

Drug Evaluation and Classification Training

“The Drug Recognition Expert School”

January 2011 Edition

Student Manual



DRUG EVALUATION AND CLASSIFICATION TRAINING PROGRAM
THE DRUG RECOGNITION EXPERT SCHOOL

JANUARY 2011 EDITION

U.S. DEPARTMENT OF TRANSPORTATION
Transportation Safety Institute
National Highway Traffic Safety Administration

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SESSION I
INTRODUCTION AND OVERVIEW

SESSION I INTRODUCTION AND OVERVIEW

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

- o State the goals and objectives of the course.
- o Outline the major course content.
- o Outline the schedule of major course activities.
- o Outline the contents and arrangements of the student manual.

During this session, the student will demonstrate their current knowledge of basic concepts and terminology relevant to the Drug Evaluation and Classification process.

NOTE: Throughout this manual, the term "DRE" is used to designate an individual who is specially trained to conduct evaluations of suspected drug-impaired subjects. In some participating agencies, the term stands for "drug recognition expert"; in others, it means "drug recognition examiners"; and in others "drug recognition evaluator". In addition, some agencies use the terms "DRT" (for drug recognition technician) or "DRS" (drug recognition specialists). All of these are acceptable and synonymous. But for this training program, the standard term is DRE.

A. Introduction to The Second Stage of Training: The DRE School

The Drug Evaluation and Classification (DEC) training program focuses on a set of examination procedures, or steps that make up the DRE drug influence evaluation. They include the following:

- a breath test to determine blood alcohol concentration (BAC);
- preliminary assessments of the subject's speech, breath, appearance, demeanor, behavior, etc;
- examinations of the subject's eyes (for nystagmus, tracking ability, ability to converge, pupil size and pupil reaction to light);
- psychophysical evaluations of the subject, based on divided attention tests;
- examinations of the subject's vital signs (e.g. blood pressure, pulse rate and temperature);
- inspections of the subject's arms, neck, nasal area, oral cavity, etc. for signs of drug ingestion.

Based on these examinations, and on other articulable evidence that may emerge during contact with the subject, a trained DRE can reach reasonably accurate conclusions concerning

the category or categories of drugs, or medical conditions, causing the impairment observed in the subject. Based on these informed conclusions, the DRE can request the collection and analysis of an appropriate chemical sample (blood or urine) to obtain corroborative, scientific evidence of the subject's drug use.

The DRE School provides detailed explanations of the evaluation procedures; careful demonstrations of these procedures, both "live" and via video; and ample opportunities for the students to practice administering the evaluations. By the completion of this course of instruction, students should be fully proficient in checking vital signs, conducting careful examinations of the eyes, administering divided attention tests and, in general, carrying out the procedural steps of the DRE's job.

However, there is one essential learning experience that this classroom training cannot provide. It cannot afford students an opportunity to practice examining subjects who are under the influence of drugs other than alcohol. For this reason, this classroom training only constitutes Phase II in the process of developing DRE skills. Phase III of the training (which commences upon the successful completion of this course) involves hands-on practice in an actual enforcement context, i.e. examining persons who are under the influence of drugs.

Although this DRE School will not conclude with the student's immediate certification as a

DRE, successful completion of this classroom training is nevertheless highly important. No one can advance to Certification Training until they demonstrate a mastery of basic knowledge of drug categories and their effects on the human mind and body, and of the basic skills in administering and interpreting the examinations involved in the Drug Evaluation and Classification process. All students must pass the knowledge exam with a score of 80 percent or greater.

Mastering the necessary knowledge and skills is not difficult if students apply themselves diligently to study and practice. There is no reason why a student who possesses solid skills in detecting and investigating persons under the influence of alcohol cannot achieve proficiency as a DRE.

B. Goals and Objectives of the Training

The ultimate goal of the Drug Evaluation and Classification (DEC) program, and of this course of instruction, is to "help you prevent crashes, deaths and injuries caused by drug-impaired drivers".

No one knows precisely how many people operate motor vehicles while under the influence of drugs, or how many crashes, deaths and injuries these people cause. But even the most conservative estimates suggest that America's drug-impaired drivers kill thousands of people each year, and seriously injure tens of thousands of others. There are numerous studies that illustrate these facts. They include:

- Maryland (1986) - 32 percent of crash-injured drivers had evidence of marijuana in their blood.
- University of Tennessee (1988) - 40 percent of crash-involved drivers treated at the University's Trauma Center had drugs other than alcohol in their urine.
- NHTSA (Terhune, Ippolito, Hendricks et al., 1992) - 1,882 operators involved in fatal crashes from 13 locations from eight states were tested for alcohol and 43 other drugs. Alcohol was the most prevalent drug detected in 51.5 percent of the crashes, while other drugs were involved in 17.8 percent of the crashes.
- Washington State (Schwilke, et al 2006) - The results of tests of blood and/or urine from 370 fatally injured drivers revealed that marijuana was the most encountered drug (12 percent), followed by benzodiazepines (5.1 percent), cocaine (4.8 percent) and amphetamines (4.8 percent).

How about people who drive under the influence of alcohol and other drugs that are not involved in crashes? A 2008 survey (National Survey on Drug Use and Health) revealed that 10.0 million persons admitted driving under the influence of alcohol at least once in the past year. The same survey also revealed that an estimated 20 million Americans, or 8.2 percent of the population aged 12 years or older, were current illicit drug users, and that marijuana was the most commonly used illicit drug.

It should be noted that traffic crash reduction is not the only benefit that should result from an effective Drug Evaluation and Classification program. Improved investigative skills should increase society's effectiveness in combating the drug threat in general, and result in significant economic and human savings.

The goals of this classroom training, from the viewpoint of the law enforcement agencies participating in it, are three-fold:

1. To help police officers acquire the knowledge and skills needed to distinguish individuals under the influence of alcohol only from individuals who are under the influence of other drugs, or of combinations of alcohol and other drugs, or who are suffering from an injury or illness.
2. To enable police officers to identify the broad category or categories of drugs inducing the observable signs of impairment manifested by an individual.
3. To qualify police officers to progress to Certification Training.

The objectives of this course, from the viewpoint of the individual students who enroll in it, are as follows:

- to be able to describe the involvement of drugs in impaired driving incidents.
- to be able to name the seven broad categories of drugs, and recognize their effects.
- to be able to describe, and administer properly, the psychophysical and physiological examinations included in the drug influence evaluation.
- to be able to document the results of DRE evaluations.
- to interpret the results of these evaluations accurately.
- to be able to prepare a narrative Drug Influence Report based on the results of the complete evaluation.
- to be able to testify properly in typical drug evaluation cases.
- to develop and maintain an up-to-date, relevant Curriculum Vitae (CV) to document their qualifications as DREs.

Throughout this classroom training, and especially at its conclusion, students will be tested to assess their ability to do these things.

C. Overview of Content And Schedule

During this classroom training some of the major content topics will be:

- the incidence of drugs in society and in vehicle operation,
- the development and effectiveness of the DEC program,
- the DRE procedures,
- eye examinations,
- physiology and drugs,
- vital signs examination,
- Physicians Desk Reference and other resources
- interviewing subjects,

- curriculum vitae (C.V.), case preparation and testimony,
- interpreting and documenting the results of the examination.

Since hands-on practice is the principle learning activity, time will be spent on conducting the eye examinations, psychophysical tests, interpreting the examination results, administering vital signs examinations, practicing the examination procedures and simulating the drug influence examinations.

D. Overview of Student Manual

The student manual is be used as a reference and is a summary of material presented. You are required to attend every session of the DRE School in order to proceed to the certification training phase.

**THE DRE SCHOOL
PRE-TEST**

NAME _____ AGENCY _____

SCHOOL LOCATION _____ DATE _____

Circle the letter(s) corresponding to the correct answer(s) for each question. **Note: Some questions have more than one correct answer.**

1. The Autonomic Nervous Sub-system has **sympathetic** nerves and ____ nerves.
 - A. Parasympathetic
 - B. Hypersympathetic
 - C. Hyposympathetic
 - D. Metasympathetic
 - E. Transsympathetic

2. The technical term for **constricted pupils** is _____.
 - A. Mydriasis
 - B. Mithosis
 - C. Ptosis
 - D. Ptarsis
 - E. Miosis

3. You examine a subject that you know is under the combined influence of PCP and Cocaine, and you observe that he or she exhibits Horizontal Gaze Nystagmus. This is an example of _____.
 - A. A Synergistic Effect
 - B. An Additive Effect
 - C. An Antagonistic Effect
 - D. The Null Effect
 - E. An Overlapping Effect

4. Which of the following ordinarily will cause Horizontal Gaze Nystagmus? (Circle **all** that usually cause HGN)
 - A. Methamphetamine
 - B. Valium
 - C. Peyote
 - D. Cannabis
 - E. Cocaine

5. **Ritalin** is an example of _____.
- A. A CNS Stimulant
 - B. A Narcotic Analgesic
 - C. An Hallucinogen
 - D. A CNS Depressant
 - E. An analog of Phencyclidine
6. Which of the following usually will be true in a subject who is under the influence of LSD? (Circle **all** that usually would be true)
- A. Blood pressure will be lowered
 - B. Eyes will not be able to converge
 - C. Horizontal Gaze Nystagmus will be present
 - D. Pulse rate will be slowed
 - E. Pupils will be dilated
7. Unless it is physically impossible to do so, a DRE will always use the _____ pulse point to measure a subject's pulse rate.
- A. Right Brachial
 - B. Right Carotid
 - C. Right Radial
 - D. Left Radial
 - E. Left Brachial
8. Which of the following is not classified as an Hallucinogen? (Circle **all** that are not Hallucinogens)
- A. MDMA
 - B. DOM
 - C. MDA
 - D. STP
 - E. MPPP
9. Amphetamines produce the same effects as Cocaine with the exception of _____.
- A. Pupil dilation
 - B. Pulse rate elevation
 - C. Anesthesia
 - D. Blood pressure elevation
 - E. No exception: both Cocaine and Amphetamines produce all four effects listed above

10. The gap between two nerve cells is called the _____.
- A. Axon
 - B. Dendrite
 - C. Neuron
 - D. Synapse
 - E. Vesicle
11. How many distinct, validated clues have been established for the Romberg test?
- A. Eight
 - B. Six
 - C. Four
 - D. Three
 - E. No validated clues have been established for that test.
12. How many distinct, validated clues have been established for the Walk and Turn test?
- A. Eight
 - B. Six
 - C. Four
 - D. Three
 - E. No validated clues have been established for that test.
13. The normal range of pupil size in “room light” is _____.
- A. 2.5 mm to 5.0 mm
 - B. 3.0 mm to 6.0 mm
 - C. 3.0 mm to 6.5 mm
 - D. 3.5 mm to 6.5 mm
 - E. We do not attempt to specify "normal ranges" in the DEC program.
14. The drug _____ is an example of a synthetic Narcotic Analgesic. (Circle **all** that are synthetic Narcotic Analgesics)
- A. Dilaudid
 - B. Percodan
 - C. Demerol
 - D. Codeine
 - E. Oxycodone

15. The drug _____ is an example of an anti-anxiety tranquilizer. (Circle **all** that are anti-anxiety tranquilizers)
- A. Xanax
 - B. Thorazine
 - C. Elavil
 - D. Amobarbital
 - E. Chloral Hydrate
16. In a blood pressure measurement, the **lower** number is called the _____ pressure.
- A. Pulmonary
 - B. Atrial
 - C. Diastolic
 - D. Arterial
 - E. Systolic
17. Which of the following is a Dissociative Anesthetic?
- A. Heroin
 - B. Thorazine
 - C. PCP
 - D. Methadone
 - E. Cocaine
18. Which of the following usually will not cause the pupils to dilate? (Circle **all** that usually don't cause dilation).
- A. MDMA
 - B. Methaqualone
 - C. Methamphetamine
 - D. Peyote
 - E. PCP
19. You examine a subject that you know is under the combined influence of PCP and Marijuana, and you find that his or her pulse rate is 102. This is an example of _____.
- A. A Synergistic Effect
 - B. An Overlapping Effect
 - C. The Null Effect
 - D. An Antagonistic Effect
 - E. An Additive Effect

20. Which sub-category of Narcotic Analgesics usually causes elevated body temperature?
- A. The Synthetics
 - B. The Alkaloids
 - C. The Opium Derivatives
 - D. **All** Narcotic Analgesics cause elevated body temperature
 - E. **No** Narcotic Analgesics cause elevated body temperature
21. The normal range of pulse rate is _____.
- A. 60 to 90
 - B. 60 to 100
 - C. 70 to 90
 - D. 70 to 100
 - E. We do not attempt to specify "**normal ranges**" in the DEC program
22. The technical term for an abnormally rapid heart rate is _____.
- A. Myocardia
 - B. Hypercardia
 - C. Tachycardia
 - D. Hypocardia
 - E. Bradycardia
23. In the 2007 National Roadside Survey of Alcohol and Drug Use by Drivers Study, using both blood tests and oral fluids, what percentage of drivers tested positive for drugs?
- A. 14.1%
 - B. 16.3%
 - C. 17.0%
 - D. 17.3%
 - E. 18.0%
24. "Crank" is a street name for _____.
- A. Heroin
 - B. Cocaine
 - C. PCP
 - D. Methamphetamine
 - E. Methaqualone

25. Which of the following is not a validated clue for the One Leg Stand test? (Circle **all** that are **not** validated clues)

- A. Hopping
- B. Raising the Arms
- C. Putting the Foot Down
- D. Failing to Count Out Loud
- E. Swaying

DRUG EVALUATION AND CLASSIFICATION PROGRAM

GLOSSARY OF TERMS

ACCOMMODATION REFLEX

The adjustment of the eyes at various distances. Meaning the pupils will automatically constrict as objects move closer.

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 subject's pupils could be constricted, or dilated, or within the normal range of size.

ARRHYTHMIA

An abnormal heart rhythm.

ARTERY

The strong, elastic blood vessel that carries blood away from 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; pulse rate below the normal range.

BRADYPNEA

Abnormally slow rate of breathing.

BRUXISM

Grinding the teeth. This behavior is often seen in persons 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 is made from the dried and pressed resin of a marijuana plant. 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, preludin 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 solid 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 subject 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 ANESTHETIC

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 task at a time. The four psychophysical tests used by DREs require the subject to divide attention.

DOWNSIDE EFFECT

An effect that may occur when the body reacts to the presence of a drug by releasing 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 et. al.

Shortness of breath.

DYSMETRIA

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

DYSPHORIA

A mood disorder. 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 the 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.

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 higher 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 observed only 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.

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 it is not produced from any species of cannabis plant.

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 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 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 (such as demerol and numorphan).

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 analgesic. The subject's eyelids droop and chin rests on the chest. Subject 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 by 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 neurotransmitters 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 for 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 people 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 subject's impairment.

PSYCHOTOGENIC

Literally "creating psychosis" or "giving birth to insanity". A drug is considered to be psychotogenic if people 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 people 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 relaxation of the walls of an artery, caused by the surging flow of blood.

PULSE RATE

The number of expansions of an artery per minute.

PUPILLARY LIGHT

The pupils of the eyes will constrict and dilate 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 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 powder 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 in order 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. In its simplest terms it is a transposition of the senses. For example, seeing a particular sight may cause the user to perceive a sound.

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; pulse rate above the normal range.

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 their 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.

SESSION II

DRUGS IN SOCIETY AND IN VEHICLE OPERATION

SESSION II DRUGS IN SOCIETY AND IN VEHICLE OPERATION

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

- o Define the term "drug" in the context of this course.
- o Name the seven major categories of drugs that are relevant to the Drug Evaluation and Classification program.
- o State in approximate, quantitative terms the incidence of drug use among various segments of the American public.
- o State in approximate, quantitative terms the incidence of drug involvement in motor vehicle crashes and other driving incidents.
- o Correctly answer the "topics for study" questions at the end of this session.

A. Definition and Categories of Drugs

The word "drug" means many things to many people. The word is used in a number of different ways, by different people, to convey some very different ideas.



For purposes of this training, a simple, enforcement-oriented definition is needed:

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

This definition is adapted from the California Vehicle Code, and reflects the traffic safety orientation of this training program.

It is worth noting that this definition excludes many substances that physicians and others would not consider "drugs". For example, nicotine (cigarettes) and acetyl salicylic acid (aspirin) would not be considered "drugs" for purposes of this training. Similarly, this definition includes as "drugs" many substances that physicians wouldn't ordinarily think of when they hear the word. Model airplane glue, for example, is a "drug" for purposes of this training.

Under this definition, there are seven broad categories of drugs.

Central Nervous System Depressants

Examples

Alcohol
Barbiturates
Anti-Depressants
Anti-Anxiety Tranquilizers



Central Nervous System Stimulants

Examples

Cocaine
Amphetamines
Methamphetamine
Ritalin

Hallucinogens

Examples

LSD
MDMA (Ecstasy)
Psilocybin
Peyote

Dissociative Anesthetics

Examples

PCP (Phenyl Cyclohexyl Piperidine)
Ketamine
Dextromethorphan

Narcotic Analgesics

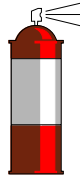
Examples

Heroin
Codeine
Demerol
Methadone
OxyContin

Inhalants

Examples

Glue
Gasoline
Aerosols
Nitrous Oxide
Amyl Nitrite



Cannabis

This category includes the various forms and products of Cannabis plants (e.g. marijuana, hashish, Marinol, etc.)



Each category produces a different set of effects on the human mind and body. Each category exhibits different signs of drug influence, signs which come to light in the Drug Evaluation and Classification examinations. Each category also includes drugs that are widely abused.

One fact that is abundantly clear is that many drug users don't stick with only one substance, but instead routinely ingest more than one drug category. This behavior is called "polydrug" use (the prefix "poly" derives from the Greek word for "many"). Some commonly abused combinations of drugs include:

- Alcohol and virtually any other drug (for example, out of 173 drivers arrested by LAPD on suspicion of being under the influence of drugs, 81 (or 47%) had consumed alcohol and some other drug).
- Marijuana and PCP (A common way of ingesting PCP is to sprinkle it on a marijuana cigarette and smoke it. The user then automatically ingests both PCP and Cannabis.)
- Cocaine and Heroin (This combination has its own "street name". It is commonly called a "speedball".)

- Heroin and Amphetamine (This combination is sometimes called a "poor man's speedball".)
- Heroin and PCP (Sometimes called a "fireball".)
- "Crack" Cocaine and PCP (Sometimes called "space base".)
- "Crack" cocaine and marijuana (Sometimes called "primo".)
- "Crack" and Methamphetamine (Sometimes called "croak".)

The practice of polydrug use is so common that a DRE should expect to encounter many subjects who are under the influence of more than one category of drugs. Indeed, at some times and places, polydrug use may be more common than single drug use.

B. Incidence and Characteristics of Drug Use in America

Estimates of the number of American drug users vary widely and are difficult to pinpoint with any accuracy. It is known that one drug, alcohol, is occasionally used by at least a majority of adults in this country. Despite the fact that almost all of the alcohol consumed in this country is legally manufactured (and taxed) under fairly close governmental scrutiny, experts disagree as to how many people abuse alcohol, how much they consume, how frequently, etc. Knowledge of consumption patterns of other drugs is even less exact, since these drugs often are produced and sold illegally.

Nevertheless, virtually all experts agree that millions of Americans use drugs other than alcohol. The 2008 National Survey on Drug Use and Health (NSDUH) reported by the Substance Abuse and Mental Health Services Administration (SAMHSA) obtained survey information on numerous categories of drugs; marijuana, cocaine, heroin, hallucinogens, inhalants and non-medical use of prescription drugs. The results confirmed that a large percentage of the American population use drugs other than alcohol. Marijuana was the most commonly used illicit drug in 2008 with 15.2 million current users (6.2 percent of the population).

In 2008, 6.2 million people were users of psychotherapeutic drugs taken non-medically.

The NSDUH survey also reported that an estimated 1.9 million persons were current Cocaine users.

Hallucinogens were used in the past month by 1.1 million persons including 555,000 users of Ecstasy. Of the non-medical prescription drug users, an estimated 4.7 million abused pain relievers, 1.8 million abused tranquilizers, 1.2 million abused stimulants and 300,000 abused sedative medications.

C. Incidence of Drug Impaired Driving

Accurate data on the frequency with which people drive while under the influence of drugs is very hard to come by. First of all, many impaired drivers are never detected. Secondly, since many drug users also drink alcohol, when they are stopped for impaired driving they may be arrested (and tabulated in statistics) as alcohol impaired drivers only. Thirdly, when they are involved in crashes, they may not be tested for drugs other than alcohol.

Nevertheless, some limited studies have been conducted that suggest drug impaired driving is a problem of significant proportions.

- (1) A study was conducted in California of young (15-34 years old) male drivers killed in crashes during 1982 and 1983. This study covered 440 such drivers. More than half (51%) were found to have some drug or drugs other than alcohol in them. The most prevalent drug other than alcohol was cannabis, which was found in 37% of these young dead drivers. Nearly one-third of these 440 deceased drivers (30%) had alcohol and cannabis in them.
- (2) In what is probably one of the most comprehensive studies of this kind conducted by the University of Tennessee Medical Center who analyzed the urine samples of crash-injured drivers for a broad spectrum of drugs, and found that 40 percent had evidence of drugs other than alcohol.
- (3) The U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) reported that a study of fatally injured drivers from seven states showed that alcohol was present in more than 50% of the drivers and other drugs were present in 18% of the drivers.
- (4) The 2008 NSDUH, study reported that an estimated 10 million persons aged 12 or older reported driving under the influence of an illicit drug in the past year.
- (5) The NHTSA 2007 National Roadside Survey of Alcohol and Drug Use by Drivers indicated that 16.3% of nighttime drivers tested positive for drugs.

Topics for Study

1. What does the term "drug" mean, as used in this course?
2. What are the seven categories of drugs? To which category does alcohol belong? To which category does cocaine belong?
3. What does "polydrug use" mean?
4. What is a "Speedball"? What is "Space Base"?
5. In the 2007 National Roadside Survey of Alcohol and Drug Use by Drivers Study, using both blood tests and oral fluids, what percentage of nighttime drivers tested positive for drugs?

SESSION III

**DEVELOPMENT AND EFFECTIVENESS OF THE DRUG
EVALUATION AND CLASSIFICATION PROGRAM**

SESSION III

DEVELOPMENT AND EFFECTIVENESS OF THE DRUG EVALUATION AND CLASSIFICATION PROGRAM

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

- o State the origin and evolution of the Drug Evaluation and Classification program.
- o Describe research and demonstration project results that validate the effectiveness of the program.
- o State the impact of legal precedents established by case law.
- o Correctly answer the "topics for study" questions at the end of this session.

A. Origin and Evolution of the Program

The Drug Evaluation and Classification program was developed by personnel of the Los Angeles Police Department (LAPD). The initial impetus for the program stemmed from the frequent encounters, by experienced traffic enforcement officers, with drivers who were clearly impaired but whose blood alcohol concentrations were very low or zero. The logical suspicion was that these drivers were under the influence of drugs other than alcohol. But obtaining convincing evidence to back up that suspicion was not easy. Occasionally, officers succeeded in having physicians examine their low BAC subjects, sometimes resulting in a medical diagnosis of drug influence. But medical personnel typically receive little or no training in the recognition of specific signs of drug impairment, particularly at street level doses; therefore, they often were unable or reluctant to offer a judgment about a subject's condition. As a result, many drivers who almost certainly were under the influence were not prosecuted or convicted.

Two LAPD sergeants were instrumental in organizing a program to help police officers develop the skills needed to perform their own assessments of drug-impaired drivers. One was Dick Studdard, a traffic officer, the other was Len Leeds, a narcotics officer. They undertook independent research by consulting with physicians, enrolling in relevant courses, studying text books and technical articles, etc. Also, they secured management level support within LAPD to continue and accelerate the research and development effort. With the assistance of many others, Sergeants Studdard and Leeds ultimately succeeded in developing a drug recognition program based on a three-step process:

STEP ONE

Verify that the subject is impaired, and verify that the subject's blood alcohol concentration is not consistent with the degree of impairment that is evident.

STEP TWO

Determine whether the impairment is drug or medically related (i.e. injury or illness).

STEP THREE

Use proven diagnostic procedures to determine the category (or combination of categories) of drugs that is the likely cause of the impairment.

In 1979, the drug recognition program received the official recognition of the LAPD.

Persons unfamiliar with drugs sometimes wonder why it is necessary to use an elaborate set of diagnostic procedures to point toward the likely category of drugs. At first glance, it might seem that the easily observable inconsistency between the subject's impairment and his or her BAC would be sufficient. In other words, if the subject is obviously impaired, and if the alcohol level in the subject's blood is not enough to account for that impairment, why not simply obtain a blood sample and analyze it for drugs? For several reasons, this simplistic approach would not work.

- The request for a blood or urine sample should be based on (at least) the strongest articulable evidence of drugs that is available. The mere inconsistency between BAC and observable impairment might not be deemed (by courts or by motor vehicle licensing agencies) as sufficient to justify the subsequent chemical

test. For example, it could be argued that the subject is ill or injured, or is simply very susceptible to the effects of even low doses of alcohol. It is preferable if the officer who initiates the chemical test for drugs can articulate a credible basis for believing that those drugs are present.

- The subject may simply refuse to submit to the test. Although that action might put the subject's driver's license in jeopardy of suspension or revocation, it also will deny the prosecution access to the scientific evidence of drug involvement. Conviction or acquittal in such a case may hinge on the officer's ability to submit detailed and convincing testimony concerning the signs pointing toward a specific category or categories of drugs.
- Chemical tests of blood or urine usually disclose only whether or not a particular drug was recently used. The chemical test cannot be relied upon to determine whether the drug was psychoactive in the subject at that time (i.e. whether the subject was "under the influence" of the drug, within the meaning of the law). The DRE is needed to establish the fact that the drug was indeed causing impairment.
- Analysis of blood (or urine) samples for "drugs" can be very expensive, and may require a large volume. Practical constraints require that the officer requesting the chemical analysis be able to point the laboratory technician toward the type of drugs most likely to be found in the sample.
- Several new and innovative methods for drug toxicological analysis are currently being researched. These include, but are not limited to, saliva and hair sampling. As these methods are accepted in the scientific community, they will be evaluated for incorporation into the DEC program.
- There is always the possibility that a person suspected of drug impairment is actually suffering from an illness or injury requiring medical attention. If the subject's sample is simply drawn for subsequent analysis, and they are not examined by someone qualified to recognize the presence -- or absence -- of symptoms of drug impairment, the medical problem may not be discovered until it is too late. DRE's take justifiable pride in the numerous instances where they have secured prompt medical care for persons initially suspected of drug abuse.

B. Evidence of Program Effectiveness

Proof of the effectiveness of the DEC program began to be accumulated from the very outset of the program. LAPD personnel demonstrated that they could conduct examinations that led directly to the conviction of drug impaired drivers and other drug law violators. They also demonstrated that they could train others to conduct these examinations successfully.

Scientific evidence that the examinations provide accurate indicators of drug categories began to be accumulated in the early 1980's. The National Highway Traffic Safety Administration sponsored a controlled, laboratory evaluation of the LAPD drug recognition procedures. The evaluation was conducted by researchers from Johns Hopkins University, assisted by senior

drug recognition experts from LAPD. The researchers recruited volunteers who agreed to consume a variety of drugs, and other substances, under the researchers' supervision. During each experimental session, each volunteer swallowed a "pill" and smoked a "cigarette". Subsequently, each volunteer was examined independently by four LAPD DREs.

The "pills" given to volunteers contained one of the following:

- a placebo (i.e. no drug at all)
- Secobarbital (a CNS Depressant)
- Valium (i.e. Diazepam -- another CNS Depressant)
- d-amphetamine (a CNS Stimulant)

The "cigarette" contained marijuana or a placebo (i.e. no drug) marijuana that either actually contained THC or from which the THC had been removed (i.e., a placebo).

No combinations of drug categories were administered to any volunteer on any session. That is, if a volunteer received a marijuana cigarette, then that volunteer received a placebo pill. If the volunteer received a "loaded" pill (i.e. with a drug), then his or her cigarette was a placebo. Some volunteers on some sessions received no drug at all i.e. both the "pill" and the "cigarette" were placebos.

Two different dose levels of marijuana, diazepam and d-amphetamine were used. That is, some of the marijuana cigarettes were "weak" and some were "strong". Similarly, some of the diazepam and d-amphetamine pills were "weak" and some "were strong". All of the secobarbital pills were "strong". Note: The "strong" dose levels were significantly weaker than the drugs typically abused by impaired drivers encountered by police officers.

A most important condition of this laboratory experiment was that neither the volunteers nor the LAPD officers knew what drugs the volunteers had received. Also, the DRE's were not allowed to "compare notes" concerning their examinations of the subjects. Each DRE conducted his or her examinations in a separate room, and each had to reach an independent judgment as to what category (if any) of drug was present.

The DREs' performance in the laboratory experiment was excellent. They correctly classified 95% of the placebo only subjects as "not impaired". Conversely, they correctly classified 98.7% of the subjects who received "strong" drug doses as "impaired". Furthermore they correctly identified the category of drugs for 91.7% of those "strong" dose subjects.

The DREs were less successful in identifying the volunteers who received "weak" drug doses. For example, they classified as "impaired" about one-third of the subjects who received "weak" marijuana cigarettes, and about one-sixth of those who received "weak" d-amphetamine pills. However, it is unlikely that those "weak" dose subjects would have been stopped by officers, if they actually had been driving.

NHTSA followed up the laboratory experiment by sponsoring a Field Validation Study, in Los Angeles. Arrangements were made to have an independent laboratory analyze blood samples drawn from persons actually arrested on suspicion of drug impaired driving. Any subject who was involved in a crash was excluded from the study, since injuries could have confounded the drug examination. Similarly, any subject who refused to submit to the blood test was excluded, since there would have been no way to substantiate or refute the DRE's conclusions.

Ultimately 173 suspected drug impaired drivers were included in the Field Validation Study. Each was examined by a DRE and subsequently provided a blood sample for analysis by the independent laboratory.

A number of important facts emerged from the Field Validation Study:

1. When a trained drug recognition expert concludes that a subject is under the influence of drugs, chances are very good that the subject actually has drugs in his or her body. Only one of the 173 subjects were found to have no alcohol or other drug. Only ten others were found to have alcohol only. Thus, 93.6% of the subjects were confirmed to have drugs other than alcohol in their bodies. Of the 173 subjects, 125, or 72%, had ingested two or more drugs other than alcohol.
2. Polydrug use is very common. Only 21% of the subjects had consumed one drug other than alcohol. The study found 47% had two drugs in their system other than alcohol. Also 25% had three or more drugs other than alcohol in their system. Among the more common combinations were the following:
 - Alcohol and PCP (23 subjects)
 - Alcohol and Cannabis (19 subjects)
 - Alcohol, PCP and Cannabis (18 subjects)
 - Cannabis and PCP (20 subjects)
3. The independent blood analyses confirmed the DREs' opinions in most cases. Overall, for more than nine out of ten subjects (92.5%), the blood test confirmed the presence of at least one drug category "predicted" by the DREs.
4. Confirmation rates varied among the categories, as follows:

<u>Category</u>	<u>Percent Confirmed by Blood</u>
PCP*	92%
Narcotic Analgesics	85%
Cannabis	78%
Depressants (other than alcohol)	50%
CNS Stimulants	33%

*Study data for PCP was collected when PCP was considered a DRE drug category.

5. The relatively low confirmation rates for CNS Depressants and CNS Stimulants may have been due to limitations in the laboratory rather than because of misjudgments

by the DREs. For example, the laboratory analyzed the blood only for the subcategories of Depressants known as the Barbiturates and the Benzodiazepines; there are many Depressant drugs that do not belong to those two groupings. In addition, the blood samples were not frozen prior to their shipment to the laboratory. Unfortunately, Cocaine continues to metabolize in unfrozen blood samples. Therefore, it is possible that in some samples obtained from Stimulant abusers, the Cocaine simply disappeared before the samples were analyzed.

