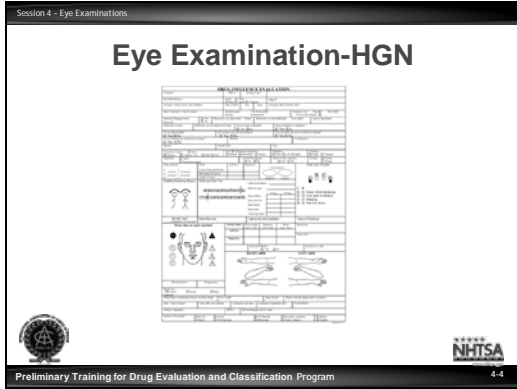
The slide contains a checklist for 'EYE EXAMINATION' with various fields for recording observations. To the right of the checklist is a photograph of a police officer in a dark uniform jacket with a patch on the sleeve, pointing towards a person's face. The person is wearing a light-colored jacket. The slide also features a logo in the bottom left corner and the text 'Preliminary Training for Drug Evaluation and Classification Program' and '4-3' at the bottom.

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### **A. Purposes of the Eye Examinations**

The principal purpose of all of the eye examinations is to obtain articulable facts indicating the presence or absence of specific categories of drugs.

- Certain drug categories usually cause the eyes to react in specific ways.
- Other drug categories usually do not cause those reactions.



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### *Horizontal Gaze Nystagmus (HGN)*

The tests of Horizontal Gaze Nystagmus (HGN) and Vertical Gaze Nystagmus (VGN) provide important indicators of the drug categories that may or may not be present.

- Prior to the administration of the HGN, the subject's eyes should be checked for equal pupil size, resting nystagmus and equal tracking.
- The check for equal pupil size is simply done by visibly checking to see if both pupils are equal in size. If they are not, this may be an indicator of a head injury or other medical conditions.
- The check for equal tracking is done by moving the stimulus smoothly across the subject's entire field of vision checking to see if the eyes track together or if one lags behind.
- If the subject's pupils are noticeably unequal in size or if resting nystagmus is present or if the eyes do not track together, there may be a chance of a medical condition or pathological disorder.
- This part of the examination may require more than one check to ensure that a medical condition or pathological disorder does not exist.
- If HGN is observed, it is likely that the subject may have taken a CNS Depressant, Dissociative Anesthetic, an Inhalant, or a combination of those.

Session 4 - Eye Examinations

## Eye Examination-VGN

Preliminary Training for Drug Evaluation and Classification Program

NHTSA  
4-5

Notes: \_\_\_\_\_

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### *Vertical Gaze Nystagmus (VGN)*

- If VGN is observed, the implication may be that the subject took Dissociative Anesthetics, or fairly large doses of depressants or inhalants (for that individual).
- Point out that it is very unlikely that a subject would exhibit Vertical Gaze Nystagmus without also exhibiting HGN.
- By comparing the subject's blood alcohol concentration with the angle of onset of HGN, it may be possible to determine that alcohol is or is not the sole cause of the observed nystagmus.

Session 4 - Eye Examinations

## Eye Examination - Angle of Onset

**BAC = 50 - Angle of Onset**

Preliminary Training for Drug Evaluation and Classification Program

NHTSA  
4-6

Notes: \_\_\_\_\_

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### *Angle of Onset*


The consistency of onset angle and BAC can be compared using the following formula:

- Explanation:  $BAC = 100 \times \text{blood alcohol}$  (e.g., if blood alcohol is 0.10,  $BAC = 10$ ).
- Example: If onset angle is 35 degrees, then  $BAC = 50 - 35 = 15$ .
- The corresponding blood alcohol concentration would be approximately 0.15.
- Keep in mind that this formula is only a statistical approximation. It is not an exact relationship for all subjects at all times.
- The only purpose of comparing BAC and the angle of onset is to obtain a gross indication of the possible presence of another Depressant, Inhalant, or Dissociative Anesthetic.

Session 4 - Eye Examinations

## Eye Examination - Angle of Onset (Cont.)

Angle of Onset = 35 degrees  
 BAC = 50 - Angle of Onset  
 = 50 - 35  
 = 15



Preliminary Training for Drug Evaluation and Classification Program 4-7

Notes: \_\_\_\_\_

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- A DRE is expected to be able to estimate the angle of onset of nystagmus to the nearest 5 degree increment, over the range from 30 to 45 degrees.
- If the subject's eyes begin to jerk before they have moved to the 30 degree mark, you will not attempt to estimate the angle precisely, but will record that they exhibit "immediate onset."
- From 30 degrees on out, you will record a numeric estimate of onset.

Session 4 - Eye Examinations

## Eye Examination – Lack of Convergence




Preliminary Training for Drug Evaluation and Classification Program 4-8

Notes: \_\_\_\_\_

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### *Lack of Convergence (LOC)*

The check for Lack of Convergence (LOC) can provide another clue as to the possible presence of Depressants, Inhalants, or Dissociative Anesthetics.

Lack of Convergence is also an indicator of the possible presence of Cannabis.


The checks of pupil size, equal tracking and reaction to light provide useful indicators of the possible presence of many drug categories.

- CNS Depressants, CNS Stimulants and Inhalants will usually cause the pupils to react slowly to light.
- CNS Stimulants, Hallucinogens and Cannabis usually will cause the pupils to dilate.
- Narcotic Analgesics will usually cause the pupils to constrict, with little or no reaction to light.

Session 4 – Eye Examinations

## Three Clues of Horizontal Gaze Nystagmus

- Lack of Smooth Pursuit
- Distinct and Sustained Nystagmus at Maximum Deviation
- Angle of Onset



Preliminary Training for Drug Evaluation and Classification Program 4-9

Notes: \_\_\_\_\_

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### **B. Procedures and Clues**

#### *Three Clues of Horizontal Gaze Nystagmus*

Prior to the administration of the HGN test, the eyes are checked separately for equal pupil size, resting nystagmus and equal tracking.

- Note: As pointed out earlier, if the eyes do not track together, or if the pupils are noticeably unequal in size, the chance of a medical disorder or injuries causing the nystagmus may be present. Resting nystagmus may also be observed at this time.

Horizontal Gaze Nystagmus test consists of three separate checks, administered independently to each eye.

#### *Lack of Smooth Pursuit*


The first check is for “lack of smooth pursuit.”

- Position the stimulus approximately 12 to 15 inches from of the subject’s nose.
- Hold the tip of the stimulus slightly above the subject’s eye level.

Session 4 – Eye Examinations

### Three Clues of Horizontal Gaze Nystagmus (Cont.)

- Lack of Smooth Pursuit
- Distinct and Sustained Nystagmus at Maximum Deviation
- Angle of Onset



Click on Picture for Video Example of Lack of Smooth Pursuit

Preliminary Training for Drug Evaluation and Classification Program

NHTSA

4-10

Notes: \_\_\_\_\_

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- Instruct the subject to hold their head still and follow the stimulus with the eyes only.
- Move the stimulus smoothly, all the way to the subject’s left, then all the way to the right, then back again all the way to the left, then once again all the way back to the right.
- While the eye is moving, examine it for evidence of a lack of smooth pursuit.


Use these or similar analogies:

- A smoothly pursuing eye will move without friction, much the way that a windshield wiper glides across the windshield when it is raining steadily. An eye showing lack of smooth pursuit will move in a fashion similar to a wiper moving across a dry windshield.

Session 4 - Eye Examinations

### Three Clues of Horizontal Gaze Nystagmus (Cont.)

- Lack of Smooth Pursuit
- Distinct and Sustained Nystagmus at Maximum Deviation
- Angle of Onset



Preliminary Training for Drug Evaluation and Classification Program 4-11

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*Participant Practice*

*Distinct and Sustained Nystagmus at Maximum Deviation*


The second check is for “distinct and sustained nystagmus at maximum deviation.”

- Again position the stimulus as before.
- Move the stimulus all the way to the subject’s left side and hold it there so that the subject’s eye is turned as far to the side as possible.
- Hold the eye at that position for a minimum of 4 seconds, to check carefully for any jerking that may be present.
- Then, move the stimulus all the way to the subject’s right side, and hold it there for a minimum of 4 seconds.

Session 4 - Eye Examinations

### Three Clues of Horizontal Gaze Nystagmus (Cont.)

- Lack of Smooth Pursuit
- Distinct and Sustained Nystagmus at Maximum Deviation
- Angle of Onset



Click on Picture for Video Example of Maximum Deviation

Preliminary Training for Drug Evaluation and Classification Program 4-12

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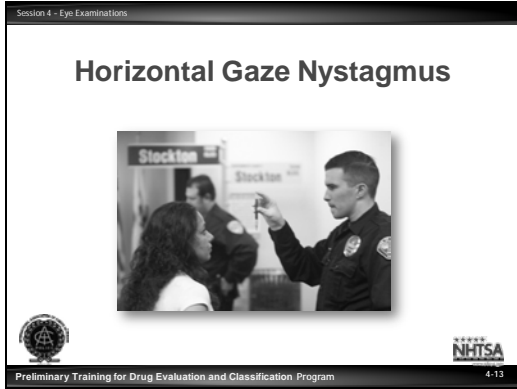
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A slightly or barely visible tremor is not sufficient to consider this cue present.

A definite, strong jerking must be seen.

Participants’ initial practice of the check for distinct and sustained nystagmus at maximum deviation.





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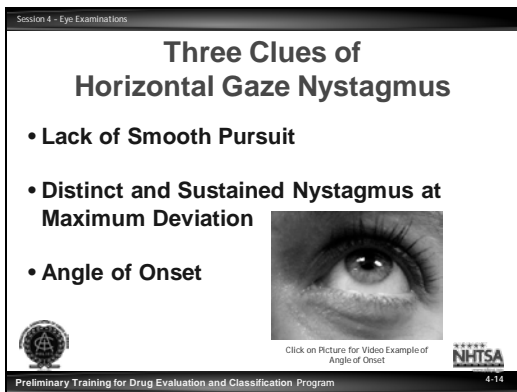
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*Angle of Onset*

The final check is for the “angle of onset.” The formula is  $BAC = 50 - \text{Angle of Onset}$ .

- Position the stimulus as before.
- Slowly move the stimulus to the subject’s left side, carefully watching the eye for the first sign of jerking.
- When you think that you see the eye jerk, stop moving the stimulus and hold it still.
- Verify that the eye is, in fact, jerking.
- Once you have established that you have located the point of onset, estimate the angle.
- Repeat this procedure on the subject’s right eye.



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*Participant Practice*

- Participants’ initial practice of angle of onset estimation.

Session 4 - Eye Examinations

## Three Clues of Horizontal Gaze Nystagmus (Cont.)

- Standardization
- Medical Complications

Preliminary Training for Drug Evaluation and Classification Program 4-15

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Session 4 - Eye Examinations

## Vertical Gaze Nystagmus



Click on Picture for Video Example of Vertical Gaze Nystagmus



Preliminary Training for Drug Evaluation and Classification Program 4-16

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### *Vertical Gaze Nystagmus*

The Vertical Gaze Nystagmus test is a very simple test.

- Position the stimulus horizontally, approximately 12 to 15 inches in front of the subject's nose.
- Point out to the subject that he or she will have to keep their head steady and try to keep their eyes focused on the stimulus as it moves upward.
- Raise the stimulus until the subject's eyes are elevated as far as possible.
- Watch closely for evidence of jerking.

### *Participant Practice*

Participants' initial practice of the Vertical Gaze Nystagmus test.



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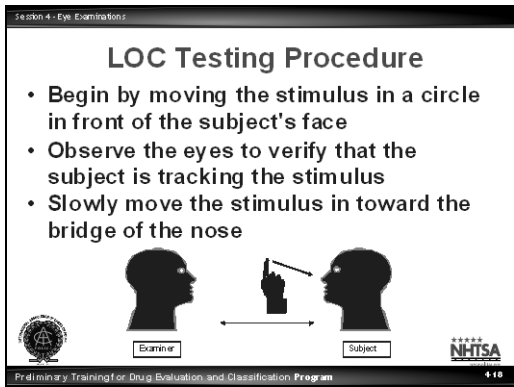
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*Lack of Convergence*

The test for Lack of Convergence (LOC) determines whether the subject is able to cross his or her eyes.



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- Position the stimulus approximately 12 to 15 inches in front of the subject's nose in the same position we use for the HGN test.
- Inform the subject that you are going to move the stimulus around in a circle in front of his or her face and to follow the stimulus with his or her eyes only.
- Inform the subject that you will move the tip of the stimulus in toward the bridge of his or her nose.

Session 4 - Eye Examinations

### LOC Testing Procedure (Cont.)

- Begin by moving the stimulus in a circle in front of the subject's face
- Observe the eyes to verify that the subject is tracking the stimulus
- Slowly move the stimulus in toward the bridge of the nose

The diagram shows a silhouette of an examiner on the left and a silhouette of a subject on the right. An arrow points from the examiner towards the subject. A hand is shown holding a stimulus (a pen) and moving it towards the subject's nose. Labels 'Examiner' and 'Subject' are placed below their respective silhouettes. Logos for the Department of Justice and NHTSA are visible in the bottom corners.

Preliminary Training for Drug Evaluation and Classification Program 4-19

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- Start to move the object slowly in a circle.
- Verify the subject is tracking the stimulus.
- Move the stimulus within approximately two inches of the bridge of the nose. Carefully observe the subject's eyes to determine whether both eyes converge on the stimulus.

Session 4 - Eye Examinations

Normal convergence is a distance approximately two inches (2") from the bridge of the nose

The diagram shows a silhouette of an examiner on the left and a silhouette of a subject on the right. A vertical line is drawn from the bridge of the subject's nose to a horizontal line representing the distance from the examiner. A double-headed arrow indicates this distance is 2 inches. Labels 'Examiner' and 'Subject' are placed below their respective silhouettes. Logos for the Department of Justice and NHTSA are visible in the bottom corners.

Preliminary Training for Drug Evaluation and Classification Program 4-20

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- If the eyes converge (cross) when the stimulus is approximately two inches from the bridge of the nose, the Lack of Convergence is "not present"
- Lack of convergence is present if the subject's eyes do not come together and cross as they track and stay aligned on the stimulus
- In a normal non-impaired subject, the eyes should come together (converge) and remain converged for one second.
- If the eyes do not converge or remain converged on the stimulus for one second, then Lack of Convergence is present.

*Participant Practice*

Participants' initial practice of the test for Lack of Convergence.

Session 4 - Eye Examinations

## Drug Categories That Induce LOC

The following drug categories usually will induce Lack of Convergence:

- CNS Depressants
- Inhalants
- Dissociative Anesthetics
- Cannabis

Preliminary Training for Drug Evaluation and Classification Program 4-21

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Drug categories which usually cause lack of convergence include:

- CNS Depressants
- Inhalants
- Dissociative Anesthetics
- Cannabis

Session 4 - Eye Examinations

## Estimating Pupil Size

Preliminary Training for Drug Evaluation and Classification Program 4-22

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### *Estimation of Pupil Size*

We use a device called a pupillometer to estimate the size of the subject's pupil.