In a study conducted in 1990, the Arizona Department of Public Safety's Central Regional Crime Laboratory compiled records of the toxicological analyses corresponding to DREs' opinions from 1987 to 1990. A total of 526 cases were analyzed showing that a laboratory confirmation rate of 86.5% had been achieved.

Numerous other states have conducted comparisons of laboratory analysis and DRE opinions, with the correlation rates generally exceeding 80%.

The overall conclusion of both the laboratory and field studies is that the Drug Evaluation and Classification program is a worthwhile tool for enforcement of drug-impaired driving. The tool is not 100% accurate, especially in a climate of polydrug use. However, it will furnish reliable evidence of the link between a particular subject and a particular category of drugs in more than a majority of cases.

C. Case Law Review

American courts employ either the *Frye* or *Daubert* Standard for determining the admissibility of scientific evidence. The Frye Standard is the traditional test for determining the admissibility of scientific evidence. The standard derives from *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), a case involving the admissibility of the systolic blood pressure deception test (the precursor to today's polygraph test). Essentially, *Frye* courts admit new or novel scientific evidence only if the evidence is "generally accepted" in the "relevant scientific communities." The "general acceptance" standard does not require "unanimity of view." The Frye Standard does not apply to evidence that has passed from the stage of experimentation to reasonable demonstrability. This distinction makes sense because the purpose of requiring general acceptance is to ensure that a party cannot gain an unfair advantage by finding an obscure witness who will attest to obscure techniques or "junk science" without being subject to any kind of real scrutiny. The *Frye* general acceptance standard applies to methods and techniques only; it does not apply to pure expert opinion testimony based on training and experience. In other words, an expert's opinion itself need not be generally accepted. If the evidence is not new or novel, the evidence is admissible if it is sufficiently reliable to be relevant.

The DEC Program is receiving increasingly favorable attention in court. Courts in various states have ruled favorably on the program the DRE process. Some judges have held that the DRE examination procedures meet the Frye Standard for admissibility of "new" scientific

evidence, while others have ruled that the Frye Standard need not apply. The Frye Standard is set by the U.S. Supreme Court to govern the admissibility of "new" scientific evidence. In effect, these courts took judicial notice of the DEC Program, so that it is no longer necessary -- within the jurisdictions of those specific courts -- to introduce expert scientific testimony to secure the admissibility of the results of a drug influence examination.

Some of the courts which have rendered decisions are (1) the Municipal Court of the City of Tucson, County of Pima, State of Arizona (acting in "State of Arizona vs. Dayton Johnson and Samuel Rodriguez, et al.", numbers 90056865 and 90035883). The court ruled that the Frye Standard was met. This decision was appealed to the Arizona Supreme court which ruled that the Frye standard did not apply to the DEC Program. (2) the Municipal Court of Minneapolis,

State of Minnesota (acting in State of Minnesota, City of Minneapolis vs. Larry Michael Klawitter, 518 N.W. 2nd 577), ruled that outside of nystagmus, the DEC Program is not subject to the Frye Standard. (3) the County Court of Boulder, State of Colorado (State of Colorado vs. Daniel Hernandez, 92M181) also ruled that the procedures utilized by DRE's are not new or novel and that the Frye Standard did not apply. (4) Washington v. Baity, 991 P. 2d 1151, 140 Wn. 2d 1 (Washington 2000), the court determined that Frye applies to the protocol because the

process has "scientific elements." These are examples of decisions illustrating the acceptance of the DEC Program in many courts across the nation.

One key element of the drug influence evaluation namely, Horizontal Gaze Nystagmus (HGN) has been found to meet the Frye Standard by several State Supreme Courts. The first case that led to statewide judicial notice of HGN is commonly known as "State vs. Blake" (718 P.2d 171; Arizona, 1986). See also "State vs. Superior Court of County of Cochise, 149 Ariz 269, 718 P.2d 171, 60 ALR 4th, 1103). In this landmark ruling, the Arizona Supreme Court also set standards governing the training of officers who would be qualified to testify about HGN. The court also explicitly ruled that HGN cannot be used to establish BAC quantitatively in the absence of a chemical test.

To Summarize:

The prevailing trend in court is to accept HGN as evidence of impairment, provided the proper scientific foundation is laid. However, courts consistently reject any attempt to derive a quantitative estimate of BAC from nystagmus. Keep in mind that neither nystagmus nor any other elements of the drug influence evaluation are intended to substitute for chemical testing.

It is true that there is an approximate, statistical relationship between BAC and angle of onset, but this approximate relationship is not sufficiently reliable to permit BAC "prediction" in any individual case.

Topics for Study

1. State four reasons why it is important not to rely simply on a chemical test to establish a subject's drug impairment.
2. What categories of drugs were included in the Johns Hopkins Laboratory Study
3. In what percentage of cases in the Los Angeles Field Validation Study did blood tests confirm the DREs' opinion that PCP was present?
4. What percentage of subjects were found to be polydrug users in the LAPD Field Validation Study?
5. What was the landmark State Supreme Court case that upheld the use of HGN as evidence of impairment?
6. What do we call the standards for admissibility of scientific evidence, set by the U.S. Supreme Court?
7. Which State first found the Drug Evaluation and Classification procedures met the standards of scientific evidence?

ATTACHMENT A

“Frye” Decisions Regarding Admissibility of Drug Recognition Expert Testimony

“Frye” refers to a United States Federal Court opinion dealing with the admissibility of scientific evidence. The court established that new or novel scientific evidence, or the novel application of scientific principles, must be shown to have met with general acceptance in the relevant scientific community before it can be admitted.

1990

**State of Arizona v. Dayton Johnson and Samuel Rodriguez, et al. Defendants
Nos 90056865 & 90035883 (Unpublished Opinion).
The Municipal Court of the City of Tucson, County of Pima, State of Arizona**

“Virtually all the witnesses agreed that the scientific procedures utilized by trained drug recognition experts are reliable and are generally accepted in the scientific community. The methodology in place, used by trained law enforcement personnel in the field, has been shown to produce reasonably reliable and uniform results that will contribute materially to the ascertainment of the truth.”

On May 7, 1992, the Arizona Supreme Court heard oral arguments in a special proceeding regarding this case. The Justices uniformly rejected the application of “Frye” to the DRE procedures. The Chief Justice observed that the component examination procedures had been established for fifty years.

The prosecutors in this case were Tom Rankin (Tucson) and Cliff Vanell (Phoenix). Expert witnesses for the prosecution included: Sgt. Richard Studdard, LAPD, Marcelline Burns, Ph.D., Sgt. Thomas Page, LAPD, Zenon Zuk, M.D., and Eugene Adler, toxicologist.

1992

**County Court, Boulder, Colorado
Case No. 92M181 (Unpublished Opinion)
People of the State of Colorado v. Daniel Hernandez**

“The DRE methods are accepted within the scientific community because they have found to be reliable.”

“The Court finds that the expert does have sufficient specialized knowledge to assist the jurors in better deciding whether the defendant drove his car when under the influence of a specific drug. The DRE testimony can be used at trial provided a sufficient foundation is laid.” Overall, this court ruled that the procedures used by DRE’s are not new or novel scientific techniques that must meet the “Frye” standard.

The prosecutor in this case was David Archeluta (Boulder County). Expert witnesses for the prosecution include: Sergeant Thomas Page, LAPD, Zenon Zuk, M.D., Marcelline Burns, Ph.D.,

Rick Abbott, M.D., and Laurel Farrell (chemist).

1993

State of Minnesota in Supreme Court, C6-93-2092, filed June 30, 1994. (Unpublished Opinion)

State of Minnesota, City of Minneapolis vs. Larry Michael Klawitter, 518 N.W.2d 577 (1994)

“Given proper foundation and subject to other qualifications, opinion testimony by experienced police officers trained in use of so-called drug recognition protocol is generally admissible in evidence in a trial of a defendant for driving while under the influence of a controlled substance.”

The Court determined that the gaze nystagmus test satisfies the requirements of “Frye”.

“We agree with the trial court that the officer should be allowed to give an opinion based on the officer’s training and experience and his or her observations following the 12-step drug recognition protocol, as long as (a) there is sufficient foundation for the specific opinion expressed, (b) the state does not attempt to exaggerate the officer’s credentials by referring to the officer as a “Drug Recognition Expert” or to unfairly suggest that the officer’s opinion is entitled to greater weight than it deserves, and...” “We add only that it should be obvious that the mere fact that such opinion testimony by itself will be sufficient to support a guilty verdict.”

The court also determined that, outside of nystagmus, the components of a DRE examination are not scientifically new and are not subject to the “Frye” test.

The trial court stated, “...there is nothing scientifically new, novel, or controversial about any component of the DRE protocol itself. The symptomatology matrix used by DRE’s to reach their conclusions is not new and is generally accepted in the medical community as an accurate compilation of signs and symptoms or impairment by the various drug categories.”

The prosecutor in this case was Karen Herland (City of Minneapolis). Expert witnesses for the prosecution included: Sergeant Thomas Page, LAPD, Dr. Marcelline Burns (psychologist), Dr. David Peed (optometrist), Dr. Zenon Zuk (medical doctor), Eugene Adler (criminalist), Dr. S.J. Jejurikar (Minnesota Bureau of Criminal Apprehension), and Robert Meyer (toxicologist).

1994

11th Judicial Circuit in and for Dade County, Florida

Case No. 256998,9-I (Unpublished Opinion)

State of Florida v. Frederick Williams

Judge Maxine Cohen Lando

Original filed January 19, 1995

“Given proper foundation and subject to other qualifications, opinion testimony by an experienced police officer trained in the use of the drug recognition protocol is generally admissible in evidence in a trial of a defendant charged with driving under the influence of a controlled or chemical substance. Furthermore, Horizontal Gaze Nystagmus (HGN) test results are generally admissible to establish (1) that the defendant was impaired; and/or (2) that the defendant was over the legal limit; and/or (3) the defendant’s specific breath or blood alcohol level at the time he performed the test.”

This court found that the “Frye” standard is inapplicable to the DRE Protocol because neither the protocol nor any of its subsets (including HGN, VGN, and Lack of Convergence) are “scientific”.

Further, these tests are neither new nor novel. The Court also state that “Frye” is inapplicable to HGN, VGN, and LOC because none of them are new or novel. “None of these tests or the theories and procedures they encompass, are new, novel, or emerging scientific techniques. The medical and psychological professions have acknowledged the tests’ underlying theories and procedures for decades.”

The Court concluded:

“Drug recognition training is not designed to qualify police officers as scientists, but to train them as observers. The training is intended to refine and enhance the skill of acute observation...and to focus that power...in a particular situation.”

This court followed the Klawitter (Minnesota) decision, that it requires the state to “lay a proper predicate before referring to a DRE as anything other than a DRE or Drug Recognition Evaluator or Examiner.”

“The real issue is not the admissibility of the evidence, but the weight it should receive. That is a matter for the jury to decide.”

The prosecutor in this case was Steve Talpins (Dade County). Expert witnesses for the prosecution in this case included: Marcelline Burns, Ph.D., Zenon Zuk, M.D., Robert Dobie, M.D., Sergeant Thomas Page, LAPD, and others.

2000

Case No. 66876-1

State of Washington vs. Michael Baity

Judge J. Talmadge, WA Supreme Court

Original filed 2000

In this case, the court was asked to determine if a drug recognition protocol, used by trained drug recognition officers to determine if a suspect's driving is impaired by a drug other than alcohol, meets the requirements of *Frye v. United States*, 293 F. 1013,34 A.L.R. 145 (1923), for novel scientific evidence.

The issue brought before the court was; Is a drug recognition program novel scientific evidence generally accepted in the scientific community, thus satisfying the *Frye* test for admissibility?

The facts in this case were:

The state charged Baity with one count of DUI, in violation of RCW 46.61.502 (l) (b) (c), and one count of driving while license suspended in the third degree, in violation of RCW 46.20.342(l)(c), after he failed roadside SFST's and showed signs of drug impairments.

In a pretrial motion in Baity's case, the State sought to qualify the DREs as experts and to obtain a ruling on the admissibility of DRE evidence with respect to the defendant's drug impairment and the evaluation process used to determine that impairment. Specifically, the State sought to admit testimony that Baity's impairment was consistent with the symptoms associated with one of seven categories of drugs. Additionally, the state moved to admit testimony regarding the use of the horizontal gaze nystagmus (HGN) test, both for the detection of alcohol and for the detection of drugs. Baity moved to suppress all DRE evidence, including the HGN test, on the basis that the DRE program and protocol constitute novel scientific evidence subject to the *Frye* test for admissibility.

On May 19, 1998, the Pierce County District Court judges issued their opinion titled, "*Opinion Regarding Admissibility of HGN and DRE.*" In that opinion, they denied the defendants' motions to suppress the field sobriety tests (SFSTs) as to their alcohol impairment, holding those tests are "reasonably understandable to the ordinary person" and therefore not subject to *Frye*. Clerk's Papers at 56. The court also noted some features of the DRE protocol were either not of a scientific nature or were scientific, but not novel.

The court ruled that after analyzing the DRE protocol and the approach of other courts to its admissibility, that the DRE protocol and the chart used to classify the behavioral patterns associated with seven categories of drugs have scientific elements meriting evaluation under *Frye*. They also found that the protocol to be accepted in the relevant scientific communities. However, the court ruled that there is confined situations where all 12-steps of the protocol have been undertaken. Moreover, an officer may not testify in a fashion that casts an aura of scientific certainty to the testimony. The officer also may not predict the specific level of drugs present in a suspect. The DRE officer, properly qualified, may express an opinion that a suspect's behavior and physical attributes are or are not consistent with the behavioral and physical signs associated with certain categories of drugs.

The court also held that the protocol meets the mandate of Frye. An officer may testify concerning such drug impairment, subject to the limitations set forth in this opinion, upon meeting the requirements of ER 702 and 703 for the admission of expert opinion testimony. The court reversed the suppression orders of the Pierce County District Court and remanded the cases for further proceedings consistent with this opinion.

2003

Case No. CR-2003-00025

State of New Mexico vs. Miriam Aleman

State of New Mexico, County of Dona Ana

Third Judicial District

Judge Silvia E. Cano-Garica

Defendant made a motion *In Limine* to exclude the testimony of the DRE officer. They heard the testimony of various witnesses and reviewed the State's Brief in support of the DRE testing. Testimony and other applicable documents found that:

The DRE officer was recognized as an expert of DRE testing based upon his specialized knowledge and experience, the DRE evaluation method is generally accepted in the particular scientific field of forensic toxicology, the DRE evaluation provides critical information which assists the toxicologist in forming an opinion as to whether the driver was impaired by the use of drugs at or near the time the driver was driving the motor vehicle.

The DRE protocols are the application or incorporation of traditional techniques in the biology, physiology, anatomy, chemistry, pharmacology and toxicology fields, and the ultimate decision as to the driver's alleged impairment, based on all of the testimony received, rests with the jury.

2004

Case No. CR 03-8203

State of Nebraska vs. Timothy J. Cubrich

Judge Todd J. Hutton, Sarpy Co. Court

The court was asked to determine the admissibility of the law enforcement officer's opinion that the defendant was under the influence of a drug, other than alcohol, to the extent that his abilities to safely operate the vehicle were appreciable impaired.

To this end the court applied the standards set forth in *Schafersman v. Agland Coop*, 262 Neb. 215, 631 N.W. 2d 862 (2001), having adopted *Daubert v. Merrel Dow Pharmaceuticals, Inc.*, 509 U.S.579 (1993), as the controlling authority in determining the admissibility of expert opinion testimony.

The court concluded: Since *Daubert*, the court now serves in the "gatekeeping" role in which it is called upon to determine the reliability and relevance of expert testimony. There is no Case Law in Nebraska which has specifically addressed the issue of expert testimony relating to impaired drivers suspected of using drugs. Nor is there a statutory procedure by which Drug Recognition Examinations or the opinions derived there from have been codified.

Application of the Daubert standard provided a number of considerations the court used in determining the admissibility of evidence through the testimony of an expert, which included:

The 12-step protocol which relies on determining if a person is drug impaired has been recognized in the scientific community, including physicians, ophthalmologists, and forensic toxicologists, as a dependable methodology by which an officer, properly trained, can identify impairment and the category of drug(s) which are impairing the suspect's cognitive and physical capabilities.

The methodology is reliable because it is dependent on a fixed set of assessments which are verified by a toxicology test. The evaluation process includes HGN testing which has been found to meet the Frye standard of admissibility. Additionally, the HGN and VGN tests have been subject to peer review and publication. The remaining tests serve to screen the suspect's mental and physical condition documenting clues explaining why the person may or may not be impaired and if so the source(s) involved.

The drug recognition assessment is a tool by which a specially trained officer can conclude "based on the totality of results" whether or not a person is impaired by a drug other than alcohol.

The court found that the DREs opinion was correct in that the Defendant showed signs of impairment from a drug, other than alcohol, which caused him to seek a toxicological examination. The category of drug is admissible for the limited purpose of establishing foundation for drug screen conducted by the toxicologists.

ATTACHMENT B

American Prosecutors Research Institute National Traffic Law Center

HORIZONTAL GAZE NYSTAGMUS STATE CASE LAW SUMMARY

INTRODUCTION

The following state case law summary contains the seminal cases for each state, the District of Columbia and the Federal courts on the admissibility of HGN. Three main issues regarding the admissibility of the HGN test are set out under each state: evidentiary admissibility, police officer testimony, and purpose and limits of the HGN test results. The case or cases that address each issue are then briefly summarized and cited.

Alabama

I. Evidentiary Admissibility

HGN is a scientific test that must satisfy the *Frye* standard of admissibility. The Supreme Court of Alabama found that the State had not presented “sufficient evidence regarding the HGN test’s reliability or its acceptance by the scientific community to determine if the Court of Criminal Appeals correctly determined that the test meets the Frye standards.” *Malone v. City of Silverhill*, 575 So.2d 106 (Ala. 1990).

II. Police Officer Testimony Needed to Admit HGN Test Result

The Court did not address this issue.

III. Purpose and Limits of HGN

The Court did not address this issue.

Alaska

I. Evidentiary Admissibility

HGN is a scientific test. It is generally accepted within the relevant scientific community. *Ballard v. Alaska*, 955 P.2d 931, 939 (Alaska Ct. App. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

A police officer may testify to the results of HGN testing as long as the government establishes a foundation that the officer has been adequately trained in the test.

Ballard, 955 P.2d at 941.

III. Purpose and Limits of HGN

HGN testing is “a reliable indicator of a person’s alcohol consumption and, to that extent, HGN results are relevant.” The court cautioned that the HGN test could not be used to correlate the results with any particular blood-alcohol level, range of blood-alcohol levels, or level of impairment. *Ballard*, 955 P.2d at 940.

Arizona

I. Evidentiary Admissibility

HGN is a scientific test that needs to satisfy the *Frye* standard of admissibility. State has shown that HGN satisfies the *Frye* standard. *State v. Superior Court (Blake)*, 718 P.2d 171, 181 (Ariz. 1986) (seminal case on the admissibility of HGN).

II. Police Officer Testimony Needed to Admit HGN Test Result

“The proper foundation for [admitting HGN test results] . . . includes a description of the officer's training, education, and experience in administering the test and showing that proper procedures were followed.”

Arizona ex. rel. Hamilton v. City Court of Mesa, 799 P.2d 855, 860 (Ariz. 1990).

See also *Arizona ex. Rel. McDougall v. Ricke*, 778 P.2d 1358, 1361 (Ariz. Ct. App. 1989).

III. Purpose and Limits of HGN

HGN test results are admissible to establish probable cause to arrest in a criminal hearing. *State v. Superior Court (Blake)*, 718 P.2d at 182.

“Where a chemical analysis has been conducted, the parties may introduce HGN test results in the form of estimates of BAC over .10% to challenge or corroborate that chemical analysis.” *Ricke*, 778 P.2d at 1361.

When no chemical analysis is conducted, the use of HGN test results “is to be limited to showing a symptom or clue of impairment.” *Hamilton*, 799 P.2d at 858.

Arkansas

I. Evidentiary Admissibility

Novel scientific evidence must meet the *Prater* (relevancy) standard for admissibility. Because law enforcement has used HGN for over thirty-five years, a *Prater* inquiry is not necessary as the test is not “novel” scientific evidence. *Whitson v. Arkansas*, 863 S.W.2d 794, 798 (Ark. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

The Court did not address this issue.

III. Purpose and Limits of HGN

HGN may be admitted as evidence of impairment, but is not admissible to prove a specific BAC. *Whitson*, 863 S.W.2d at 798.

California

I. Evidentiary Admissibility

HGN is a scientific test and the *Kelly/Frye* “general acceptance” standard must be applied. *California v. Leahy*, 882 P.2d 321 (Cal. 1994). *California v. Joehnk*, 35 Cal. App. 4th 1488, 1493, 42 Cal. Rptr. 2d 6, 8 (Cal. Ct. App. 1995).

“...A consensus drawn from a typical cross-section of the relevant, qualified scientific community accepts the HGN testing procedures....”

Joehnk, 35 Cal. App. 4th at 1507, 42 Cal. Rptr. 2d at 17.

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer testimony is insufficient to establish “general acceptance in the relevant scientific community.” *Leahy*, 882 P.2d. at 609. Also see *People v. Williams*, 3 Cal. App. 4th 1326 (Cal. Ct. App. 1992).

Police officer can give opinion, based on HGN and other test results, that defendant was intoxicated. Furthermore, police officer must testify as to the administration and result of the test. *Joehnk*, 35 Cal. App. 4th at 1508, 42 Cal. Rptr. 2d at 18.

III. Purpose and Limits of HGN

HGN may be used, along with other scientific tests, as some evidence that defendant was impaired. *Joehnk*, 35 Cal. App. 4th at 1508, 42 Cal. Rptr. 2d at 17.

HGN test results may not be used to quantify the BAC level of the defendant. *California v. Loomis*, 156 Cal. App. 3d Supp. 1, 5-6, 203 Cal. Rptr. 767, 769-70 (1984).

Connecticut

I. Evidentiary Admissibility

Proper foundation must be established in accordance with *Daubert* prior to the introduction of HGN test results. *State v. Russo*, 773 A. 2d 965 (Conn. App. Ct. 2001).

Also see, *Connecticut v. Merritt*, 647 A.2d 1021, 1028 (Conn. App. Ct. 1994). HGN must

meet the *Frye* test of admissibility. In this case, the state presented no evidence to meet its burden under the *Frye* test.

HGN satisfies the *Porter* standards and is admissible. (In *State v. Porter*, 698 A.2d 739 (1997), the Connecticut Supreme Court held the *Daubert* approach should govern the admissibility of scientific evidence and expressed factors to be considered in assessing evidence.) *Connecticut v. Carlson*, 720 A.2d 886 (Conn. Super. Ct. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

Must lay a proper foundation with a showing that the officer administering the test had the necessary qualifications and followed proper procedures. *Connecticut v. Merritt*, 647 A.2d 1021, 1028 (Conn. App. Ct. 1994).

III. Purpose and Limits of HGN

HGN test results can be used to establish probable cause to arrest in a criminal hearing. *Connecticut v. Royce*, 616 A.2d 284, 287 (Conn. App. Ct. 1992).

Delaware

I. Evidentiary Admissibility

HGN evidence is scientific and must satisfy the Delaware Rules of Evidence standard. *Delaware v. Ruthardt*, 680 A.2d 349, 356 (Del. Super. Ct. 1996).

HGN evidence is acceptable scientific testimony under the Delaware Rules of Evidence. *Ruthardt*, 680 A.2d at 362.

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer may be qualified as an expert to testify about the underlying scientific principles that correlate HGN and alcohol. Delaware police receiving three-day (twenty-four hour) instruction on HGN test administration are not qualified to do this. *Ruthardt*, 680 A.2d at 361-62.

Police officer testimony about training and experience alone, without expert testimony, is not enough foundation to admit HGN test results. *Zimmerman v. Delaware*, 693 A.2d 311, 314 (Del. 1997).

III. Purpose and Limits of HGN

HGN test results admissible to show probable cause in a criminal hearing. *Ruthardt*, 680 A.2d at 355.

HGN test results admissible to show probable cause in a civil hearing. *Cantrell v. Division of Motor Vehicles*, 1996 Del. Super. LEXIS 265 (Del. Super. Ct. Apr. 9, 1996).

HGN test results cannot be used to quantify the defendant's BAC. However, they can be used as substantive evidence that the defendant was "under the influence of intoxicating liquor." *Ruthardt*, 680 A.2d at 361-62.

District of Columbia

I. Evidentiary Admissibility

The Court does not address this issue.

II. Police Officer Testimony Needed to Admit HGN Test Result

The Court used the case law of other jurisdictions to come to the conclusion that the Officer in the case could testify as an expert on the administration and the results of the HGN test. Therefore, in this case, the evidence was properly admitted using the Officer as the expert. See *Karamychev v. District of Columbia*, 772 A. 2d 806 (D.C. App. 2001).

III. Purpose and Limits of HGN

The Court has not yet addressed this issue.

Florida

I. Evidentiary Admissibility

The 3rd District Court found HGN to be a "quasi-scientific" test. Its application is dependent on a scientific proposition and requires a particular expertise outside the realm of common knowledge of the average person. It does not have to meet the *Frye* standard because HGN has been established and generally accepted in the relevant scientific community, and has been *Frye* tested in the legal community. The court took judicial notice that HGN is reliable based on supportive case law from other jurisdictions, numerous testifying witnesses and studies submitted. It is "no longer 'new or novel' and there is simply no need to reapply a *Frye* analysis." *Williams v. Florida*, 710 So. 2d 24 (Fla. Dist. Ct. App. 1998).

The 4th District Court found HGN to be a scientific test. However, because it is not novel, the *Frye* standard is not applicable. However, “[e]ven if not involving a new scientific technique, evidence of scientific tests is admissible only after demonstration of the traditional predicates for scientific evidence including the test's general reliability, the qualifications of test administrators and technicians, and the meaning of the results.” Without this predicate, “the danger of unfair prejudice, confusion of issues or misleading the jury from admitting HGN test results outweighs any probative value.” The state did not establish the appropriate foundation for the admissibility of HGN test results. *Florida v. Meador*, 674 So. 2d 826, 835 (Fla. Dist. Ct. App. 1996), *review denied*, 686 So. 2d 580 (Fla. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

“We take judicial notice that HGN test results are generally accepted as reliable and thus are admissible into evidence once a proper foundation has been laid that the test was correctly administered by a qualified DRE [Drug Recognition Expert].” *Williams*, 710 So. 2d at 32.

Also see *Bown v. Florida*, 745 So. 2d 1108 (Fl. Dist. Ct. App. 1999) which expands *Williams*. Allows trooper to explain HGN, but district requires confirmatory blood, breath or urine test before admitting HGN into evidence.

No evidence presented as to the police officer’s qualifications nor administration of the HGN test in this case. *Meador*, 674 So. 2d at 835.

III. Purpose and Limits of HGN

The HGN test results alone, in the absence of a chemical analysis of blood, breath, or urine, are inadmissible to trigger the presumption provided by the DUI statute, and may not be used to establish a BAC of .08 percent or more. *Williams*, 710 So. 2d at 36.

Georgia

I. Evidentiary Admissibility

The HGN test is admissible as a “scientifically reliable field sobriety evaluation” under the *Harper* “verifiable certainty” standard. *Manley v. Georgia*, 424 S.E.2d 818, 819-20 (Ga. Ct. App. 1992).

HGN testing is judicially noticed as a scientifically reliable test and therefore expert testimony is no longer required before the test results can be admitted. *Hawkins v. Georgia*, 476 S.E.2d 803, 808-09 (Ga. Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer, who received specialized training in DUI detection and worked with a DUI task force for two years, was permitted to testify that, in his opinion, defendant was under the influence. *Sieveking v. Georgia*, 469 S.E.2d 235, 219-20 (Ga. Ct. App. 1996).

A police officer who testifies to the results, administration, and procedure of HGN may be cross-examined about those areas even if the state only offers him as a POST-certified officer. This is because the analysis and expertise needed for HGN go far beyond those needed by a lay person who observes the walk and turn or one leg stance tests. *James v. State*, 2003 WL 1540235 (Ga. App.).

III. Purpose and Limits of HGN

HGN test can be admitted to show that the defendant “was under the influence of alcohol to the extent that it was less safe for him to drive.” *Sieveking*, 469 S.E.2d at 219.

Hawaii

I. Evidentiary Admissibility

HGN is a scientific test. The HGN test is reliable under the Hawaii Rules of Evidence and admissible as “evidence that police had probable cause to believe that a defendant was DUI.” Judicial notice of the “validity of the principles underlying HGN testing and the reliability of HGN test results” is appropriate. HGN test results can be admitted into evidence if the officer administering the test was duly qualified to conduct the test and the test was performed properly. *Hawaii v. Ito*, 978 P.2d 191 (Haw. Ct. App. 1999).

II. Police Officer Testimony Needed to Admit HGN Test Result

Before HGN test results can be admitted into evidence in a particular case, however, it must be shown that (1) the officer administering the test was duly qualified to conduct and grade the test; and (2) the test was performed properly in the instant case. *Hawaii v. Ito*, 978 P.2d 191 (Haw. Ct. App. 1999), *See also Hawaii v. Toyomura*, 904 P.2d 893, 911 (Haw. 1992) and *Hawaii v. Montalbo*, 828 P.2d. 1274, 1281 (Haw. 1992).

III. Purpose and Limits of HGN

HGN test can be admitted as “evidence that police had probable cause to believe that a defendant was DUI.” *Hawaii v. Ito*, 978 P.2d 191 (Haw. Ct. App. 1999).

Idaho

I. Evidentiary Admissibility

HGN test results admitted under the Idaho Rules of Evidence. Rule 702 is the correct test in determining the admissibility of HGN. *State v. Gleason*, 844 P.2d 691, 694 (Idaho 1992).

II. Police Officer Testimony Needed to Admit HGN Test Result

Officer may testify as to administration of HGN test, but not correlation of HGN and BAC. *State v. Garrett*, 811 P.2d 488, 493 (Idaho 1991).

III. Purpose and Limits of HGN

“HGN test results may not be used at trial to establish the defendant's blood alcohol level. Although we note that in conjunction with other field sobriety tests, a positive HGN test result does supply probable cause for arrest, standing alone that result does not provide proof positive of DUI....” *Garrett*, 811 P.2d at 493.

HGN may be “admitted for the same purpose as other field sobriety test evidence -- a physical act on the part of [defendant] observed by the officer contributing to the cumulative portrait of [defendant] intimating intoxication in the officer's opinion.” *Gleason*, 844 P.2d at 695.

Illinois

I. Evidentiary Admissibility

HGN meets *Frye* standard of admissibility.

People v. Buening, 592 N.E.2d 1222, 1227 (Ill. App. Ct. 1992).

Despite the ruling of the *Buening* appellate court, the Fourth District Court of Appeals declined to recognize HGN's general acceptance without a *Frye* hearing. The court criticized the *Buening* court for taking judicial notice of HGN's reliability based on the decisions of other jurisdictions. *People v. Kirk*, 681 N.E.2d 1073, 1077 (Ill. App. Ct. 1997).

The state supreme court held that the state was no longer required to show than an HGN test satisfied the Frye standard before introducing the results of the test into evidence. Absent proof by the defense that the HGN test was unsound, the State only had to show that the officer who gave the test was trained in the procedure and that the test was properly administered. *The People of the State of Illinois v. Linda Basler*, 740 N.E.2d 1 (Ill. 2000), 2000 Ill. LEXIS 1698 (Ill. 2000). (Plurality Opinion) According to Fourth Circuit, a *Frye* hearing must be held for HGN to be admitted. *People v. Herring*, 762 N.E.2d 1186.

II. Police Officer Testimony Needed to Admit HGN Test Result

“A proper foundation should consist of describing the officer's education and experience in administering the test and showing that the procedure was properly administered.” *Buening*, 592 N.E.2d at 1227.