The DRE pupillometer has a series of circles or semi-circles, with diameters usually ranging from 1.0 mm to 10.0 mm, in half millimeter increments.

The pupillometer is held alongside the subject's eye, and moved up and down until the circle or semi-circle closest in size to the pupil is located.

The pupil size estimations are recorded as the numeric value that corresponds to the diameter of the circle or semi-circle closest in size to the subject's pupil in each lighting condition.

Session 4 - Eye Examinations

### Estimating Pupil Size (Cont.)

Preliminary Training for Drug Evaluation and Classification Program

NHTSA

4-23

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### Participants' Initial Practice of Pupil Size Estimation

Session 4 - Eye Examinations

### Estimating Pupil Size (Cont.)

DRE Average range of pupil size in room light is 2.5 to 5.0 mm

Preliminary Training for Drug Evaluation and Classification Program

NHTSA

4-24

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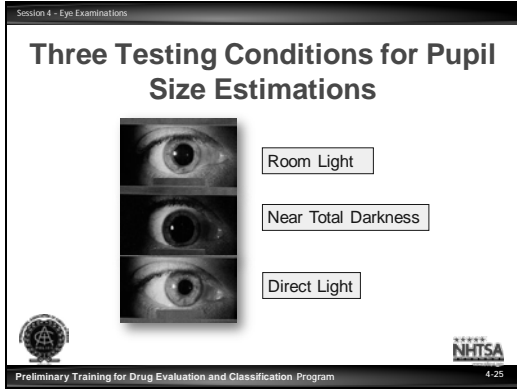
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- 8.5 or larger \_\_\_\_\_
- 8.0 \_\_\_\_\_
- 7.5 \_\_\_\_\_
- 7.0 \_\_\_\_\_
- 6.5 \_\_\_\_\_
- 6.0 \_\_\_\_\_
- 5.5 \_\_\_\_\_
- 5.0 \_\_\_\_\_
- 4.5 \_\_\_\_\_
- 4.0 \_\_\_\_\_
- 3.5 \_\_\_\_\_
- 3.0 \_\_\_\_\_
- 2.5 or smaller \_\_\_\_\_



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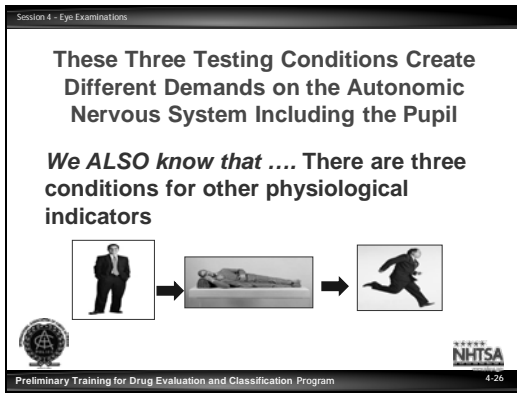
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### Three Lighting Conditions

We estimate pupil size under three (3) different lighting conditions:

- Room Light
- Near Total Darkness
- Direct Light



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- Different testing conditions create different demands on the autonomic nervous system, including the pupil.
- Examining the pupils in three different lighting conditions is similar to examining other clinical indicators, i.e., pulse or blood pressure in different conditions.


In the DEC program and DRE training we use the terms “Normal”, “Average”, “Average Ranges” or “DRE Average Range”.

“Normal” means a range of values that represents the “middle” or “typical” value that the majority of healthy, non-impaired people would be expected to exhibit or have in a specific test.

Session 4 – Eye Examinations

### Estimation of Pupil Size

- Pupils are examined in Room Light prior to darkening the room
- The final two pupil size estimations are made with the use of a penlight in a near totally darkened room
- Prior to estimating the pupil sizes, we darken the room and wait 90 seconds to allow the subject's eye to adapt to the dark



Preliminary Training for Drug Evaluation and Classification Program 4-27

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*Estimation of Pupil Size under Room Light*

- Pupils are examined in Room Light prior to darkening the room.

*Estimation of Pupil Size under Near Total Darkness and Direct Light*

The final two pupil size estimations are made with the use of a penlight in a near totally darkened room.


- Prior to estimating the pupil sizes, we darken the room and wait 90 seconds to allow the subject's eyes and our own to adapt to the dark.
- For the estimation under near total darkness, completely cover the tip of the penlight with your finger or thumb, so that only a reddish glow and no white light emerges.
- Bring the glowing red tip up toward the subject's left eye until you can distinguish the pupil from the colored portion of the eye (iris).
- Position the pupillometer alongside the pupil (left eye first) and locate the circle or semi-circle that is closest in size to the pupil.
- Repeat the procedure for the subject's right eye.



Session 4 – Eye Examinations

### Estimation of Pupil Size Darkroom Demonstrations

- For the estimation under direct light, bring the uncovered light from the side of the subject's face directly into his or her left eye and hold it there for approximately 15 seconds



Preliminary Training for Drug Evaluation and Classification Program 4-28

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- For the estimation under direct light, bring the uncovered light from the side of the subject's face directly into his or her left eye and hold it there for approximately 15 seconds.
- Bring the pupillometer up alongside the left eye, and find the circle or semi-circle that is closest in size to the pupil.
- Repeat the procedure for the right eye.

*Average Sizes for the Pupil*

Since we estimate pupil size under three different lighting conditions (Room Light, Near Total Darkness, and Direct Light) the range of pupil sizes will vary.

Session 4 – Eye Examinations


## Recent Research for DRE Average Values

**Mean or Average:**

- The average value of a given set of findings

**Average Range: (1.5 Standard Deviation)**

- The range of data in which 88% or greater of the findings are included



Preliminary Training for Drug Evaluation and Classification Program 4-29

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*Basic Concepts Relative to Interpreting Pupil Sizes*


It is important to understand a few basic concepts relative to interpreting pupil sizes. Understanding these concepts will allow DRE's to better understand the relationship of pupil size to impairment.

Mean values and average ranges: scientifically validated studies were conducted to determine normative values for pupil size in non-impaired persons. These studies show what one would expect a person to exhibit when their pupil sizes are checked under different lighting conditions. Sometimes average means "in the middle" or sum of all numbers divided by the number in a particular group. What we use for interpretation purposes are "average ranges" of pupil sizes.

- As a DRE, you will be making your decision of impairment based on clinical, psychophysical, and behavioral indicators. This includes using pupil sizes as one of the factors in determining that impairment.
- With many people, even under very bright light, the pupils won't constrict much below a diameter of 2.0 mm, and even under near total dark conditions, the pupils usually only dilate to a diameter of not more than 8.5 mm.

Session 4 – Eye Examinations

## Updated Values – Where did they come from specifically related to DRE?



**An evaluation of pupil size standards used by police officers for detecting drug impairment**

Jack E. Richman, O.D., Kathleen Galko McAndrew, M.S.N., ADMS\*  
Donald Decker\* and Stephen C. Mullaney, B.S., M.S.\*\*

\*The New England College of Optometry, Boston, Massachusetts and \*\*Massachusetts State Police, Massachusetts

CLINICAL RESEARCH

An evaluation of pupil size standards used by police officers for detecting drug impairment

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The New England College of Optometry, Boston, Massachusetts and \*\*Massachusetts State Police, Massachusetts

NHSTA

Preliminary Training for Drug Evaluation and Classification Program 4-30

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- Studies have indicated there are significant differences between the average pupil size in these three conditions. (Source: See Below)
- Consequently, the use of three distinct pupil sizes range for each of the different testing conditions may be more useful to determine impairment versus non-impairment.

Source: “An Evaluation of Pupil Size Standards Used By Police Officers for Detecting Drug Impairment” JAOA, March 2004, Richman, McAndrew, Decker & Mullaney.

Session 4 – Eye Examinations

|         |        |
|---------|--------|
| 10.0 mm | 0.00%  |
| 9.5 mm  | 0.00%  |
| 9.0 mm  | 0.00%  |
| 8.5 mm  | 0.00%  |
| 8.0 mm  | 0.00%  |
| 7.5 mm  | 0.45%  |
| 7.0 mm  | 1.12%  |
| 6.5 mm  | 1.79%  |
| 6.0 mm  | 0.89%  |
| 5.5 mm  | 3.35%  |
| 5.0 mm  | 4.24%  |
| 4.5 mm  | 13.17% |
| 4.0 mm  | 23.66% |
| 3.5 mm  | 24.11% |
| 3.0 mm  | 18.08% |
| 2.5 mm  | 5.36%  |
| 2.0 mm  | 0.89%  |
| 1.5 mm  | 0.00%  |
| 1.0 mm  | 0.00%  |

### Room Light

Room Light is approximately 4.0 mm, with an average range of pupil sizes ranging from 2.5 to 5.0 mm.

88% fall within the range of 2.5 to 5.0 mm. In fact, the percentage that falls within 3.5 to 4.5 mm is more than half (61%) of the people.

NHSTA

Preliminary Training for Drug Evaluation and Classification Program 4-31

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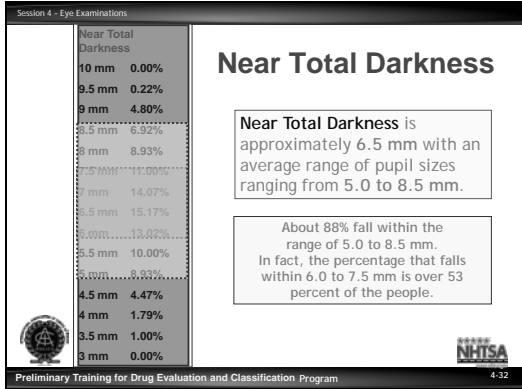
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- Room Light is approximately 4.0 mm with an average range of sizes ranging from 2.5 to 5.0 mm.



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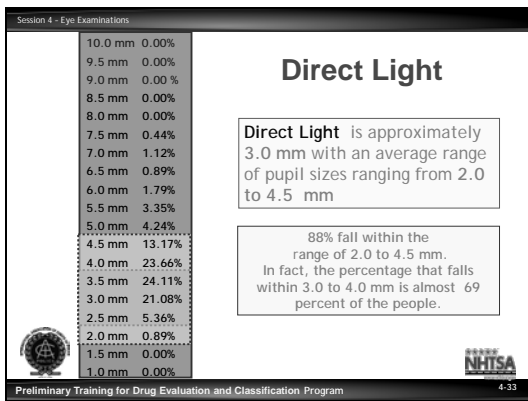
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- Near Total Darkness is approximately 6.5 mm with an average range of pupil sizes ranging from 5.0 to 8.5 mm.



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- Direct Light is approximately 3.0 mm with an average range of pupil sizes ranging from 2.0 to 4.5 mm

Many drugs, however, will affect the dilation or constriction of the pupils and many cause the pupil size to go outside these ranges

Session 4 - Eye Examinations

## Pupil Reaction Time

- Check of the pupil's reaction to light takes place at the same time as the test of pupil size under direct light
- Observe the subject's pupil size as the penlight is aimed directly at the eye
- As you bring the beam of light directly into the subject's eye, note how the pupil reacts
- Under ordinary conditions, the pupil should react very quickly, and constrict noticeably when the light strikes the eye

Preliminary Training for Drug Evaluation and Classification Program 4-34

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The check of the pupil's reaction to light takes place at the same time as the test of pupil size under direct light.

- Observe the subject's pupil size as the penlight is aimed directly at the subject's eye.
- As you bring the beam of light directly into the subject's eye, note how the pupil reacts.
- Under ordinary conditions, the pupil should react very quickly, and constrict noticeably when the light beam strikes the eye.
- Under the influence of certain categories of drugs, the pupil's reaction may be very sluggish, or there may be no constriction at all.

Session 4 - Eye Examinations

## Pupil Reaction Time

### Participant Practice

Preliminary Training for Drug Evaluation and Classification Program 4-35

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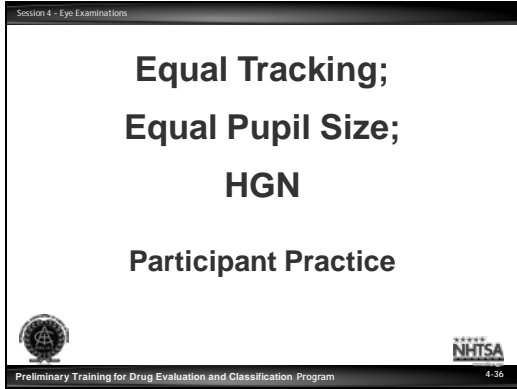
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### *Participant Practice*

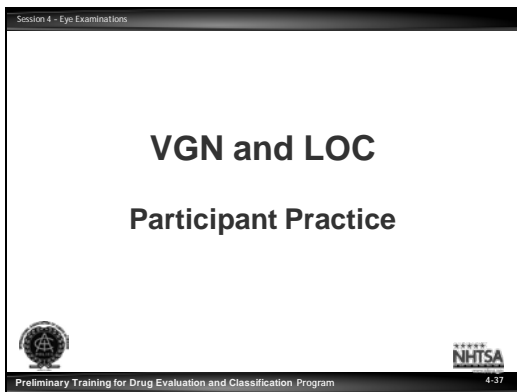
Participants' initial practice in measuring the pupil's reaction to light.



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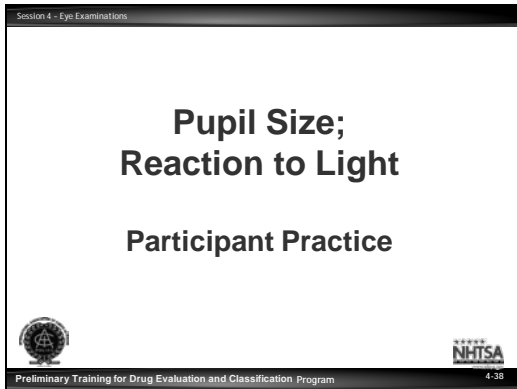
### C. Demonstrations

#### *Estimation of the Angle of Onset*



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#### *Demonstration of Vertical Gaze Nystagmus and Lack of Convergence*



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#### *Demonstration of Pupil Size Estimation and Test for Reaction to Light*

- Pupil size estimation under room light.
- Darkroom estimations of pupil size.

Session 4 – Eye Examinations

### Pupil Size Ranges Recap

- **Room Light: 4.0 mm**  
with average range of 2.5 – 5.0 mm
- **Near Total Darkness: 6.5 mm**  
with average range of 5.0 – 8.5 mm
- **Direct Light: 3.0 mm**  
with average range of 2.0 – 4.5 mm



Preliminary Training for Drug Evaluation and Classification Program 4-39

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To review, the DRE pupil size ranges for non-impaired people are:

- Room Light: 4.0 mm with an average range of 2.5 – 5.0 mm.
- Near Total Darkness: 6.5 mm with an average range of 5.0 – 8.5 mm.
- Direct Light: 3.0 mm with an average range of 2.0 – 4.5 mm.