III. Purpose and Limits of HGN

HGN test results may be used to establish probable cause in a criminal hearing. *People v. Furness*, 526 N.E.2d 947, 949 (Ill. App. Ct. 1988).

HGN test results admissible to show probable cause in a civil hearing. *People v. Hood*, 638 N.E.2d 264, 274 (Ill. App. Ct. 1994).

HGN test results may be used “to prove that the defendant is under the influence of alcohol.” *Buening*, 592 N.E.2d at 1228.

Indiana

I. Evidentiary Admissibility

Results of properly administered HGN test are admissible to show impairment which may be caused by alcohol and, when accompanied by other evidence, will be sufficient to establish probable cause to believe a person may be intoxicated. *Cooper v. Indiana*, 751 N.E.2d 900, 903 (Ind. Ct. App. Feb. 2002)

II. Police Officer Testimony Needed to Admit HGN Test Result

The proper foundation for admitting HGN evidence should consist of describing the officer’s education and experience in administering the test and showing that the procedure was properly administered. *Cooper*, 751 N.E.2d at 903.

The question of whether a trained officer might express an opinion that defendant was intoxicated based upon the results of field sobriety tests was not before the court, and thus, the court expressed no opinion concerning the admissibility of such testimony. *Cooper*, 751 N.E. 2d at 902, n. 1.

III. Purpose and Limits of HGN

HGN test results, when accompanied by other evidence, will be sufficient to establish probable cause that the person may be intoxicated. *Cooper*, 751 N.E.2d at 903.

Iowa

I. Evidentiary Admissibility

HGN admissible as a field test under the Iowa Rules of Evidence. “[T]estimony by a properly trained police officer with respect to the administration and results of the horizontal gaze nystagmus test are admissible without need for further scientific evidence.” *State v. Murphy*, 451 N.W.2d 154, 158 (Iowa 1990).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer may testify about HGN test results under Rule 702 if the officer is properly trained to administer the test and objectively records the results.
Murphy, 451 N.W.2d at 158.

III. Purpose and Limits of HGN

HGN test results may be used as an indicator of intoxication. *Murphy*, 451 N.W.2d at 158.

Kansas

I. Evidentiary Admissibility

HGN must meet *Frye* standard of admissibility and a *Frye* hearing is required at the trial level. There was no *Frye* hearing conducted and the appellate court refused to make a determination based on the record it had. *State v. Witte*, 836 P.2d 1110, 1121 (Kan. 1992).

HGN test has not achieved general acceptance within the relevant scientific community and its exclusion was appropriate. *State v. Chastain*, 960 P.2d 756 (Kan. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

The Court did not address this issue.

III. Purpose and Limits of HGN

The Court did not address this issue.

Kentucky

I. Evidentiary Admissibility

HGN test results admitted due to defendant's failure to object.
Commonwealth v. Rhodes, 949 S.W.2d 621, 623 (Ky. Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

The Court did not address this issue.

III. Purpose and Limits of HGN

The Court did not address this issue.

Louisiana

I. Evidentiary Admissibility

HGN meets *Frye* standard of admissibility and with proper foundation may be admitted as evidence of intoxication.

State v. Breitung, 623 So. 2d 23, 25-6 (La. Ct. App. 1993).

State v. Regan, 601 So. 2d 5, 8 (La. Ct. App. 1992).

State v. Armstrong, 561 So. 2d 883, 887 (La. Ct. App. 1990).

The standard of admissibility for scientific evidence is currently the Louisiana Rules of Evidence. *State v. Foret*, 628 So. 2d 1116 (La. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer may testify as to training in HGN procedure, certification in the administration of HGN test and that the HGN test was properly administered. *Armstrong*, 561 So. 2d at 887.

III. Purpose and Limits of HGN

The HGN test may be used by the officer “to determine whether or not he [needs] to ‘go any further’ and proceed with other field tests.” *Breitung*, 623 So. 2d at 25.

HGN test results may be admitted as evidence of intoxication.

Armstrong, 561 So. 2d at 887.

Maine

I. Evidentiary Admissibility

Because the HGN test relies on greater scientific principles than other field sobriety tests, the reliability of the test must first be established. Either *Daubert* or *Frye* standard must be met. *State v. Taylor*, 694 A.2d 907, 912 (Me. 1997).

The Maine Supreme Court took judicial notice of the reliability of the HGN test to detect impaired drivers. *Taylor*, 694 A.2d at 910.

II. Police Officer Testimony Needed to Admit HGN Test Result

“A proper foundation shall consist of evidence that the officer or administrator of the HGN test is trained in the procedure and the [HGN] test was properly administered.”

Taylor, 694 A.2d at 912.

III. Purpose and Limits of HGN

HGN test results may only be used as “evidence of probable cause to arrest without a warrant or as circumstantial evidence of intoxication. The HGN test may not be used by an officer to quantify a particular blood alcohol level in an individual case.”

Taylor, 694 A.2d at 912.

Maryland

I. Evidentiary Admissibility

HGN is scientific and must satisfy the *Frye/Reed* standard of admissibility. The Court of Appeals took judicial notice of HGN's reliability and its acceptance in the relevant scientific communities. *Schultz v. State*, 664 A.2d 60, 74 (Md. Ct. Spec. App. 1995).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer must be properly trained or certified to administer the HGN test. [NOTE: In *Schultz*, the police officer failed to articulate the training he received in HGN testing and the evidence was excluded.] *Schultz*, 664 A.2d at 77.

III. Purpose and Limits of HGN

HGN testing may not be used to establish a specific blood alcohol level. *Wilson v. State*, 723 A.2d 494 (Md. Ct. Spec. App. 1999).

Massachusetts

I. Evidentiary Admissibility

HGN is scientific and is admissible on a showing of either general acceptance in the scientific community or reliability of the scientific theory. *See Commonwealth v. Lanigan*, 641 N.E.2d 1342 (Mass. 1994). HGN test results are inadmissible until the Commonwealth introduces expert testimony to establish that the HGN test satisfies one of these two standards. *Commonwealth v. Sands*, 675 N.E.2d 370, 373 (Mass. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

“There must be a determination as to the qualification of the individual administering the HGN test and the appropriate procedure to be followed.” In this case there was no testimony as to these facts, thus denying the defendant the opportunity to challenge the officer’s qualifications and administration of the test. *Sands*, 675 N.E.2d at 373.

III. Purpose and Limits of HGN

The Court did not address this issue.

Michigan

I. Evidentiary Admissibility

Court found that HGN test is scientific evidence and is admissible under the *Frye* standard of admissibility. *State v. Berger*, 551 N.W.2d 421, 424 (Mich. Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

Only foundation necessary for the introduction of HGN test results is evidence that the police officer properly performed the test and that the officer administering the test was qualified to perform it. *Berger*, 551 N.W.2d at 424.

III. Purpose and Limits of HGN

HGN test results are admissible to indicate the presence of alcohol. *Berger*, 551 N.W.2d at 424 n.1.

Minnesota

I. Evidentiary Admissibility

Court found that HGN meets the *Frye* standard of admissibility. *State v. Klawitter*, 518 N.W.2d 577, 585 (Minn. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officers must testify about their training in and experience with the HGN test. *See generally Klawitter*, 518 N.W.2d at 585-86.

III. Purpose and Limits of HGN

HGN admissible as evidence of impairment as part of a Drug Evaluation Examination in the prosecution of a person charged with driving while under the influence of drugs. *See generally Klawitter*, 518 N.W.2d at 585.

Mississippi

I. Evidentiary Admissibility

HGN is a scientific test. However, it is not generally accepted within the relevant scientific community and is inadmissible at trial in the State of Mississippi. *Young v. City of Brookhaven*, 693 So.2d 1355, 1360-61 (Miss. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officers cannot testify about the correlation between the HGN test and precise blood alcohol content. *Young*, 693 So.2d at 1361.

III. Purpose and Limits of HGN

HGN test results are admissible only to prove probable cause to arrest. *Young*, 693 So.2d at 1361.

HGN test results cannot be used as scientific evidence to prove intoxication or as a mere showing of impairment. *Young*, 693 So.2d at 1361.

Missouri

I. Evidentiary Admissibility

Court found that HGN test meets the *Frye* standard of admissibility. *State v. Hill*, 865 S.W.2d 702, 704 (Mo. Ct. App. 1993), *rev'd on other grounds*, *State v. Carson*, 941 S.W.2d 518, 520 (Mo. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer must be adequately trained and able to properly administer the test. *Hill*, 865 S.W.2d at 704.

See also, *Duffy v. Director of Revenue*, 966 S.W. 2d 372 (Mo. Ct. App. 1998). HGN not admitted at trial because the administering officer was not aware of how to properly score the test and interpret its results.

III. Purpose and Limits of HGN

HGN can be admitted as evidence of intoxication. *Hill*, 865 S.W.2d at 704.

Montana

I. Evidentiary Admissibility

Court found that HGN is neither new nor novel; thus, *Daubert* does not apply. Court still finds that HGN must meet the state's rules of evidence that are identical to the Federal Rules of Evidence. *Hulse v. DOJ, Motor Vehicle Div.*, 961 P.2d 75, 88 (Mont. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

The court held that before an arresting officer may testify as to HGN results, a proper foundation must show that the officer was properly trained to administer the HGN test and that he administered the test in accordance with this training. Before the officer can testify

as to the correlation between alcohol and nystagmus, a foundation must be established that the officer has special training in the underlying scientific basis of the HGN test. *Hulse*, 961 P.2d 75 (Mont. 1998).

See Also, *State v. Crawford*, 315 Mont. 480, 68 P.3d 848 (2003), in which the court ruled that the officer's credentials were sufficient to establish his expertise, along with evidence that he was previously qualified as an expert. They relied on *Russette* (2002 MT 200), stating that to establish an expert's qualifications, the proponent of the testimony must show that the expert has special training or education and adequate knowledge on which to base an opinion.

III. Purpose and Limits of HGN

HGN test results admissible as evidence of impairment. *State v. Clark*, 762 P.2d 853, 856 (Mont. 1988).

Nebraska

I. Evidentiary Admissibility

HGN meets the *Frye* standard for acceptance in the relevant scientific communities, and when the test is given in conjunction with other field sobriety tests, the results are admissible for the limited purpose of establishing impairment that may be caused by alcohol. *State v. Baue*, 607 N.W.2d 191 (Neb. 2000)

II. Police Officer Testimony Needed to Admit HGN Test Result

A police officer may testify to the results of **HGN** testing if it is shown that the officer has been adequately trained in the administration and assessment of the **HGN** test and has conducted the testing and assessment in accordance with that training. *State v. Baue*, 607 N.W.2d 191 (Neb. 2000)

III. Purpose and Limits of HGN

“Testimony concerning **HGN** is admissible on the issue of impairment, provided that the prosecution claims no greater reliability or weight for the **HGN** evidence than it does for evidence of the defendant's performance on any of the other standard field sobriety tests, and provided further that the prosecution makes no attempt to correlate the **HGN** test result with any particular blood-alcohol level, range of blood-alcohol levels, or level of impairment.” *State v. Baue*, 607 N.W.2d 191 (Neb. 2000) (quoting *Ballard v. State*, 955 P.2d 931, 940 (Alaska App. 1998))

New Hampshire

I. Evidentiary Admissibility

In *State v. Dahoo* (Dec. 20, 2002), the N.H. Supreme Court ruled that the HGN test is admissible under N.H. Rule of Evidence 702 and *Daubert* for the limited purpose of providing circumstantial evidence of intoxication. HGN test is a scientifically reliable and valid test.

N.H. Supreme Court ruled their findings binding in *Dahoo* and that courts “will not be required to establish the scientific reliability of the HGN.”

II. Police Officer Testimony Needed to Admit HGN Test Result

“Since we have already determined that the scientific principles underlying the HGN test are reliable, a properly trained and qualified police officer may introduce the HGN test results at trial.” *State v. Dahoo*, 2002 N.H. LEXIS 179.

III. Purpose and Limits of HGN

“HGN results cannot be introduced at trial for the purpose of establishing a defendant’s BAC level....[T]he results are not sufficient alone to establish intoxication.” *State v. Dahoo*, Id.

New Jersey

I. Evidentiary Admissibility

In New Jersey, the party offering the results of a scientific procedure into evidence must comply with Frye and show that the procedure is generally accepted in the relevant scientific communities. A party may prove this general acceptance via “(1) testimony of knowledgeable experts[,] (2) authoritative scientific literature[, or] (3) [p]ersuasive judicial decision.” Based on the testimony of Dr. Marcelline Burns and Dr. Jack Richman, the Court found the HGN test to be generally accepted and the results thus admissible. The Court also noted the “significant number” of jurisdictions that have accepted the HGN test as admissible scientific evidence. *State v. Maida*, 2000 N.J. Super. LEXIS 276 (N.J. Super. Ct. Law Div. 2000).

***But See**, *State v. Doriguzzi*, 760 A.2d 336 (N.J. Super. 2000), which held that HGN is scientific evidence that must meet Frye Standard. However, in each trial, sufficient foundation evidence must be laid by expert testimony to assure defendants that a conviction for DUI, when based in part on HGN testing, is grounded in reliable scientific data. In this case, the appellate court reversed defendant’s conviction because at trial no such foundation was presented. The court found that because HGN testing has not achieved general acceptance in the community, it is not a matter of which a court can take judicial notice.

II. Police Officer Testimony Needed to Admit HGN Test Result

The Court did not address this issue.

III. Purpose and Limits of HGN

The Court found the HGN test admissible “as a reliable scientific indicator of likely intoxication.”

New Mexico

I. Evidentiary Admissibility

HGN is a scientific test. New Mexico follows the *Daubert* standard, which requires a showing of reliability before scientific evidence can be admitted. The court held that a scientific expert must testify to the underlying scientific reliability of HGN and that a police officer cannot qualify as a scientific expert. Because the State failed to present sufficient evidence regarding the HGN test’s reliability, the court remanded the case stating it would be appropriate for the trial court, on remand, to make the initial determination of whether HGN testing satisfies *Daubert*. In addition, the court found HGN to be “beyond common and general knowledge” and declined to take judicial notice of HGN reliability. *State v. Torres*, 976 P.2d 20 (N.M. 1999).

State v. Lasworth, 42 P.3d 844 (Ct. App. N.M. 2001), cert. denied (2002). Results of HGN test were inadmissible at trial (*State v. Torres*, 976 P.2d 20 (N.M. 1999)). The State needed to prove that HGN was both valid and reliable.

State called Dr. Marceline Burns as a witness (reliability) but did not call an expert in a discipline such as biology or medicine to explain how the amount of alcohol a person consumes correlates with HGN (validity).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officers can qualify as non-scientific experts based on their training and experience. Non-scientific experts may testify about the administration of the test and specific results of the test provided another scientific expert first establishes the reliability of the scientific principles underlying the test. In order to establish the “technical or specialized knowledge” required to qualify as an expert in the administration of the HGN test, “there must be a showing: (1) that the expert has the ability and training to administer the HGN test properly, and (2) that the expert did, in fact, administer the HGN test properly at the time and upon the person in question.” *State v. Torres*, 976 P.2d 20 (N.M. 1999).

State v. Lasworth, 42 P.3d 844 (Ct. App. N.M. 2001), cert. denied (2002). Court believed that state had to show that presence of HGN (BAC above .08) correlates with diminishment of driver’s mental or physical driving skills (which it failed to do) & a correlation between presence of HGN and BAC above or below .08 (which it did through testimony of Dr. Burns). Court did not preclude use of results of HGN to establish probable cause for arrest or to establish grounds for administering a chemical BAC test.

III. Purpose and Limits of HGN

The Court did not address this issue.

New York

I. Evidentiary Admissibility

Prue holds that HGN test results are admissible under *Frye* standard of “general acceptance.” *People v. Prue*, Indictment No. I-5-2001, Franklin County Court (November 2001).

In *Gallup*, the court said that it was only necessary to conduct a foundational inquiry into the techniques and the tester’s qualifications for admissibility. *People v. Gallup*, Memorandum and order #13094, 302 A.D.2d 681 (3rd Dept)(2003).

The Court allowed the introduction of HGN and the results because it was properly administered and the burden of establishing that HGN is a reliable indicator of intoxication is generally accepted in the relevant scientific community was satisfied. *People v. William Miley*, NYLJ 12/6/02 p.30 col. 6 (Nassau Co. Ct 2002).

II. Police Officer Testimony Needed to Admit HGN Test Result

The People must lay a proper evidentiary foundation in order for HGN results to be admissible at trial.

III. Purpose and Limits of HGN

The Court held that HGN is generally accepted in the relevant scientific community as a reliable indicator of intoxication.

North Carolina

I. Evidentiary Admissibility

HGN is a scientific test. It “does not measure behavior a lay person would commonly associate with intoxication but rather represents specialized knowledge that must be presented to the jury by a qualified expert.” As a result, “until there is sufficient scientifically reliable evidence as to the correlation between intoxication and nystagmus, it is improper to permit a lay person to testify as to the meaning of HGN test results.” *State v. Helms*, 504 S.E.2d 293 (N.C. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

Testimony of one police officer, whose training consisted of a “forty hour training class dealing with the HGN test”, was inadequate foundation for admission of HGN test results. *Helms*, 504 S.E.2d 293 (N.C. 1998).

III. Purpose and Limits of HGN

HGN test results are evidence of impairment. *Helms*, 504 S.E.2d 293 (N.C. 1998).

North Dakota

I. Evidentiary Admissibility

Court found that HGN test is admissible as a standard field sobriety test. *City of Fargo v. McLaughlin*, 512 N.W.2d 700, 706 (N.D. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer must testify as to training and experience and that the test was properly administered. *City of Fargo*, 512 N.W.2d at 708.

III. Purpose and Limits of HGN

“ . . . HGN test results admissible only as circumstantial evidence of intoxication, and the officer may not attempt to quantify a specific BAC based upon the HGN test.”
City of Fargo, 512 N.W.2d at 708.

Ohio

I. Evidentiary Admissibility

HGN test is objective in nature and does not require an expert interpretation. *State v. Nagel*, 506 N.E.2d 285, 286 (Ohio Ct. App. 1986).

Court determined that HGN was a reliable indicator of intoxication without specifically ruling on whether HGN meets *Frye* or some other standard of admissibility. *State v. Bresson*, 554 N.E.2d 1330, 1334 (Ohio 1990).

Court held that SFSTs, including HGN, must be administered in *strict compliance* with NHTSA’s directives in order for the test results to be admissible. *State v. Homan*, 732 N.E.2d 952 (Ohio 2000).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer need only testify to training in HGN procedure, knowledge of the test and ability to interpret results. *Bresson*, 554 N.E.2d at 1336.

III. Purpose and Limits of HGN

HGN can be used to establish probable cause to arrest and as substantive evidence of a defendant's guilt or innocence in a trial for DUI, but not to determine defendant's BAC. *Bresson*, 554 N.E.2d at 1336.

Oklahoma

I. Evidentiary Admissibility

HGN test results excluded because state failed to lay adequate foundation regarding HGN's scientific admissibility under the *Frye* standard of admissibility. Police officer's testimony alone was insufficient. *Yell v. State*, 856 P.2d 996, 996-97 (Okla. Crim. App. 1993).

The *Daubert* rationale replaces the *Frye* standard as the admissibility standard for scientific evidence. *Taylor v. State*, 889 P.2d 319, 328-29 (Okla. Crim. App. 1995).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer testified to training on how to administer HGN test and how the test was administered in this case. Officer also testified as to his training in analyzing HGN test results. *Yell*, 856 P.2d at 997.

III. Purpose and Limits of HGN

If HGN testing was found to satisfy the *Frye* standard of admissibility, HGN test results would be considered in the same manner as other field sobriety test results. HGN test results are inadmissible as scientific evidence creating a presumption of intoxication. *Yell*, 856 P.2d at 997.

Oregon

I. Evidentiary Admissibility

HGN test results are admissible under the Oregon Rules of Evidence. HGN test results are scientific in nature, are relevant in a DUI trial, and are not unfairly prejudicial to the defendant. *State v. O'Key*, 899 P.2d 663, 687 (Or. 1995).

II. Police Officer Testimony Needed to Admit HGN Test Result

“Admissibility is subject to a foundational showing that the officer who administered the test was properly qualified, that the test was administered properly, and that the test results were recorded accurately.” *O'Key*, 899 P.2d at 670.

III. Purpose and Limits of HGN

“... HGN test results are admissible to establish that a person was under the influence of intoxicating liquor, but is not admissible...to establish a person's BAC...”
O'Key, 899 P.2d at 689-90.

Officer may not testify that, based on HGN test results, the defendant's BAC was over .10.
State v. Fiskien, 909 P.2d 206, 207 (Or. Ct. App. 1996).

Pennsylvania

I. Evidentiary Admissibility

The state laid an inadequate foundation for the admissibility of HGN under the *Frye/Topa* standard.

Commonwealth v. Moore, 635 A.2d 625, 629 (Pa. Super. Ct. 1993).

Commonwealth v. Apollo, 603 A.2d 1023, 1028 (Pa. Super. Ct. 1992).

Commonwealth v. Miller, 532 A.2d 1186, 1189-90 (Pa. Super. Ct. 1987).

Testimony of police officer is insufficient to establish scientific reliability of HGN test.
Moore, 635 A.2d at 692.

Miller, 532 A.2d at 1189-90.

Testimony of behavioral optometrist did not establish general acceptance of HGN test.
Apollo, 603 A.2d at 1027-28.

II. Police Officer Testimony Needed to Admit HGN Test Result

County detective certified as HGN instructor. Court did not comment on whether this would be enough foundation to allow the detective to testify about HGN test results.
Moore, 635 A.2d 629.

Police officer had one-day course on HGN. Court did not comment on whether this would be enough foundation to allow the officer to testify about HGN test results.
Miller, 603 A.2d at 1189.

III. Purpose and Limits of HGN

Not addressed by court.

South Carolina

I. Evidentiary Admissibility

HGN admissible in conjunction with other field sobriety tests. By implication, HGN is not regarded as a scientific test. *State v. Sullivan*, 426 S.E.2d 766, 769 (S.C. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer given twenty hours of HGN training. *Sullivan*, 426 S.E.2d at 769.

III. Purpose and Limits of HGN

HGN test results admissible “to elicit objective manifestations of soberness or insobriety . . . Evidence from HGN tests is not conclusive proof of DUI. A positive HGN test result is to be regarded as merely circumstantial evidence of DUI. Furthermore, HGN test shall not constitute evidence to establish a specific degree of blood alcohol content.”
Sullivan, 426 S.E.2d at 769.

South Dakota

I. Evidentiary Admissibility

If it can be shown that a horizontal gaze nystagmus test was properly administered by a trained officer, such evidence should be admitted for a jury to consider at trial along with evidence of the other accepted field sobriety tests administered in South Dakota.
STATE v. HULLINGER, 2002 SD 83; 649 N.W.2d 253 (S.D.S.Ct. 2002); 2002 S.D. LEXIS 99

II. Police Officer Testimony Needed to Admit HGN Test Result

Officer may testify if properly trained and test properly administered. At the pretrial hearing, the State presented three witnesses: 1) Monte Farnsworth, training director for the Office of Highway Safety at the Division of Criminal Investigation Law Enforcement Training Academy; 2) Deputy Ludwig; and 3) Dr. Larry Menning, optometrist and expert witness. South Dakota follows a *Daubert* standard in use of expert witnesses.

III. Purpose and Limits of HGN

The Court did not address this issue.

Tennessee

I. Evidentiary Admissibility

HGN is a scientific test. To be admissible at trial, such evidence must satisfy the requirements of Tenn. Rules of Evidence 702 and 703. State provided an inadequate amount of evidence to allow the court to conclude that HGN evidence meets this standard.
State v. Murphy, 953 S.W.2d 200 (Tenn. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

HGN must be offered through an expert witness. To qualify as an expert, a police officer must establish that he is qualified by his “knowledge, skill, experience, training or education” to provide expert testimony to “substantially assist the trier of fact to

understand the evidence or determine a fact in issue.” Although the court did not rule out the possibility that the officer can be considered an expert, the court set a high level of proof. In this case, the court felt that although the officer had attended law enforcement training in DUI offender apprehension and the HGN test, this training was not enough to establish him as an expert. *State v. Grindstaff*, 1998 Tenn. Crim. App. Lexis 339 (March 23, 1998).

III. Purpose and Limits of HGN

The Court did not address this issue.

Texas

I. Evidentiary Admissibility

HGN admissible under the Texas Rules of Evidence.
Emerson v. State, 880 S.W.2d 759, 769 (Tex. Crim. App. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

A police officer must qualify as an expert on the HGN test, specifically concerning its administration and technique, before testifying about a defendant’s performance on the test. Proof that the police officer is certified in the administration of the HGN test by the Texas Commission on Law Enforcement Officer Standards and Education satisfies this requirement. *Emerson*, 880 S.W.2d at 769.

III. Purpose and Limits of HGN

HGN admissible to prove intoxication, but not accurate enough to prove precise BAC.
Emerson, 880 S.W.2d at 769.

Utah

I. Evidentiary Admissibility

HGN test admissible as other field sobriety test. Court reserved judgment as to the scientific reliability of HGN. *Salt Lake City v. Garcia*, 912 P.2d 997, 1001 (Utah Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer need only testify as to training, experience and observations when HGN admitted as a field test. *Garcia*, 912 P.2d at 1001.

III. Purpose and Limits of HGN

Admissible as any other field sobriety test. *Garcia*, 912 P.2d at 1000-01.

Washington

I. Evidentiary Admissibility

It is “undisputed” in the relevant scientific communities that “an intoxicated person will exhibit nystagmus”. HGN testing is not novel and has been used as a field sobriety test for “decades” and is administered the same whether investigating alcohol impairment or drug impairment. Thus, the use of HGN in drug and alcohol impaired driving cases is acceptable.

State v. Baity, 140 Wn.2d 1, 991 P.2d 1151 (Wash. 2000).

“[T]he *Frye* standard applies to the admission of evidence based on HGN testing, unless . . . the State is able to prove that it rests on scientific principles and uses techniques which are not ‘novel’ and are readily understandable by ordinary persons.” The state failed to present any evidence to this fact and the court declined to take judicial notice of HGN.

State v. Cissne, 865 P.2d 564, 569 (Wash. Ct. App. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

The Court did not address this issue.

III. Purpose and Limits of HGN

The Court did not address this issue.

West Virginia

I. Evidentiary Admissibility

The state did not present evidence for the court to reach “the question of whether the HGN test is sufficiently reliable to be admissible.” However, the court did conclude “that even if the reliability of the HGN test is demonstrated, an expert’s testimony as to a driver’s performance on the test is admissible only as evidence that the driver was under the influence. Estimates of blood alcohol content based on the HGN test are inadmissible.”

State v. Barker, 366 S.E.2d 642, 646 (W. Va. 1988).

The West Virginia Supreme Court modified *State v. Barker* to the extent that the *Daubert* analysis of FRE 702 is applicable to the question of admissibility of expert testimony under the West Virginia Rules of Evidence Rule 702.

Wilt v. Buracker, 443 S.E. 2d 196 (W.Va. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer's training consisted of a one-day, eight-hour training session conducted by the state police. Officer testified to giving the HGN test about 100 times. Court did not reach

question of whether this would be enough to allow the officer to testify about the HGN test results. *Barker*, 366 S.E.2d at 644.

III. Purpose and Limits of HGN

HGN test results admissible to show probable cause in a civil hearing. *Muscattell v. Cline*, 474 S.E.2d 518, 525 (W. Va. 1996).
Boley v. Cline, 456 S.E.2d 38, 41 (W. Va. 1995).

“If the reliability of the HGN test is demonstrated, an expert's testimony as to a driver's performance on the test is admissible only as evidence that the driver was under the influence,” the same as other field sobriety tests. *Barker*, 366 S.E.2d at 646.

Wisconsin

I. Evidentiary Admissibility

The court held that the HGN test results are admissible in this case because the test results were not the only evidence. The results were accompanied by the expert testimony of the officer. *State v. Zivcic*, 598 N.W.2d 565 (Wisc. Ct. App. 1999).
See also, *State v. Maxon*, 633 N.W. 2d 278 (Wisc. Ct. App. 2001)

II. Police Officer Testimony Needed to Admit HGN Test Result

A police officer who is properly trained to administer and evaluate the HGN test can testify to the test results. A second expert witness is not needed. *State v. Zivcic*, 598 N.W.2d 565 (Wisc. Ct. App. 1999).

III. Purpose and Limits of HGN

The Court did not address this issue.

Wyoming

I. Evidentiary Admissibility

SFSTs, including HGN, are admissible to establish probable cause when administered in *substantial compliance* with NHTSA guidelines. Strict compliance is not necessary. The court took judicial notice of the number of states that allow HGN evidence on the basis of the “officer’s training, experience and ability to administer the test”. *Smith v. Wyoming*, 2000 Wyo. LEXIS 202 (Wyo. October 4, 2000).

II. Police Officer Testimony Needed to Admit HGN Test Result

A police officer that is properly trained to administer and evaluate the HGN test can testify to HGN results. *Smith v. Wyoming*, 2000 Wyo. LEXIS 202 (Wyo. October 4, 2000).

III. Purpose and Limits of HGN

HGN test results are admissible to show probable cause.
Smith v. Wyoming, 2000 Wyo. LEXIS 202 (Wyo. October 4, 2000).

United States

I. Evidentiary Admissibility

U.S. V. Eric D. Horn, 185 F. Supp. 2d 530 (D. Maryland 2002) In this case, U.S. District Court in Maryland made the first application of the newly revised FRE 702 to the HGN and other SFSTs.

Results of properly administered WAT, OLS and HGN, SFSTs may be admitted into evidence in a DWI/DUI case only as circumstantial evidence of intoxication or impairment but not as direct evidence of specific BAC.

Officer must first establish his qualifications to administer the test - training and experience, not opinion about accuracy rate of test or causal connection between alcohol consumption and exaggerated HGN.

Government may prove causal connection by: judicial notice, expert testimony, or learned treatise. Horn may prove other causes by: judicial notice, cross-examination of state's expert, defense expert, or learned treatise.

U.S. V. Daras, 1998 WL 726748 (4th Cir. 1998)(Unpublished opinion). WAT and OLS were not scientific so no expert needed. Court would have applied *Daubert* to HGN test, but there was no need to because breathalyzer, WAT and OLS were sufficient.

HGN test was admitted as part of series of field tests. Its admission was not challenged on appeal. *U.S. v. Van Griffin*, 874 F.2d 634 (9th Cir. 1989).

II. Police Officer Testimony Needed to Admit HGN Test Result

Foundation for HGN must address validity & reliability under FRE 702. In *Horn*, prosecution had a medical doctor and a police officer, but defense used behavioral psychologist to attack HGN literature of Dr. Marceline Burns and others.

III. Purpose and Limits of HGN

SFSTs may be admitted into evidence in a DWI/DUI case only as circumstantial evidence of intoxication or impairment but not as direct evidence of specific BAC. *Horn*.

Properly qualified, Officer may give opinion of intoxication or impairment by alcohol. *Horn*.

Note: The following states were not listed above due to a lack of case law discussion on HGN:

Colorado

Nevada

Rhode Island

Vermont(HGN was mentioned in the context of a refusal being admissible as evidence of probative guilt. *State v. Blouin*, 168 Vt. 119 (Vt. 1998)

Virginia

Last Update: Jan. 2004

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Or

Visit their website www.ndaa-apri.org.

ATTACHMENT C

SCIENTIFIC PUBLICATIONS AND RESEARCH REPORTS ADDRESSING NYSTAGMUS

1. Anderson, Schweitz & Snyder, Field Evaluation of Behavioral Test Battery for DWI, U.S. Dept. of Transportation Rep. No. DOT-HS-806-475 (1983) (field evaluation of the Standardized Field Sobriety Test battery (HGN, one-leg stand, and walk and turn) conducted by police officers from four jurisdictions indicated that the battery was approximately 80% effective in determining BAC above and below .10 percent).
2. Aschan, Different Types of Alcohol Nystagmus, 140 ACTA OTOLARYNGOL SUPP. 69 (Sweden 1958) ("From a medico-legal viewpoint, simultaneous recording of AGN (Alcohol Gaze Nystagmus) and PAN (positional alcoholic nystagmus) should be of value, since it will show in which phase the patient's blood alcohol curve is...").
3. Aschan & Bergstedt, Positional Alcoholic Nystagmus in Man Following Repeated Alcohol Doses, 80 ACTA OTOLARYNGOL SUPP. 330 (Sweden 1975) (abstract available on DIALOG, file 173: Embase 1975-79) (degree of intoxication influences both PAN I and PAN II).
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SESSION IV

**OVERVIEW OF DRUG EVALUATION
AND CLASSIFICATION PROCEDURES**

SESSION IV

**OVERVIEW OF DRUG EVALUATION AND
CLASSIFICATION PROCEDURES**

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

- o Name the components of the Drug Evaluation and Classification program drug influence evaluation.
- o State the purposes of each component.
- o Describe the activities performed during each component.
- o Correctly answer the "topics for study" questions at the end of this session.

A. Components of the Drug Evaluation and Classification (DEC) Procedure

The DEC procedure is a systematic and standardized method of examining a subject to determine:

- (1) Whether the subject is impaired; and if so,
- (2) Whether the impairment is caused by drugs or a medical condition; and if drugs,
- (3) The category or combination of categories of drugs that are the likely cause of the subject's impairment.

It is a systematic process because it is based on a complete set of observable signs and symptoms that are known to be reliable indicators of drug impairment. A DRE never reaches a conclusion based on any one element of the evaluation, but instead on the totality of facts that emerge. These facts are obtained from careful observations of the subject's:

- appearance
- behavior
- performance of psychophysical tests
- eyes
- vital signs
- any other evidence

The evaluation is standardized because DRE officers perform it the same way every time. By conducting a systematic and standardized evaluation, you will help avoid mistakes and help promote and maintain professionalism and consistency among DREs. Perhaps most importantly, you will help secure the court's acceptance of your testimony.

The systematic and standardized evaluation is broken down into twelve major components or steps. The checklist on the next page lists the steps in the sequence in which they are performed. DREs refer to the checklist every time they conduct an evaluation.

Note: There may be cases in which the DRE is unable to complete each step of the evaluation due to circumstances beyond his or her control such as injury to the subject, uncooperativeness of the subject, or equipment failure. In such cases, the DRE may still be able to form an opinion based on the evidence that he/she is able to observe and document. (See *State v. Cammack*, 1997 WL 104913 (Minn. Ct, App. 1997) (DRE need not complete entire 12-step evaluation for opinion to be admissible so long as there is sufficient admissible evidence which supports the DRE's opinion.)

**INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE
DRUG EVALUATION AND CLASSIFICATION PROGRAM
DRUG INFLUENCE EVALUATION CHECKLIST**

- _____ 1. Breath alcohol test

- _____ 2. Interview of arresting officer

- _____ 3. Preliminary examination and first pulse
(Note: Gloves must be worn from this point on.)

- _____ 4. Eye examinations

- _____ 5. Divided attention tests:
 - _____ Romberg balance

 - _____ Walk and turn

 - _____ One leg stand

 - _____ Finger to nose

- 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

The 12-step drug influence evaluation procedure includes the following:

1. Breath Alcohol Test, to determine the subject's blood alcohol concentration (BAC).

By obtaining an accurate and immediate measurement of BAC, the DRE can determine whether alcohol may be contributing to the subject's observable impairment, and whether the concentration of alcohol is sufficient to be the sole cause of that impairment.

It is always possible that a person suspected of being under the influence of drugs other than alcohol may actually have consumed only alcohol. However, it is also very common to find that a subject has consumed alcohol and other drugs.

2. Interview of the Arresting Officer, to take advantage of the things that he or she may have seen or heard during earlier contact with the subject.



Most arresting officers are not as knowledgeable about drugs as are DREs. The arresting officers may have uncovered some drug paraphernalia, or overheard the subject using drug related "street" terms, without recognizing their significance. A few minutes spent in a careful discussion with the arresting officer can alert the DRE to the most promising areas of investigation to be explored with the subject.

3. Preliminary Examination, which is a structured series of questions, specific observations and simple tests that provides the first opportunity to examine the subject closely and directly. **NOTE: to avoid infection, the DRE must wear gloves from this portion of the evaluation on.**

One major purpose of the preliminary examination is to determine if the subject may be suffering from an injury or some other condition not necessarily related to drugs. Another major purpose is to begin systematically assessing the subject's appearance, behavior, etc. for signs of possible drug influence.

4. Examinations of the Eyes, which include Horizontal Gaze Nystagmus, Vertical Gaze Nystagmus and a check for Lack of Convergence.

Nystagmus is caused by certain categories of drugs. Nystagmus is an involuntary jerking of the eyes as the eyes gaze to the side or as they are elevated. The presence of nystagmus, and the point at which it becomes observable, can shed light on the possible presence of those categories and the extent to which they may be affecting the subject.

The inability of the eyes to converge toward the bridge of the nose also gives evidence of the possible presence of certain categories of drugs.

5. Divided Attention Psychophysical Tests, which include the Romberg Balance; the Walk and Turn; One Leg Stand; and the Finger to Nose.

The subject's performance of these tests produces articulable evidence of their psychophysical impairment. The specific errors of omission or commission may point toward the categories of drugs that are behind that impairment.

6. Vital Signs Examinations, which include systematic checks of the subject's blood pressure; pulse rate; and temperature.

Certain categories of drugs may elevate blood pressure, pulse rate and raise the body temperature. Other drugs would have precisely the opposite effects. Vital signs as well as physical observations thus provide much valuable evidence of the presence and influence of a variety of drug categories.

7. Dark Room Examinations, which include systematic checks of the size of the pupils of the subject's eyes; the reaction of the pupils to light; and evidence of ingestion of drugs by nose or mouth.

Certain categories of drugs affect the eyes, and especially the pupils, in predictable ways. By examining the eyes under carefully controlled lighting conditions, important evidence of those drug categories may be obtained.

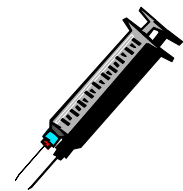
8. Examination for Muscle Tone

Certain categories of drugs will cause the muscles to become rigid, while others may cause the muscles to become flaccid.

Examination of a subject's muscle tone is done by checking their left arm, firmly grasping the upper arm and slowly moving down to determine whether the muscle tone is flaccid, near normal or rigid.

9. Examination for Injection Sites, e.g. via hypodermic needles.

Users of certain categories of drugs routinely or occasionally ingest their drugs via injection. Evidence of needle use (scars, "tracks", etc.) may be found on veins along the neck, arms, legs, etc.



10. Subject's Statements and Other Observations.

Based on the nine previous components of the drug influence evaluation, the DRE should have formed at least an articulable suspicion as to the category or categories of drugs that may be present. The DRE then can proceed, in full conformance with the subject's Miranda rights, to attempt to interview the subject concerning the drug or drugs involved.

11. Opinion of the Evaluator

Based on all of the evidence and observations obtained during the preceding ten steps, the DRE should be able to reach an informed opinion concerning:

- Whether the subject is under the influence of a drug or drugs; and if so,
- The category or combination of categories of drugs that is the probable cause of the subject's impairment.

These conclusions must be documented, along with a narrative summary of the observed facts that led to the conclusions.

12. Toxicological Examination, which is a chemical test or tests that can provide scientific, admissible evidence to substantiate the DRE conclusions.

B. General Guidelines For Interviewing The Arresting Officer

In most cases, the people you examine on suspicion of drug impairment will not be people whom you arrested. Some other officer usually will have had the first contact with the subject and will have made the arrest. The charge or charges of arrest may vary widely and may or may not involve a traffic related offense. In any event, the situation usually will be that the arresting officer (or someone else) recognizes that the subject may be impaired, has some reason to believe that drugs other than alcohol may be contributing to the impairment, and summons you to conduct an evaluation of the subject.

In a particular case, the arresting officer may happen to be quite knowledgeable about drugs and may have some very well informed suspicions as to what types of drugs the subject may be using. In another case, the arresting officer may not have the knowledge as to the kinds of drugs that may be involved. But in all cases there is the possibility that the arresting officer may have seen, heard, smelled or uncovered something that could be a significant clue of drug influence to a trained DRE. A few minutes spent in a careful, systematic interview of the arresting officer may supply the DRE with some very important insights as to the categories of drugs most likely to be found in the particular case at hand.

The key concept here is that the interview be systematic. The DRE shouldn't simply ask the arresting officer an open-ended question such as "What do we have here?" The arresting officer may not be sufficiently knowledgeable about drugs to recognize what is relevant and what is not. Instead, the DRE should inquire in a logical sequence as to the subject's behavior, statements and any physical evidence that may have been uncovered.

Inquiries concerning the subject's behavior

- (1) Was the subject operating a vehicle?
(This may help to establish whether the implied consent law applies to this particular case, and also serve to identify whether potential traffic law violations may be relevant.)
- (2) What vehicle/operator actions, maneuvers, etc. were observed?
(This may disclose evidence of impaired divided attention ability, relaxed inhibitions, etc.)
- (3) Was there a crash?
(This can indicate whether the subject may have suffered injuries that could confound the drug evaluation.)
- (4) Was the subject observed smoking, drinking or eating?
(All of these are common means of ingesting various drugs.)
- (5) Was the subject inhaling any substance?
(Another common method of ingesting certain drugs.)
- (6) How did the subject respond to the arresting officer's stop?
(Actions during the stopping sequence may also disclose indicators of impairment.)
- (7) Did the subject attempt to conceal or throw away any items or materials?
(Such materials may have been drugs or drug-related paraphernalia.)
- (8) What has been the subject's attitude and demeanor during contact with the arresting officer and have there been any changes?

(This information can be relevant to the DRE's own safety, and can also shed light on the kinds of impairment the subject may be experiencing.)

Inquiries concerning the subject's statements

- (9) Has the subject complained of an illness or injury?
(An illness or injury could confound the drug evaluation, but could also suggest the effects of certain types of drugs.)
- (10) Has the subject used any "street terms" or slang associated with drugs or drug paraphernalia? (Persons who use such terms are likely to be users of the

drugs to which the terms relate.) NOTE: The arresting officer might not recognize "street terms" for what they are. It may be useful to follow up this question by asking the officer whether the subject used any unusual or unfamiliar words or phrases.

- (11) How has the subject responded to the arresting officer's questions? (Impairment may be evident, in a variety of ways, from the manner of the subject's responses.)
- (12) Was the subject's speech slurred, slow, rapid, thick, mumbled, incoherent, etc? (Various types of drugs may affect speech in various ways.)
- (13) What, specifically, has the subject said to the arresting officer? (Numerous utterances may shed light on the kinds of drug-related effects that the subject is experiencing.)

Inquiries Concerning Physical Evidence

- (14) What items or materials were uncovered during the search of the subject and/or vehicle? (Even seemingly innocuous or familiar items may be recognized by trained DREs as being associated with possible drug use.)
- (15) Were any smoking paraphernalia uncovered? (Even routine smoking items, such as commercially produced cigarettes, pipes, etc. may disclose evidence of drugs.)
- (16) Was there any injection related material? (For example, such material could include needles, syringes, leather straps or rubber tubes used as tourniquets to help expose veins, bent spoons or bottle caps used in heating and dissolving drugs, etc.)
- (17) Were there any balloons, plastic bags, small metal foil wrappings or any similar items? (These kinds of items frequently are used as drug containers.)
- (18) What was the subject's blood alcohol concentration? (If an attempt to administer a breath test has not yet been made, the DRE should do so now.)

C. Overview of The Preliminary Examination

The preliminary examination of the subject consists of a series of questions; observations of the subject's face, breath and speech; an initial series of checks of the subject's eyes; and the first of three checks of the subject's pulse rate that will be made during the drug influence evaluation. As a safety precaution, officers should secure their weapons prior to beginning the evaluation.

The questions are a set of formal inquiries about any injuries or medical problems from which the subject may be suffering. Courts generally hold that these questions do not conflict with the subject's Miranda rights. However, you should be guided by your department's policy and procedure concerning the possible need to admonish the subject of those rights prior to posing these questions. The questions include:

- Are you sick or injured?
- Do you have any physical defects?
- Are you diabetic or epileptic?
- Do you take insulin?
- Are you under a doctor's or dentist's care?
- Are you taking medication?

Answers to these questions may disclose circumstances that could impede or confound the subsequent steps in the drug evaluation. The subject's answers, and the manner in which he or she answers, could also give evidence of the possible presence of certain types of drugs. If any affirmative responses are given, the DRE should ask appropriate follow up questions.

The observations of the subject's face, breath and speech are straight forward. Make note, for example, if the face appears flushed or pale, and if the subject appears to be perspiring. Any noteworthy odors of the breath should be recorded, such as alcoholic beverages; marijuana; or a chemical odor. If the subject's speech is in any way distorted, this too should be recorded.

The initial checks of the subject's eyes include some very important steps. One of these is the visual check for equal pupil size. Look at the subject's eyes to determine whether the pupils appear to be equal. If the pupils appear to be unequal, a further check will be necessary. This check is made by using a device called a "pupillometer", which has a series of small circles or semi-circles of various diameters. The diameter is measured and indicated in millimeters ("mm"). By holding the pupillometer alongside the subject's eye, you can determine which circle/semi-circle is approximately the same size as the pupil. You must check both pupils.



A second important check of the eyes is an assessment of the eyes' tracking ability. You should hold a pencil, penlight or similar object about 12 - 15 inches in front of the subject's nose, and move it smoothly to the subjects extreme left, and smoothly back to the extreme right, instructing the subject to follow the stimulus with their eyes only. Always make at least two complete passes in front of the subject's eyes. If the two eyes do not exhibit the same tracking ability, this too may indicate a possible head injury or medical problem.

After assessing the subject's tracking ability, you can also perform a preliminary assessment of whether Horizontal Gaze Nystagmus is present in the subject's eyes. In particular, if the nystagmus or "jerking" is observed, an initial estimation of the angle of onset can be made. The approximate angle of onset may help to determine whether the subject has consumed some drug other than alcohol.

If there is a significant disparity between the nystagmus angle of onset, and what would be expected from the known BAC, the DRE should be alert to the possible presence of some other nystagmus causing drug.

The nystagmus angle of onset is one clue to consider in assessing whether drugs other than alcohol may be present. But it certainly is not the only clue to consider, and it is far from being the most important.

One final thing to be examined in the initial checks of the subject's eyes is the condition of the eyelids. Many drugs will cause the eyelids to droop, as the user exhibits a sleepy appearance. A drooping of one eyelid, but not the other, possibly signifies an injury or other medical problem. The medical, or technical, term for droopy eyelids is Ptosis.

The final element in the preliminary examination is the first check of the subject's pulse rate. Pulse rate is one of the vital signs that serve as very reliable indicators of the possible presence of certain categories of drugs. Pulse rate can also be affected by anxiety, and it is common for an arrested subject to experience anxiety while being examined by a police officer. Pulse rate is measured near the beginning of the drug influence evaluation, again during the middle, and finally near the end to allow the subject's anxiety to "settle down" before the last measurement.

D. Overview of the Examinations of the Eyes

Prior to administration of HGN, the eyes are checked for equal tracking (can they follow an object together) and equal pupil size. If the eyes do not track together, or if the pupils are noticeably unequal in size, the chance of medical disorders or injury may be present.



If the subject is wearing eyeglasses have them removed. Position the stimulus approximately 12-15 inches from the subject's nose and slightly above eye level. You may observe Resting Nystagmus at this time. Check the subject's eyes for the ability to track together. Move the stimulus smoothly across the subject's entire field of vision. Check to see if the eyes track the stimulus together or if one lags behind the other. If the eyes don't track together it could indicate a possible medical disorder, injury or blindness.

Next, check to see that both pupils are equal in size. If they are not, this may indicate a head injury, or some other complication.

DREs obtain important evidence of the presence of certain drug categories from three examinations of the subject's eyes:

- **Horizontal Gaze Nystagmus**
- **Vertical Gaze Nystagmus**
- **Lack of Convergence**

HORIZONTAL GAZE NYSTAGMUS (HGN) should already be familiar to you as a highly reliable Standardized Field Sobriety Test for alcohol impairment. In fact, HGN not only is a powerful indicator of alcohol impairment, but it will also disclose impairment by CNS Depressants, Dissociative Anesthetics, and by most Inhalants. These three categories of drugs usually will cause HGN.

You should check for the following three clues of HGN in each eye:



Clue #1: Lack of Smooth Pursuit

Start with a stimulus (pencil, pen, penlight, etc.) held vertically in front of the subject's face, above eye level and approximately 12 to 15 inches away from the subject's nose. Tell the subject to keep his/her eyes focused on the stimulus, to hold their head still and to follow the movement of the stimulus with their eyes only.



Check the subject's left eye by moving the stimulus smoothly to the subject's extreme left, then smoothly all the way to his/her extreme right, then smoothly back to the extreme left and then back to the extreme right. The stimulus should be moved at a speed that requires approximately 2 seconds (between 1.5 and 2.5 seconds) to bring it from the center to the subjects extreme left, and approximately 4 seconds (between 3 and 5 seconds) to bring it from one side to the other. Two complete passes should be made in front of the eye: that is, from the center to left the side, back to the right side, back to the left side again, back to the right side, and finally back to the center.

While the eye is moving, you should examine it closely for signs of "a lack of smooth pursuit". If a person is not under the influence of a CNS Depressant, Inhalant, or a Dissociative Anesthetic (D.I.D. drugs), their eyes should glide smoothly in the sockets, in much the same way that windshield wipers slide smoothly across the windshield when it is raining steadily. But if the person is under the influence of one of those

three categories of drugs, their eyes will usually jerk noticeably as they move, similar to a windshield wiper dragging across a dry windshield.



Clue #2: Distinct and Sustained Nystagmus at Maximum Deviation

Continue with the stimulus about 12 - 15 inches in front of the subject's face, with the tip of the stimulus above eye level. Instruct the subject to keep his/her head still and follow the stimulus with their eyes. Move the stimulus all the way to the subject's left side, until the eye is turned to its maximum deviation. Hold the stimulus in that position for at least four seconds, and carefully observe the eye. Then, repeat the process with the stimulus at the subject's extreme right side. Persons under the influence of alcohol or other nystagmus causing drugs usually will exhibit a distinct, sustained, pulsating, very pronounced jerking when the eye is at maximum deviation. In order to consider this clue as "present", you must observe a clear, sustained and unmistakable jerking. A slight, barely visible tremor **does not** constitute "distinct jerking".



Clue #3: Angle of Onset

When you use HGN as a Standardized Field Sobriety Test of alcohol impairment, you are used to determining whether the jerking of the eye begins prior to 45 degrees. As a DRE, you are going to have to be a bit more precise than that. Within certain limits, it is important for the DRE to estimate the actual angle at which the jerking first begins. We need to do this because it gives us a clue as to whether the subject is impaired by alcohol alone, or by some combination of alcohol with another Depressant, an Inhalant, or a Dissociative Anesthetic.

From the original research that led to the development and validation of HGN as a Standardized Field Sobriety Test for alcohol, we know that there is an approximate statistical relationship between blood alcohol concentration (BAC) and the angle of onset of nystagmus. The relationship is expressed by this formula:

$$\text{BAC} = 50 - \text{Angle of Onset}$$

According to the formula, if the angle of onset were 40 degrees, then the "BAC" would approximately equal 50 minus 40 or 10; that corresponds to a BAC of 0.10. Similarly, if the angle of onset were 35-degrees, "BAC" would be approximately 15, for a BAC of 0.15.

It is important to keep in mind that this formula expresses an average, approximate statistical relationship, **not a precise mathematical relationship**. Humans (and their eyes) do not all react to alcohol or other drugs in exactly the same way. The formula may be reasonably accurate for some people, but much less accurate for others.

The formula is **not** sufficiently accurate for us to use HGN to produce evidence of a specific BAC, and courts routinely reject any attempt to do so. But the formula is of value to us as DREs because it can help us detect an evident gross disparity between the subject's BAC and the nystagmus that is observed.

For example, you are called in to examine a subject who has a BAC of 0.07. Based on that alone, you'd expect to find the onset of HGN close to 40 to 45 degrees. But you discover that the subject's HGN begins at approximately 30 degrees. That would be inconsistent with the BAC, and you would begin to think that this subject might also have taken some other Depressant, an Inhalant, or a Dissociative Anesthetic.

For DRE purposes, you will be expected to be able to estimate an angle of onset to the nearest 5 degree increment, over the range from 30 degrees to 45 degrees. If the subject's eyes begin to jerk before they have moved to the 30 degree angle, you will not attempt to estimate the angle precisely, but will simply record that the subject exhibits "immediate onset". But from 30 degrees on out, you will record a numeric estimate of onset, i.e. 30 degrees, 35 degrees, 40 degrees or 45 degrees.

To determine the angle of onset, again position the stimulus approximately 12-15 inches from the subject's nose and slowly move the stimulus toward your right. NOTE: It is important to use the four full seconds to determine the onset of nystagmus. Watch the left eye ball closely for the first sign of jerking. When you think that you first see the eye jerk, stop moving the stimulus and hold it steady. Verify that the eye really is jerking: if it is not, start moving it again to your right until you see the jerking begin. Once you find the point of onset of nystagmus, estimate the angle, to the nearest 5 degrees, then, repeat this procedure for the subject's right eye. One final point about the nystagmus onset angle is don't forget that there are many drugs that **do not cause HGN**. For example, CNS Stimulants do not cause HGN; neither do Hallucinogens, Cannabis or Narcotic Analgesics. Therefore, a subject might be under the influence of, for example a combination of alcohol and cocaine, and their nystagmus angle of onset would be consistent with the alcohol level alone.

VERTICAL GAZE NYSTAGMUS

Vertical Gaze Nystagmus, like HGN, is a jerking of the eyes. Vertical Gaze Nystagmus is an involuntary jerking of the eyes (up and down) which occurs when the eyes gaze upward at maximum elevation.

Vertical Gaze Nystagmus is associated with the very same drugs that cause Horizontal Gaze Nystagmus. In other words, Vertical Gaze Nystagmus may be exhibited by someone who is under the influence of any CNS Depressant (including alcohol), an Inhalant or a Dissociative Anesthetic such as PCP and its analogs. By the same token, Vertical Gaze Nystagmus, like HGN, is not produced by CNS Stimulants, Hallucinogens, Cannabis or Narcotic Analgesics. High doses for that individual of Depressants, Inhalants or a Dissociative Anesthetic usually cause Vertical Gaze Nystagmus. Therefore, it is not uncommon to encounter subjects who exhibit HGN, but do not exhibit Vertical Gaze Nystagmus.

To check for Vertical Gaze Nystagmus, hold a stimulus horizontally in front of the subject, approximately 12-15 inches in front of the subject's nose. Direct the subject to focus his/her eyes at a specific point on the stimulus. Instruct the subject to hold his/her head steady and to follow the stimulus with their eyes only. Elevate the stimulus until the eyes are raised as far as possible and hold them at that position for a minimum of four seconds. Observe the eyes closely to see whether any up and down jerking occurs. With Vertical Gaze Nystagmus, we do not attempt to identify an angle of onset. Vertical Nystagmus is either present or not present. There is no drug that will cause Vertical Gaze Nystagmus that will not cause Horizontal Gaze Nystagmus.

Remember, the mere fact that Vertical Gaze Nystagmus is present does not guarantee that the subject is under the influence of some drug other than alcohol. Alcohol itself will cause Vertical Gaze Nystagmus, if the BAC is high for that individual. Remember that there are many drugs that do not cause Vertical Gaze Nystagmus.

LACK OF CONVERGENCE

In simplest terms, **Lack of Convergence** means an inability to cross the eyes. We start to check for Lack of Convergence by positioning 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, then move it toward their face, and that you will bring it in close to the bridge of the nose. You will not actually touch the subject's nose with the stimulus. Make sure that the subject knows this in advance, so that they do not become frightened during the test and jerk their head away.

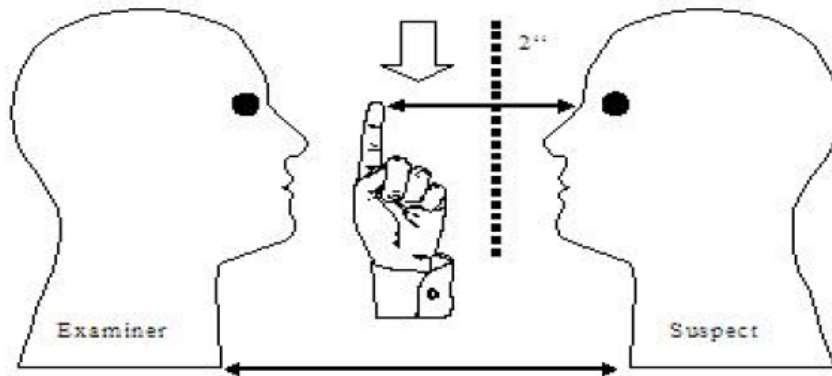
Instruct the subject to keep their head steady and to follow the movement of the stimulus with the eyes only.

Start moving the stimulus in a circle in front of the subject's face either clockwise or counterclockwise, and observe the eyes to verify that the subject is tracking the stimulus. Then move the stimulus to 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.

Note: You should not touch the subject's nose nor come any closer than approximately two (2) inches from the bridge of the nose. Also, you should keep the stimulus high enough so that you can observe the eye movements, making sure the subject does not close his/her eyes to a point where you cannot observe them.

If the eyes are able to cross (converge) i.e. if they come together at a minimum of two inches (2") from the bridge of the nose, Lack of Convergence is "not present", But if one eye drifts away or outward toward the side instead of converging to the bridge of the nose or to the point of convergence (approximately 2 inches from the bridge of the nose), Lack of Convergence is "present". (Refer to the diagram on the next page).

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



If the subject cannot converge one or both eyes on the stimulus at approximately two inches from the bridge of the nose, then Lack of Convergence is “**present**”

We record the results of this test by diagramming the movement of the eyes as they come together and then at their final position when the stimulus is moved in to approximately two inches from the bridge of the nose.

Lack of Convergence usually occurs with people who are under the influence of any drug that causes HGN. CNS Depressants, Inhalants and Dissociative Anesthetics usually will cause Lack of Convergence. Cannabis also will usually cause Lack of Convergence, even though it doesn't cause HGN. Other kinds of drugs, i.e. CNS Stimulants, Hallucinogens and Narcotic Analgesics usually do not prevent the eyes from converging. You should be aware that many people have difficulty crossing their eyes even when they are totally drug free, and it is not uncommon to find unimpaired individuals who exhibit Lack of Convergence.

E. Review of the Divided Attention Psychophysical Tests

Four divided attention tests are administered to subjects during a drug influence evaluation.

Romberg Balance

The Romberg Balance test used by DRE's is a modified version of the original Romberg Balance test developed in the 19th Century.

This test requires the subject to stand with his/her feet together, head tilted slightly back, eyes closed and estimate the passage of thirty seconds. When the subject believes that the thirty seconds have passed, he or she is to tilt the head forward, open the eyes and say "Stop".

Administrative Procedures

- Tell the subject to stand straight with his/her feet together and his/her arms down at their sides.
- Tell the subject to maintain that position while you give the instructions. Emphasize that he or she must not start the test until you say "begin".
- Ask the subject if he or she understands so far.
- Tell the subject that, when you tell them to, they must tilt their head back and close their eyes. DEMONSTRATE how the head should be tilted, but DO NOT CLOSE YOUR EYES while demonstrating.
- 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".
- Ask the subject if they understand.
- Look at your watch 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.
- Keep track of time while the subject performs the test.
- When the subject opens his/her eyes, ask them "how much time was that?"
- If 90 seconds elapses before the subject opens his/her eyes, stop the test.

Documenting the test

At the ends of the "arrows" above the "stick figures", record the number of inches of sway exhibited by the subject. The "stick figure" that has only one arm and one leg is used to record front to back sway. The two armed and two legged figure is used for side to side sway.

Under "internal clock", record the actual number of seconds the subject stood with their eyes closed.

Look and listen for the following:

- subject unable to stand still or steady with the feet together
- body tremors
- eyelid tremors
- muscle tone (either more rigid or more flaccid than normal)
- any statements or unusual sounds made by the subject when performing the test.

Document any of the above, or any other noteworthy observations, across the chest areas of the "stick figures", and elaborate as necessary on the reverse side of the drug influence evaluation face sheet.



Walk and Turn

This test should already be very familiar to you from your previous SFST and DRE Pre-School training. The test requires the subject to stand in a heel to toe fashion with his/her arms at his/her sides while a series of instructions are given. Then, the subject must take nine heel to toe steps along a straight line, turn in a prescribed manner, and take another nine heel to toe steps along the line. All of this must be done while counting the steps aloud and keeping their arms at their sides. The subject must not stop walking until the test is completed.

For the DEC evaluation, this test requires a straight line long enough to allow the subject to take 12-15 heel-to-toe steps.

Procedures for Walk-and-Turn Testing

1. Instructions Stage: Initial Positioning and Verbal Instructions

For standardization in the performance of this test, have the subject assume the heel-to-toe stance by giving the following verbal instructions, accompanied by demonstrations:

- "Place your left foot on the line". Demonstrate.

- "Place your right foot on the line ahead of the left foot, with the heel of your right foot against the toe of left foot." Demonstrate.
- "Place your arms down at your sides." Demonstrate.
- "Maintain this position until I have completed the instructions. Do not start to walk until told to do so."
- "Do you understand the instructions so far?" (Make sure subject indicates understanding.)

2. Demonstrations and Instructions for the Walking Stage

Explain the test requirements, using the following verbal instructions, accompanied by demonstrations:

- "When I tell you to start, take nine heel-to-toe steps on the line, turn, and take nine heel-to-toe steps on the line back." (Demonstrate 3 heel-to-toe steps.)
- "When you turn, keep the front foot on the line, and turn by taking a series of small steps with the other foot, like this." (Demonstrate).
- "While you are walking, keep your arms at your sides, watch your feet at all times and count your steps out loud."
- "Once you start walking, don't stop until you have completed the test."
- "Do you understand the instructions?" (Make sure subject indicates understanding.)
- "You may begin."

NOTE: If the subject fails to either look at his/her feet or count their steps out loud, remind them to do so and note the occurrence on the evaluation form.

Note: There may be times when the subject will have to be reminded that step "one" is the first step taken from heel-to-toe position.

Documenting the test

Using the "footprints" you will record every instance where the subject stopped walking or stepped off the line. For a **stop** draw a vertical line across the "toe" of the step at which the stop occurred and mark the line with an "S". For a **step off**, draw a line from the appropriate footprint at an angle in the direction in which the foot stepped. If the subject fails to touch heel to toe, draw a



vertical line across the “toe” where this clue was noted and mark the line with an “M”.

Eight validated clues of impairment have been identified for the Walk and Turn test. Two of them apply while the subject is standing in the heel to toe position and listening to the instructions:

- Cannot keep balance. (i.e. feet break away from the heel to toe stance);
- Starts too soon (i.e. subject starts walking before told to do so).

At the top of the checklist portion of the Walk and Turn segment of the drug influence evaluation face sheet, you will record the numbers of times these two clues were observed while you were giving the instructions. For example, if the subject breaks away from the heel to toe stance twice, put two check marks on the "Cannot keep balance" line.

The other six validated clues apply during the walking stage of the test. They are:

- Stops while walking
- Does not touch heel to toe (by more than ½ inch)
- Steps off the line
- Uses arms to balance
- Improper turn
- Incorrect number of steps

In the checklist area you will record the first five of those, separately for the first nine steps and the second nine. Beneath the footprint area you will describe how the subject turned. If they turned in the appropriate fashion, simply write "proper" in that space. But if the subject "staggered to the left" or executed an "about face" turn or any turn other than a proper turn, write that description in the space.