Session 4 – Eye Examinations

### Relationship of Drug Categories to the Eye Examinations

|     | CNS Depressants | CNS Stimulants | Hallucinogens | Dissociative Anesthetics | Narcotic Analgesics | Inhalants | Cannabis |
|-----|-----------------|----------------|---------------|--------------------------|---------------------|-----------|----------|
| HGN | Present         | None           | None          | Present                  | None                | Present   | None     |

Preliminary Training for Drug Evaluation and Classification Program 4-40

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### D. Relationship of Drug Categories to the Eye Examinations

Three of the seven drug categories normally will cause Horizontal Gaze Nystagmus.

- CNS Depressants, Inhalants and Dissociative Anesthetics normally will cause HGN.
- The other four categories normally will not cause HGN.

Session 4 – Eye Examinations

### Relationship of Drug Categories to the Eye Examinations (Cont.)

|                     | CNS Depressants | CNS Stimulants | Hallucinogens | Dissociative Anesthetics | Narcotic Analgesics | Inhalants | Cannabis |
|---------------------|-----------------|----------------|---------------|--------------------------|---------------------|-----------|----------|
| HGN                 | Present         | None           | None          | Present                  | None                | Present   | None     |
| VGN                 | Present         | None           | None          | Present                  | None                | Present   | None     |
| Lack of Convergence | Present         |                |               | Present                  |                     | Present   |          |

FOOTNOTE: These indicators are those most consistent with the category. Keep in mind that there may be variations due to individual reactions, dose taken and drug interactions.

Preliminary Training for Drug Evaluation and Classification Program 4-41

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- Any drug that will cause HGN also will cause Vertical Gaze Nystagmus, if a high enough dose of the drug is taken.
- Depressants, Inhalants and Dissociative Anesthetics can all cause Vertical Gaze Nystagmus at higher doses for that individual.
- But if a drug will not cause HGN, then it will not cause Vertical Gaze Nystagmus.

All drugs that cause nystagmus also will cause the eyes to be unable to converge.

- Therefore, Depressants, Inhalants and Dissociative Anesthetics, including PCP and its analogs, usually will cause Lack of Convergence.
- Interestingly, there is one category of drug that does not cause nystagmus but that does usually cause Lack of Convergence.



Session 4 – Eye Examinations

### Relationship of Drug Categories to the Eye Examinations (Cont.)

|                     | CNS Depressants | CNS Stimulants | Hallucinogens | Dissociative Anesthetics | Narcotic Analgesics | Inhalants  | Cannabis    |
|---------------------|-----------------|----------------|---------------|--------------------------|---------------------|------------|-------------|
| HGN                 | Present         | None           | None          | Present                  | None                | Present    | None        |
| VGN                 | Present         | None           | None          | Present                  | None                | Present    | None        |
| Lack of Convergence | Present         | None           | None          | Present                  | None                | Present    | Present     |
| Pupil Size          |                 | Dilated        | Dilated       | Normal                   | Constricted         | Normal (4) | Dilated (6) |

FOOTNOTE: These indicators are those most consistent with the category. Keep in mind that there may be variations due to individual reactions, dose taken and drug interactions.

(4) Normal, but may be dilated. (6) Pupil size possibly normal.

Preliminary Training for Drug Evaluation and Classification Program 4-42

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- Cannabis usually does cause Lack of Convergence, even though it does not cause nystagmus.
- The other three categories do not cause a Lack of Convergence.

An interesting and important fact is that the drugs that cause nystagmus usually don't affect pupil size, and the drugs that don't cause nystagmus usually do affect pupil size.

- CNS Stimulants and Hallucinogens usually cause the pupils to become larger or "dilated."
- Cannabis may cause the pupils to dilate.
- Narcotic Analgesics usually cause the pupils to become smaller or "constricted."
- Dissociative Anesthetics and most Inhalants tend to leave pupil size in the average ranges.

Session 4 – Eye Examinations



### Relationship of Drug Categories to the Eye Examinations (Cont.)

|                     | CNS Depressants | CNS Stimulants | Hallucinogens | Dissociative Anesthetics | Narcotic Analgesics | Inhalants  | Cannabis    |
|---------------------|-----------------|----------------|---------------|--------------------------|---------------------|------------|-------------|
| HGN                 | Present         | None           | None          | Present                  | None                | Present    | None        |
| VGN                 | Present         | None           | None          | Present                  | None                | Present    | None        |
| Lack of Convergence | Present         | None           | None          | Present                  | None                | Present    | Present     |
| Reaction to Light   | Normal (1)      | Dilated        | Dilated       | Normal                   | Constricted         | Normal (4) | Dilated (6) |
| Pupil Size          | Slow            | Slow           | Normal        | Normal                   |                     |            | Normal      |

FOOTNOTE: These indicators are those most consistent with the category. Keep in mind that there may be variations due to individual reactions, dose taken and drug interaction.

(1) Soma, Quaaludes and possibly some anti-depressants usually dilate pupils.

(4) Normal, but may be dilated. (6) Pupil size possibly normal.

Preliminary Training for Drug Evaluation and Classification Program 4-43

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CNS Depressants also usually leave the pupils near the average range.

- However, there are some exceptions, i.e., depressant drugs that usually dilate the pupils.

Soma, Quaaludes and some anti-depressants usually dilate pupils.

Generally, the pupillary reaction to light is either slowed by the effect of the drug or the pupil reacts normally. The most significant exception is the effect caused by Narcotic Analgesics. Though there is always some reaction to light, in subjects, the constricted pupil caused by narcotics makes it difficult to perceive a change in the pupil size.

- CNS Depressants and CNS Stimulants usually cause a slowed reaction to light.
- With Hallucinogens, Dissociative Anesthetics and Cannabis the pupillary reaction to light is usually normal.

Session 4 – Eye Examinations

### Relationship of Drug Categories to the Eye Examinations (Cont.)



|                     | CNS Depressants | CNS Stimulants | Hallucinogens | Dissociative Anesthetics | Narcotic Analgesics    | Inhalants  | Cannabis    |
|---------------------|-----------------|----------------|---------------|--------------------------|------------------------|------------|-------------|
| HGN                 | Present         | None           | None          | Present                  | None                   | Present    | None        |
| VGN                 | Present         | None           | None          | Present                  | None                   | Present    | None        |
| Lack of Convergence | Present         | None           | None          | Present                  | None                   | Present    | Present     |
| Reaction to Light   | Normal (1)      | Dilated        | Dilated       | Normal                   | Constricted            | Normal (4) | Dilated (6) |
| Pupil Size          | Slow            | Slow           | Normal (3)    | Normal                   | LITTLE to NONE Visible | Slow       | Normal      |

FOOTNOTE: These indicators are those most consistent with the category. Keep in mind that there may be variations due to individual reactions, dose taken and drug interaction.

(1) Soma, Quaaludes and possibly some anti-depressants usually dilate pupils.

(3) Certain psychedelic amphetamines may cause slowing. (6) Pupil size possibly normal.

(4) Normal, but may be dilated.

Preliminary Training for Drug Evaluation and Classification Program 4-44

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Due to the constricted nature of the pupils when under the influence of Narcotic Analgesics, it is difficult to perceive a reaction to light. As a result, we list reaction to light for Narcotic Analgesics as “little or none visible.”

Inhalants will usually slow pupillary reaction.

Session 4 – Eye Examinations

# QUESTIONS?



Preliminary Training for Drug Evaluation and Classification Program 4-45

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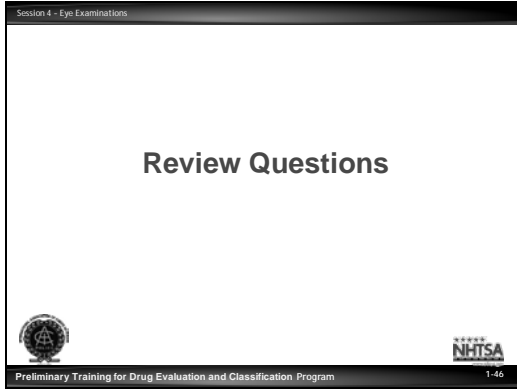
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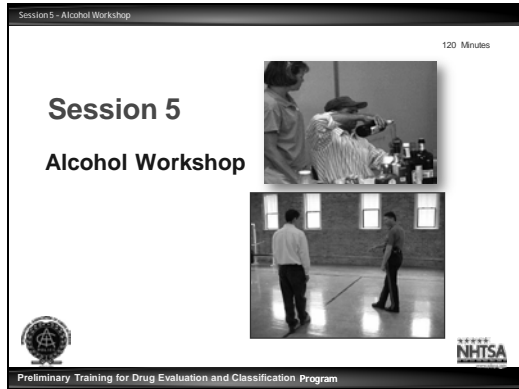


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### **REVIEW QUESTIONS**

1. Name the three clues of impairment associated with Horizontal Gaze Nystagmus.
2. Complete this formula  $BAC = 50 - ???$  :
3. Which categories of drugs will not cause Vertical Gaze Nystagmus?
4. Which categories of drugs usually will cause Lack of Convergence?
5. Name the three lighting conditions under which a DRE makes pupil size estimations.
6. What is the average range of pupil size for room light?
7. Which categories of drugs will usually slow down the reaction of the pupils to light?

## Participant Manual DRE Pre School - Session 5 – Alcohol Workshop



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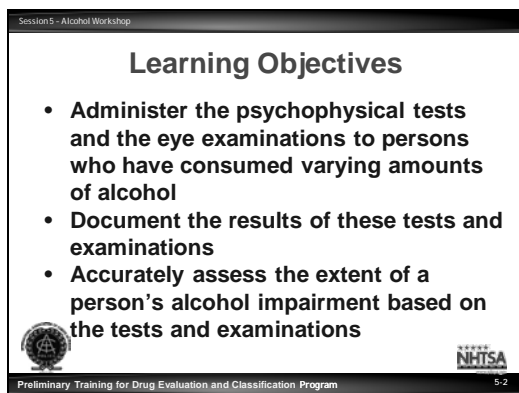
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Upon successfully completing this session the participant will be able to:

- Administer the psychophysical tests and the eye examinations to persons who have consumed varying amounts of alcohol.
- Document the results of these tests and examinations.
- Accurately assess the extent of a person's alcohol impairment based on the tests and examinations.

### CONTENT SEGMENTS

- A. Assignments and Procedures
- B. Testing
- C. Feedback and Discussion
- D. Alcohol Workshop Checklist

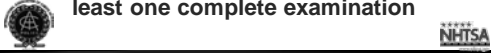
### LEARNING ACTIVITIES

- Hands-on Practice
- Participant-Led Presentations

Session 5 - Alcohol Workshop

### Team Assignments

- One member will be an examiner and will complete all portions of the exam
- One member will be the recorder and document the findings of the examination on the evaluation form
- All others in the group will observe/coach
- Each team member will conduct at least one complete examination



Preliminary Training for Drug Evaluation and Classification Program 5-3

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## **A. Assignments and Procedures**

Session 5 - Alcohol Workshop

### Testing Procedures

- Horizontal Gaze Nystagmus (record onset angle in each eye)
- Vertical Gaze Nystagmus
- Lack of Convergence
- Modified Romberg Balance
- Walk and Turn
- One Leg Stand (on left foot)
- One Leg Stand (on right foot)
- Finger to Nose



Preliminary Training for Drug Evaluation and Classification Program 5-4

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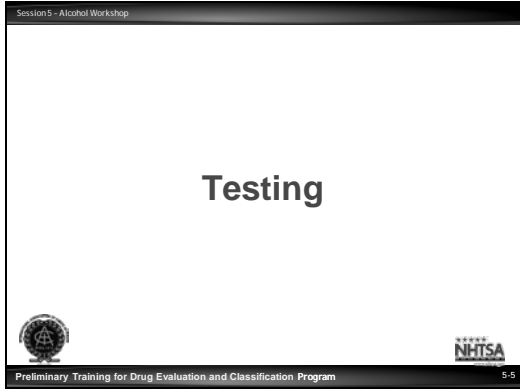
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### *Explanation of Testing Procedures*

Each team will conduct the following sequence of tests and examinations on each volunteer:

- HGN (record angle of onset in each eye).
- Vertical Gaze Nystagmus.
- Lack of Convergence.
- Modified Romberg Balance.
- Walk and Turn.
- One Leg Stand (standing on left leg).
- One Leg Stand (standing on right leg).
- Finger to Nose

Upon completing the test and examinations, the team members will record their best estimate as to the volunteer's BAC.



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**B. Testing**

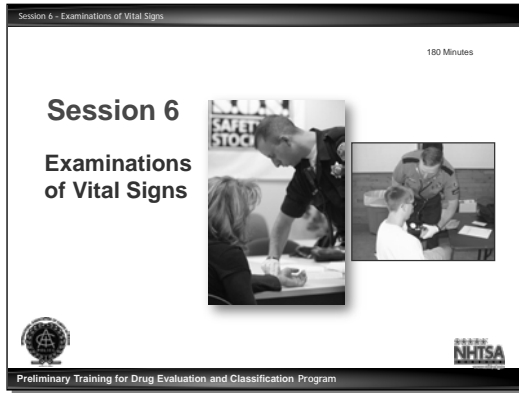
**C. Feedback and Discussion**

**D. Alcohol Workshop Checklist**



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## Participant Manual DRE Pre School - Session 6 – Examinations of Vital Signs



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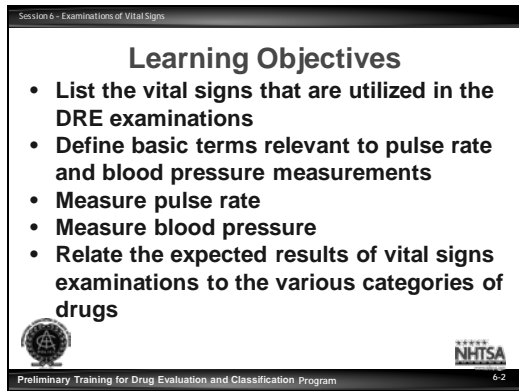
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Upon successfully completing this session the participant will be able to:

- List the vital signs that are utilized in the DRE examinations.
- Define basic terms relevant to pulse rate and blood pressure measurements.
- Measure pulse rate.
- Measure blood pressure.
- Relate the expected results of vital signs examinations to the various categories of drugs.

### CONTENT SEGMENTS

- A. Purposes of the Examinations
- B. Procedures and Cues
- C. Demonstrations
- D. DRE Ranges of Vital Signs
- E. Relationship of Drug Categories to the Vital Signs Examinations
- F. Practice

### LEARNING ACTIVITIES

- Instructor-Led Presentations
- Participant-Led Demonstrations
- Hands-on Practice




Session 6 - Examinations of Vital Signs

## Vital Signs

- Pulse rate
- Blood pressure
- Temperature

Different types of drugs affect these vital signs in different ways



Preliminary Training for Drug Evaluation and Classification Program 6-3

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### **A. Purposes of the Examinations**

The vital signs that are relevant to the drug influence evaluation process include:

- Pulse rate
- Blood pressure
- Temperature

Different types of drugs affect these vital signs in different ways.

Certain drugs tend to “speed up” the body and elevate these vital signs.

Clarification:

- Pulse may quicken
- Blood pressure may rise
- Temperature may rise

Other drugs tend to “slow down” the body and lower these vital signs.

Clarification:

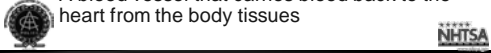
- Pulse may slow
- Blood pressure may drop
- Temperature may fall

Systematic examination of the vital signs gives us much useful information concerning the possible presence or absence of various categories of drugs.

Session 6 – Examinations of Vital Signs

### Definitions Concerning “Pulse”

- **Pulse**  
The expansion and contraction of an artery generated by the pumping action of the heart
- **Pulse Rate**  
The number of pulsations in an artery per minute
- **Artery**  
A strong, elastic blood vessel that carries blood from the heart to the body tissues
- **Vein**  
A blood vessel that carries blood back to the heart from the body tissues



Preliminary Training for Drug Evaluation and Classification Program 6-4

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**B. Procedures and Cues**

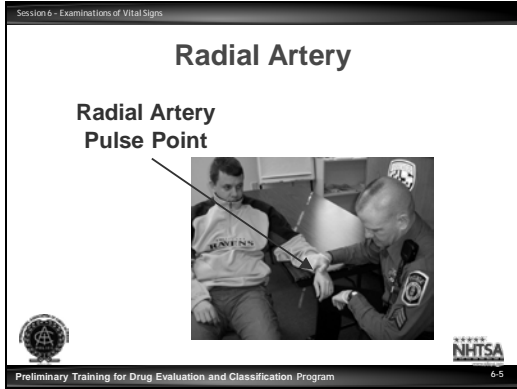
*Measurement of Pulse Rate*

- Pulse is the expansion and contraction of an artery generated by the pumping action of the heart.
- Pulse rate is the number of pulsations in an artery per minute.
- An artery is a strong, elastic blood vessel that carries blood away from the heart.
- A vein is a blood vessel that carries blood back to the heart.
- When the heart contracts, it squeezes blood out of its chambers into the arteries.
- The surging blood causes the arteries to expand.

By placing your fingers on the skin next to an artery and pressing down, you can feel the artery expand as the blood surges through.

By keeping your fingers on the artery and counting the number of pulses that occur in one minute, you will measure the pulse rate.

Pulse is easy to measure, once you locate an artery close to the surface of the skin.



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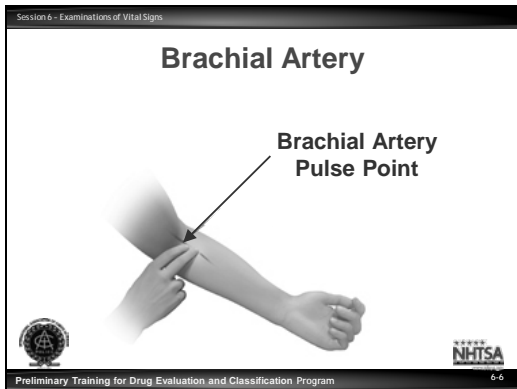
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### *Radial Artery*

One convenient pulse point involves the radial artery.

- The radial artery can be located in or near the natural crease of the wrist, on the side of the wrist next to the thumb.
- Point to the radial artery pulse point on your own wrist.
- Hold your left hand out, with the palm down.
- Place the tips of your right hand's index finger and middle finger into the crease of your left wrist, and exert a slight pressure.
- Allow your left hand to curl downward.
- You should be able to feel the pulse in your radial artery.



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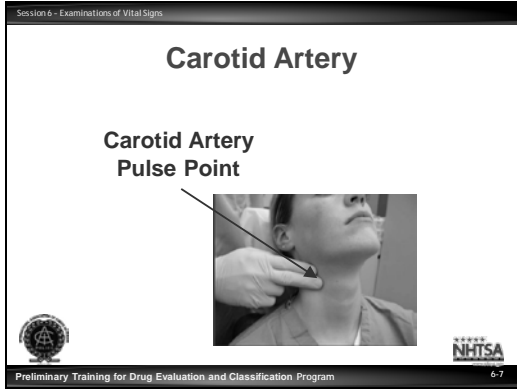
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### *Brachial Artery*

Another pulse point involves the brachial artery.

- The brachial artery can be located in the crook of the arm, halfway between the center of the arm and the side of the arm closest to the body.
- Hold your left hand out, with the palm up.
- Place the tips of your right hand's index and middle fingers into the crook of your left arm, close to the body, and exert a slight pressure.
- You should be able to feel the pulse in your brachial artery.



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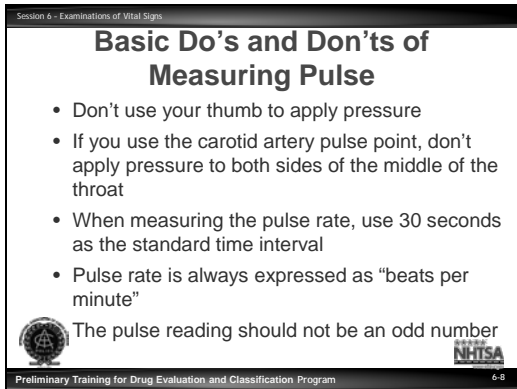
*Carotid Artery*

Another pulse point involves the carotid artery.

- The carotid artery can be located in the neck, on either side of the middle of the throat (“Adam’s Apple”).

Place the tips of your right hand’s index and middle fingers alongside the right side of your “Adam’s Apple.”

- You should be able to feel the pulse in your carotid artery.



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*Basic Do's and Don'ts of Measuring Pulse*

- Don't use your thumb to apply pressure while measuring a subject's pulse.
- If you use the carotid artery pulse point, don't apply pressure to both sides of the middle of the throat: this can cut off the supply of blood to the brain.
- When measuring the pulse rate, use 30 seconds as the standard time interval.

Session 6 - Examinations of Vital Signs

### Pulse Hands On Practice

- Work in pairs, taking turns measuring each other's pulse
- Record partner's pulse rate



Preliminary Training for Drug Evaluation and Classification Program

NHTSA

6-9

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*Participants' Initial Practice at Measuring Pulse Rate*


Monitor, coach and critique the participants' practice. Allow the practice to continue for only about 5 minutes.

- |                 |            |
|-----------------|------------|
| 50 or less_____ | 76-78_____ |
| 52-54_____      | 80-82_____ |
| 56-58_____      | 84-86_____ |
| 60-62_____      | 88-90_____ |
| 64-66_____      | 92-94_____ |
| 68-70_____      | 96-98_____ |
| 72-74_____      | 100+_____  |

Session 6 - Examinations of Vital Signs

## Definitions Concerning "Blood Pressure"

- **Blood Pressure**  
The force that the circulating blood exerts on the walls of the arteries
- **Systolic Pressure**  
The maximum blood pressure, reached as the heart contracts
- **Diastolic Pressure**  
The minimum pressure, reached when the heart is fully expanded



NHTSA  
6-10

Preliminary Training for Drug Evaluation and Classification Program

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### *Measurement of Blood Pressure*

Blood pressure is the force that the circulating blood exerts on the walls of the arteries.

- Blood pressure changes constantly as the heart contracts and relaxes.
- Blood pressure reaches its maximum as the heart contracts and sends the blood surging through the arteries. This is called the systolic pressure.
- Blood pressure reaches its minimum when the heart is fully expanded. This is called the diastolic pressure.
- It is always necessary to measure and record both the systolic and diastolic blood pressure.

Session 6 - Examinations of Vital Signs

## Sphygmomanometer




NHTSA  
6-11

Preliminary Training for Drug Evaluation and Classification Program

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The device used for measuring blood pressure is called a sphygmomanometer.

The sphygmomanometer has a special cuff that can be wrapped around the subject's arm and inflated with air pressure.

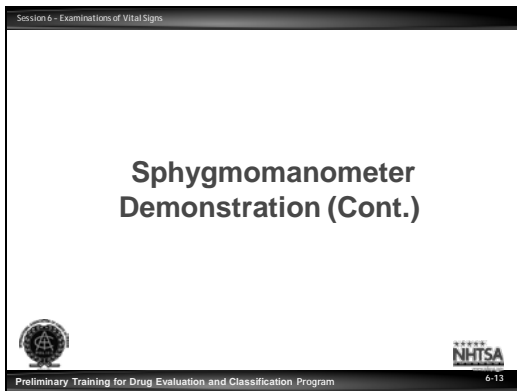


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- As the pressure in the cuff increases, the cuff squeezes tightly on the arm.
- When the pressure gets high enough, it will squeeze the artery completely shut.
- Blood will cease flowing through the brachial artery. Since the brachial artery “feeds” the radial artery, blood will also cease flowing through the radial artery.

If we slowly release the air in the cuff, the pressure on the arm and on the artery will start to drop.

- Eventually, the pressure will drop enough so that blood will once again start to flow through the artery.
- Blood will start flowing in the artery once the pressure inside the artery equals the pressure outside the artery.




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- The two pressures will become equal when the air pressure in the cuff drops down to the systolic pressure.
- Point out that the blood would spurt through the artery each time the heart contracted, but would cease flowing when the heart expanded.
- When that happens, blood will spurt through the artery each time the heart contracts.
- Once the air pressure in the cuff drops down to the diastolic level, the blood will flow continuously through the artery.

Session 6 - Examinations of Vital Signs

### The Basics of Blood Pressure Measurement

- Apply enough air pressure to cut off the flow of blood through the artery
- Slowly release the air, about 2 mmHg per second, until the blood just begins to spurt through the artery: **THAT WILL BE THE SYSTOLIC PRESSURE**
- Continue to release the air until the blood flows continuously: **THAT WILL BE THE DIASTOLIC PRESSURE**



Preliminary Training for Drug Evaluation and Classification Program 6-14

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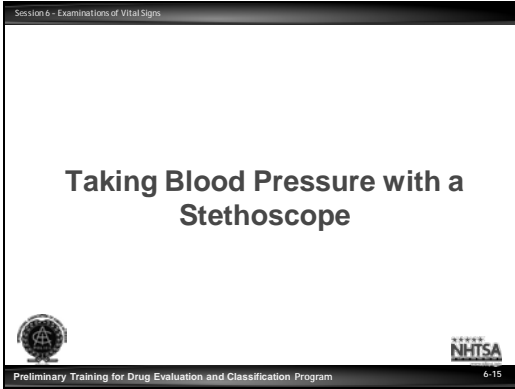
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### Overview of Procedures for Measuring Blood Pressure

- Apply enough air pressure to the cuff to cut off the flow of blood through the artery (approximately 180 mmHg).
- Slowly release the air pressure until the blood just begins to spurt through the artery: that level will be the systolic pressure.
- Slowly release the pressure in the cuff.
- Emphasize that the pressure should drop at approximately 2 mmHg per second (5 sec for each 10 mm drop).
- Continue to release the air pressure until the blood flows continuously through the artery: that level will be the diastolic pressure.

We can listen to the spurting blood, using a stethoscope.





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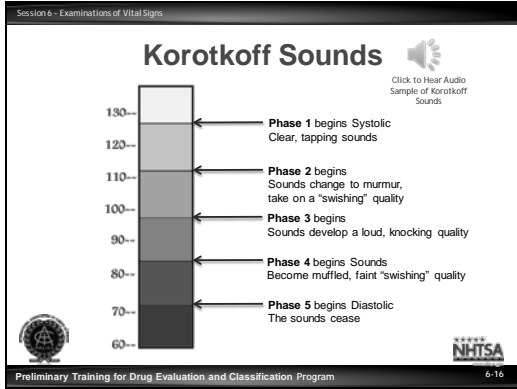
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- Apply the stethoscope to the skin directly above the artery.
- Apply pressure to the cuff, enough to cut off the flow of blood.
- Inflate the cuff on the participant-volunteer's arm.
- When no blood is flowing through the artery, we hear nothing through the stethoscope.
- Slowly release the air from the cuff, letting the pressure start to drop.
- Release the air in the cuff.
- When we drop to the systolic pressure, we start to hear a spurting sound.
- As we continue to allow the air pressure to drop, the surges of blood become steadily longer.
- When we drop to the diastolic pressure, the blood slows steadily and all sounds cease.



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### *Korotkoff Sounds*

The sounds that we listen to are called Korotkoff Sounds. Named after Dr. Nikolai Korotkoff, a Russian physician who introduced the method of determining blood pressure in 1905.

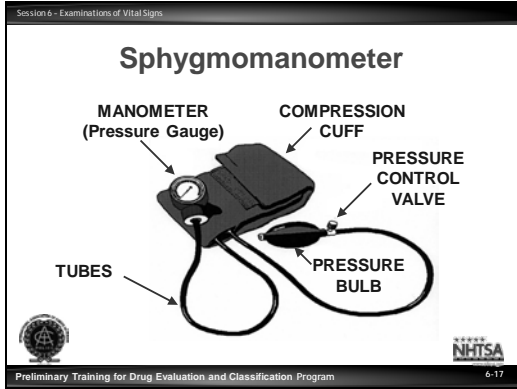
Phase 1: the first appearance of clear, tapping sounds that gradually increase in intensity.

Phase 2: the sounds change to a murmur and take on a swishing quality.

Phase 3: the sounds develop a loud, knocking quality (not quite as clear as Phase 1).

Phase 4: the sounds suddenly become muffled and again have a faint swishing quality.

Phase 5: the sounds cease.



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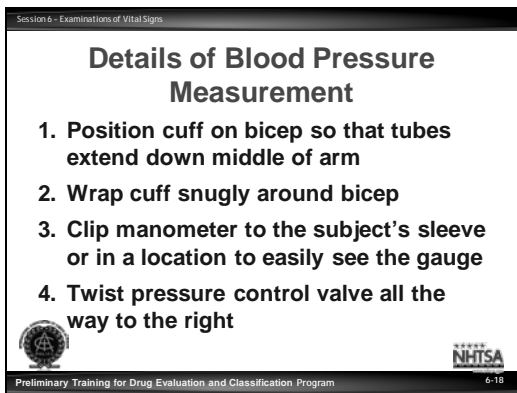
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### *Familiarization with the Sphygmomanometer*

The compression cuff contains an inflatable rubber bladder.

A tube connects the bladder to the manometer, or pressure gauge.

- Another tube connects the bladder to the pressure bulb, which can be squeezed to inflate the bladder.
- The pressure control valve permits inflation of the bladder and regulates the rate at which the bladder is deflated.
- To inflate the bladder, the pressure control valve must be twisted all the way to the right.
- When the valve is twisted all the way to the right, air can be pumped into the bladder, but no air can escape from the bladder.
- To deflate the bladder, twist the valve to the left.
- The more the valve is twisted to the left, the faster the bladder will deflate.





### *Details of Blood Pressure Measurement*

- Wrap the cuff snugly around the bicep.
- Clip the manometer (pressure gauge) on the subject's sleeve, so that it is readily viewable.
- Twist the pressure control valve all the way to the right.