If the subject was unable to begin or complete the test, explain why. Usually this will be due either to a physical infirmity that precludes the test entirely (e.g. "subject has an artificial left leg") or to your decision to stop the test (e.g. "subject nearly fell twice while attempting to stand for the instructions"). Whatever the case might be, some reason must be documented for a test that wasn't given or completed.

One Leg Stand

This test obviously requires the subject to stand on one leg. The other leg is to be extended in front of the subject in a stiff leg manner, with the foot held approximately six inches above the ground. The subject is to look at the elevated foot and count out loud in the following manner: "one thousand one, one thousand two, one thousand three, ..." until told to stop. You will time the subject as this test is performed and will tell the subject to stop when the thirty seconds has elapsed. The subject will be required to perform this test **twice**, first standing on the left leg, then on the right.

Procedures for One-Leg Stand Testing

1. Instructions Stage: Initial Positioning and Verbal Instructions

Initiate the test by giving the following verbal instructions, accompanied by demonstrations.

- "Please stand with your feet together and your arms down at the sides, like this." (Demonstrate)
- "Do not start to perform the test until I tell you to do so."
- "Do you understand the instructions so far?" (Make sure subject indicates understanding.)

2. Demonstrations and Instructions for the Balance and Counting Stage

Explain the test requirements using the following verbal instructions, accompanied by demonstrations:

- "When I tell you to start, raise your (right/left) leg, approximately six inches off the ground, foot parallel to the ground." (Demonstrate one leg stance.)
- "You must keep both legs straight and your arms at your side."
- "While holding that position, count out loud in the following manner: "one thousand one, one thousand two, one thousand three, until told to stop." (Demonstrate a count, as follows: "one thousand one, one thousand two, one thousand three, etc." Officer should not look at his foot when conducting the demonstration - OFFICER SAFETY.)
- "Keep your arms at your sides at all times and keep watching the raised foot."
- "Do you understand?" (Make sure subject indicates understanding.)
- "You may begin."

NOTE: It is important that this test lasts for thirty seconds and you must keep track of time. If the subject counts slowly, you will tell them to stop when thirty seconds have gone by, even if for example, the subject has only counted to "one thousand twenty". On the other hand, if the subject is counting rapidly, they may count to "one thousand forty" before the thirty seconds has gone by and you say to stop.

Make sure you record the subjects' actual count in the thirty seconds.

AFTER the subject completes the test while standing on the left leg, have him/her

put their feet together with their arms down at their side. Repeat the instructions and ask the subject if they understand. Have him/her perform the test while standing on the right leg.

Documenting the test

Four validated clues of impairment have been identified for the One Leg Stand:

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

You will place check marks in or near the small boxes to indicate how many times you observed each of the clues. You will do this separately for the test on the left leg (L) and the test on the right (R). In addition, if the subject puts their foot down during the test, you will record when it happened. To do this, write the count number at which the foot came down. For example, if the subject when standing on their left leg, lowered their right foot at a count of "one thousand thirteen", and again at "one thousand twenty" your diagram should look like the example to the right. The subject's actual count during the thirty seconds should be documented in the top area of the box above the foot the subject was standing on.

ONE LEG STAND:

13 20

L R

Sways while balancing.

Uses arms to balance.

Hopping

Puts foot down.

You must also pay attention to the subject's general appearance and behavior while he or she is performing this test. Take note of any body tremors or muscle tension that may be apparent. Listen for any unusual or "interesting" sounds or statements the subject might make while the test is in progress. Make sure that any such information is documented on the face sheet or in your narrative report.

Finger to Nose

The Finger to Nose test means just that: the subject is required to bring the tip of his/her index finger up to touch the tip of their nose. They will perform this test with their eyes closed and their head tilted slightly back, standing in a manner identical to that required for Romberg Balance (feet together and arms at their sides). The subject will attempt this six times, three with each hand. You will instruct the subject as to which hand to use for each attempt. You will **always** use this sequence when administering this test: "left...right...left...right...right...left".

Administrative Procedures

- Tell the subject to place his/her feet together and to stand straight.
- Tell the subject to place his/her arms down at their sides, close their hands with the index finger extended and rotate the palms forward.
- Tell the subject that, when you say to "begin", he/she will tilt their head back slightly and close their eyes. DEMONSTRATE how the head should be titled back, but DO NOT CLOSE YOUR EYES.
- Inform the subject that you will instruct them to bring the tip of an index finger up to touch the tip of their nose. DEMONSTRATE how the subject is supposed to move the arm and how he/she is supposed to touch the tip of their nose.

NOTE: The arm is brought directly from the subject's side in front of the body touching the tip of their nose with the tip of their index finger.

- Tell the subject that, as soon as they touch their finger to their nose, they must return the arm to their side.
- Tell the subject that, when you say "right", they must move the right hand index finger to their nose; when you say "left", the subject must move the left hand finger to their nose.
- Ask the subject if they understand.
- Tell the subject to "begin". MAKE SURE he/she tilts his/her head back and closes their eyes. EMPHASIZE to the subject that he/she must keep their eyes closed until you say to open them.
- Give the commands in EXACTLY this sequence:

"left...right...left...right...right...left".

MAKE SURE the subject returns their arm to their side immediately after each attempt. PAUSE about two or three seconds between commands.

- After the sixth attempt, tell the subject to open their eyes.

Documenting the test

Although the Finger to Nose test has not been scientifically validated, experience shows that persons who are impaired by alcohol or other drugs sometimes miss the tip of the nose and sometimes fail to use the proper finger. On the diagram, you will draw a line to indicate where the finger tip "landed" on each attempt, and you will indicate which finger was actually used. In addition, be alert for body sway, body tremors, eyelid tremors, muscle tension, unusual or "interesting" sounds or statements and anything else noteworthy. Document all such observations on the face sheet and in your narrative report.



F. Overview of the Vital Signs Examinations

The three vital signs examined during the drug influence evaluation are pulse rate; blood pressure; and body temperature. They are covered in some detail in Session VII of this training program. For the time being, some simple definitions are sufficient:

Pulse rate is the number of expansions that occur in an artery in one minute. Each time the heart "beats" (or contracts) it sends a surge of blood through the arteries. These surges can easily be felt if you place your finger tips over an artery and apply slight pressure. All you have to do to measure pulse rate is to feel the surges while looking at a wristwatch, and count the number of surges that occur in thirty seconds, then multiply by two.

Blood pressure is the force exerted by blood on the walls of the arteries. A person's blood pressure constantly changes from instant to instant. When the heart contracts, and sends the blood surging through the arteries, the blood pressure reaches its highest value. This is called the **systolic** pressure. As the heart expands, the surge of blood slows, and the pressure drops.



When the heart is fully expanded, the blood pressure falls to its lowest level. This is called the **diastolic** pressure. Then, the heart starts to contract and the pressure rises again. The blood pressure continuously rises and falls, cycling between the systolic and diastolic values, as the heart beats.

Measurement of blood pressure requires a special instrument called a sphygmomanometer. A stethoscope is also needed.

Body temperature is measured by using an oral thermometer.

G. Overview of the Dark Room Examinations

Estimating Pupil Size

The pupils of our eyes continually adjust in size to accommodate different lighting conditions. When we are in a darkened environment, the pupils expand or "dilate", to allow the eyes to capture as much light as possible. When the lighting conditions are

very bright, the pupils shrink, or “constrict”, to keep the eyes from being overloaded. This process of constriction and dilation normally occurs within limits.

We use a device called a **pupillometer** to estimate the size of the subject’s pupils. The DRE pupillometer has a series of circles or semi-circles, with diameters ranging from 1.0 mm to 10.5 mm, in half-millimeter increments. We hold the pupillometer alongside the subject's eye, and move the pupillometer up or down until we locate the circle or semi-circle closest in size to the pupil.

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

We estimate pupil size under three different lighting conditions:

- **Room Light**
- **Near Total Darkness**
- **Direct Light**

1. Estimation of Pupil Size Under Room Light

The pupils are examined in room light prior to darkening the room. Since room lighting conditions can vary considerably and often cannot be controlled, the range of pupil sizes may vary.

Have the subject look straight ahead at a point or location behind the DRE and slightly above the subject’s eye level. Care should be taken to ensure the subject is not staring at a light source. Position the pupillometer along side the eye to ensure an accurate estimation.

After checking both the left and right eye, turn off the lights and wait 90 seconds to allow your eyes and the subject’s eyes to adapt to the dark.

2. Estimation of Pupil Size 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). Continue to hold the glowing red tip in that position and bring the pupillometer up alongside the subject's left eye and locate the circle/semi-circle that is closest in size to the pupil. Then repeat this procedure for the subject's right eye.

3. Estimation of Pupil Size Under Direct Light

Leave the tip of the penlight uncovered and bring the light from the side of the subject's face and shine it directly into their left eye. Position the penlight so that it

illuminates and approximately fills the subject's eye socket. Hold the penlight in that position for 15 seconds with the pupillometer up alongside the left eye, and find the circle/semi-circle that is closest in size to the pupil. Then repeat this procedure for the subject's right eye. While observing the eye for the 15 seconds with the pupillometer in position, you should also check for rebound dilation.

The definition for rebound dilation is available in the glossary and will be covered in depth later in this school.

While checking the pupil size under direct light, you must evaluate the pupil's reaction to light. If a person is not under the influence of any drug, his or her pupils should constrict within one second when the penlight's beam strikes the eye directly. But certain categories of drugs may cause the constriction to occur more slowly, or perhaps not to occur at all.

Two other activities conducted in the darkroom are the examination of the nasal area and the examination of the oral cavity. In both cases, you must look closely for signs of drug use, or even for traces of a drug or concealed quantities of drugs.

Tell the subject to tilt their head back. Shine the penlight directly into the nostrils. Look for traces of drugs or other materials in the nasal passages. Also check for redness and scarring or abrasions that might indicate repeated "snorting" of certain drugs.

Tell the subject to open their mouth wide. Shine the penlight directly into the mouth. Shine the beam around the inside of the mouth to illuminate all areas.

Look for residual quantities of drugs and for unusual coloring of the inside surfaces of the mouth (e.g. green or reddish coloring). Look near the gums for small balloons, bags, tissue or foil wrappings, or other small containers of drugs. Tell the subject to elevate their tongue, and look under the tongue for debris, or other evidence of ingestion.

Three important things should be kept in mind about the dark room examinations. First, a second officer should always accompany you and the subject into the dark room, as a safety precaution. Second, no weapons should be taken into the darkroom. Third, after entering the dark room, no examination should begin for 90 seconds, to allow your eyes, and the subject's to adjust to the darkness.

H. Examination of Muscle Tone

To begin the examination of the muscle tone start with the subject's left arm, firmly grasping the upper arm and slowly moving down. The muscle will appear flaccid, normal or rigid to the touch. Then check the right arm in the same manner.

I. Examination for Injection Sites

Persons who frequently inject drugs often develop lengthy scars, called "tracks", from repeated injections into the same vein. Fresh injection sites often can be found at the end of a "track". Many times, a fresh injection site will not be easily visible to the naked eye. Therefore, a DRE should search for injection sites by touch, running the fingers along such places as the neck, forearms, wrists, back of hands, or other subjected areas of injection. When a possible injection site is located, a ski light can be used to provide a magnified and illuminated visual inspection. The third pulse is taken by the DRE in this step.

Hypodermic needles are sized according to gauge. The gauge of a needle is a measurement of its inside diameter. The gauge number represents how many needles of that size would be needed to equal one inch. For example, a 24 gauge needle has an inside diameter of 1/24th of an inch; a 10 gauge needle has an inside diameter of 1/10th of an inch. Therefore, the higher gauge, the smaller the diameter of the needle.

J. Subject Statements

The DRE should be aware that often during the evaluation process, subject's may make numerous spontaneous, incriminating statements. These statements should be documented. DRE's should check to make sure that the subject has been appropriately advised of his/her Miranda rights. DRE's should ask additional probing questions as appropriate.

K. Opinion of DRE

By this point in the evaluation, the DRE should have formed an opinion of the category or categories of drugs responsible for any observed impairment. This opinion is based on the totality of the evaluation.

L. Obtaining a Toxicological Sample

The process of obtaining toxicological samples will vary depending upon individual state implied consent statutes. The laws of your state will dictate what samples can be taken, i.e. urine, blood, saliva and/or breath. The containers for these samples will also vary depending on the type of test used and the laboratory that will do the analysis. A department or agency policy should delineate how each sample should be taken. You will need to become familiar with and follow your department's policies and procedures governing toxicological sample collection, handling, shipment, be taken. You will need to become familiar with and follow your department's policies and procedures governing toxicological sample collection, handling, shipment, etc. Consideration should be given to witnessing the sample being obtained, chain of custody for the evidence, preservation and the return of the analysis by the laboratory.

M. A Brief Overview of Toxicology

1. Introduction

The information in this section is intended to provide a basic understanding of chemical testing for drugs that a DRE needs to have to appreciate fully the role of toxicology in this program. As much as possible, the information has been kept non-technical. It will not be covered in depth in class, but you are expected to be familiar with what is given in this manual.

2. Some Key Concepts

DEFINITION: Toxicology is the study of poisons and their effects on living organisms. For DRE purposes, the "poisons" in question are drugs, and in some cases the metabolites of drugs. A toxicologist analyzes physical specimens such as blood and urine for drugs and drug metabolites.

A metabolite, for DRE purposes, is a chemical substance derived from a drug, and that is formed by the action of the body upon that drug. It is important to be aware that some metabolites are themselves psychoactive. That is to say, some metabolites cause impairment: Therefore, a metabolite may also be a drug. It is also important to know that it may be the metabolite, and not the original or "parent" drug that is detected in the laboratory. In some instances, finding a particular metabolite allows the chemist to conclude with certainty that a specific drug was ingested, even though the methods and equipment available to the lab can't detect that drug itself. Finding the metabolite is good, scientific evidence that the drug was there.

3. Limitations of Toxicology

Toxicology has some important limitations. One limitation is that, with the exception of alcohol, toxicology cannot produce "per se" proof of drug impairment. That is, the chemist can't analyze the blood or urine and come up with a number that "proves" the person was or wasn't impaired. For alcohol alone, the chemist can do that, or at least come very close to doing it.

But alcohol is a special drug. Chemically speaking, the alcohol molecule is very simple compared to the molecules of other drugs. Alcohol's metabolites don't impair. Scientists have had many opportunities to study alcohol's effects under carefully controlled experimental conditions. The scientific community has a relatively clear understanding of how alcohol works on the body and brain.

These statements generally can't be made about other drugs. Drugs are metabolized in complex ways, and sometimes the metabolites are also drugs. Some drugs can be stored in the body's tissues, so that even after the drug has cleared from the blood, it's still in the body and brain and still causing

impairment. Apart from post-mortem studies of lethal levels, there haven't been routine opportunities to correlate drug concentrations with degrees of impairment. Ethical concerns limit our ability to study illegal drugs, especially at "street" dosages. It is difficult to replicate in the laboratory the drug combinations, methods of ingestion and drug purities characteristic of "street" use. Even if it were possible to study individual drug concentrations and their relationships to impairment in depth, the practice of polydrug use and the myriad of different combinations seen on the street would make that information of little practical use. Finally, many laboratories simply don't perform quantitative analyses to determine the drug concentrations, but only determine qualitatively the presence of the drugs. The reasons for avoiding quantitative analysis include the facts that it is costly, time consuming, and may be beyond the capability of the equipment available to the lab. Also, if urine is the specimen preferred by or submitted to the lab, quantitative analysis is less important, because it doesn't lend itself to clear interpretation. In short, chemistry basically cannot supply the "magic number" of impairment for drugs.

Another limitation of toxicology is that it doesn't provide evidence of the time at which the drug was ingested. Therefore, they will not be able to provide direct evidence of the subject's condition at the time of arrest. In some instances, it is possible that a "positive" chemical test reflects drugs that the subject took long before being arrested, and that were metabolized and no longer causing impairment prior to his or her arrest.

4. Toxicology's Roles in this Program

Exactly what are the roles that toxicology plays in this program? First and foremost, toxicology is **the twelfth step in the drug influence evaluation.**

A DRE doesn't complete the evaluation until they either obtain a specimen from the subject, or formally document the fact that the subject refused to submit to the toxicological test. It is important that the court be aware that toxicology is the final step of the evaluation. It follows the formation of the DRE's opinion; the opinion is not based on the results of the toxicological analysis. Similarly, the arrest, booking and charging of the subject are not based on the toxicological analysis, and must be supported by other, solid evidence. The DRE expects that toxicology will **support or corroborate the opinion** that they have formed. A toxicological analysis supports the opinion by confirming the presence of a particular drug that is consistent with the DRE's opinion. The concentration at which the drug is present shouldn't be an issue, because it isn't possible to relate concentration to "impairment" with any degree of reliability.

DREs also need to understand that sometimes the toxicological analysis will not confirm the DRE's opinion. The DRE needs to be honest enough to admit

that, when that happens, it may be because their opinion is incorrect. The drug influence evaluation isn't an exact science. Drugs affect different people in different ways. In this program, we "never say never", and we "always avoid saying always".

But sometimes, the toxicology doesn't corroborate a DRE's opinion even though the opinion is correct. The lab's instruments, personnel and analytical methods are not infallible. There are certain drugs that a particular laboratory simply may not test for, and there are others that can't be "seen" unless they are present at fairly high concentrations.

To corroborate DREs' opinions, toxicology performs two kinds of analyses: **screening and confirmation**. Screening tests are easier, cheaper and faster than confirmatory tests. Confirmatory tests are more sensitive and more specific than screening tests. In loose terms we can say that a positive screening test means "it looks like this sort of drug is there". A positive confirmatory test means "this particular drug is definitely there".

Confirmatory tests employ methods different from those of the screening tests. The confirmatory test is designed to provide absolute proof of a drug's presence, or at least as close to absolute as science can come. Confirmatory tests usually are required if the case goes to trial. DREs should be aware that, to cut down on costs, some labs do not conduct the confirmatory tests unless the case is going to go to trial. If this is the policy of your laboratory, you must provide the toxicologist with as much advanced notice of the trial date as possible, so he or she can perform the confirmatory analysis in a timely manner.

Suppose the screening test is positive, but the confirmatory test is not positive; what does that mean? Here again, DREs need to admit that it may mean that the drug isn't there. Some "screens" will react to substances other than psychoactive drugs. The screening tests are not absolutely indicative of drug presence; if they were, there would be no need for a confirmatory test.

Failure to confirm a drug does not necessarily mean that the "screen" was inaccurate. Every analytical procedure has a "detection" threshold; that is the lowest quantity or concentration of the drug that the instrument can possibly detect. Above that is the "quantification" threshold; that is the lowest concentration that can be numerically determined by the instrument. Standard laboratory procedure calls for establishing a third level, called the "cut-off" level, which usually is set slightly **above** the "quantification" threshold. Typically, the laboratory's report for the confirmatory test will read "not detected" unless the drug is found at a concentration greater than or equal to the "cut-off" level. But in fact, the drug could be present, at a somewhat lower concentration.

Then why don't laboratories simply lower their "cut-off" levels, if they really want to support their DREs? The reason is that the laboratory needs to preserve its scientific validity. If it loses that, the testimony of its toxicologists will be worthless. There are definite limits to the accuracy of chemical equipment and procedures. If the cut-offs are set too low, "false positives" will result (i.e. reports of "drug found" when it isn't really there). The lab won't be able to defend its reports scientifically, so it won't be able to support the DREs at all. Still, it is important for DREs and State and agency DRE coordinators to consult with their toxicologists to try to reach agreement concerning optimum cut-offs, that do not compromise scientific integrity but at the same time provide adequate support to this program.

Fundamentally, toxicology's role in this program is **corroborative**. The observations of the arresting officer, and the observations, measurements and estimates of the DRE provide the best proof of the subject's impairment.

Toxicological analysis provides scientific corroboration that the subject actually ingested a drug. In some cases, the analysis may also provide scientific support for the allegation that the subject was impaired. In addition toxicologists can provide expert witness testimony on the analytical procedures used and the results of that testing, the prevalence of the drug in epidemiological studies, and information from peer reviewed and published scientific literature. This may include case reports, laboratory studies of controlled drug dosing, driving simulator studies or actual on-the-road driving studies. All of this information can be used together to support the observations made by the DRE and subsequently their opinions of impairment. Toxicology also plays an important role in on-going studies to document the validity of this program, in monitoring the work of individual DREs and in assessing the progress students are making during their certification training.

5. Blood or Urine: Which is Better?

Blood and urine are the most common specimens used for toxicology analysis. If we have a choice, which should we pick?

The answer is, it depends. The laws of your State, the policies and procedures of your department, the particular condition of your subject, the equipment and procedures available to your laboratory and possibly the drug categories you believe are causing the subject's impairment will all have a bearing on the choice. **There is no single perfect or "best" specimen.** It is not possible to say that blood is better or that urine is better. Each has advantages and disadvantages.

Some advantages of blood:

- The presence of a drug in blood more reliably indicates recent use than does the presence of the drug in urine. Urine tests may produce "positive" results weeks after the drugs were used. This is much less likely to happen with blood tests. Thus a positive blood test is more contemporaneous with drug impairment.
- The collection of a blood specimen usually occurs under a greater degree of supervision. When providing a urine specimen, a subject may have an opportunity to dilute or contaminate the specimen, or even substitute some other fluid for it.
- Quantitative analysis of urine specimens provides information of essentially no value. Quantitative analysis of drugs in blood **may** help to corroborate impairment.

Some advantages of urine:

- Urine is usually easier to obtain. Subjects often are more willing to supply urine, and medical personnel need not be present to collect it.
- Urine analysis is less expensive than blood analysis.
- Drug concentrations usually are higher and thus easier to detect in urine than in blood.
- Some drugs clear very quickly from the blood. The time delay from the initial traffic stop to the collection of the blood sample may impede the laboratory's ability to corroborate the DRE's opinion. But drugs usually remain detectable in the urine for longer periods of time.

6. What DREs Can Do To Optimize Laboratory Corroboration

DREs can help the lab help them by following a few simple reporting procedures. First, make sure that you **advise the lab what drug category(s) you believe are present** when you submit the urine or blood specimen.

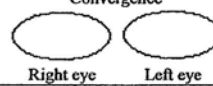
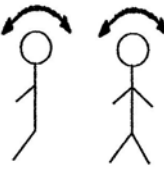
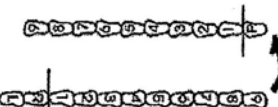
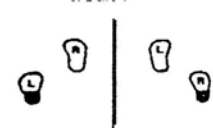

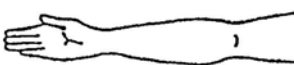





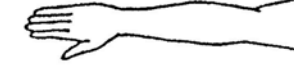

Many labs request a copy the DRE report along with the specimen. The report assists in ensuring that targeted and appropriate testing is performed. All labs need to know the kinds of drugs that may be present, because that information can help the toxicologist determine if he or she needs to extend testing beyond the standard "menu" of screening procedures. Also make sure you **tell the lab**

what drugs the subject admitted taking, and also let them know **what drugs you found in the subject's possession**.

Probably the most important advice for a DRE who wants maximum support from the lab is to **talk to the toxicologists**. Find out what kind of specimen (blood or urine) they prefer to receive. This will vary from lab to lab, and possibly from case to case. Ask the toxicologists for instruction and find out if they would like to receive a copy of your report along with the specimen. Make sure you understand what the laboratory report means. Establishing a regular dialogue with the lab is essential for maintaining the support system this program demands.

Finally, DREs need to be aware of and sympathetic to the laboratory's limitations. DREs are not infallible, and neither are laboratories. All labs have "chemical blind spots", i.e. drugs for which no routine detection procedures or suitable instruments are available. Many labs, for example, find it very difficult to detect or confirm THC in blood specimens, or to find LSD in either urine or blood. In addition, most laboratories are not well equipped to screen for certain anti-psychotic drugs or for some of the narcotic analgesics. DREs need to know that these limitations are a fact of life. They should not be a cause for disagreement between the DRE and the lab.

DRUG INFLUENCE EVALUATION

Evaluator		DRE No.		Rolling Log No.			
Recorder/Witness		Crash: <input type="checkbox"/> None <input type="checkbox"/> Fatal <input type="checkbox"/> Injury <input type="checkbox"/> Property		Case #			
Arrestee's Name (Last, First MI)		DOB	Sex	Race	Arresting Officer (Name, ID No.)		
Date Examined/Time/Location		Breath Results: <input type="checkbox"/> Refused Instrument #		%		Chemical Test <input type="checkbox"/> Refused <input type="checkbox"/> Urine <input type="checkbox"/> Blood	
Miranda Warning Given: <input type="checkbox"/> Yes <input type="checkbox"/> No		What have you eaten today?		When?		What have you been drinking? How much?	
By:						Time of last drink?	
Time now?		When did you last sleep?		How long?		Are you sick or injured? <input type="checkbox"/> Yes <input type="checkbox"/> No	
						Are you diabetic or epileptic? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Do you take insulin? <input type="checkbox"/> Yes <input type="checkbox"/> No		Do you have any physical defects? <input type="checkbox"/> Yes <input type="checkbox"/> No		Are you under the care of a doctor or dentist? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Are you taking any medication or drugs? <input type="checkbox"/> Yes <input type="checkbox"/> No		Attitude:		Coordination:			
		Breath:		Face:			
Speech:		Eyes: <input type="checkbox"/> Reddened Conjunctiva <input type="checkbox"/> Normal <input type="checkbox"/> Bloodshot <input type="checkbox"/> Watery		Blindness: <input type="checkbox"/> None <input type="checkbox"/> Left Eye <input type="checkbox"/> Right Eye		Tracking: <input type="checkbox"/> Equal <input type="checkbox"/> Unequal	
Corrective lens: <input type="checkbox"/> None <input type="checkbox"/> Glasses <input type="checkbox"/> Contacts, if so <input type="checkbox"/> Hard <input type="checkbox"/> Soft		Pupil size: <input type="checkbox"/> Equal <input type="checkbox"/> Unequal, (explain)		Able to follow stimulus: <input type="checkbox"/> Yes <input type="checkbox"/> No		Eyelids: <input type="checkbox"/> Normal <input type="checkbox"/> Droopy	
Pulse and time 1. <u> </u> / <u> </u> 2. <u> </u> / <u> </u> 3. <u> </u> / <u> </u>		HGN Lack of smooth pursuit Maximum deviation Angle of onset		Left Eye	Right Eye	Vertical Nystagmus <input type="checkbox"/> Yes <input type="checkbox"/> No	
						Convergence  Right eye Left eye	
Romberg Balance 		Walk and Turn test 		Cannot keep balance		One Leg Stand 	
				Starts too soon:		L R	
				1 st Nine 2 nd Nine		<input type="checkbox"/> <input type="checkbox"/> Sways while balancing	
				Stops walking		<input type="checkbox"/> <input type="checkbox"/> Uses arms to balance	
				Misses heel to toe		<input type="checkbox"/> <input type="checkbox"/> Hopping	
				Steps off line		<input type="checkbox"/> <input type="checkbox"/> Puts foot down	
				Raises arms			
				Actual # steps		Type of footwear:	
Internal clock Est. as 30 seconds		Describe Turn		Cannot do test (explain)		Nasal area:	
Draw lines to spots touched 		Pupil Size	Room Light	Darkness	Direct	Oral cavity:	
		Left				Reaction to Light:	
		Right				Rebound dilation <input type="checkbox"/> Yes <input type="checkbox"/> No	
Blood pressure		Temperature		RIGHT ARM		LEFT ARM	
/		°f					
Muscle tone: <input type="checkbox"/> Near normal <input type="checkbox"/> Flaccid <input type="checkbox"/> Rigid							
Comments:							
							
What medication or drug have you been using? How much?		Time of use?		Where were the drugs used? (location)			
Date/Time of Arrest		Time DRE Notified		Evaluation Start Time		Time Completed	
DRE signature (Include rank)		ID #		Reviewed by:			
Opinion of evaluator:		<input type="checkbox"/> Rule Out <input type="checkbox"/> Medical	<input type="checkbox"/> Alcohol <input type="checkbox"/> CNS Depressant	<input type="checkbox"/> CNS Stimulant <input type="checkbox"/> Hallucinogen	<input type="checkbox"/> Dissociative Anesthetic <input type="checkbox"/> Narcotic Analgesic	<input type="checkbox"/> Inhalant <input type="checkbox"/> Cannabis	

Topics for Study

1. Give three important reasons for conducting drug evaluation and classification evaluations in a standardized fashion.
2. What are the twelve major components of the drug evaluation process?
3. How many times is pulse rate measured during the drug evaluation and classification evaluation?
4. Are the diameters of a pupillometer's circles/semi-circles indicated in centimeters, millimeters or micrometers?
5. What formula expresses the approximate statistical relationship between blood alcohol concentration and nystagmus onset angle?
6. Which of the seven categories of drugs ordinarily do not cause nystagmus?
7. How many heel-to-toe steps is the subject instructed to take, in each direction, on the Walk and Turn test?
8. What period of time is the subject required to estimate during the Romberg Balance test?
9. What is systolic pressure?
10. What is the name of the instrument used to measure blood pressure?
11. Name the four validated clues of the One Leg Stand test.
12. Name the eight validated clues of the Walk and Turn test.
13. Suppose you have two hypodermic needles, one is 14 gauge, the other is 20 gauge. Which needle has the smaller inside diameter?

SESSION V

**EYE EXAMINATIONS: NYSTAGMUS, CONVERGENCE,
PUPIL SIZE AND REACTION TO LIGHT**

SESSION V

EYE EXAMINATIONS: NYSTAGMUS, CONVERGENCE, PUPIL SIZE AND REACTION TO LIGHT

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

- o State the purposes of various eye examinations in the DEC drug influence evaluation procedure.
- o Describe the administrative procedures for the eye examinations.
- o Describe the clues of each eye examination.
- o Conduct the eye examinations and note the clues observed.
- o Prepare complete, clear and accurate records of the eye examinations.

In this session, you will have an opportunity to observe demonstrations of the various eye examinations of the drug influence evaluation process. You will also have opportunities to practice administering those examinations.

The eye examinations include:

- Horizontal Gaze Nystagmus
- Vertical Gaze Nystagmus
- Lack of Convergence
- Pupil Size Estimation
- Pupil Reaction to Light

Horizontal Gaze Nystagmus (HGN).

As a review, we already know that HGN is an excellent indicator of alcohol impairment and will also disclose impairment by any CNS Depressant other than alcohol, Dissociative Anesthetics, such as PCP and its analogs and by most Inhalants. These three categories of drugs usually will cause HGN.

We check for three clues of HGN in each eye:



Check #1: Does the eye track smoothly?

As a reminder, we start with a stimulus (pencil, pen, penlight, etc.) held vertically in front of the subject's face, above eye level and about 12 to 15 inches away from the subject's nose. Tell the subject to keep his/her eyes focused on the stimulus, to hold his/her head steady, and to follow the movement of the stimulus with their eyes only.

Check the subject's left eye by moving the stimulus to your right. Move the stimulus smoothly, at a speed that requires approximately two seconds to bring the subject's eye as far to the side as it can go. While moving the stimulus look at the subject's eye and determine whether it is able to pursue smoothly. Then move the stimulus all the way to the left, back across subject's face checking if the right eye pursues smoothly. Movement of the stimulus should take approximately two seconds out and two seconds back for each eye. Make at least two complete passes in front of the eyes to check for this clue.

While the eye is moving you should examine it closely for signs of "a lack of smooth pursuit". If a person is not under the influence of a CNS Depressant, Inhalant or a Dissociative Anesthetic their eyes should glide smoothly in the sockets, in much the same way that windshield wipers slide smoothly across the windshield when it is raining steadily. But if the person is under the influence of a CNS Depressant, an Inhalant or a Dissociative Anesthetic their eyes will usually jerk noticeably as they move, similar to a windshield wiper dragging across a dry windshield.