Session 6 - Examinations of Vital Signs

### Details of Blood Pressure Measurement (Cont.)

5. Put stethoscope earpieces in your ears
6. Apply the stethoscope to the brachial artery pulse point
7. Rapidly inflate bladder to a level high enough to squeeze the artery shut (Normally 180)

Preliminary Training for Drug Evaluation and Classification Program 6-19

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- Put the stethoscope earpieces in your ears.
- Place the diaphragm or bell of the stethoscope over the brachial artery.
- Rapidly inflate the bladder to approximately 180mmHg.

Session 6 - Examinations of Vital Signs

### Details of Blood Pressure Measurement (Cont.)

8. Twist the pressure control valve slightly to the left (pressure should drop at 2 mmHg per second)
9. Keep your eyes on the gauge and listen for the Korotkoff sounds

Preliminary Training for Drug Evaluation and Classification Program 6-20

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- Twist the pressure control valve slightly to the left to release the pressure slowly.
- Keep your eyes on the gauge and listen for the Korotkoff sounds.

Session 6 - Examinations of Vital Signs

### Blood Pressure Values

- Systolic: 120-140
- Diastolic: 70-90

Some people can have significantly different blood pressures

Preliminary Training for Drug Evaluation and Classification Program 6-21

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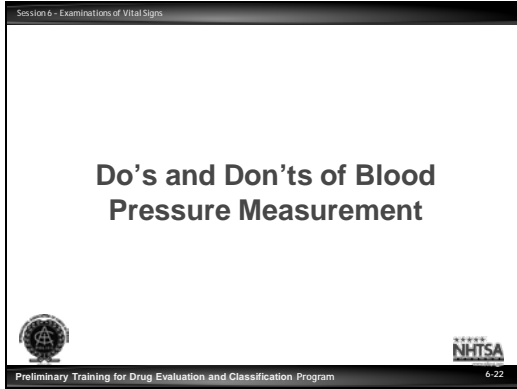
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*DRE Average Blood Pressure Values*

Systolic: 120-140

Diastolic: 70-90

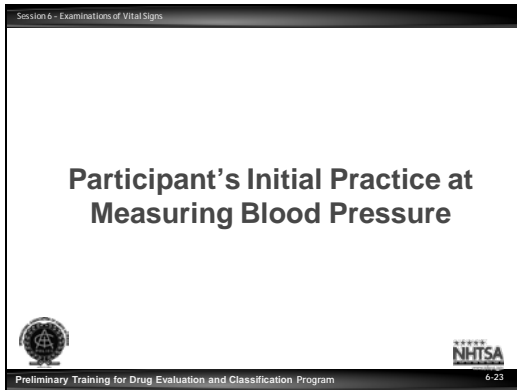


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*Do's and Don'ts of Blood Pressure Measurement*

If you inflate the bladder and then need to repeat the measurement, wait at least three minutes to allow the subject's artery to return to normal.

Hold the bell of the stethoscope with your fingers; don't slide it under the cuff – that will distort the measurement.





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*Participant's Initial Practice at Measuring Blood Pressure*

Session 6 - Examinations of Vital Signs

### Measuring Body Temperature

- Oral thermometer recommended
- Always use protective disposable mouthpiece
- Position thermometer under the subject's tongue
- Have subject refrain from talking when measuring temperature
- Refrain from letting subject drink hot or cold fluids immediately prior to measuring temperature

Preliminary Training for Drug Evaluation and Classification Program 6-24

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## C. Demonstrations

### *Measurement of Temperature*

- Temperature is measured orally using a thermometer.
- Ensure that the subject does not take any hot or cold liquids by mouth prior to taking the temperature.

Session 6 - Examinations of Vital Signs

### Measuring Pulse Rate

Preliminary Training for Drug Evaluation and Classification Program 6-25

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### *Pulse Rate Measurement Demonstrations*

Session 6 - Examinations of Vital Signs

### Measuring Blood Pressure

Preliminary Training for Drug Evaluation and Classification Program 6-26

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### *Blood Pressure Measurement Demonstrations*

Session 6 – Examinations of Vital Signs

### DRE Ranges of Vital Signs

- **Pulse Rate:**
  - 60 to 90 beats per minute
- **Blood Pressure:**
  - Systolic – 120 to 140 mmHg
  - Diastolic – 70 to 90 mmHg
- **Body Temperature:**
  - 98.6 degrees Fahrenheit plus or minus one degree



Preliminary Training for Drug Evaluation and Classification Program 6-27

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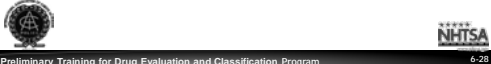
### D. Ranges of Vital Signs

Human vital signs vary between individuals. However, the DEC program has identified a set of ranges for each of the three vital sign examinations used in the drug influence evaluation process. The ranges used in the DEC program are a bit wider than those used by the medical profession.

Session 6 - Examinations of Vital Signs

### Drug Categories and Vital Signs

- All seven categories of drugs ordinarily will affect pulse rate and blood pressure
- Some categories usually will lower pulse and blood pressure



Preliminary Training for Drug Evaluation and Classification Program 6-28

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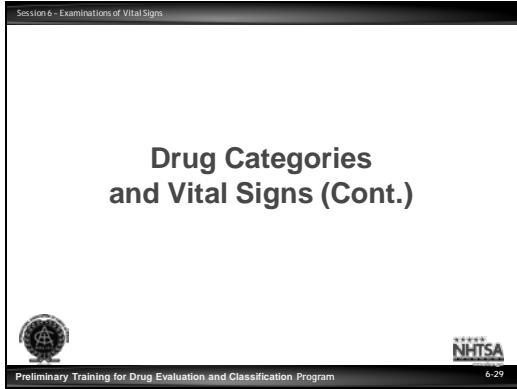
### **E. Relationship of Drug Categories to the Vital Signs Examinations**

- All seven categories of drugs ordinarily will affect pulse rate and blood pressure.
- Some categories usually will lower pulse and blood pressure.
- CNS Depressants and Narcotic Analgesics usually lower pulse and BP.
- Quaaludes, ETOH and possibly some anti-depressants may cause the pulse to increase.

The other five categories all tend to elevate pulse rate.

- Most of the drug categories that elevate pulse rate also elevate blood pressure.
- CNS Stimulants, Hallucinogens, Dissociative Anesthetics and Cannabis all usually cause blood pressure to rise.
- The vast majority of Inhalants, namely, the volatile solvents and the aerosols, also elevate blood pressure.
- But the remaining small group of Inhalants, the anesthetic gases, actually lowers the blood pressure.
- So for Inhalants, the effect on blood pressure will be up or down.





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Three of the categories usually will cause the body temperature to rise.

The drug PCP and its analogs from the Dissociative Anesthetics category usually increase body temperature; PCP users have been known to remove their clothing to cool down.

CNS Stimulants and Hallucinogens also will usually increase body temperature.

The effect of Inhalants on body temperature depends on the specific substance that is inhaled.

Some inhalants may cause temperature to increase or be down.

But other inhalants may leave the temperature near normal.

One category usually causes body temperature to be lowered.


Narcotic Analgesics usually lower body temperature.

The remaining two categories usually do not affect temperature.

Session 6 - Examinations of Vital Signs

## Drug Categories and Vital Signs (Cont.)

Which drugs affect muscle tone?



Preliminary Training for Drug Evaluation and Classification Program 6-30

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Three of the categories usually will cause the muscle tone to be rigid.

Write "RIGID" on the Muscle Tone line for Stimulants, Dissociative Anesthetics and Hallucinogens.

Two categories usually cause muscle tone to be flaccid.

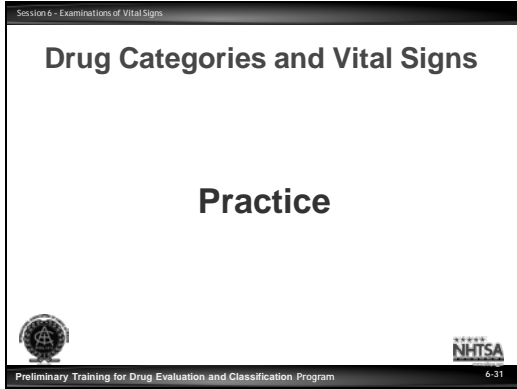
CNS Depressants and Narcotic Analgesics usually cause a flaccid muscle tone.

One category usually causes normal muscle tone.

Cannabis usually causes normal muscle tone.

One category will usually cause either normal or flaccid muscle tone.

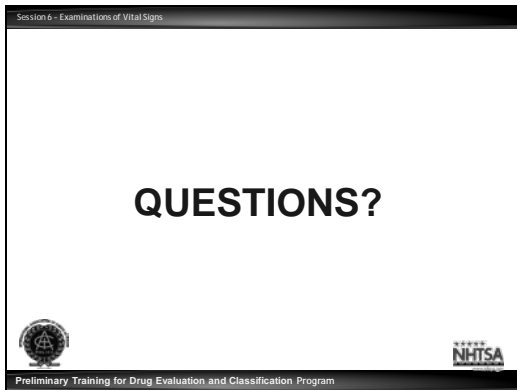
Inhalants usually cause either normal or flaccid muscle tone.



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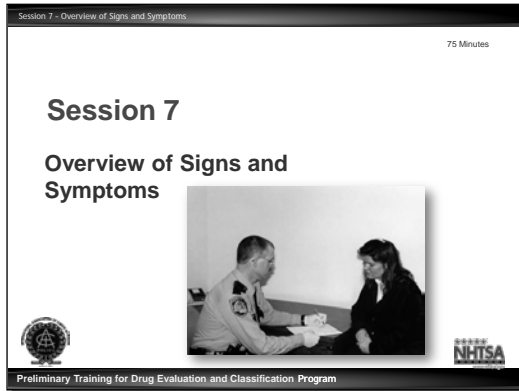
### F. Practice

- Explanation of Practice
- Teammates will take turns measuring each other's pulse rate and blood pressure.
- Each participant will write down every measurement he or she makes and the time at which the measurement was made.
- Whichever member of the team is not engaged in taking the measurement or serving as the "suspect" will act as a coach and offer appropriate constructive criticism to his or her teammate.
- Practice will continue until each participant has taken at least three complete pulse and blood pressure measurements on both teammates.



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# Participant Manual DRE Pre School - Session 7 – Overview of Signs and Symptoms



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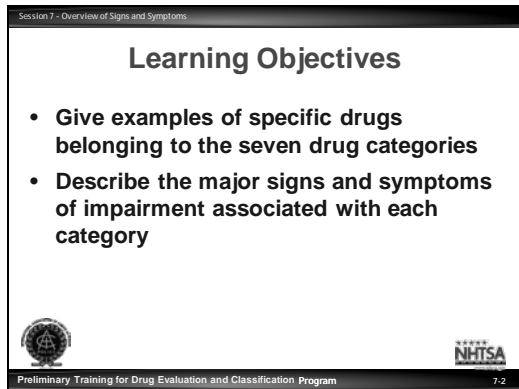
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Upon successfully completing this session the participant will be able to:

- Give examples of specific drugs belonging to the seven drug categories.
- Describe the major signs and symptoms of impairment associated with each category.

## CONTENT SEGMENTS

- A. CNS Depressants
- B. CNS Stimulants
- C. Hallucinogens
- D. Dissociative Anesthetics
- E. Narcotic Analgesics
- F. Inhalants
- G. Cannabis
- H. Wrap-Up


## LEARNING ACTIVITIES

Interactive Discussions

Session 7 – Overview of Signs and Symptoms

## Sign and Symptom Definition

- **Sign:** An observable or detectable indicator of drug influence
- **Symptom:** A subjective indicator of drug influence that is reported by the drug impaired subject



Preliminary Training for Drug Evaluation and Classification Program 7-3

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- Sign: An observable or detectable indicator of drug influence (i.e., dilated pupils, high blood pressure).
- Symptom: A subjective indicator of drug influence that is reported by the drug impaired subject (i.e., “I feel nauseous.”)

Session 7 – Overview of Signs and Symptoms

## CNS Depressants

- HGN ?
- VGN ?
- LOC ?

Preliminary Training for Drug Evaluation and Classification Program 7-4

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### A. CNS Depressants

Central Nervous System Depressants is a category that includes many different drugs.

#### *Indicators of CNS Depressant Influence Found in Eye Exams*

HGN usually will be present.



Vertical Gaze Nystagmus may be present, especially with high doses (for that individual) of Depressants



Under the influence of Depressants, Lack of Convergence usually will be present.

Session 7 - Overview of Signs and Symptoms

## CNS Depressants

- Pupil size ?

Preliminary Training for Drug Evaluation and Classification Program 7-5

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Depressants usually do not affect pupil size; therefore, the pupils will normally be in the average range.

But some specific Depressant drugs do affect pupil size.

Soma, Methaqualone (Quaaludes) and some anti-depressants usually dilate pupils.



Depressants generally will cause pupillary reaction to light to be sluggish.

Session 7 - Overview of Signs and Symptoms

## CNS Depressants

Vital signs ?

- Pulse rate
- Blood pressure
- Body temperature

Preliminary Training for Drug Evaluation and Classification Program 7-6

Notes: \_\_\_\_\_

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*Indicators of CNS Depressant Influence Found in Checks of the Vital Signs*

Depressants usually lower pulse rate.

But some specific Depressant drugs may elevate the pulse.

Methaqualone (Quaaludes), alcohol and possibly some anti-depressants may cause elevation in pulse rate.

Depressants usually lower blood pressure.

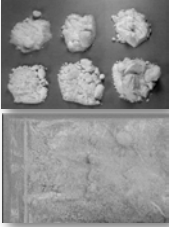


Depressants usually leave temperature near normal.

Depressants usually cause flaccid muscle tone.

Session 7 - Overview of Signs and Symptoms

## CNS Stimulants

- HGN ?
- VGN ?
- LOC ?

Preliminary Training for Drug Evaluation and Classification Program 7-7

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### **B. CNS Stimulants**

The category called Central Nervous System Stimulants includes many drugs.

*Indicators of CNS Stimulant Influence Found in Eye Exams*




HGN will not be present.

Vertical Gaze Nystagmus will not be present.

Session 7 - Overview of Signs and Symptoms

## CNS Stimulants

- Pupil size ?

Preliminary Training for Drug Evaluation and Classification Program 7-8

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CNS Stimulants usually cause the pupils to dilate.


We have seen that CNS Depressants effect pupillary reaction; similarly, CNS Stimulants may cause a slowing in the pupillary reaction to light.

Session 7 - Overview of Signs and Symptoms

## CNS Stimulants

**Vital signs ?**

- **Pulse rate**
- **Blood pressure**
- **Body temperature**



Preliminary Training for Drug Evaluation and Classification Program 7-9

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*Indicators of CNS Stimulant Influence Found in Checks of Vital Signs*

CNS Stimulants usually increase pulse rate.

CNS Stimulants usually increase blood pressure.

CNS Stimulants usually elevate body temperature.



CNS Stimulants usually cause a rigid muscle tone.

Though not directly related to the vital signs, the evaluator may find the subject's muscle tone to be rigid with possible body tremors. A grinding of the teeth, referred to as "bruxism" may also be noticed.

Session 7 - Overview of Signs and Symptoms

## Hallucinogens

- **HGN ?**
- **VGN ?**
- **LOC ?**

Preliminary Training for Drug Evaluation and Classification Program 7-10

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**C. Hallucinogens**

Hallucinogens include some naturally occurring substances as well as some synthetic drugs.

*Indicators of Hallucinogen Influence Found in Eye Exams*

HGN will not be present.

Vertical Gaze Nystagmus will not be present.



Under the influence of Hallucinogens, the eyes should still be able to converge; therefore, lack of convergence will not be present.




Session 7 - Overview of Signs and Symptoms

## Hallucinogens

- **Pupil size ?**




Preliminary Training for Drug Evaluation and Classification Program 7-11

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Hallucinogens usually cause the pupils to dilate.

Normally, Hallucinogens do not effect pupillary reaction to light.



However, certain psychedelic amphetamines may cause a slowing in the pupillary reaction.

Session 7 - Overview of Signs and Symptoms

## Hallucinogens

**Vital signs ?**

- **Pulse rate**
- **Blood pressure**
- **Body temperature**

Preliminary Training for Drug Evaluation and Classification Program 7-12

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*Indicators of Hallucinogen Influence Found in Checks of Vital Signs*

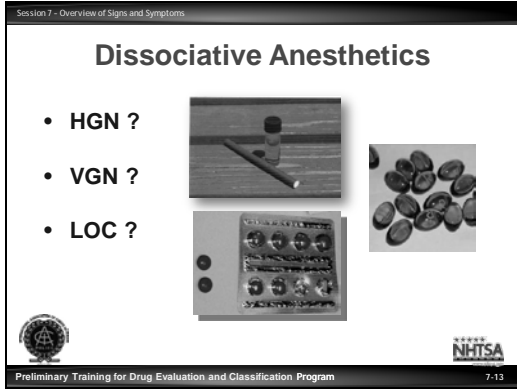
Hallucinogens usually increase pulse rate.

Hallucinogens usually increase blood pressure.

Hallucinogens usually elevate body temperature.

Hallucinogens usually cause a rigid muscle tone.

If we only had these major signs to go by, it would be difficult to distinguish between someone under the influence of CNS Stimulants from someone under the influence of Hallucinogens.



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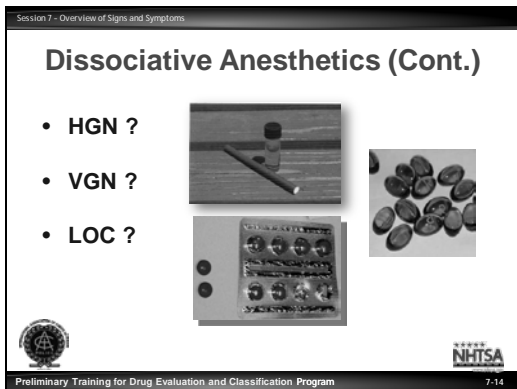
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**D. Dissociative Anesthetics**

The category called Dissociative Anesthetics consists of the drug PCP, its various analogs and Dextromethorphan.

- An ‘analog’ of PCP is a drug that is a ‘chemical first cousin’ of PCP; that is, it is a drug that has a slightly different molecular structure from that of PCP, but produces the same effects as PCP.
- One of the most popular analogs of PCP is the drug called Ketamine.
- Ketamine is a legally manufactured (but controlled) drug that is used as an anesthetic in some surgical applications.
- Some other analogs of PCP include Ketalar, Ketaset, and Ketajet.
- Dextromethorphan is a drug found in numerous over-the-counter substances.



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*Indicators of the Dissociative Anesthetics Found in Eye Exams*

HGN usually will be present, and often with a very early onset.



Vertical Gaze Nystagmus usually will be present.

Lack of Convergence usually will be present.

Session 7 - Overview of Signs and Symptoms

## Dissociative Anesthetics

- Pupil size ?

Preliminary Training for Drug Evaluation and Classification Program 7-15

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Dissociative Anesthetics do not normally effect pupil size; therefore, a person under the influence of a Dissociative Anesthetic, such as PCP usually will have pupils that are in the DRE average ranges.

Dissociative Anesthetics normally will not effect pupillary reaction to light.

Session 7 - Overview of Signs and Symptoms

## Dissociative Anesthetics

Vital signs ?

- Pulse rate
- Blood pressure
- Body temperature



Preliminary Training for Drug Evaluation and Classification Program 7-16

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*Indicators of Dissociative Anesthetic Influence Found in Checks of Vital Signs*

Dissociative Anesthetics usually increase pulse rate.

Dissociative Anesthetics usually elevate blood pressure.


PCP and its analogs usually elevate body temperature. Dextromethorphan may or may not rise temperature.



Dissociative Anesthetics usually cause rigid muscle tone.

Session 7 - Overview of Signs and Symptoms

## Narcotic Analgesics

- HGN ?
- VGN ?
- LOC ?



Preliminary Training for Drug Evaluation and Classification Program 7-17

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### E. Narcotic Analgesics

Narcotic Analgesics include some natural derivatives of opium as well as some synthetic drugs.

#### *Indicators of Narcotic Analgesic Influence Found in Eye Exams*

HGN will not be present.

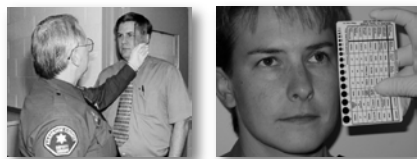
Vertical Gaze Nystagmus will not be present.



Under the influence of Narcotics, the eyes should still be able to converge; therefore, Lack of Convergence usually is not present.

Session 7 - Overview of Signs and Symptoms

## Narcotic Analgesics

- Pupil size?



Preliminary Training for Drug Evaluation and Classification Program 7-18

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Narcotic Analgesics usually cause a very noticeable constriction of the pupils.



Though there is always some reaction to light, the constricted pupils caused by Narcotic Analgesics can make it nearly impossible to perceive a change in pupil size. However, when observed it will generally be little or none visible.

Session 7 - Overview of Signs and Symptoms

## Narcotic Analgesics

**Vital signs?**

- **Pulse rate**
- **Blood pressure**
- **Body temperature**

Preliminary Training for Drug Evaluation and Classification Program 7-19

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*Indicators of Narcotic Analgesic Influence Found in Checks of Vital Signs*

Narcotic Analgesics usually lower pulse rate.

Narcotic Analgesics usually lower blood pressure.

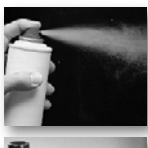




Narcotic Analgesics usually lower body temperature.

With a Narcotic Analgesic, muscle tone will be flaccid.

Session 7 - Overview of Signs and Symptoms

## Inhalants

- **HGN ?**
- **VGN ?**
- **LOC ?**

Preliminary Training for Drug Evaluation and Classification Program 7-20

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Session 7 - Overview of Signs and Symptoms

## Inhalants

- HGN ?
- VGN ?
- LOC ?



Preliminary Training for Drug Evaluation and Classification Program 7-20

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### **F. Inhalants**

The category of Inhalants includes a wide variety of gases and fumes that have mind-altering effects.

- Not all Inhalants affect their users in exactly the same way.
- There is probably less consistency in the signs and symptoms of Inhalants than there is with any other category.
- When we talk of the signs and symptoms of Inhalants, we often must qualify our statements.
- For example, we may say that a particular effect will be observed “for most Inhalants.”

#### *Indicators of Inhalant Influence Found in Eye Exams*

With most Inhalants, HGN usually will be present.



With most Inhalants, Vertical Gaze Nystagmus may be present, especially with large doses.



Under the influence of Inhalants, Lack of Convergence usually will be present.

Session 7 - Overview of Signs and Symptoms

## Inhalants

- **Pupil size ?**

Preliminary Training for Drug Evaluation and Classification Program 7-21

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The effect of Inhalants on pupil size depends on the particular substance inhaled.

Most inhalants usually leave the pupils in the DRE average ranges.

Some inhalants may cause pupil dilation.



Depending on the substance used, Inhalants may cause a slowed reaction to light or the pupils may react normally. However, the most frequently observed effect will be a sluggish reaction to light.

Session 7 - Overview of Signs and Symptoms

## Inhalants

**Vital signs ?**

- **Pulse rate**
- **Blood pressure**
- **Body temperature**

Preliminary Training for Drug Evaluation and Classification Program 7-22

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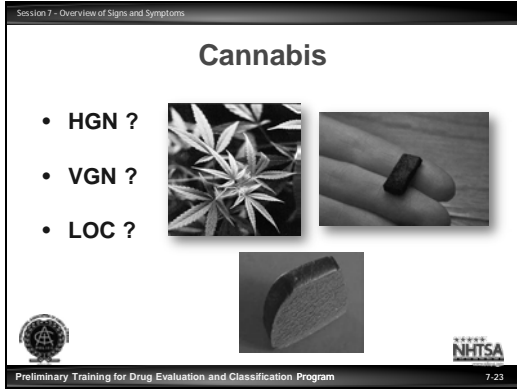
*Indicators of Inhalant Influence Found in Checks of Vital Signs*

Inhalants usually elevate pulse rate.

Most inhalants usually elevate blood pressure, but some lower blood pressure.

The effects of Inhalants on temperature depend on the particular substance inhaled.

Depending on the Inhalant, muscle tone will either be normal or flaccid.



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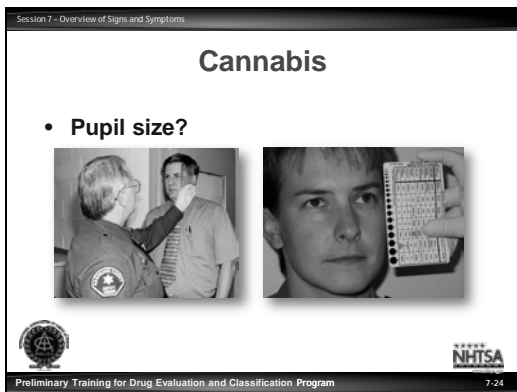
**G. Cannabis**

Indicators of Cannabis Influence Found in Eye Exams

HGN will not be present.

Vertical Gaze Nystagmus will not be present.

Under the influence of Cannabis, Lack of Convergence will be present.



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Under the influence of Cannabis, the pupils may be dilated or possibly within the DRE average ranges.

The pupillary reaction to light will appear normal when under the influence of Cannabis.





Session 7 - Overview of Signs and Symptoms

## Cannabis

**Vital signs ?**

- **Pulse rate**
- **Blood pressure**
- **Body temperature**



Preliminary Training for Drug Evaluation and Classification Program 7-25

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### *Indicators of Cannabis Influence Found in Checks of Vital Signs*

Cannabis usually elevates pulse rate.

Cannabis usually elevates blood pressure.



Cannabis usually leaves temperature near the average body temperature ranges.

Cannabis usually causes normal muscle tone.

Session 7 - Overview of Signs and Symptoms

## Wrap Up

**Matrix summarizes the major signs of drug influence that are observed by DREs**



Preliminary Training for Drug Evaluation and Classification Program 7-26

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## **H. Wrap-Up**

Session 7 - Overview of Signs and Symptoms

# QUESTIONS?



Preliminary Training for Drug Evaluation and Classification Program

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## Participant Manual DRE Pre School - Session 8 – Alcohol as a Drug

Session 8 - Alcohol as a Drug 90 Minutes

### Session 8

#### Alcohol as a Drug



Preliminary Training for Drug Evaluation and Classification Program

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Session 8 - Alcohol as a Drug

### Learning Objectives

- Describe a brief history of alcohol
- Identify common types of alcohol
- Describe the physiological processes of absorption, distribution and elimination of alcohol in the human body
- Describe dose response relationships that impact on alcohol's impairing effects



Preliminary Training for Drug Evaluation and Classification Program 8-2

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

- Describe a brief history of alcohol.
- Identify common types of alcohols.
- Describe the physiological processes of absorption, distribution and elimination of alcohol in the human body.
- Describe does response relationships that impact alcohol's impairing effects.

### CONTENT SEGMENTS

- A. Brief Overview of Alcohol
- B. Physiological Processes
- C. Symptomatology of Alcohol
- D. Dose-Response Relationships
- E. Questions for Review

### LEARNING ACTIVITIES

- Instructor-Led Presentations
- Oral Quiz

- Alcohol is a drug. In fact, alcohol is the most commonly abused drug.
- As DREs, the participants will often encounter persons who are under the combined influence of alcohol and some other drug.

Session 8 - Alcohol as a Drug

## Alcohol

A family of closely-related chemicals whose molecules are made up of hydrogen, carbon and oxygen

$$\begin{array}{c}
 \text{H} \quad \text{H} \\
 | \quad | \\
 \text{H}-\text{C}-\text{C}-\text{OH} \\
 | \quad | \\
 \text{H} \quad \text{H}
 \end{array}$$

NHTSA

Preliminary Training for Drug Evaluation and Classification Program 8-3

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### A. Brief Overview of Alcohol

The word “alcohol” refers to a number of distinct but similar chemicals.

- Each of the chemicals that is called an “alcohol” is composed of the three elements: hydrogen, carbon, and oxygen.
- Each of the “alcohols” is a drug within the scope of our definition.
- But only one can be tolerated by the human body in substantial quantities.

Session 8 - Alcohol as a Drug

## Some Types of Alcohol

METHYL ALCOHOL  
*(Methanol)*

ETHYL ALCOHOL  
*(Ethanol)*

ISOPROPYL ALCOHOL  
*(Isopropanol)*

NHTSA

Preliminary Training for Drug Evaluation and Classification Program 8-4

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### *Common Alcohols*

Three of the more commonly known “alcohols” are Methyl, Ethyl, and Isopropyl.

- Methyl Alcohol, also known as Methanol, or “wood alcohol.”
- Ethyl Alcohol, also known as Ethanol, or “beverage alcohol.”
- Isopropyl Alcohol, also known as Isopropanol, or “rubbing alcohol.”

### *Ethanol Alcohol*

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

- Ethanol is the active ingredient in beer, wine, whiskey, and other alcoholic beverages intended for drinking.
- Like all “alcohols,” ethanol is composed of hydrogen, carbon and oxygen.
- Chemists use a number of different symbols to represent ethanol.

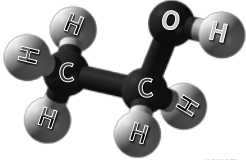
Session 8 - Alcohol as a Drug

## Ethanol

**Ethyl Alcohol**  
(Intended for human consumption)

**Chemical Symbols:**

- ETOH
- C<sub>2</sub>H<sub>5</sub>OH



Preliminary Training for Drug Evaluation and Classification Program NHSTA 8-5

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- For our purposes, we will use the symbol “ETOH.”
- The “ET” represents “ethyl” and the “OH” represents an oxygen atom and hydrogen atom, bonded together in what the chemists refer to as the “hydroxyl radical.” All alcohols have a hydroxyl radical in their molecules.