Check #2: Does the eye exhibit distinct and sustained nystagmus when it is held at maximum deviation for a minimum of four seconds?

After you have checked both eyes for lack of smooth pursuit, check the eyes for distinct and sustained nystagmus at maximum deviation beginning with the subject's left eye. This is done by moving the stimulus to the subject's left side until the eye has gone as far to the side as possible. Usually no white will be showing in the corner of the eye at maximum deviation. Hold the eye at that position for a minimum of four seconds and observe the eye for distinct and sustained nystagmus. Move the stimulus all the way across the subject's face to check the right eye holding that position for a minimum of four seconds. Repeat the procedure. Someone under the influence of Depressants, Inhalants or a Dissociative Anesthetic usually will exhibit distinct and sustained nystagmus at maximum deviation. A slight, barely visible tremor of the eye **does not** constitute "distinct jerking" for our purposes.



Check #3: What is the angle of onset of the nystagmus?

When using HGN as a Standardized Field Sobriety Test of alcohol impairment, you determine whether the jerking of the eye begins prior to 45-degrees. As a DRE, you are going to have to be more precise than that. Within certain limits, it is important for the DRE to estimate the actual angle at which the jerking first begins. We need to do this because it gives us a clue as to whether the subject is impaired by alcohol alone, or by some combination of alcohol with another Depressant, an Inhalant or a Dissociative Anesthetic.

You should remember from your earlier training that some original research led to the development and validation of HGN as a Standardized Field Sobriety test for alcohol, and that we know that there is an approximate statistical relationship between blood alcohol concentration (BAC) and the angle of onset of nystagmus. The relationship is expressed by this formula:

$$\text{BAC} = 50 - \text{Angle of Onset}$$

According to the formula, if the angle of onset were 40 degrees, then the "BAC" would approximately equal 50 minus 40 or 10; that corresponds to a BAC of 0.10. If the onset angle were 35 degrees, the "BAC" would be approximately 15, for a BAC of 0.15.

It is important to always keep in mind that this formula expresses an average, approximate statistical relationship, **not a precise mathematical relationship**. Humans, and their eyes, do not all react to alcohol or other drugs in exactly the same way. The formula may be reasonably accurate for some people but much less accurate for others. The formula is **not** sufficiently accurate for us to use HGN to produce evidence of a specific BAC and courts routinely reject any attempt to do so. But the formula is of value to us as DREs because it can help us detect an evident gross disparity between the subject's BAC and the nystagmus observed.

For example, you are called in to evaluate a subject who has a BAC of 0.07. Based on that alone, you would expect to find the onset of HGN close to 40 to 45 degrees. But suppose you discover that the subject's HGN begins at about 30 degrees. That would be inconsistent with the BAC, and you would begin to think that this subject might also have taken some other Depressant, an Inhalant, or possibly a Dissociative Anesthetic.

Remember for DRE purposes, you will be expected to be able to estimate angle of onset to the nearest 5 degree increment, over the range from 30 degrees to 45 degrees. If the subject's eyes begin to jerk before they have moved to the 30 degree angle, you will not attempt to estimate the angle precisely and will record that the subject exhibits "immediate onset". But from 30 degrees on out, you will record a numeric estimate of onset, i.e. 30 degrees, 35 degrees, 40 degrees, or 45 degrees.

To determine the angle of onset, position the stimulus about 12-15 inches from the subject's nose and slowly move the stimulus toward your right. Watch the left eye closely for the first sign of jerking. When you think that you first see the eye jerk, stop moving the stimulus and hold it steady. Verify that the eye is jerking. If it is not, start moving it again to your right until you see the jerking begin. Once you find the point of onset of nystagmus estimate the angle to the nearest five (5) degrees. Repeat this procedure for the subject's right eye. One final point about the nystagmus onset angle, don't forget that there are many drugs that **do not cause HGN**.

Vertical Gaze Nystagmus (VGN)

From your earlier training you learned that Vertical Gaze Nystagmus, like HGN, is a jerking of the eyes. Vertical Gaze Nystagmus is an involuntary jerking of the eyes (up and down) which occurs as the eyes are held at maximum elevation.

Vertical Gaze Nystagmus is associated with the same drugs that cause Horizontal Gaze Nystagmus. High doses, for that individual, of Depressants, Inhalants or a Dissociative Anesthetic cause Vertical Gaze Nystagmus. Therefore, it is not uncommon to encounter subjects who exhibit HGN but do not exhibit Vertical Gaze Nystagmus.

To check for Vertical Gaze Nystagmus, hold a stimulus horizontally in front of the subject, about 12-15 inches in front of the subject's nose. Direct the subject to focus their eyes at a specific point on the stimulus. Instruct the subject to hold their head steady and to follow the stimulus with their eyes only. Elevate the stimulus until the eyes are raised as far as possible and hold them at that position for a minimum of four seconds. Observe the eyes closely to see whether any up and down jerking occurs. With Vertical Gaze Nystagmus, we do not attempt to identify an angle of onset: we simply record that Vertical Gaze Nystagmus is either "present" or "not present". There is no drug that will cause VGN that will not cause HGN.

Remember, the mere fact that Vertical Gaze Nystagmus is present does not guarantee that the subject is under the influence of some drug other than alcohol. Alcohol itself will cause Vertical Gaze Nystagmus, if the BAC is high for that individual. Also remember that there are many drugs that do not cause Vertical Gaze Nystagmus.

Lack of Convergence

You should recall from your earlier training that **Lack of Convergence** means an inability to cross the eyes. To check for Lack of Convergence, we first determine if the subject routinely wears eyeglasses during reading and near visual tasks. If so, ensure that the eyeglasses are worn by the subject for the check for Lack of Convergence, if they are

available. The role of clear vision and focusing can have a significant effect on the convergence of the eyes. In the clinical setting, the Lack of Convergence check is routinely conducted with the eyeglasses on if normally worn by the subject. To conduct the Lack of Convergence check, we position the stimulus approximately 12 to 15 inches in front of the subject's face 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, then you are going to move it toward their face and that you will bring it in close to the nose. You will not touch the subject's nose with the stimulus. Make sure that the subject knows this in advance so that he/she does not become frightened during the test and jerk their head away. Instruct the subject to keep their head steady, and to follow the movement of the stimulus with the eyes only.

Start moving the stimulus in a circle in front of the subject's face either clockwise or counterclockwise, and observe their eyes to verify that the subject is tracking the stimulus. Then, slowly move the stimulus in toward the bridge of the nose.

The eyes should come together and cross (converge) as they track and stay aligned on the stimulus. Continue moving the stimulus and have the subject's eyes converge toward the bridge of the nose. If the subject cannot converge towards the bridge of the nose, (the minimum distance for a normal convergence response is approximately two inches (2") from the bridge of the nose) hold the stimulus at the convergence point for approximately one (1) second then remove the stimulus while observing the eyes.

Remember that you should not actually touch the subject's nose and should not come in any closer than approximately two (2) inches from the bridge of the nose. Also, you should keep the stimulus high enough so that you can observe the eye movements, making sure the subject does not close the eyes to a point where you cannot observe them.

Lack of Convergence usually occurs with people who are under the influence of any drug that causes HGN. Thus, Depressants, Inhalants, and Dissociative Anesthetics usually will cause Lack of Convergence. Cannabis also will usually cause Lack of Convergence, even though it doesn't cause HGN. Other kinds of drugs, i.e. CNS Stimulants, Hallucinogens and Narcotic Analgesics usually do not prevent the eyes from converging. But you should be aware that many people have difficulty crossing their eyes even when they are totally drug free. So it is not uncommon to find unimpaired individuals who exhibit Lack of Convergence.

Estimating Pupil Size

The pupils of our eyes continually adjust in size to accommodate different lighting conditions. When we are in a darkened environment, the pupils expand, or "dilate", to allow the eyes to capture as much light as possible. When the lighting conditions are very bright, the pupils shrink, or "constrict", to keep the eyes from being overloaded. This process of constriction and dilation normally occurs within limits.

We use a device called a **pupillometer** to estimate the size of the subject's pupils. The DRE pupillometer has a series of circles or semi-circles, with diameters in half-millimeter increments. The pupillometer is held alongside the subject's eye and moved up or down until the circle or semi-circle closest in size to the pupil is located.

We record the pupil size estimations that corresponds to the diameter of the circle/semi-circle closest in size to the subject's pupil in each lighting condition.

The three pupil size estimations conducted by the DRE are:

1. Estimation of Pupil Size Under Room Light

Here the pupils are examined in room light prior to darkening the room. Since room lighting conditions can vary considerably and often cannot be controlled, the range of pupil sizes may also vary.

The final two pupil size estimations are made with the use of a penlight in a near totally darkened room. After darkening the room, we wait 90 seconds to allow the subject's eyes and our own eyes to adapt to the dark. Once we have done that, we proceed with the estimations.

2. Estimation of Pupil Size Under Near Total Darkness

For this examination, we completely cover the tip of the penlight with our 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). Continue to hold the glowing red tip in that position and bring the pupillometer up alongside the subject's left eye and locate the circle/semi-circle that is closest in size to the pupil. This is then repeated for the subject's right eye.

3. Estimation of Pupil Size Under Direct Light

During this examination we bring the penlight from the side of the subject's face and shine the beam directly into their left eye. Position the penlight so that it illuminates and approximately fills the subject's eye socket. Hold the penlight in that position for 15 seconds with the pupillometer up alongside the left eye, and find the circle/semi-circle that is closest in size to the pupil. Then repeat this procedure for the subject's right eye. While observing the eye for the 15 seconds with the pupillometer in position, you should also check for rebound dilation. Rebound dilation has been reported with persons under the influence of cannabis, CNS Stimulants, and/or hallucinogens. If rebound dilation is observed, it should be recorded by indicating the smallest or constricted size and the largest or dilated size,
e.g. 3.0 – 4.5mm.

Normal Sizes for the Pupil

We estimate pupil size under three different lighting conditions; Room Light, Near Total Darkness and Direct Light, and remember that the range of pupil sizes will vary. For most non-impaired people, even under very bright light the pupils won't constrict much below a diameter of 2.0 millimeters (mm); and even under near total dark conditions, the pupils usually will only dilate to a diameter of not more than 8.5 mm. For a normal non-impaired person, the average pupil size and range for:

- **Room Light** is approximately **4.0 mm** with an average range of normal pupil sizes ranging from **2.5 to 5.0 mm**.
- **Near Total Darkness** is approximately **6.5 mm** with an average range of normal pupil sizes ranging from **5.0 to 8.5 mm**.
- **Direct Light** is approximately **3.0 mm** with an average range of normal pupil sizes ranging from **2.0 to 4.5 mm**.

Reaction of the Pupils to Light

During the direct light estimation of the pupil size, we also look for another clue of possible drug influence; reaction of the pupils to light. With a non-impaired person, the pupils will constrict within one second after the penlight is shined directly into the eye. Some drugs however, may affect the pupil's reaction to light. No category of drugs will speed up the reaction of the pupils, but some will slow it down. CNS Depressants and CNS Stimulants for example, will both slow the pupil's reaction. It may seem strange that CNS Stimulants will do this, since we think of those type of drugs as "speeding things up", nevertheless they do slow the reaction. With someone under the influence of Narcotic Analgesics, you may observe little or no visible reaction of the pupils to direct light. This may be due to the fact that the drug constricts the pupils to the point where any further constriction isn't noticeable to your naked eye. Hallucinogens, Dissociative Anesthetics, and Cannabis usually don't affect the reaction of the pupils. Inhalants will slow pupillary reaction.

Expected Results

The following summarizes the results that generally can be expected when these eye examinations are administered to persons under the influence of the various categories of drugs.

	CNS Depressants	CNS Stimulants	Hallucino gens	Dissoc. Anesthetics	Narcotic Analgesics	Inhalants	Cannabis
Horizontal Gaze Nystagmus	Present	None	None	Present	None	Present	None
Vertical Gaze Nystagmus	Present (High Dose)*	None	None	Present	None	Present (High Dose)*	None
Lack of Convergence	Present	None	None	Present	None	Present	Present
Pupil Size	Normal (**)	Dilated	Dilated	Normal	Constrict ed	Normal (****)	Dilated (*****)
Reaction to Light	Slow	Slow	Normal (***)	Normal	Little or none visible	Slow	Normal

- * High dose for that particular individual.
- ** Soma, Quaaludes and some anti-depressants usually dilate pupils.
- *** Certain psychedelic amphetamines may cause slowing.
- **** Normal, but may be dilated.
- ***** Pupil size possibly normal.

BEAR IN MIND that there is a great deal of difference among humans and their individual reactions to drugs. The chart lists what we can generally expect to find when we examine subjects, but no one can guarantee that we will always find precisely these responses.

SOME KEY TECHNICAL TERMS REGARDING THE EYES

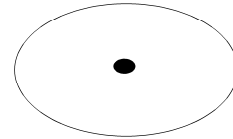
Rebound Dilation is defined as a period of pupillary constriction followed by a period of pupillary dilation where the pupil steadily increases in size and does not return to its original constricted size. Rebound dilation is observed only with the estimation of pupil size under the Direct Light procedure.

Pupillary Unrest is defined as the continuous, irregular change in the size of the pupils that may be observed under room or steady light conditions.

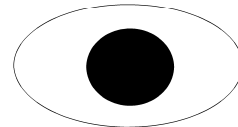
Accommodation Reflex is an adjustment of the eyes for viewing objects at various distances. Meaning the pupils will automatically constrict as objects move closer and dilate as objects move further away.

Pupillary Light Reflex means the pupils of the eyes will constrict and dilate depending on changes in lighting.

Miosis means an abnormally small pupil, i.e. constricted.



Mydriasis means an abnormally large pupil, i.e. dilated.



Ptosis is the technical term for "droopy eyelids".



SESSION VI
PHYSIOLOGY AND DRUGS: AN OVERVIEW

SESSION VI

PHYSIOLOGY AND DRUGS: AN OVERVIEW

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

- o Explain in layman's terms the general concept of human physiology.
- o Explain in layman's terms the purpose and functions of major systems in the body (nervous system, circulatory system, respiratory system, etc.).
- o Explain in layman's terms how drugs work in the body.
- o Explain in general terms how the drug evaluation is used to detect signs or symptoms indicative of drug impairment.
- o Correctly answer the "topics for study" questions at the end of this session.

Physiology and Drugs: An Overview

The purpose of this session is to provide a brief overview of how the human body functions in a "normal" state and thus lay a foundation for comparison when drugs are introduced into the body. At best, you will acquire a general working knowledge and will by no means become a qualified medical specialist.

The DRE can be compared to the operator of an evidential chemical test device...while it is beneficial to understand the general principles involved in the operation of the device, it is not necessary for each operator to be able to explain every detail of its operation. Rather, if the operator follows the operational instructions the device will produce accurate and reliable results. The same is true of the Drug Evaluation and Classification procedure...if each DRE conducts the evaluation as instructed, and accurately records the test results and other observations, then the totality of information gathered during the evaluation will enable the DRE to predict the cause of impairment with a high degree of accuracy. The DRE's opinions of the cause of impairment will be limited to the seven categories of drugs, or some combination thereof, and/or a known or unknown medical or other condition that may produce similar signs or symptoms. It is not necessary to become a medical specialist or technician in human physiology. However, a general working knowledge of how the body functions is very helpful.

Physiology is the branch of biology dealing with the functions and activities of life or living matter and the physical and chemical phenomena involved.¹ For purposes of this course, physiology is the study of the functions of living organisms and their parts. In this session, we will focus on the chief functions of the body systems. This approach should provide a general overview of the intricate workings of the body and its larger parts.

A. Body Systems

Our simple concept of human physiology focus on ten major systems of the body. We can help remember their names by using the somewhat gruesome, but easy to recall phrase "MURDERS, INC.". Each of those letters stands for the name of a body system:

M is for the Muscular System	I is for the Integumentary System
U is for the Urinary System	N is for the Nervous System
R (the 1st R) is for the Respiratory System	C is for the Circulatory System
D is for the Digestive System	
E is for the Endocrine System	
R (the 2nd R) is for the Reproductive System	
S is for the Skeletal System	

The last two (Nervous and Circulatory) are the most important systems to a DRE, but several of the others also come at least indirectly into play when we conduct a drug influence evaluation. Each of the ten systems is briefly discussed below.

¹ Merriam-Webster's Medical Dictionary (2008).

Muscular System: The body has three kinds of muscles: (1) the heart; (2) the smooth muscles (which control involuntary movements); and (3) the striated muscles (which control voluntary movements). The brain controls the operation of all these muscles through the nervous system.

Urinary System: The urinary apparatus consists of two kidneys connected by long tubes (ureters) to a storage device, the bladder, plus a third tube, the urethra, which leads from the bladder to the outside. Many of the waste products are filtered out of the blood as it passes through the kidneys and these wastes are then removed from the body in the urine.

Since drugs are removed from the blood in the kidneys and passed out of the body in the urine, the urinary system plays a key role in producing evidence of drug use.

Respiratory System: The chief organs of the respiratory system are the diaphragm and the lungs. The diaphragm is a muscular sheet that separates the thoracic cavity from the abdominal cavity, and draws fresh air into the lungs and forces used air out. The transfer of oxygen from the air to the blood and of carbon dioxide from the blood to the atmosphere occurs in the lungs. Oxygen must be supplied to all the body cells, and carbon dioxide must be removed from them in order for life to exist. The voice and, therefore all verbal communication is largely the responsibility of the respiratory system. The respiratory system forces air through the voice box, which in turn allows for speech to be accomplished.

Digestive System: The digestive system consists chiefly of the tongue and teeth, esophagus (food tube), stomach, intestines, liver and pancreas. The digestive system is responsible for reducing large food particles to a size and chemical nature that can be absorbed (taken from the digestive system into the blood) and thereby utilized by the body cells for energy, growth and tissue repair.

The digestive system plays a key role in introducing drugs that are swallowed (pills, alcohol, etc.) into the blood. It also plays a role in determining onset of effects, depending upon the contents of the stomach and the type(s) of drug involved.

Endocrine System: The endocrine system consists of the thyroid, parathyroid, pituitary, and adrenal glands, plus portions of the pancreas, testes, and ovaries, in conjunction with certain other hormone producing tissues. The endocrine system produces powerful chemical substances, called hormones, that exert great influence on the growth and development of the individual, and aid the nervous system in the regulation of numerous body processes. The hormones released by the endocrine system travel through the bloodstream, and reach other tissues and organs that they help to control.

Reproductive System: The functions of the reproductive system fall into two categories: cell producing (cytogenic) and hormone producing (endocrinic). We are primarily concerned with hormone production since the hormones produced by the reproductive system aid the nervous system in its regulatory role.

Skeletal System: The skeletal system consists of bones, cartilage and the ligaments that hold bones together. The skeletal system gives the body support and protection, permits movement, provides for muscle attachment, forms blood cells, stores minerals, and removes certain poisons from the blood.

While the drug evaluation does not directly examine the skeletal system, we must be aware that injuries or other conditions can affect performance of psychomotor tests.

Integumentary System: The integumentary systems consist of the skin and its accessory structure, hair and nails. The skin is well supplied with blood vessels, nerves, sweat and oil glands. The chief functions of the skin include protection of the body, helping to maintain a constant body temperature and water content, excretion of wastes and perception of changes in the environment (sensation).

The skin can provide several clues during the drug evaluation. For example, pale or flushed appearance, skin temperature, presence or absence of sweat, lack of sensation, etc.

Nervous System: The nervous system consists of the brain, spinal cord, and nerves, each of which is made up of nerve cells (neurons) and supporting tissues. The nervous system keeps the body apprised of changes in the environment by enabling sight, hearing, smell, taste and through sensations of temperature, touch, pressure and pain. The nervous system also enables reasoning, memory and emotions.

It sends impulses that cause muscles to contract and glands to secrete, and it works with all body systems to integrate all physiological processes so that normal functions can be maintained. Much of the activity of the nervous system is reflex in character; that is, it is carried out below the level of consciousness.

Circulatory System: The circulatory system consists of the heart, blood vessels, arteries, veins, capillaries and blood. The heart pumps blood throughout the body, transporting food, water, hormones, antibodies, oxygen, carbon dioxide, and many other substances to or from the body cells as required. Body temperature regulation is a partial responsibility of the circulatory system, since warm blood is constantly moved throughout the body.

The circulatory system plays a key role in transporting drugs to the brain, where most of the drugs' effects are exerted. The circulatory system also transports the drugs to the liver and other organs, where the drugs are metabolized.

B. The Concept of Homeostasis

Homeostasis: The internal environment of the body consists of those fluids that bathe the body cells (intercellular or tissue fluid, blood and lymph). Many years ago it was discovered that although oxygen, foods, water and other substances are constantly leaving the body fluids to enter cells, and carbon dioxide and other wastes are constantly leaving cells and entering these fluids, the chemical composition of the fluids remains within remarkably narrow limits. This phenomenon was given the name "homeostasis". ("Homeo" meaning similar or same and "stasis" meaning balance).

By definition, homeostasis is **the dynamic balance or steady state involving levels of salts, water, sugars and other materials in the body's fluids**. Homeostasis is a dynamic, rather than a static, or stationary equilibrium because the composition of body fluids is in a state of flux. No matter what we eat, how much or how little we exercise, or what daily stresses and strains the body is subjected to, it retains homeostatic equilibrium of the body fluids. The rhythm of the heart and that of breathing, the constancy of body temperature, and the steady level of blood pressure under specific circumstances or conditions are all manifestations of homeostatic mechanisms at work within the body.

Every organ system plays some role in the maintenance of homeostasis. The circulatory system keeps the body fluids well mixed; the respiratory system constantly brings in oxygen and eliminates carbon dioxide; the digestive system takes in food and water and eliminates solid wastes; the skin and kidneys eliminate watery wastes; the skeletal system forms blood cells; the nervous system integrates the functioning of the other systems; and so on.

When drugs are introduced into the body the resultant interactions can cause the body to speed up, to slow down, or to become confused. During the drug evaluation we examine bodily functions and attempt to determine the cause of the impairment that is observed.

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C. A Simple View of the Heart and the Circulatory System

You have often heard that the heart is a pump, and that it works in pretty much the same way as an old fashioned, hand operated pump used to draw water from a well. That remains an accurate picture for our purposes.

The heart, of course, pumps **blood**. The heart has chambers that fill with blood. Then, the heart constricts strongly in response to signals received along the Autonomic Motor Nerves. That constriction sends the blood surging out of the heart. The blood surges out into a group of strong, elastic "tubes" called **arteries**. The arteries carry the blood away from the heart. The arteries divide into smaller and smaller branches, and finally into a network of tiny blood vessels called **capillaries**, which pervade the body's tissues and organs.

After the heart completes its strong contraction, it relaxes and begins to expand again. This expansion is also in response to signals received along Autonomic Motor Nerves. As the heart's chambers expand, blood pours into them. This returning blood is carried by

another network of "tubes" called **veins**. The veins collect the blood seeping back from the tissues and organs, and carry it back to the heart.

There are two separate circulation systems: 1) the systemic system involves the whole body and is driven by the left side of the heart; 2) the pulmonary system deals with the passage of blood through the lungs and is driven by the right side of the heart.

The left side pumps blood through the aorta and arteries to the tissues. The right side pumps blood through the pulmonary artery to the lungs and returns it to the left side of the heart via the pulmonary vein.

One very special artery is connected to the right side of the heart. This is the Pulmonary Artery. This is the artery that the heart uses to send blood to the lungs. The blood that surges into the Pulmonary Artery has little or no oxygen in it. But when the blood reaches the lungs it picks up a fresh supply of oxygen. The newly oxygenated blood then returns to the left side of the heart, via the four Pulmonary Veins. On the next contraction of the heart, the newly oxygenated blood is sent surging into the network of arteries that connect to the left side of the heart; through those arteries the blood is carried to all other organs and tissues.

The blood deposits its oxygen in the organs and tissues and then seeps back from those organs and tissues through a network of veins that connect to the right side of the heart. On the next contraction, this oxygen-depleted blood is sent surging into the Pulmonary Artery and over to the lungs, and the process continues.

Every time the heart contracts, blood rich in oxygen rushes out of the left side of the heart, into a network of arteries. At the same time, blood depleted of oxygen surges out of the right side of the heart, through the one special artery called the Pulmonary Artery. Every time the heart expands, blood that has just received a fresh supply of oxygen from the lungs pours back into the left side of the heart via the Pulmonary Veins. At the same time, blood that has given up its oxygen to the tissues and organs pours back into the right side via the many other veins.

The special nature of the Pulmonary Artery is now clear: **it is the only artery that carries blood depleted of oxygen**. All other arteries connect to the left side of the heart, and carry blood rich in oxygen. By the same token, the Pulmonary Veins are special, too. They are the only veins that carry oxygenated blood.

The normal heart beats regularly, and keeps on beating, and beating, and beating...never resting for more than a small fraction of a second. The rate of heartbeat, or heart rate, is the number of beats per minute and is regulated by the Autonomic Motor Nerves. Sympathetic Nerve fibers insure that the heart beats fast enough to maintain circulation during any activity. Parasympathetic Nerve fibers send signals to slow the heart. This coordination of nerve signals insures that the heart beats neither too fast nor too slowly. And the coordination works, unless something...such as drugs...interferes with the signals.

In the DEC program, heart rate is measured by taking a subject's pulse. Some people may exhibit an irregular or arrhythmic heart beat, i.e., where the interval between pulses

varies. The normal range of pulse rate for the DEC program is 60-90 beats per minute.

The force exerted by the blood circulating in the arteries is called **blood pressure**. There are two components of blood pressure; systolic pressure, and diastolic pressure. Systolic pressure occurs when the heart contracts and the maximum force is exerted on the arteries by the blood. Diastolic pressure occurs when the heart relaxes and the minimum force is exerted on the arteries by the blood. In the DEC program, the normal range for blood pressure is 120-140 systolic and 70-90 diastolic.

Additional information on pulse and blood pressure is available in Session VII - Vital Signs.

D. A Simplified Concept of the Nervous System

The Nervous System is one of the body's major control mechanisms. The other major control mechanism is the endocrine system. The endocrine system uses "chemical messengers", called hormones, to control the various tissues and organs. The Nervous System uses a combination of electrical and chemical "messengers" to transmit its signals.

Nerves are sometimes depicted as wires, similar to telephone or telegraph wires, that carry electric signals from the brain to the muscles and from the eyes, ears, etc. back to the brain. That is not a very accurate representation, and it is not suitable for our purposes.

A better model is one that imagines that a nerve consists of a series of broken wire segments, where the segments are separated by short spaces, or gaps. In this model, each segment of "wire" is a nerve cell, also known as a **neuron**. The space between two cells is called a **synapse**, or synaptic gap.



We can imagine a message running along a "wire segment" in much the same manner that electrical signals travel along telephone lines. When the message reaches the end of a segment, it must somehow "jump across the synapse" to reach the next piece of wire. Nerves use chemical

messengers to jump the gap. When the signal reaches the end of the neuron, it triggers the release of a special chemical called a **neurotransmitter**. The neurotransmitter flows across the synapse and contacts the next neuron, where it is received. The reception of the chemical triggers an "electrical impulse" in that neuron, causing the signal to travel along the neuron until it reaches the next gap, where the release of the chemical is once again triggered. In this way, the signal moves along the entire nerve, in a series of electrical impulses and chemical transfers.

Neurons, or nerve cells, contain a number of different neurotransmitters, or chemical messengers. Each neurotransmitter carries a particular message.

The neuron has three main parts:

- The **cell body**.

- The **Axon** is the part of the neuron that sends out the neurotransmitter.
- The **Dendrite** is the part that **receives** the neurotransmitter.

Using a baseball analogy, the Axon is the “pitcher” of neurotransmitter, and the Dendrite is the “catcher” of the neurotransmitter.

The gap between two neurons is called synapse or synaptic gap. The neurotransmitters carry a message across the synaptic gap from the axon of one cell to the dendrite of the next cell.

The sequence of how a neurotransmitter works:

The neuron makes a neurotransmitter; synaptic vesicles are small membrane bound structures in the axon terminals of nerve cells that contain neurotransmitters. These vesicles release neurotransmitters into the synaptic gap that enter the synaptic gap to transmit electrical impulse to a receptor site; the receptor then performs a function.

Types of Nerves

Some nerves carry messages **away from the brain**, for example, commands from the brain to the heart, telling it to beat faster or more slowly; or, commands from the brain to the eyes, telling them to dilate or constrict the pupils; or, from the brain to the muscles in the arm, telling them to raise or lower the hand; or, many other commands of this type. These nerves that carry messages away from the brain are called the **Motor Nerves**, or the Efferent Nerves. If something interferes with the messages that the brain sends out along the Motor Nerves, the brain's control over the body's organs and muscles will be disturbed. As a result, the heart might beat faster than it should, the pupils might constrict when they shouldn't, the arms and legs might not move exactly as the brain intends.

Other nerves carry messages **to the brain**, for example, signals from the eyes, the ears, the body's pain sensors, the inner ear, etc. The brain decodes the signals that come to it along these nerves, and forms "pictures" of the outside world and of the body's internal condition. These nerves that carry messages to the brain are called the **Sensory Nerves**, or the Afferent Nerves. If something interferes with the messages that the brain receives through the Sensory Nerves, the brain's perception of what is happening to the body and to the outside world will be distorted. As a result, the brain might "smell an odor" when it ought to hear a sound, or might "see an object" that doesn't really exist, or might feel no pain despite a severe injury.

This, very basically, is how drugs work: they interfere with the messages that the brain transmits along the Motor (Efferent) Nerves, and they interfere with the messages that the brain receives along the Sensory (Afferent) Nerves.

The Motor Nerves divide into two subsystems:

- (1) One subsystem is made up of the **Voluntary Motor Nerves**; they carry messages from the brain to the striated muscles, i.e., the muscles that we

consciously control. The Voluntary Motor nerves carry the commands that cause us to move our arms and legs, smile or frown, turn our heads, etc.

- (2) The other subsystem is made up of the **Autonomic Motor Nerves**; they carry messages from the brain to the heart and to the smooth muscles. The Autonomic Motor Nerves carry the commands that cause our pupils to dilate, our lungs to inhale and exhale, our heartbeat to slow, etc. In other words, the Autonomic Motor Nerves send commands to the muscles and organs we do not consciously control.

The Autonomic Motor Nerves are further divided into two groups, the **Sympathetic Nerves** and the **Parasympathetic Nerves**. The Sympathetic Nerves command the body's automatic responses in reaction to fear, stress, excitement, etc.

Through the Sympathetic Nerves, the brain sends "wake up calls" and "fire alarms" to the heart and the smooth muscles. The Sympathetic Nerves carry the messages that cause the pupils to dilate; the blood pressure and pulse rate to rise; the sweat glands to activate; the hair to stand on end; the blood vessels of the skin to constrict; etc. In short, the messages transmitted along the Sympathetic Nerves excite or stimulate the body. The Sympathetic Nerves act as the body's "gas pedal" and make the body go faster.

The Parasympathetic Nerves have exactly the opposite function. They carry messages that produce a relaxed state in the body, and that promote tranquil activities. The brain sends its "at ease" and "all clear" messages along the Parasympathetic Nerves. Those messages cause the pupils to constrict; heartbeat to slow; blood pressure to drop; peripheral blood vessels to dilate; digestion to proceed; etc. The Parasympathetic Nerves act as the body's "brake pedal" and slows the body down.

Naturally, neurotransmitters, or chemical messengers, are involved in carrying signals along both the Sympathetic and Parasympathetic nerves. Some drugs mimic the action of certain neurotransmitter. When taken into the body, these drugs come into contact with dendrites (receptor ports) of nerves and cause messages to be transmitted along Sympathetic or Parasympathetic Nerves.

Drugs that mimic neurotransmitter that are associated with Sympathetic Nerves are called **Sympathomimetic** drugs. They artificially cause the excitement and stimulation associated with the brain's natural "wake up calls". CNS Stimulants and Hallucinogens are considered to be sympathomimetic drugs.