Ethanol has been around for a long time. People drank it long before they learned to write.

Session 8 - Alcohol as a Drug

## Production of Ethanol

- **FERMENTATION**  
Yeast combines with sugars from fruit or grains in a chemical reaction that results in ETOH

Preliminary Training for Drug Evaluation and Classification Program NHSTA 8-6

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Ethanol is a naturally occurring drug. That is, it is produced through a process called fermentation.

In fermentation, spores of yeast, carried by the wind, come in contact with fruit or grain that has fallen to the ground.

Sugars in the fruit or grain chemically react with yeast, and produce ethanol.

Humans almost certainly first encountered ethanol that had been produced accidentally in this fashion.

Of course, today we don't sit around waiting for the wind to bring yeast to fallen fruit. Most fermentation takes place on purpose, under controlled conditions.


Through the process of fermentation, we can produce a beverage that has, at most, about 14% ethanol.

When the ethanol concentration reaches 14%, the yeast die, so fermentation stops.

Session 8 - Alcohol as a Drug

### Production of Ethanol

- **FERMENTATION**  
Yeast combines with sugars from fruit or grains in a chemical reaction that results in ETOH
- **DISTILLATION**  
Fermented beverage is boiled at a controlled temperature to extract and concentrate the ethanol fumes



Preliminary Training for Drug Evaluation and Classification Program 8-7

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If we want to have higher concentration ethanol beverages, we have to use another step in the production.

Distillation is the process used to produce a higher concentration of ethanol.

In distillation, a fermented beverage is heated to the point where the ethanol begins to boil.

- Ethanol starts to boil at a lower temperature than water.
- The ethanol vapor is collected and allowed to cool until it turns back into a liquid.
- By repeating the process of heating the liquid and collecting and cooling the vapors, higher and higher concentrations of ethanol can be produced.
- Ethanol beverages that are produced by distillation are called distilled spirits.


Over the centuries in which people have produced ethanol, some general or common sized servings of different beverages have evolved.

Session 8 - Alcohol as a Drug

### Common Drink Sizes


**Bottle of Beer**

- 12 ounces of fluid @ 4% alcohol equals 0.48 ounces of pure alcohol




**Glass of Wine**



- 4 ounces of fluid @ 12% alcohol equals 0.48 ounces of pure alcohol



**Shot of Whiskey (80-Proof)**

- 1 and 1/4 ounces @ 40% alcohol equals 0.50 ounces of pure alcohol



Preliminary Training for Drug Evaluation and Classification Program 8-8

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- Beer is usually served in 12-ounce cans or bottles. Since beer averages an ethanol concentration of four percent, a can or bottle contains a bit less than one-half ounce of pure ethanol.
- Four ounces of wine with an alcohol concentration of 12% contains approximately one half ounce of pure alcohol.
- Whiskey and other distilled spirits are dispensed in a “shot” glass, which usually contain one and one-quarter ounces of liquid.
- Since whiskey usually has an ethanol concentration of 40%, a “shot” of whiskey has exactly one-half ounce of pure ethanol.

For all practical purposes, standard sized servings of beer, wine, and whiskey all pack the same “punch.”



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**B. Physiological Processes**

Alcohol is the most abused drug in the United States.

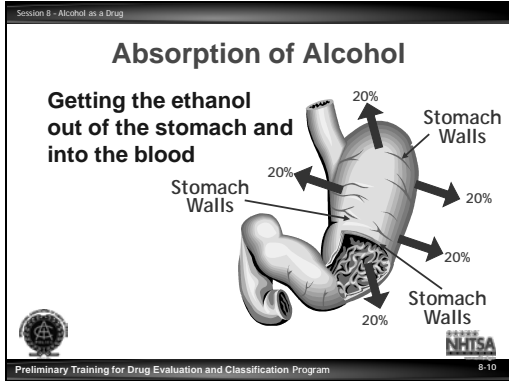
Ethanol is a Central Nervous System Depressant.

- It doesn't impair until it gets into the brain.
- It can't get into the brain until it first gets into the blood.
- It can't get into the blood until it first gets into the body.

There are a number of ways in which alcohol can get into the body.

- It can be injected into a vein via hypodermic needle.
- It can be inhaled, i.e., alcohol fumes can be brought into the lungs, and some molecules will pass into the blood.
- It could also be inserted as an enema and ingested by quickly passing from the large intestine into the blood.

But the vast majority of times that alcohol gets into the body, it gets there via drinking.



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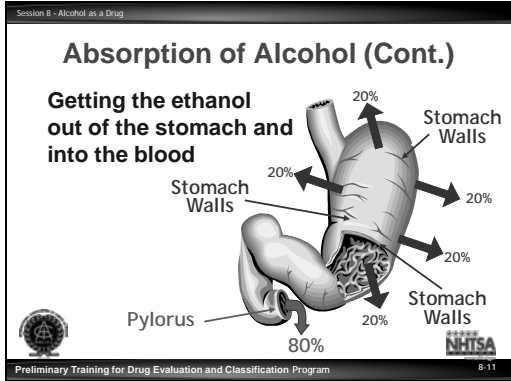
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Once the alcohol is in the stomach, it will take two routes to get into the blood.

- One interesting thing about alcohol is that it is able to pass directly through the stomach walls.
- Under normal conditions, about 20% of the alcohol a person drinks gets into the blood by diffusing through the walls of the stomach.
- 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.
- 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.
- When a person eats food, the food must remain for a time in the stomach.
- 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 track.
- 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.





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- Note the muscle called the pylorus, or pyloric valve.
- Since alcohol doesn't have to be digested, the pylorus does not constrict when alcohol enters the stomach.
- If we drink on an empty stomach, the pylorus stays wide open.
- The alcohol will pass immediately through the base of the stomach, into the small intestine, and quickly move into the bloodstream.
- Food will cause the pylorus to constrict.
- While the pylorus is closed, nothing will move from the stomach to the small intestine.
- Any alcohol that is in the stomach will be "trapped" there, along with the food.
- 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.
- While the alcohol is trapped in the stomach, the acids and enzymes will start to react with it and break it down.
- 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.
- Once the alcohol gets into the blood, the blood will carry it to the various tissues and organs of the body



Session 8 - Alcohol as a Drug

## Distribution of Alcohol

**Getting the ethanol into the body's tissues and organs**

**Basic Principle:**

- Ethanol goes wherever it finds water

Preliminary Training for Drug Evaluation and Classification Program 8-12

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- Alcohol is attracted to water. The blood will deposit the alcohol in all the parts of the body where water is found.
- Parts of the body that have a lot of water will receive a lot of alcohol.
- Parts of the body that have only a little water will receive little alcohol.



Session 8 - Alcohol as a Drug

## Which Parts of the Body Have a Lot of Water?








**BRAIN LIVER MUSCLE TISSUE KIDNEY**

## Which Parts Contain Very Little Water?

**BONES FATTY TISSUE**

Preliminary Training for Drug Evaluation and Classification Program 8-13

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- Brain
- Liver
- Muscle tissue
- Kidney
- Bones
- Fatty tissue

The fatty tissue will receive very little of the alcohol.

The muscle tissue will receive a relatively high proportion of the alcohol that a person drinks.

Session 8 - Alcohol as a Drug

### Significant Difference Between Men and Women

- The average male is 68 percent water
- The average female is only 55 percent water

The image shows two pie charts. The first pie chart, with a male symbol (♂) above it, is divided into a dark grey section representing 68% and a lighter grey section representing 32%. The second pie chart, with a female symbol (♀) above it, is divided into a dark grey section representing 55% and a lighter grey section representing 45%.

Preliminary Training for Drug Evaluation and Classification Program 8-14

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Here is an interesting and significant difference between men and women: pound-for-pound, the average male has much more water in his body than the average female.

- The female body has more fatty tissue than does the male body.
- Pound-for-pound, the average female has more fat and less muscle than does the average male.
- Since fatty tissue has very little water, the average female, pound-for-pound, has less water than the average male.
- This means that the average woman has fewer places in her body in which to deposit the alcohol she drinks.
- The woman's blood alcohol concentration will be higher than the man's because she has less water in which to distribute the alcohol.
- As soon as alcohol gets into the body, the body begins working to get rid of it.

Session 8 - Alcohol as a Drug

## Elimination of Alcohol


**Getting the ethanol out of the body:**

**Direct Excretion:**

- Breath, sweat, tears, urine, etc.

**Metabolism:**

- Primarily in the liver



Preliminary Training for Drug Evaluation and Classification Program 8-15

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- Some alcohol is simply expelled directly from the body, i.e., on the breath, in the sweat, in urine, etc.
- Relatively little of the alcohol we drink is directly expelled from the body.

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


- The body eliminates most of the alcohol by chemically breaking it down.
- The liver is primarily responsible for breaking down, or metabolizing, the alcohol.

Clarification: Some metabolism of alcohol also takes place in other parts of the body, including the brain. The liver does the vast majority of the job.

Session 8 - Alcohol as a Drug

## Metabolism in the Liver

- The liver burns the ethanol (i.e., causes a chemical reaction of ethanol with oxygen)
- The process is aided by an enzyme called alcohol dehydrogenase
- The ultimate products of the chemical reaction are carbon dioxide and water



Preliminary Training for Drug Evaluation and Classification Program 8-16

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- Metabolism of alcohol actually consists of a slow, controlled burning of the alcohol.
- In the burning process, the alcohol combines with oxygen.
- The liver has an enzyme called alcohol dehydrogenase, which helps to speed up the reaction of oxygen with the alcohol.

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.

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

Session 8 - Alcohol as a Drug

### Metabolism in the Liver

- Due to metabolism, the average person's BAC drops by about 0.015 per hour

Preliminary Training for Drug Evaluation and Classification Program

8-17

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

- **BUT ON THE AVERAGE:** Due to metabolism, a person's BAC will drop by about 0.015 per hour. For the average male, a BAC of 0.015 is equal to the alcohol content of about two-thirds of a "standard drink". i.e., about two-thirds of a can of beer, or about two-thirds of a glass of wine, or two-thirds of a shot of whiskey.
- For the average woman, a BAC of 0.015 is equal to the alcohol content of only one-half of a "standard drink." So the average male can "burn up" about two-thirds of a drink in an hour. But the average female can only burn up about one-half of a drink in an hour.
- In other words: suppose a person gulps down a can of beer, or a glass of wine, or a shot of whiskey; if the person is an average man, it will take him about an hour and one-half to burn up that alcohol; if the person is a woman, it will take her about two hours.
- We can't speed it up.
- Drinking coffee won't help.
- A cold shower won't help.
- Exercise won't help.
- Our livers take their own sweet time burning the alcohol.

Session 8 - Alcohol as a Drug

### Alcohol Symptomatology

|           | ALCOHOL              |
|-----------|----------------------|
| HGN       | Present              |
| VGN       | Present (HIGH DOSES) |
| LACK CONV | Present              |
|           |                      |
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Preliminary Training for Drug Evaluation and Classification Program NHSTA 8-18

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### C. Symptomatology of Alcohol

- ETOH may elevate the pulse rate in lower BAC levels.

#### *Indicators of Alcohol Influence Found in Eye Exams*

- HGN will be present.
- Vertical Gaze Nystagmus may be present, especially with high doses (for that individual) of alcohol.
- Under the influence of alcohol, Lack of Convergence frequently will be present.

Session 8 - Alcohol as a Drug

### Alcohol Symptomatology (Cont.)

|             | ALCOHOL |
|-------------|---------|
| HGN         |         |
| VGN         |         |
| LACK CONV   |         |
| PUPIL SIZE  |         |
| RCTN LIGHT  |         |
| PULSE RATE  |         |
| BLOOD PRESS |         |
| TEMP        |         |
| MUSCLE TONE |         |

Preliminary Training for Drug Evaluation and Classification Program NHSTA 8-19

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- Alcohol does not affect pupil size; therefore, alcohol usually leaves the pupils in the DRE Average ranges.
- Alcohol will cause pupillary reaction to light to be sluggish.
- Indicators of Alcohol Influence Found in Checks of Vital Signs
- Pulse rate will usually be down. However, some subjects have been found to have elevated pulse rates at lower BACs.
- Blood pressure response to alcohol will normally be down.
- *Alcohol usually leaves body temperature near the average range.*
- Alcohol usually causes flaccid muscle tone.

Session 8 - Alcohol as a Drug

### Alcohol Symptomatology (Cont.)

|             | ALCOHOL              |
|-------------|----------------------|
| HGN         | Present              |
| VGN         | Present (High Doses) |
| LACK CONV   | Present              |
| PUPIL SIZE  | Normal               |
| RCTN LIGHT  | Slow                 |
| PULSE RATE  | Down                 |
| BLOOD PRESS | Down                 |
| TEMP        | Normal               |
| MUSCLE TONE | Flaccid              |

Preliminary Training for Drug Evaluation and Classification Program 8-20

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Session 8 - Alcohol as a Drug



### Blood Alcohol Concentration

**What does it mean?**

**BAC is the number of grams of alcohol found in 100 milliliters of the person's blood.**

**Example:**

If a person has a BAC of .08, it means there is 0.08 grams of ethanol in every 100 milliliters (ml) of his or her blood.

Preliminary Training for Drug Evaluation and Classification Program 8-21

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### D. Dose-Response Relationships

What does “Blood Alcohol Concentration” mean?

BAC is the number of grams of alcohol found in 100 milliliters of the person’s blood.

Example:

If a person has a BAC of .08, it means there is 0.08 grams of ethanol in every 100 milliliters (ml) of his or her blood.


Session 8 - Alcohol as a Drug

### Grams, Milligrams and Nanograms

**A "gram" is pretty light (it takes almost 500 grams to make one pound)**

- ✓ One gram is equal to one thousand milligrams.
- ✓ One-tenth of a gram therefore is equal to one hundred milligrams.

**So if a person has a BAC of 0.10, he or she has 100 milligrams of alcohol in every 100 milliliters of blood. That is the same as one milligram in every milliliter.**



Preliminary Training for Drug Evaluation and Classification Program 8-22

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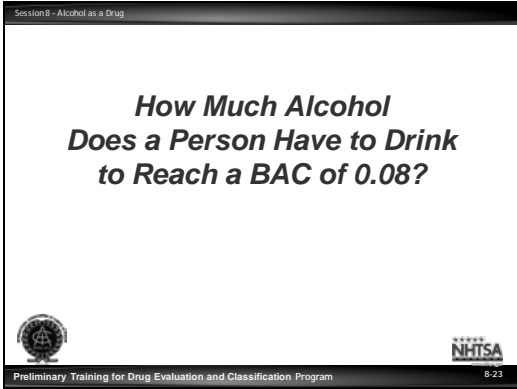
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- Blood alcohol concentration means the number of grams of pure ethanol that are found in every 100 milliliters of a person's blood.
- A gram is a measure of weight; it takes almost 500 grams to make a pound.
- The so-called "illegal limit" of BAC is 0.08 in all states.
- In 2005, all 50 states had adopted 0.08 BAC.
- If a person has a BAC of 0.08, it means there is 0.08 grams (g) of ethanol in every 100 milliliters (ml) of his/her blood.