Cannabis and PCP also have sympathomimetic characteristics, to some degree.

Drugs that mimic neurotransmitter associated with the Parasympathetic Nerves are called **Parasympathomimetic**. They induce the transmission of messages that cause lowered blood pressure, drowsiness, muscle relaxation, etc; Narcotic Analgesics and CNS Depressants are considered to be parasympathomimetic.

Although there are more than 100 chemicals in the brain, only about two dozen probably are true neurotransmitters. The primary neurotransmitters in the brain are

norepinephrine (noradrenaline), acetylcholine, dopamine, serotonin, gamma amino butyric acid (GABA), endorphins and enkephalins. Norepinephrine, also called noradrenaline, produces effects in the body that are similar to the effects produced by adrenaline. Acetylcholine plays a role in muscle control and effects neuromuscular or myoneural junctions. Dopamine plays a role in mood control and is used in treating Parkinson's Disease. Serotonin is a vasoconstrictor, thought to be involved in sleep, wakefulness, and sensory perception. GABA inhibits various neurotransmitters and also causes a release of growth hormones. Endorphins and enkephalins are the body's natural pain relievers.

E. How Drugs Work

In simple terms, drugs work by artificially creating natural body reactions that are generally associated with the work of neurotransmitters and hormones. Therapeutic doses of legitimate prescription drugs and over the counter medications are designed to produce carefully controlled simulations of natural action of hormones or neurotransmitters, to make up for a deficiency in the body's natural supply. A common example of this is the first-thing-in-the-morning cup of coffee that is a ritual for many people. When the alarm clock forces us to awake, against our will, our Parasympathetic Nerves are operating in high gear and we are flooded with hormones that induce sleep and relaxation. We use the stimulant caffeine to overcome the body's natural chemicals, so that we can get started on the day's work. An entirely different, but also common example, occurs when we find ourselves worried and anxious at the end of the day, because of problems on the job, at home or wherever. This is stress, and our brains react to stress by activating the Sympathetic Nerves: we're too "keyed up" to sleep. That is when many people reach for the glass of wine, or the Xanax or Valium tablet, to overcome the body's natural stimulation.

But we pay a price when we do these things. When we introduce these chemicals, we disrupt the body's natural balance. The body is going to react, because it must preserve homeostasis. And the body's reaction will try to alter its own supply of natural chemicals to accommodate the ones we have introduced.

One way in which the body may react to the presence of a drug is by producing hormones and neurotransmitters that tend to **counteract** the effects of the drug. For example, if a person snorts cocaine, their brain might react to the resulting stimulation by sending commands along the Parasympathetic Nerves to depress bodily functions, and by commanding the endocrine system to release hormones that also will produce depression. This can lead to an interesting situation: the drug may metabolize, i.e., react with oxygen and other chemicals in the body, and dissipate so that its effects no longer are present; but in the mean time, the brain has caused the body to be flooded with natural hormones and neurotransmitters designed to counteract the drug, and **they** may still be exerting their effects.

We call this situation the "downside of a drug" or the "**downside effect**". When a person is experiencing the downside of a drug or the downside effect they may not be under the active influence of the drug. The person may be exhibiting the opposite effects of the drug because of the body's attempt to counteract the effects produced by the drug they consumed.

Two common examples occur with cocaine and methamphetamine. Both of these drugs stimulate the body. The body attempts to counter these stimulant effects by releasing certain hormones and neurotransmitters. As the effects of cocaine or methamphetamine diminish, the hormones and neurotransmitters the brain dispatched to counteract the drug take over and in some cases, cause the body to go below the homeostasis level producing an opposite effect or “downside effect”. Many times the person’s signs and symptoms will also mirror a narcotic analgesic or depressant, i.e., constricted pupils, depressed pulse and blood pressure. Persons on the downside of a drug or exhibiting the downside effect may be unable to operate a vehicle safely.

It is not uncommon for a DRE to encounter someone on the downside of a drug. When the arresting officer apprehends a subject, the effects of a particular drug might be very evident. But by the time the DRE is summoned and arrives to conduct the evaluation, the effects may have worn off. As a DRE, you are called upon to give your best professional opinion concerning what is affecting the subject at the time of your evaluation. You must never attempt to infer or estimate what the subject’s state or nature of impairment may have been at the time prior to your contact with them.

There is another way in which the body may react to drugs, especially when the drug is routinely used over a period of time. Because the drug is artificially simulating the actions of certain hormones and neurotransmitters, the body may come to rely on the drug to supply those actions, and may simply cease producing those natural chemicals. We call this phenomenon **Negative Feedback**. It simply means that the brain accommodates the routine presence of a drug by turning off the supply of natural chemicals that correspond to the drug. Evidence suggests that this Negative Feedback clearly occurs in users of heroin and cocaine, to cite just two examples. The bodies of cocaine and heroin users apparently cease producing the hormones and neurotransmitters needed for proper pain relief, stress reduction, mental stability and motivation. Very quickly, the user simply can't cope without the drug. A similar effect is physical dependence, or **addiction to the drug**; because the natural chemicals are no longer available, the body needs the drug to provide the functions those natural chemicals used to perform.

Another way in which the body may compensate is by developing increased **tolerance** to the drug, meaning that the same dose of the drug will produce diminishing effects. To express this another way, a steadily stronger dose of the drug will be needed to produce the same effects. Habitual users of drugs may develop tolerance to the drug and as a result they may exhibit relatively little evidence of impairment on the psychophysical test. Even tolerant drug users, when impaired, usually exhibit clinical evidence.

The concept of metabolism is important for an understanding of how drugs work in the body. **Metabolism** is defined as the combined chemical and physical processes that take place in the body involving the distribution of nutrients and resulting in growth, energy production, the elimination of wastes, and other body functions.

There are two basic phases of metabolism: anabolism, the constructive phase, during which small molecules resulting from the digestive process are built up into complex compounds that form the tissues and organs of the body; and catabolism, the destructive phase, during which larger molecules are broken down into simpler substances with the release of energy.

A metabolite is a product of metabolism, the chemical changes that take place when the drug reacts with enzymes and other substances in the body. The body uses chemical reactions to break down the drug and ultimately to eliminate it. Sometimes, metabolites of the original drug are themselves drugs and cause impairment. An example, the body quickly metabolizes heroin into morphine, and it is the morphine that actually produces the effects the heroin user experiences.

F. Medical Conditions Which Sometimes Mimic Drug Impairment

There are numerous medical conditions and injuries that may cause their victims to appear to be under the influence of alcohol or other drugs. DREs are not expected to be a physician and should not attempt to diagnose a disease or medical condition. As soon as a DRE becomes aware of the fact that he or she is dealing with a medical rule out, appropriate treatment should be sought. The DRE should be suspicious of signs or symptoms that seem inconsistent with the DRE's knowledge and training.

Some common medical conditions that DREs may encounter include:

Bipolar Disorder (Manic-Depression) - a condition characterized by the alteration of manic and depressive states.

Conjunctivitis - This is an inflammation of the mucous membrane that lines the inner surface of the eyelids giving a red, bloodshot appearance of the conjunctiva of the eyes. At first glance, this may appear similar to the bloodshot conditions associated with impairment by alcohol or Cannabis. This condition may occur in one eye only.

Diabetes - A diabetic is most likely to be confused with a person impaired by alcohol or drugs when he or she has taken **too much insulin**, so that the blood sugar level becomes dangerously low. This condition is called **insulin shock**. A diabetic in insulin shock may appear very confused, may be non-responsive, sweat profusely and exhibit elevated pulse rate and blood pressure. If you suspect that you may be dealing with insulin shock, give the subject a glass of orange juice, a bite of candy or simply a spoonful of sugar; that should rapidly produce a noticeable improvement in his or her condition.

Head Trauma - A severe blow or bump to the head may injure the brain and create disorientation, confusion, lack of coordination, slowed responses, speech impairment and other gross indicators of alcohol or drug influence. Because the injury usually affects one side of the brain more than the other, disparities usually will be evident in the subject's eyes. Look at the pupils, and observe whether they are obviously different in size. Check the eyes' tracking ability, and see whether they are dissimilar, e.g., one eye moving smoothly while the other jerks noticeably. Check the eyelids to see if one droops while the other appears normal.

Multiple Sclerosis - Victims of Multiple Sclerosis (MS) and other degenerative muscular disorders may exhibit severe coordination problems, gait ataxia, tremors, slurred or garbled speech and many of the other gross indicators of intoxication. However, they will usually appear alert.

Shock - Shock victims often will appear dazed, uncoordinated and non-responsive. Some conditions that should immediately alert a DRE to possible medical conditions include: extremely low blood pressure, fast but weak pulse, dizziness, moist clammy skin, profuse sweating, rapid shallow breathing, blue lips and fingernails.

Stroke - A stroke will usually produce many of the same effects and indicators associated with head trauma. Stroke victims often will have pupils that are markedly different in size. One pupil may remain fixed and exhibit no visible reaction to light, while the other reacts normally. Other indicators can include: drooling or slurred speech, problems with speech or understanding simple statements, or being confused.

Some other medical conditions that may cause signs and symptoms similar to drug impairment include: carbon monoxide poisoning, seizures, endocrine disorders, neurological conditions, psychiatric conditions, and infections. There are also normal conditions which can affect vital signs. Some examples are: exercise, excitement, fear, anxiety and depression.

Topics for Study

1. What is a neurotransmitter? What is a hormone?
2. What is a dendrite? What is an axon? What is a synapse?
3. Do arteries carry blood toward the heart or away from the heart?
4. What is unique about the Pulmonary Artery?
5. What are the two types of nerves that make up the Autonomic Nervous Subsystem?
6. Is Cocaine sympathomimetic or parasympathomimetic? What about Heroin?
7. Explain the concept of the "downside effect". Explain the concept of "Negative Feedback".
8. What do we call the nerves that carry messages away from the brain? What do we call the nerves that carry messages toward the brain?

SESSION VII
EXAMINATION OF VITAL SIGNS

SESSION VII EXAMINATION OF VITAL SIGNS

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

- o Explain the purposes of the various vital signs examinations in the drug influence evaluation procedure.
- o Explain the administrative procedures for these examinations.
- o Explain the cues obtained from these examinations.
- o Document the examinations of vital signs accurately and completely.
- o Correctly answer the "topics for study" questions at the end of this session.

A. Concepts and Procedures for Measuring Pulse Rate

Some important definitions:

Pulse is the expansion and relaxation of an artery generated by the pumping action of the heart.

Pulse rate is the number of pulsations in an artery in one minute.

An artery is a strong, elastic blood vessel that carries blood from the heart to the body tissues.

A vein is a blood vessel that carries blood back to the heart.

When the heart contracts, it squeezes blood out of its chambers, and sends the blood surging into the arteries. The surging blood pushes against the walls of the arteries, causing them to expand. If you know where to locate an artery (for example, in the crease of your wrist, just below the base of the thumb) and you press your finger tips onto the skin just above the artery, you will feel the artery expand each time blood surges through it. If you keep your finger tips on the artery and count the pulses that occur in one minute, you will determine your pulse rate.

The Radial Artery provides a convenient pulse point. 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. To use the Radial Artery pulse point, have the subject hold his or her arm straight out, with the palm of their hand facing down. Place the tips of your index and middle fingers into the crease of the subject's wrist, near the base of the thumb, and exert a slight pressure. Allow the subject's hand to droop down from gravity; this will tighten the pressure on your finger tips and aid you to feel the pulse.



The Brachial Artery provides another useful pulse point. It 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.

The Carotid Artery can also provide pulse points. The Carotid Artery can be located in the neck, on either side of the “Adam's Apple.”

Key points to keep in mind about measuring pulse rate:

- Don't use your thumb to feel someone's pulse because there is an artery in the thumb. If you apply pressure with the thumb, the "beat" you feel may be your own pulse, and not the subject's.
- If you use the Carotid Artery pulse point, don't apply pressure to both sides of the “Adam's Apple.” Doing so can cut off the supply of blood to the brain.

- When measuring pulse rate, count the beats for 30 seconds, then multiply by two.

Some technical terms associated with pulse rate:

- Tachycardia: Abnormally rapid heart rate.
- Bradycardia: Abnormally slow heart rate.
- Arrhythmia: Abnormal heart rhythm.

B. Concepts and Procedures for Measuring Blood Pressure

All DREs need to be aware that many females have birth control implants in their upper left arm. The DRE should check for the implants, and if found, the blood pressure should be taken on the subject's right arm.

Some important definitions:

Blood pressure is the force that the circulating blood exerts on the walls of the arteries. The blood pressure changes from instant to instant, as the heart contracts and relaxes.

Systolic pressure is the maximum or highest blood pressure. The blood pressure reaches its systolic value when the heart contracts and sends the blood surging into the arteries.

Diastolic pressure is the minimum or lowest blood pressure. The blood pressure reaches its diastolic value when the heart is fully expanded.

A Sphygmomanometer is a device for measuring blood pressure. The major parts or components of a Sphygmomanometer include:

- The compression cuff, which can be wrapped securely around the arm and which contains a rubber bladder that can be inflated with air. There are different cuffs designed for children, adults and people with extra large arms; these cuffs have different sized bladders.
- The pressure bulb, which can be squeezed to inflate the rubber bladder with air.
- The pressure control valve, which controls the inflation or deflation of the rubber bladder. To inflate the bladder, the pressure control valve must be twisted all the way to the right (clockwise); then, the pressure bulb can be squeezed to pump air into the bladder. To deflate the bladder, the pressure control valve must be twisted to the left (counter-clockwise); the more the valve is twisted to the left, the faster the bladder will deflate.
- The manometer, or pressure gauge, which displays the air pressure in the bladder.

- Tubes, connecting the pressure cuff to the manometer and to the pressure bulb.

Some technical terms associated with blood pressure:

- Hypertension: Abnormally high blood pressure.
- Hypotension: Abnormally low blood pressure.

Blood Pressure is measured in units of millimeters of mercury. Sometimes this is abbreviated as "mmHg", where "mm" represents "millimeters" and "Hg" is the chemical symbol for the element mercury (from "Hydrargyrum", the Latin word for "mercury"). When the manometer or pressure gauge indicates that the pressure in the bladder is 120 mmHg, that means that the air in the bladder, if forced into a glass tube containing liquid mercury, would push the mercury up the tube to a height of 120 millimeters. Some Sphygmomanometers actually have pressure gauges that consist of glass tubes containing mercury, with a ruler alongside the tube marked off in millimeters. Usually, however, aneroid pressure gauges are used. ("Aneroid" means "without fluid".)

When you measure and record blood pressure, it is not necessary to use the symbols "mmHg". Simply record the numbers.

The principles involved in measuring blood pressure are easy to understand. When the pressure cuff is wrapped around the upper arm (e.g. around the bicep) and inflated with air, the air pressure exerts a force on the arm. When the pressure in the bladder gets high enough, the arteries in the arm will be squeezed shut, and no blood will flow through the arteries. In this respect, the pressure cuff works just like a tourniquet.

When the pressure control valve is twisted to the left, air starts to escape from the bladder and the pressure on the arm (and on the artery) starts to drop. However, as long as the air pressure on the artery remains higher than the blood pressure in the artery, the artery will remain squeezed shut and no blood will flow.

Consider this question: What will happen when the air pressure on the artery drops to the point where it just equals the blood pressure in the artery?

At that point, the heart will again be able to push the blood through the artery, so the flow of blood will resume.

But the blood pressure is constantly changing, from instant to instant. At one instant, the pressure will be at its maximum, or Systolic value. Then the blood pressure drops, and a very short time later it will reach its minimum or Diastolic level. Then it climbs again, and repeats the cycle over and over.

When the air pressure in the bladder drops to the point where it equals the Systolic blood pressure, blood will be able to spurt through the artery each time the heart contracts. But an instant later, as the heart starts to expand and the blood pressure drops, the artery will squeeze shut again and the flow will stop.

If the air is allowed to continue to escape from the bladder, the air pressure eventually will fall to the point where it reaches the Diastolic level. At that point, the blood pressure in the artery always will be equal to or higher than the air pressure on the artery, so the artery will stay open and blood will flow steadily.

So the basic idea is simple:

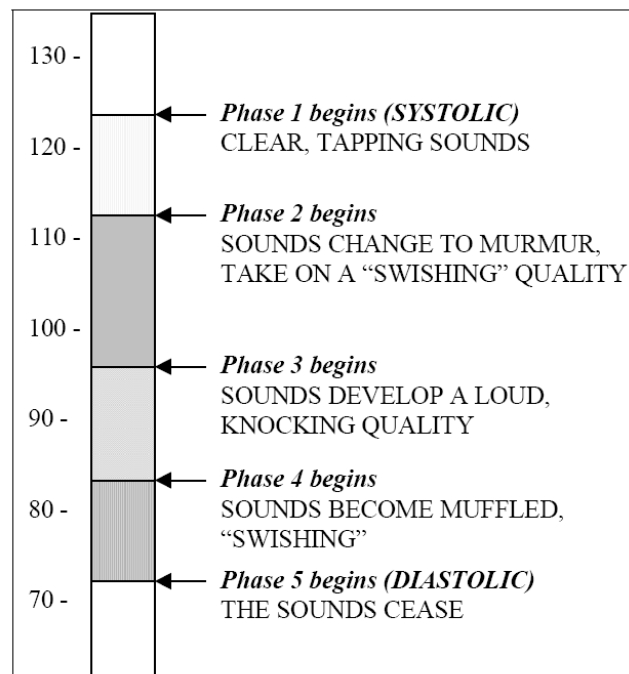
- To measure blood pressure, start by pumping up the bladder until the artery is squeezed completely shut and no blood flows.
- Let the air pressure drop slowly until the blood just begins to spurt through the artery. When that happens, the pressure shown on the gauge will be equal to the Systolic pressure.
- Continue to let the air pressure drop until the blood finally flows steadily through the artery. The pressure showing on the gauge at that time will be the Diastolic pressure.

To determine when the blood starts to spurt, and when it starts to flow steadily, a stethoscope is needed.

The stethoscope should be applied to the skin, directly above the artery. For example, with the blood pressure cuff wrapped around the bicep, the stethoscope can be applied to the Brachial artery pulse point.

When no blood is flowing through the artery, you will hear nothing through the stethoscope.

But when the air pressure in the cuff falls to the systolic level, you will hear the blood begin to spurt. The sound you will hear starts as a clear tapping. This is the first phase of what are called the Korotkoff Sounds, a distinct series of sounds that are heard as the air pressure in the cuff drops from the systolic to the diastolic level.



As you continue to allow the air to escape from the cuff, the spurts of blood through the artery become steadily longer and the sounds change. They become fainter taking on a swishing quality, and pass through a "knocking" phase, and then suddenly become muffled. Eventually, when the air pressure drops to the diastolic level, the blood flows steadily and all sound ceases.

Step-by-step procedures for measuring blood pressure

- (1) Position the cuff on the bicep so that the tubes extend down the middle of the arm.
- (2) Wrap the cuff snugly around the bicep.
- (3) Clip the manometer to the subject's sleeve, or to some other convenient location, so that you can observe the gauge easily.
- (4) Twist the pressure control valve all the way to the right.
- (5) Put the stethoscope earpieces in your ears. Make sure the earpieces are turned forward.
- (6) Apply the stethoscope to the Brachial Artery pulse point.
- (7) Rapidly inflate the bladder to a level high enough to squeeze the artery shut. Usually, a pressure of 180 will be sufficient.
- (8) Twist the pressure control valve slightly to the left to allow the air to escape from the bladder slowly (2 mmHg per second).
- (9) Keep your eyes on the pressure gauge and listen for the Korotkoff Sounds.
 - a. Record the Systolic pressure when the first sound (clear, tapping) is heard.
 - b. Record the Diastolic pressure when the sounds cease.

If the DRE is unable to successfully obtain a blood pressure measurement the first time, they should wait a minimum of three minutes before attempting to obtain another measurement.

C. Concepts of Temperature Measurement

Body temperature is measured using an oral thermometer. The thermometer should always be covered with a clean disposable cover prior to taking the subject's temperature.

When measuring temperature with an oral thermometer, it is important to ensure that the thermometer remains under the person's tongue and that the person is not talking during the measurement process. DRE's should also try to refrain from letting the person drink hot or cold fluids immediately prior to measuring temperature.

The following summarizes the results that generally can be expected when the vital signs examinations are administered to persons under the influence of the various categories of drugs.

	CNS Depressants	CNS Stimulants	Hallucinogens	D/A	Narcotic Analgesics	Inhalants	Cannabis
Pulse	Down (*)	Up	Up	Up	Down	Up	Up
Blood Pressure	Down	Up	Up	Up	Down	Up/Down (**)	Up
Temperature	Normal	Up	Up	Up	Down	Up/Down /Normal	Normal

* Quaaludes, ETOH, and possibly some anti-depressants may elevate.

** Down with Anesthetic gases, up with volatile solvents and aerosols.

NOTE: "Normal" systolic blood pressure 120-140
 "Normal" diastolic blood pressure 70-90
 "Normal" pulse (adult male) 60-90
 "Normal" temperature 98.6 plus or minus 1 degree, Fahrenheit

Topics for Study

1. Where is the Radial Artery pulse point?
2. Why should you never attempt to feel a subject's pulse with your thumb?
3. Does an artery carry blood to the heart or from the heart?
4. What does the symbol "Hg" represent?
5. What is Diastolic pressure?
6. When do the Korotkoff Sounds begin?
7. Name and describe the major components of a Sphygmomanometer.
8. Which of the seven categories of drugs generally will cause blood pressure to be elevated?

SESSION VIII
DEMONSTRATIONS OF THE EVALUATION SEQUENCE

SESSION VIII DEMONSTRATIONS OF THE EVALUATION SEQUENCE

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

- o Describe the sequence in which examinations and other activities are performed in the drug influence evaluation procedure.

In this session, you will have an opportunity to observe demonstrations of the entire Drug Evaluation and Classification drug influence evaluation procedure. Your instructors will conduct some of these demonstrations "live", in the classroom. There will also be a video demonstration. The demonstrations will illustrate the systematic and standardized process used for the Drug Evaluation and Classification Program.

Your instructors will make the video available for reviewing, after normal class hours. You should make an effort to view the video at least a second time before the completion of this course to ensure you are able to conduct an evaluation using the systematic and standardized process.

SESSION IX
CENTRAL NERVOUS SYSTEM DEPRESSANTS

SESSION IX CENTRAL NERVOUS SYSTEM DEPRESSANTS

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

- o Explain a brief history of the CNS Depressant category of drugs.
- o Identify common drug names and terms associated with this category.
- o Identify common methods of administration for this category.
- o Describe the symptoms, observable signs and other effects associated with this category.
- o Describe the typical time parameters, i.e. onset and duration of effects, associated with this category.
- o List the clues that are likely to emerge when the drug influence evaluation is conducted for a person under the influence of this category of drugs.
- o Correctly answer the "topics for study" questions at the end of this session.

A. Overview of CNS Depressants

Central Nervous System Depressants slow down the operations of the brain. They first affect those areas of the brain that control a person's conscious, voluntary actions. As dosage increases, depressants begin to affect the parts of the brain controlling the body's automatic, unconscious processes, such as heartbeat and respiration.

Alcohol is the model for the CNS Depressant category of drugs. Alcohol is the most familiar, and most widely abused, depressant. With some exceptions, all depressants affect people in much the same way as does alcohol.

Some major subcategories of CNS Depressants other than alcohol include:

- Barbiturates
(Derivatives of Barbiturate Acid)
- Non-Barbiturates
(Synthetic compounds with a variety of chemical structures)
- Anti-Anxiety Tranquilizers
(Frequently prescribed and frequently abused)
- Anti-Depressants
(It may seem to be a contradiction in terms to call a subcategory of Depressants the Anti-Depressants; but in this case, we simply mean that these drugs are prescribed to combat psychological depression. For that reason, the Anti-Depressants are sometimes known as the "mood elevators".)
- Anti-Psychotic Tranquilizers
(Also known as the "major tranquilizers", to distinguish them from the Anti-Anxiety tranquilizers, or "Minor Tranquilizers".)
- Combinations of the other five subcategories.

Some examples of specific drugs included in each subcategory are given in the table on pages IX-4 and IX-5.

Most users of CNS Depressants ingest these drugs orally. However, although the practice is not common, some Barbiturate abusers inject their drugs intravenously. The injection paraphernalia used by Barbiturate abusers are similar to those used by Heroin addicts, although a larger hypodermic needle is used, because the Barbiturate solution is thicker than the Heroin solution. The injection sites on the skin of a Barbiturate abuser exhibit large swellings, and may develop ulcerations. Necrosis may occur, i.e., a decaying of the body's tissue at the injection site.

EXAMPLES OF CNS DEPRESSANTS

BARBITURATES	NON-BARBITURATES	ANTI-ANXIETY TRANQUILIZERS
<p><u>Amobarbital</u> Common trade name: "Amytal" Common street names: "blues"; "blue heavens"</p>	<p><u>Carisoprodol</u> Trade name: "Soma"</p>	<p><u>Alprazolam</u> Trade name: "Xanax"</p>
<p><u>Amosecobarbital</u> A combination of amobarbital and secobarbital. Common trade name: "Tuinal" Common street names: "rainbows"; "Christmas trees"</p>	<p><u>Chloral Hydrate</u> Common trade names: "Aquachloral"; "Noctec" Common street names: "Mickey Finn"; "Knock-out Drops"</p>	<p><u>Chlordiazepoxide</u> Trade name: "Librium"</p>
<p><u>Pentobarbital</u> Common trade name: "Nembutal" Common street names: "yellows"; "yellow jackets"</p>	<p><u>Diphenhydramine Hydrochloride (DPH)</u> Common trade names: "Benadryl"; "Somnex"; "Dramamine"</p>	<p><u>Clonazepam</u> Trade name: "Klonopin"</p>
<p><u>Phenobarbital</u> Many trade names including Luminal Common street name: "pink ladies"</p>	<p><u>Diphenylhydantoin Sodium</u> Trade name: "Dilantin", "Phenytoin"</p>	<p><u>Diazepam</u> Trade name: "Valium"</p>
<p><u>Secobarbital</u> Common trade name: "Seconal" Common street names: "reds"; "red devils"; "RDs"; "fender benders"; "F-40s"</p>	<p><u>Eszopiclone</u> Trade name: "Lunesta"</p>	<p><u>Estazolam</u> Trade name: "ProSom"</p>
	<p><u>Ethchlorvynol</u> Trade name: "Placidyl"</p>	<p><u>Flunitrazepam</u> Trade Name: "Rohypnol" Street names: "Roofies" or "Roches"</p>
	<p><u>Gamma-hydroxybutyrate</u> Street names: "GHB"; "GBL"; "Liquid X"; "1,4 Butanediol"</p>	<p><u>Flurazepam</u> Trade name: "Dalmane"</p>
	<p><u>Methaqualone</u> (No longer produced in U.S) Street name: "Ludes"</p>	<p><u>Lorazepam</u> Trade name: "Ativan"</p>
	<p><u>Paraldehyde</u> Trade name: "Paral"</p>	<p><u>Meprobamate</u> Trade names: "Miltown"; "Probate"</p>
	<p><u>Zolpidem</u> Common trade names: "Ambien"</p>	<p><u>Oxazepam</u> Trade name: "Serax"</p>
		<p><u>Temazepam</u> Trade name: "Restoril"</p>
		<p><u>Triazolam</u> Trade name: "Halcion"</p>

EXAMPLES OF CNS DEPRESSANTS
(CONTINUED)

ANTI-DEPRESSANTS	ANTI-PSYCHOTIC TRANQUILIZERS	COMBINATIONS
<u>Amitriptyline Hydrochloride</u> Common trade names: "Elavil"; "Endep"	<u>Chlorpromazine</u> Trade name: "Thorazine"	<u>Chlordiazepoxide and Amitriptyline</u> Trade name: "Limbitrol"
<u>Bupropion</u> Trade name: "Wellbutrin"	<u>Droperidol</u> Trade name: "Inapsine"	<u>Chlordiazepoxide Hydrochloride and Clidinium Bromide</u> Trade name: "Librax"
<u>Citalopram</u> Trade name: "Celexa"	<u>Lithium Carbonate</u>	
	<u>Lithium Citrate</u>	
<u>Desipramine Hydrochloride</u> Common trade names: "Norpramin"; "Pertofrane"	<u>Haloperidol</u> Trade name: "Haldol"	<u>Perphenazine and Amitriptyline</u> Common trade names: "Triavil"; "Etrafon"
<u>Doxepin Hydrochloride</u> Common trade names: "Adapin"; "Sinequan"		
<u>Duloxetine</u> Common trade name: "Cymbalta"		
<u>Escitalopram</u> Trade name: "Lexapro"		
<u>Fluoxetine</u> Trade names: "Prozac"; "Sarafem"		
<u>Fluvoxamine</u> Trade name: "Luvox"		
<u>Imipramine</u> Trade name: "Tofranil"		
<u>Paroxetine</u> Trade name: "Paxil"		
<u>Phenelzine Sulfate</u> Trade name: "Nardil"		
<u>Sertraline</u> Trade name: "Zoloft"		
<u>Trazodone</u> Trade name: "Desyrel"		
<u>Venlafaxine</u> Trade name: "Effexor"		

B. Possible Effects of CNS Depressants

Once again, alcohol is the model here. Other depressants generally affect people in much the same way as does alcohol.

- reduced social inhibitions
- divided attention impairment
- slowed reflexes
- impaired judgment and concentration
- impaired vision and coordination
- slurred, mumbled or incoherent speech
- a wide variety of emotional effects, such as euphoria, depression, suicidal tendencies, laughing or crying for no apparent reason, etc.

In general, a person under the influence of a CNS Depressant will look and act as though they were drunk on alcohol.

C. The Onset and Duration of Depressants' Effects

Some CNS Depressants act very quickly, and begin to affect their users within seconds. Others act more slowly, sometimes taking one-half hour or more to begin to exert an influence. The quick acting depressants also tend to be relatively short acting: in some cases their effects wear off in a matter of minutes. The slow acting depressants, on the other hand, tend to produce longer lasting effects.

Depressants fall into four groups, based on how quickly they take effect and how long their effects last.

The Ultra Short Depressants take effect in a matter of seconds, but their effects dissipate in just a few minutes. They are used medically to provide a momentary sedation of a patient, for example to reduce a psychiatrist's patient's anxieties and inhibitions at the beginning of a counseling session. An example of an Ultra Short Depressant is Thiopental (Pentothal), sometimes call "truth serum". Ultra Short Depressants rarely are the drugs of choice for abusers, because their effects don't last long enough to satisfy most abusers.

The Short Depressants are more attractive to drug abusers. They generally take effect within 10-15 minutes, and their effects last approximately four hours. Medical applications of the Short Depressants include treatment of insomnia and sedation of patients prior to surgery. An example of a short depressant is Secobarbital.

Intermediate Depressants may require up to 30 minutes to take effect, but their effects typically last 6-8 hours. They are popular among drug abusers who desire a longer-lasting state of intoxication. The medical applications of Intermediate Depressants are similar to those of Short Depressants. Amobarbital is an example of an Intermediate Depressant.

The drug Tuinal, i.e. two-in-all, straddles the border between short and intermediate depressants. It combines Amobarbital (an intermediate) with Secobarbital (a short). The result is a fairly fast acting drug with fairly prolonged effects.

The Long Depressants generally are not the preferred drugs of abusers. This is because they take too long to start producing effects (typically, about one hour). However, their effects usually last 8-14 hours. Long Depressants are used medically to control epilepsy and other conditions that can cause convulsions. Barbitol is an example of a Long Depressant.

D. Signs and Symptoms of Depressant Overdose

Overdoses of CNS Depressants produce effects that are essentially identical to those of alcohol overdoses:

- the person becomes extremely drowsy and may pass out;
- the heartbeat (pulse) will be rapid and weak;
- respiration becomes shallow;
- the skin may feel cold and clammy;
- death may result from respiratory failure.