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- Take an average male weighing 175 pounds and in reasonably good physical shape.
- Assume he does his drinking on an empty stomach.
- He would have to gulp down about 4 to 5 cans of beer, or 4 to 5 glasses of wine, or five shots of whiskey in a fairly short period of time to reach 0.08 BAC.
- In terms of pure ethanol, that would amount to just about two and one-half fluid ounces, or about two shot glasses.
- If these two shot glasses were filled with pure ethanol, we would have just enough of
- 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.
- **BUT COMPARED TO OTHER DRUGS**, it takes an enormous quantity of ethanol to cause impairment.
- In order to compare ethanol to other drugs, we have to review some more units of weight.

Session 8 - Alcohol as a Drug

### More on Grams and Nanograms

- One milligram is equal to one million nanograms. (A nanogram is *very light*: it takes almost 500 billion of them to make a pound.)
- A person whose BAC is 0.10 has one million nanograms of alcohol in every milliliter of blood.

How does alcohol compare with other drugs?

Preliminary Training for Drug Evaluation and Classification Program 8-24

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- We're already familiar with the gram. It weighs only about one five-hundredth of a pound.
- The milligram is much lighter still and it takes about one thousand milligrams to make a gram.
- If one gram is equal to one thousand milligrams, then one tenth of a gram is equal to one hundred milligrams.
- Now reveal the remainder of visual.
- Clarification: 100 is one-tenth of 1,000.
- So a person with a BAC of 0.10 has 100 milligrams of ethanol in every 100 milliliters of his or her blood.
- That is exactly the same as saying there is one milligram of ethanol in every one milliliter of blood.

Session 8 - Alcohol as a Drug

### More on Grams and Nanograms

- One milligram is equal to one million nanograms. (A nanogram is *very light*: it takes almost 500 billion of them to make a pound.)
- A person whose BAC is 0.10 has one million nanograms of alcohol in every milliliter of blood.

How does alcohol compare with other drugs?

Preliminary Training for Drug Evaluation and Classification Program 8-25

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Here is a new term: the nanogram.

It takes a million nanograms to make a milligram.

That means it takes one billion nanograms to make a gram.

And that means that it takes almost five hundred billion nanograms to make a single pound.



So if a person's BAC is 0.10, he or she has one million nanograms of pure ethanol in every milliliter of blood.

Session 8 - Alcohol as a Drug

### Drug Concentrations Typically Associated With "Significant" Impairment

| Drug    | NANOGRAMS per MILLILITER |
|---------|--------------------------|
| ALCOHOL | 500,000 to 1,000,000     |
|         |                          |
|         |                          |

Preliminary Training for Drug Evaluation and Classification Program

Notes: \_\_\_\_\_

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- IT IS MOST IMPORTANT to understand that we cannot state exact correspondences between alcohol concentrations and other drug concentrations.
- For example, we can say that someone with a blood alcohol concentration between 0.05 and 0.10 will exhibit significant impairment because there is a large body of scientific research that backs up that statement.
- So we can say that research shows that significant impairment will be found with alcohol at concentrations of 500,000 to one million nanograms per milliliter.
- But we can't say exactly how much cocaine, THC, morphine, or any other drug would take to produce exactly the same impairment that we would find at 0.10 BAC.
- In part, this is because we do not have extensive scientific research for most other drugs.
- But also it is because many other drugs do not impair in the same way that alcohol impairs.
- Nevertheless, based on the available research, it is possible to make some general statements about drug concentrations that can safely be said to induce significant driving impairment.

Session 8 - Alcohol as a Drug

### Drug Concentrations Typically Associated With "Significant" Impairment (Cont.)

| Drug         | NANOGRAMS per MILLILITER |
|--------------|--------------------------|
| ALCOHOL      | 500,000 to 1,000,000     |
| AMPHETAMINES | 100 to 300               |
| THC          | 50 to 100                |

Preliminary Training for Drug Evaluation and Classification Program 8-27



Notes: \_\_\_\_\_  
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- First example: Amphetamines.
- Researchers agree that if we had two shot glasses full of pure amphetamines we'd have enough to impair as many as ten thousand people.
- Second example: Cannabis.
- Available evidence suggests that if these two little glasses were full of pure THC, we'd have enough drug to impair as many as twenty thousand people.
- Ask participants: But what if these glasses were full of pure LSD?

Session 8 - Alcohol as a Drug

### Drug Concentrations Typically Associated With "Significant" Impairment (Cont.)

| Drug         | NANOGRAMS per MILLILITER |
|--------------|--------------------------|
| ALCOHOL      | 500,000 to 1,000,000     |
| AMPHETAMINES | 100 to 300               |
| THC          | 50 to 100                |
| LSD          | 1 to 2                   |

Preliminary Training for Drug Evaluation and Classification Program 8-28

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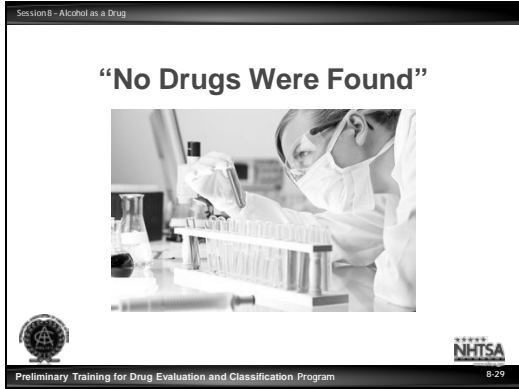
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- Many researchers believe that significant impairment results from very low LSD concentrations.
- If these two glasses contained pure LSD, we could impair up to one million people.
- What does all this mean? This is a rhetorical question.
- First, it means that compared to alcohol, most other drugs are very powerful: a little goes a long way.

Example: A person who is “only” carrying one fluid ounce of LSD (hold up one shot glass) would be capable of impairing “only” the entire population of, say, Wyoming.

- Second, it means that laboratories may be stretched to the limits of their technologic capabilities when we send them samples and request certain drug analyses.
- All analytic techniques have detection thresholds, i.e., minimum concentrations of drugs that must be present if a scientific confirmation of the presence of the drug is to be obtained.
- If the concentration of the drug is less than the detection threshold, the laboratory simply will not be able to confirm that the drug is present.
- The problem is that some people will be significantly impaired at drug concentrations that are below the lab’s detection threshold.



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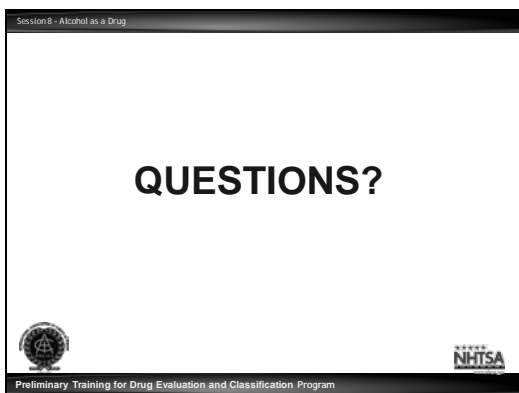
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- What this means is that a DRE sometimes examines a subject, concludes correctly that he or she is under the influence of a certain drug category, perhaps even obtains an admission from the subject that he or she has taken a drug, gets a toxicological sample and sends it to the lab, only to have the lab report that **“no drugs were found.”**
- When this happens to you – and it will – it is important that you don’t let yourself become discouraged.
- As a DRE, all you are expected to do is the best that you can do given the tools available.
- You will never become perfect in your opinion of drug impairment.
- There will be times when you will “miss” the fact that a subject is impaired.
- And there may be times when you will conclude that a subject is under the influence of a drug and a drug will not be detected.
- We rely on the laboratory to corroborate our opinions.
- However, the laboratory is not perfect and the toxicologists won’t always be able to corroborate your opinion, even though your opinion is accurate.



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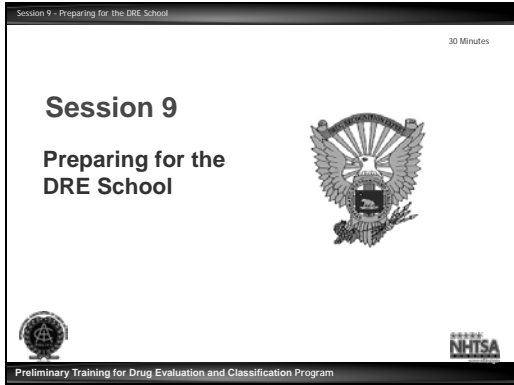
## **E. Questions for Review**

1. 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?
2. 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?
3. Multiple Choice: “Blood alcohol concentration is the number of \_\_\_\_\_ of alcohol in every 100 millimeters of blood.”
4. True or False: Pound-for-pound, the average woman contains more water than does the average man.
5. What do we mean by the “proof” of an alcoholic beverage?
6. Every chemical that is an “alcohol” contains what three elements?
7. True or False: Most of the alcohol that a person drinks is absorbed into the blood via the small intestine.
8. What is the name of the muscle that controls the passage from the stomach to the lower gastrointestinal tract?
9. True or False: Alcohol can pass directly through the stomach walls and enter the bloodstream.

10. 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....
11. In which organ of the body does most of the metabolism of the alcohol take place?
12. What is the name of the enzyme that aids the metabolism of alcohol?
13. Once a person reaches his or her peak BAC, it will drop at a rate of about \_\_\_\_\_ per hour.
14. Multiple Choice: If a person has a blood alcohol concentration of 0.10, then there are \_\_\_\_\_ nanograms of alcohol in every milliliter of his or her blood.
15. 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.



# Participant Manual DRE Pre School - Session 9 – Preparing for the DRE School



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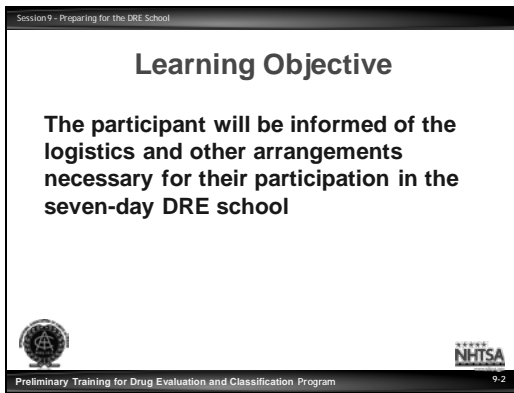
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Upon successfully completing this session the student will be informed of the logistics and other arrangements necessary for their participation in the seven day DRE School.

Session 9 – Preparing for the DRE School

## Seven-Day DRE School

- Dates
- Location
- Dress Code
- Material Needed
- Transportation
- Lodging
- Other



Preliminary Training for Drug Evaluation and Classification Program 9-3

Notes: \_\_\_\_\_

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### A. Session 9 Guide

- Dates of the seven-day school
- Location of the school
- Dress code
- Materials that the participants should bring to the school
- Transportation arrangement (if applicable)
- Lodging arrangements (if applicable)
- Recreational facilities and opportunities (if appropriate)

Session 9 – Preparing for the DRE School

## QUESTIONS?



Preliminary Training for Drug Evaluation and Classification Program

Notes: \_\_\_\_\_

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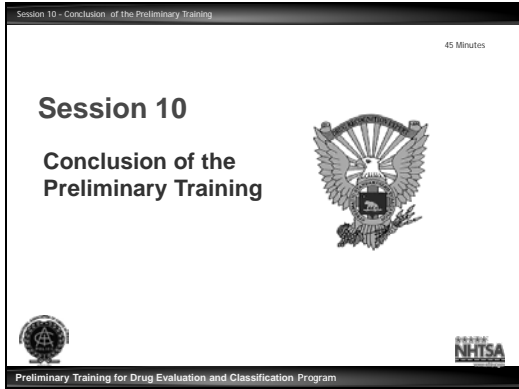
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# Participant Manual DRE Pre School - Session 10 – Conclusion of the Preliminary Training



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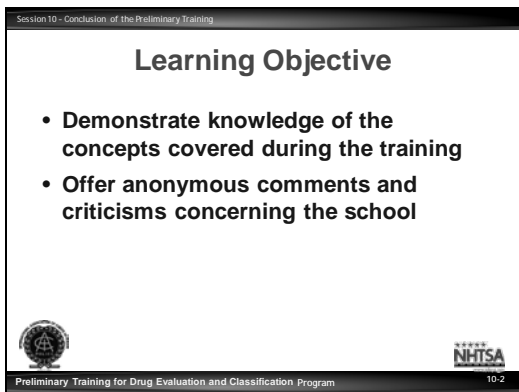
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Upon successfully completing this session the participant will be able to:

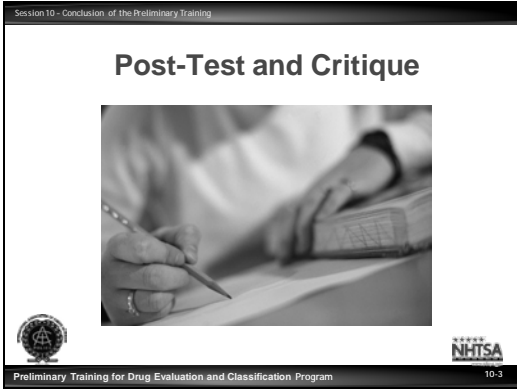
- Demonstrated his or her knowledge of the concepts covered during the DRE Pre-School.
- Offer anonymous comments and criticisms concerning the school

## CONTENT SEGMENTS

- A. Post-Test and Critique
- B. Certificates and Dismissal
- C. Session Wrap-up

## LEARNING ACTIVITIES

Written Examinations



Notes: \_\_\_\_\_  
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## A. Post Test and Critique

### *Post Test*

- Hand out copies of the post-test.
- Allow about 15 minutes for students to complete the test.

### *Critique*

- Hand out copies of the Student's Critique Form.
- Allow about 15 minutes for students to complete the critique.

### *Review of the Post Test*

- Go over the post test questions. Limit this review to 10 minutes. Instruct the students to retain the Pre-School post-test as a study guide for the upcoming DRE School.



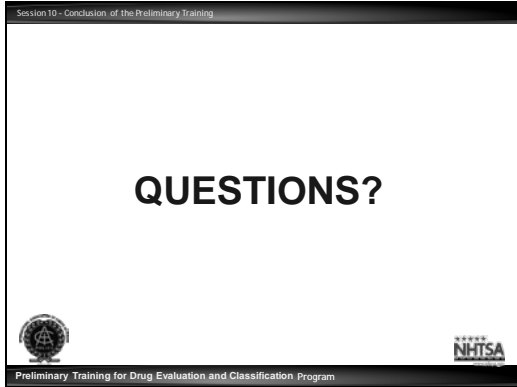
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**B. Certificates and Dismissal**

Hand out certificates of course completion.

Hand back the students' Certification Progress Logs.

- Making sure that an instructor has signed the Pre-School line on each log.
- Remind the students that they must bring the progress logs with them to the DRE School.



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**C. Session Wrap-Up**