Combinations of depressants can be especially risky. Unfortunately, many people routinely do combine depressants, usually in the form of alcohol and some other depressant. In some cases, the effects that result may be greater than the sum of the effects that the two drugs would produce independently.

E. Expected Results of the Evaluation

When a person under the influence of CNS Depressants is evaluated by a DRE, the following results can generally be expected:

Horizontal Gaze Nystagmus - present

Vertical Gaze Nystagmus – present, (high dose` for that individual)

Lack of Convergence - present.

Pupil size – normal; however, in the specific cases of Soma, Methaqualone (Quaaludes) and some anti-depressants the pupils will usually be dilated.

Pupil's reaction to light - slow

Pulse rate - will be down; however, with Quaaludes and ETOH and possibly some anti-depressants the pulse rate may be elevated.

Blood Pressure - down

Temperature - normal.

Muscle tone - flaccid

Injection Sites usually will not be found; however, some Barbiturate abusers do inject. Their injection sites often will be swollen, and may appear ulcerated.

General indicators

- disoriented
- droopy eyelids (ptosis)
- drowsiness
- drunk-like behavior
- gait ataxia (lack of coordination)
- slow, sluggish reactions
- thick, slurred speech
- uncoordinated

DRUG INFLUENCE EVALUATION						
Evaluator PFC David Pacoe, B.C. P.D.		DRE # 5293	Rolling Log # 2073		Session IX - #1	
Recorder/Witness Lt. Tom Woodward, Maryland SP		Crash: <input checked="" type="checkbox"/> None <input type="checkbox"/> Fatal <input type="checkbox"/> Injury <input type="checkbox"/> Property		Case # 07-100455		
Arrestee's Name (Last, First, Middle) Cockroft, Carolyn L.		Date of Birth 4/21/64	Sex F	Race W	Arresting Officer (Name, ID#) Officer Mike Gregor, MTA P.D. #30125	
Date Examined / Time / Location 08-06-10, 0145, Tunnel Command Office		Breath Results: Results: 0.00	Test Refused <input type="checkbox"/> Instrument #: 100324		Chemical Test: Urine <input checked="" type="checkbox"/> Blood <input type="checkbox"/> Test or tests refused <input type="checkbox"/>	
Miranda Warning Given Given By: Ofc. Gregor		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	What have you eaten today? When? Chicken Soup 8 pm		What have you been drinking? Nothing	How much? N/A
Time now/ Actual Midnight/0215		When did you last sleep? How long Last night/ 6 hours		Are you sick or injured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you diabetic or epileptic? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Do you take insulin? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Do you have any physical defects? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you under the care of a doctor or dentist? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Are you taking any medication or drugs? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No "None of your business"		Attitude: Sullen, With-drawn, non-responsive at times		Coordination: Poor, Stumbling, Staggering		
Speech: Slurred at times		Breath Odor: Normal		Face: Normal		
Corrective Lenses: <input checked="" type="checkbox"/> None <input type="checkbox"/> Glasses <input type="checkbox"/> Contacts, if so <input type="checkbox"/> Hard <input type="checkbox"/> Soft		Eyes: <input type="checkbox"/> Reddened Conjunctiva <input type="checkbox"/> Normal <input type="checkbox"/> Bloodshot <input checked="" type="checkbox"/> Watery		Blindness: <input checked="" type="checkbox"/> None <input type="checkbox"/> Left <input type="checkbox"/> Right		Tracking: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal
Pupil Size: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal (explain)		Vertical Nystagmus <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Able to follow stimulus <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Eyelids: <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Droopy
Pulse and time		HGN	Left Eye	Right Eye	Convergence	
1. 60 / 0222		Lack of Smooth Pursuit	Yes	Yes		
2. 58 / 0230		Maximum Deviation	Yes	Yes		
3. 58 / 0244		Angle of Onset	35	35		
Romberg Balance		Walk and Turn test		ONE LEG STAND		
		Cannot keep balance <input checked="" type="checkbox"/>		26 28		
		Starts too soon <input checked="" type="checkbox"/>		L R		
		Stops walking <input type="checkbox"/>		<input checked="" type="checkbox"/> Sways while balancing		
		Misses heel-toe <input type="checkbox"/>		<input checked="" type="checkbox"/> Uses arms to balance		
		Steps off line <input type="checkbox"/>		<input checked="" type="checkbox"/> Hopping		
		Raises arms <input type="checkbox"/>		<input checked="" type="checkbox"/> Puts foot down		
		Actual steps taken				
		9		11		
Internal clock 46 estimated as 30 seconds		Describe Turn Lost balance		Cannot do test (explain) N/A		Type of footwear: Loafers
Draw lines to spots touched		PUPIL SIZE			Nasal area:	
		Room light	Darkness	Direct	Clear	
		Left Eye	4.0	6.0	Oral cavity:	
		Right Eye	4.0	6.0	Clear	
		REBOUND DILATION			REACTION TO LIGHT:	
		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Slow	
		RIGHT ARM			LEFT ARM	
		Nothing observed				
Blood pressure 110/70		Temperature 98.2				
Muscle tone: <input type="checkbox"/> Normal <input checked="" type="checkbox"/> Flaccid <input type="checkbox"/> Rigid						
Comments:						
What drugs or medications have you been using? "I told you, it's none of your business"		How much? No response		Time of use? No response		Where were the drugs used? (Location) No response
Date / Time of arrest: 08/06/10 0115		Time DRE was notified: 0140		Evaluation start time: 0145		Evaluation completion time: 0300
Officer's Signature:		DRE # 5293		Reviewed/approved by / date:		
Opinion of Evaluator:						
<input type="checkbox"/> Rule Out <input type="checkbox"/> Alcohol <input type="checkbox"/> CNS Stimulant <input type="checkbox"/> Dissociative Anesthetic <input type="checkbox"/> Inhalant						
<input type="checkbox"/> Medical <input checked="" type="checkbox"/> CNS Depressant <input type="checkbox"/> Hallucinogen <input type="checkbox"/> Narcotic Analgesic <input type="checkbox"/> Cannabis						

DRUG INFLUENCE EVALUATION NARRATIVE

Suspect: Cockroft, Carolyn

1. **LOCATION:** The evaluation was conducted at Tunnel Command Processing Room at the Maryland Transportation Authority Police Department.
2. **WITNESSES:** Arresting Officer Mike Gregor of the Maryland Transportation Authority P.D and Sgt. Tom Woodward of the Maryland State Police.
3. **BREATH ALCOHOL TEST:** Cockroft's breath test was 0.00%
4. **NOTIFICATION AND INTERVIEW OF THE ARRESTING OFFICER:** Writer was notified that Officer Gregor had arrested a subject for DUI and was requesting a drug evaluation. Writer contacted Officer Gregor at the M.T.A. Tunnel Command office where it was determined that the suspect had been observed driving at 30 MPH on I-95 near the tunnel. When contacted, the suspect appeared dazed and disoriented. She was unable to perform the roadside SFST's as directed and was arrested for DUI.
5. **INITIAL OBSERVATION OF SUSPECT:** Writer first observed the suspect in the Processing Room. She was quiet, withdrawn and slow to respond to questions. When she would try to walk, she would stumble and several times nearly fell.
6. **MEDICAL PROBLEMS AND TREATMENT:** None observed or stated.
7. **PSYCHOPHYSICAL TESTS:** Romberg Balance: The suspect exhibited a 2" front to back and side to side sway. She estimated 30 seconds in 46 seconds. Walk and Turn: The suspect lost her balance during the instructions, started too soon, stepped off the line, missed heel to toe, raised her arms for balance, staggered to the right while turning and took two extra steps returning back down the line. One Leg Stand: The suspect swayed, raised her arms for balance, hopped and put her foot down. Finger to Nose: The suspect missed the tip of her nose on all six attempts.
8. **CLINICAL INDICATORS:** The suspect exhibited six clues of HGN and a Lack of Convergence. Two of her pulse readings were below the normal range and her Systolic blood pressure was below the normal range.
9. **SIGNS OF INGESTION:** None were evident.
10. **SUSPECT'S STATEMENTS:** The suspect admitted taking "some medicine" her brother gave her. She also stated she did not know what the medicine was.
11. **DRE'S OPINION:** In my opinion Cockroft is under the influence of a CNS Depressant and unable to operate a vehicle safely.
12. **TOXICOLOGICAL SAMPLE:** The suspect provided a urine sample for analysis.
13. **MISCELLANEOUS:**

DRUG INFLUENCE EVALUATION

Evaluator Officer Jason Craven, California H.P.		DRE # 4480	Rolling Log # 07-28		Session IX - #2	
Recorder/Witness Officer Travis Herbert, CHP		Crash: <input checked="" type="checkbox"/> None <input type="checkbox"/> Fatal <input type="checkbox"/> Injury <input type="checkbox"/> Property		Case # 07-445690		
Arrestee's Name (Last, First, Middle) Henry, Michael James		Date of Birth 3/11/70	Sex M	Race W	Arresting Officer (Name, ID#) Sgt. Helena Williams, CHP #113408	
Date Examined / Time / Location 09-06-10, 2110 hours, W. Sacramento		Breath Results: Results: 0.00		Test Refused <input type="checkbox"/> Instrument #: 200548	Chemical Test: Urine <input checked="" type="checkbox"/> Blood <input type="checkbox"/> Test or tests refused <input type="checkbox"/>	
Miranda Warning Given Given By: Sgt. Williams	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	What have you eaten today? When? Cheeseburger 10	What have you been drinking? Nothing	How much? N/A	Time of last drink? N/A	
Time now/ Actual 10 pm / 2115	When did you last sleep? How long Last night / 8 hours	Are you sick or injured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you diabetic or epileptic? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Do you take insulin? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Do you have any physical defects? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you under the care of a doctor or dentist? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Doctor for Stress		
Are you taking any medication or drugs? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No "Just Xanax"		Attitude: Withdrawn, Cooperative		Coordination: Poor, Slow, Sluggish		
Speech: Slurred, thick at times		Breath Odor: Normal		Face: Normal		
Corrective Lenses: <input checked="" type="checkbox"/> None <input type="checkbox"/> Glasses <input type="checkbox"/> Contacts, if so <input type="checkbox"/> Hard <input type="checkbox"/> Soft		Eyes: <input type="checkbox"/> Reddened Conjunctiva <input type="checkbox"/> Normal <input type="checkbox"/> Bloodshot <input type="checkbox"/> Watery		Blindness: <input checked="" type="checkbox"/> None <input type="checkbox"/> Left <input type="checkbox"/> Right		Tracking: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal
Pupil Size: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal (explain)		Vertical Nystagmus <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Able to follow stimulus <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Eyelids <input type="checkbox"/> Normal <input checked="" type="checkbox"/> Droopy
Pulse and time 1. <u>62</u> / <u>2130</u> 2. <u>62</u> / <u>2142</u> 3. <u>58</u> / <u>2200</u>	HGN Lack of Smooth Pursuit Maximum Deviation Angle of Onset	Left Eye Yes Yes 40	Right Eye Yes Yes 40	Convergence Right eye: Left eye:		29 ONE LEG STAND 27 L R <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Sways while balancing <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Uses arms to balance <input type="checkbox"/> <input type="checkbox"/> Hopping <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Puts foot down
Romberg Balance 	Walk and turn test 	Cannot keep balance <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Starts too soon <input type="checkbox"/> Stops walking <input type="checkbox"/> Misses heel-toe <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Steps off line <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Raises arms <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Actual steps taken 9 9		Type of footwear: Lace up boots		
Internal clock 50 estimated as 30 seconds	Describe Turn Lost balance	Cannot do test (explain) N/A		Nasal area: Clear		
Draw lines to spots touched 		PUPIL SIZE		REBOUND DILATION <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
		Room light 2.5-5.0	Darkness 5.0-8.5	Direct 2.0-4.5	REACTION TO LIGHT: Slow	
Left Eye 4.5	6.5	3.5	RIGHT ARM 			
Right Eye 4.5	6.5	3.5	LEFT ARM 			
Blood pressure 106/66	Temperature 98.6	Nothing observed				
Muscle tone: <input type="checkbox"/> Normal <input checked="" type="checkbox"/> Flaccid <input type="checkbox"/> Rigid		Comments: Nothing observed				
What drugs or medications have you been using? Xanax		How much? A couple	Time of use? 6 pm	Where were the drugs used? (Location) McDonald's		
Date / Time of arrest: 09/06/10 2015	Time DRE was notified: 2050	Evaluation start time: 2110	Evaluation completion time: 2210	Precinct/Station: West Sac		
Officer's Signature:		DRE # 4480	Reviewed/approved by / date:			
Opinion of Evaluator:		<input type="checkbox"/> Rule Out <input type="checkbox"/> Alcohol <input checked="" type="checkbox"/> CNS Depressant	<input type="checkbox"/> CNS Stimulant <input type="checkbox"/> Hallucinogen	<input type="checkbox"/> Dissociative Anesthetic <input type="checkbox"/> Narcotic Analgesic	<input type="checkbox"/> Inhalant <input type="checkbox"/> Cannabis	

Revised: 10/10

DRUG INFLUENCE EVALUATION NARRATIVE

Suspect: Henry, Michael J.

1. **LOCATION:** The evaluation took place at the West Sacramento CHP office.
2. **WITNESSES:** Arresting Officer, Sergeant Helena Williams and Officer Travis Herbert, CHP.
3. **BREATH ALCOHOL TEST:** Henry's breath test was a 0.00%
4. **NOTIFICATION AND INTERVIEW OF THE ARRESTING OFFICER:** Writer was requested to conduct a drug evaluation for Sergeant Williams at the West Sacramento CHP office. Sergeant Williams advised that she had located the suspect slumped over in the driver's seat of a vehicle stopped in the S/B traffic lane of S.R. 99. Sergeant Williams further advised that the suspect appeared to be impaired and performed poorly on the SFST's.
5. **INITIAL OBSERVATION OF SUSPECT:** Writer first observed the suspect in a slumped position in a chair next to the interview room desk. The suspect was mumbling, had thick, slurred speech and was slow to respond to questions.
6. **MEDICAL PROBLEMS AND TREATMENT:** The suspect stated he was under the care of a doctor for stress.
7. **PSYCHOPHYSICAL TESTS:** Romberg Balance: The suspect swayed approximately 3" front to back and estimated 30 seconds in 50 seconds. Walk and Turn: The suspect lost his balance twice during the instructions, stepped off the line, missed heel to toe three times, raised his arms for balance and lost his balance while turning. One Leg Stand: Suspect swayed, raised his arms and put his foot down once while standing on the left foot and twice while standing on the right foot. Finger to Nose: Suspect missed the tip of his nose on each attempt.
8. **CLINICAL INDICATORS:** Henry exhibited HGN and a Lack of Convergence. One of his pulse rates was below the normal range. His blood pressure was below the normal range.
9. **SIGNS OF INGESTION:** None observed.
10. **SUSPECT'S STATEMENTS:** The suspect admitted taking Xanax. He stated he takes the Xanax three times a day for stress.
11. **DRE'S OPINION:** In my opinion Henry is under the influence of a CNS Depressant and was unable to operate a vehicle safely.
12. **TOXICOLOGICAL SAMPLE:** The suspect provided a urine sample.
13. **MISCELLANEOUS:** The suspect voluntarily produced a pill bottle containing his Xanax pills. The prescription for 30 pills had been filled two days earlier. There were only 12 pills remaining in the bottle.

Rev. 10/10

Topics for Study

1. Name the six major subcategories of CNS Depressants.
2. Name the four groups of Depressants based on onset and duration time factors.
3. To which subcategory of Depressants does Thorazine belong? To which subcategory does Chloral Hydrate belong? To which subcategory does Xanax belong?
4. Name a CNS Depressant that usually causes the pupils to dilate.
5. What is the generic name for the drug that has the trade name "Prozac"?
6. What is a trade name for the generic drug "Alprazolam"?
7. What is the name of the subcategory of CNS Depressants that is also known as the "Minor Tranquilizers"?

SESSION X
CENTRAL NERVOUS SYSTEM STIMULANTS

SESSION X

CENTRAL NERVOUS SYSTEM STIMULANTS

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

- o Explain a brief history of the CNS Stimulant category of drugs.
- o Identify common drug names and terms associated with this category.
- o Identify common methods of administration for this category.
- o Describe the symptoms, observable signs and other effects associated with this category.
- o Describe the typical time parameters, i.e. on-set and duration of effects, associated with this category.
- o List the clues that are likely to emerge when the drug influence evaluation is conducted for a person under the influence of this category of drugs.
- o Correctly answer the "topics for study" questions at the end of this session.

A. Overview of Central Nervous System Stimulants

CNS Stimulants speed up the operation of the brain and spinal cord. It is important to emphasize that "speed up" does not mean "improve" or "enhance". The CNS Stimulants definitely do not make the brain work better. Rather, they cause the brain and the rest of the nervous system to work harder, and often to make more mistakes.

The "speeding up" caused by CNS Stimulants results in significantly increased heartbeat, respiration and blood pressure, all of which can lead to physical harm to the abuser. In addition, the stimulant user experiences nervousness, irritability and an inability to concentrate or think clearly.

There are three major subcategories of CNS Stimulants; Cocaine, the amphetamines and others.

Cocaine derives from the coca plant, an evergreen native to South America. Cocaine is made from the plant's leaves. There is archaeological evidence that natives of Peru chewed coca leaves 5,000 years ago.

Amphetamines are synthetic (i.e. manufactured) drugs. They were first produced near the end of the 19th Century. Amphetamines have a number of legitimate medical applications, including control of narcolepsy; control of certain hyperactive behavioral disorders in children; relief or prevention of fatigue to allow persons to perform essential tasks of long duration; treatment of mild depression; control of appetite; prevention and treatment of surgical shock; treatment of Parkinson's Disease; maintenance of blood pressure during surgery; enhancement of the action of certain analgesic drugs; and, to antagonize the effects of depressant drugs. Numerous pharmaceutical companies manufacture amphetamines that are prescribed for these purposes. But these pharmaceutical amphetamines often are abused, as well.

Examples of common pharmaceutical amphetamines include:

DEXEDRINE
(dextroamphetamine sulfate)
Common street names: "Dexies"; "Hearts"

BENZEDRINE
(amphetamine sulfate)
Common street names: "Bennies"; "Whites"; "Cartwheels"

DESOXYN
(methamphetamine hydrochloride, also known desoxyephedrine)

ADDERALL
(Combination of dextroamphetamine and amphetamine)

Pharmaceutical amphetamines are not the only source of abused amphetamines. Large quantities also are illegally manufactured in clandestine laboratories. The two most common amphetamines are Methamphetamine and Amphetamine sulfate.

Methamphetamine is also known as methedrine. Some common street names include “speed”; “crank”; “crystal”; “ice”; “meth”; and “water”. Methamphetamine hydrochloride is a white to light brown crystalline powder, or clear chunky crystals resembling ice. Methamphetamine base is liquid. The majority of street methamphetamine is produced in clandestine laboratories (e.g. reduction of *l*-ephedrine or *d*-pseudoephedrine over red phosphorus with hydroiodic acid, or reduction with sodium or lithium in condensed liquid ammonia). Medicinally, methamphetamine is used in the treatment of narcolepsy, attention deficit disorder (ADD), and attention deficit hyperactivity disorder (ADHD). Typical doses are 10 mg/day or up to 40 mg daily, and a course of greater than six weeks is not recommended. Methamphetamine is infrequently used in the treatment of obesity, overeating disorders, and weight loss due to its abuse potential. Amphetamine is also used in ADD, narcolepsy and weight control. Recreationally, Methamphetamine is abused to increase alertness, relieve fatigue, control weight, treat mild depression and for its intense euphoric effects.

Methamphetamine abusers often inject or smoke the drug. However, it can also be snorted or taken orally.

The smokeable forms of methamphetamine are known as "Crystal Meth" or "Ice." They contain the same active chemical compound as powdered methamphetamine, but undergo a re-crystallization process in which some impurities are removed. It is abused in much the same way as "Crack", i.e. small bits of "Ice" are placed in the bowl of a pipe and flame from a lighter is applied to vaporize the drug; the smoker then draws the vapor into the lungs.

Other non-Cocaine and non-amphetamine CNS Stimulants include the prescription drugs Ritalin, and the non-prescription drug Caffeine. Some CNS Stimulants are legally manufactured and distributed without prescription.

Ephedrine is a legally manufactured stimulant which is commonly used in diet aids and body building supplements. Ephedrine can also be found in some herbal preparations and numerous over the counter (OTC) substances. All have legitimate medical applications, but they also have the potential to be abused.

Other CNS Stimulants that are illicit and have no legitimate uses are Cathine and Cathinone. They are two psychoactive chemicals derived from the Khat plant, which originated from the sub-Saharan regions of Africa. Methcathinone is an illicitly manufactured stimulant made from common household chemicals. Its effects are very similar to methamphetamine.

There are various ways in which CNS stimulant abusers ingest their drugs. Cocaine and methamphetamine are commonly insufflated (snorted), smoked, injected or taken orally. Snorting may still be the most common method of ingesting Cocaine, although smoking has become increasingly popular.

In order to be smoked, a pure form of Cocaine is needed. Various chemical processes can be used to "free" the Cocaine from other elements to which it is chemically bonded. The pure Cocaine sometimes is called "freebase", and the practice of smoking it sometimes is called "freebasing".

One of the processes used to produce "freebase" produces the pure Cocaine in the form of small, hard chunks. The chunks are often called "Crack" or "Rock Cocaine". The term "Crack" derives from the cracking sound the chunks produce when they are smoked.

The pharmaceutical amphetamines are produced in the form of tablets, capsules and liquid elixirs, and so they are ingested orally. Illicitly manufactured amphetamine sulfate usually is produced in tablet form (the tablets sometimes are called "mini beans"), and ingested orally.

B. Possible Effects of CNS Stimulants

Cocaine, Methamphetamine and the amphetamines produce euphoria, a feeling that there are no problems. A feeling of super strength and absolute self confidence may also be present. With Cocaine, but not with the amphetamines, there is also an anesthetic effect, i.e. a dulling of pain.



Stimulant users tend to become hyperactive, e.g. nervous, extremely talkative and unable to stand still. CNS Stimulants also tend to release the user's inhibitions, and to impair the user's ability to perceive time and distance. Persons under the influence of CNS Stimulants become easily confused and lose the ability to concentrate or to think clearly for any length of time.

C. Onset and Duration of CNS Stimulants' Effects

1. Cocaine

In general, Cocaine is a fairly fast acting, but short duration drug.

When smoked, or "freebased", Cocaine goes very quickly to the brain. The smoker almost immediately feels a "rush", or very intense euphoria. However, the effects continue to be felt for only about 5-10 minutes.

When injected, the effects also begin very quickly, usually within just a few seconds, and the onset of effects is very intense. The effects usually continue to be felt for 45-90 minutes.

When insufflated or snorted, the onset of effects is still fairly rapid, although not so fast as with smoking or injection. The user generally feels the onset within about 30 seconds. A "rush" occurs, although it is not quite as intense as when the Cocaine is smoked or injected. The user generally continues to feel the effects for 30-90 minutes after snorting the Cocaine.

When taken orally, the user generally does not start to feel the effects of the Cocaine

for 3-5 minutes, and, the effects are not as intense as they are with other methods of ingestion. For these reasons, oral ingestion is the least preferred method of using Cocaine. However, the effects of Cocaine taken orally may last 45-120 minutes and may last 15-30 minutes longer than they do when other methods of ingestion are used.

Because Cocaine's effects are of relatively short duration, a Cocaine user can present some difficulty to a DRE. The suspect may have been markedly impaired when first contacted by the arresting officer, but by the time the subject is brought to the DRE, the effects of Cocaine may have worn off to the point that the indicators of stimulant influence are no longer apparent. The DRE may be understandably frustrated when this occurs, but his or her conclusions as to the probable categories of drugs involved must reflect the observable evidence gleaned from the drug influence evaluation. The DRE should never "force" a conclusion as to an impairment that might have existed 30 minutes or an hour ago when he or she has no personal, credible basis for that conclusion.

Subjects who have ingested both Cocaine and alcohol will produce a metabolite known as "Cocaethylene". This has a half-life of four hours, that possibly extends the effects of Cocaine longer than norm.

2. Methamphetamine

Methamphetamine also is a fairly fast acting drug, and its effects are very similar to Cocaine's. However, Methamphetamine's effects last a good deal longer.

When injected, Methamphetamine's effects begin to be felt within a very few seconds. The user experiences an intense "rush", which lasts at the high level of intensity for 5-30 seconds. Subsequently, the user stays "high" or "wired" for 4-8 hours, with residual effects lasting up to 12 hours.

When smoked, the "rush" is very rapid and intense, much like the "rush" produced by "Crack". However, the smoker usually will remain impaired for at least several hours.

When Methamphetamine is taken orally, the onset of effects is delayed, the "rush" is much less intense and the effects last longer.

When Methamphetamine is snorted, the onset of effects is not quite as rapid as with smoking or injecting. The onset of effects are within 30 seconds, the rush is not as intense and the effects last between 30 and 90 minutes.

D. **Signs and Symptoms of Stimulant Overdose**

The euphoria expected by a stimulant user can be replaced by panic if an overdose is taken. The user may become very confused, and suddenly aggressive. They can suffer convulsions, and possibly faint or pass into a coma. Heartbeat will increase, possibly dramatically, and heart arrhythmia (irregular beating) may develop. This may lead to cardiac arrest. Death can also occur from sudden respiratory failure.

Another danger is that users may attempt to counteract a stimulant overdose with barbiturates, possibly leading to an overdose of CNS Depressant.

Overdoses of Cocaine or Amphetamines can cause the pleasurable effects to turn into panic and often violent behavior. If the overdose is caused by Cocaine, it is commonly referred to as, Cocaine Psychosis or Cocaine Delirium. Hallucinations may occur and many overdose victims complain of the feeling that bugs are crawling under their skin. This is commonly known as “coke bugs”. The medical term for this feeling is "formication".

E. Expected Results of the Evaluation

When a person under the influence of CNS Stimulants is evaluated by a DRE, the following results can generally be expected:

Horizontal Gaze Nystagmus - none

Vertical Gaze Nystagmus - none

Lack of Convergence - none

Pupil Size - dilated

Reaction to light - slow

Pulse Rate - up

Blood Pressure - up

Temperature - up

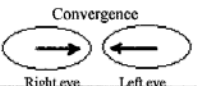
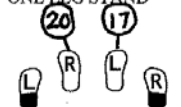
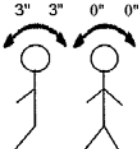
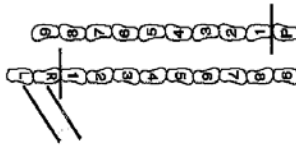
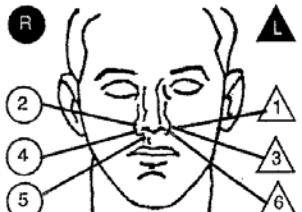
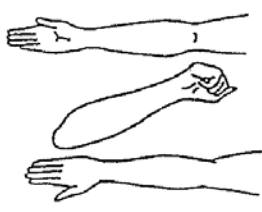
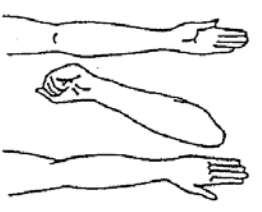
Muscle tone - rigid

Injection Sites might be found, e.g., on the arms, wrists, neck, etc., especially with Methamphetamine users but also with some Cocaine users. Other Cocaine users who routinely snort their drug may exhibit severe redness in the nasal area, and possibly scarring or erosion of the nasal septum.

General indicators:

- anxiety
- body tremors
- bruxism (grinding of the teeth)
- dry mouth
- euphoria
- exaggerated reflexes
- excited
- eyelid and leg tremors
- irritability

- increased alertness
- insomnia
- redness to nasal area
- restlessness
- runny nose
- talkative

DRUG INFLUENCE EVALUATION																		
Evaluator Sgt. Ross Batson, Arkansas H.P.		DRE # 7883	Rolling Log # 10-10-014		Session X - #1													
Recorder/Witness Pam Mays, Arkansas CJI		Crash: <input checked="" type="checkbox"/> None <input type="checkbox"/> Fatal <input type="checkbox"/> Injury <input type="checkbox"/> Property		Case # 07-44580														
Arrestee's Name (Last, First, Middle) Hedlund, James R.		Date of Birth 7/10/63	Sex M	Race W	Arresting Officer (Name, ID#) TFC Jeff Hust Arkansas H.P. #11340													
Date Examined / Time / Location 02-08-10, 2230 Pulaski Co. Jail		Breath Results: Results: 0.00		Test Refused <input type="checkbox"/> Instrument #: 600458	Chemical Test: Urine <input checked="" type="checkbox"/> Blood <input type="checkbox"/> Test or tests refused <input type="checkbox"/>													
Miranda Warning Given Given By: TFC Hust	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	What have you eaten today? When? Candy bar About 6 pm		What have you been drinking? Nothing	How much?	Time of last drink? N/A												
Time now/ Actual 8 pm/10:45 pm	When did you last sleep? How long Last night / 2 - 3 hours	Are you sick or injured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you diabetic or epileptic? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No														
Do you take insulin? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Do you have any physical defects? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you under the care of a doctor or dentist? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No														
Are you taking any medication or drugs? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Attitude: Talkative, Cooperative		Coordination: Poor, Quick, Unsteady														
Speech: Quick, Slurred at times		Breath Odor: Normal		Face: Normal														
Corrective Lenses: <input checked="" type="checkbox"/> None <input type="checkbox"/> Glasses <input type="checkbox"/> Contacts, if so <input type="checkbox"/> Hard <input type="checkbox"/> Soft		Eyes: <input type="checkbox"/> Reddened Conjunctiva <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Bloodshot <input type="checkbox"/> Watery		Blindness: <input checked="" type="checkbox"/> None <input type="checkbox"/> Left <input type="checkbox"/> Right		Tracking: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal												
Pupil Size: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal (explain)		Vertical Nystagmus <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Able to follow stimulus <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Eyelids: <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Droopy												
Pulse and time		HGN	Left Eye	Right Eye	24 ONE LEG STAND 22													
1. 102 / 2240		Lack of Smooth Pursuit	No	No	 													
2. 100 / 2253		Maximum Deviation	No	No														
3. 100 / 2305		Angle of Onset	None	None														
Romberg Balance		Walk and Turn test		Convergence Cannot keep balance <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Starts too soon <input checked="" type="checkbox"/> Stops walking <input type="checkbox"/> Misses heel-toe <input type="checkbox"/> Steps off line <input type="checkbox"/> Raises arms <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Actual steps taken 9 9														
		 Walked quickly		1 st Nine <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Sways while balancing <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Uses arms to balance <input checked="" type="checkbox"/> <input type="checkbox"/> Hopping <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Puts foot down Counted quickly														
Internal clock 22 estimated as 30 seconds		Describe Turn Quick spin around		Cannot do test (explain) N/A		Type of footwear: Boots												
Draw lines to spots touched  Quick movements		PUPIL SIZE <table border="1"> <thead> <tr> <th></th> <th>Room light 2.5 - 5.0</th> <th>Darkness 5.0 - 8.5</th> <th>Direct 2.0 - 4.5</th> </tr> </thead> <tbody> <tr> <td>Left Eye</td> <td>6.0</td> <td>9.0</td> <td>5.5</td> </tr> <tr> <td>Right Eye</td> <td>6.0</td> <td>9.0</td> <td>5.5</td> </tr> </tbody> </table>				Room light 2.5 - 5.0	Darkness 5.0 - 8.5	Direct 2.0 - 4.5	Left Eye	6.0	9.0	5.5	Right Eye	6.0	9.0	5.5	Nasal area: White powder left nostril Oral cavity: Clear	
	Room light 2.5 - 5.0	Darkness 5.0 - 8.5	Direct 2.0 - 4.5															
Left Eye	6.0	9.0	5.5															
Right Eye	6.0	9.0	5.5															
Blood pressure 142/96		Temperature 99.8		REBOUND DILATION <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No														
Muscle tone: <input type="checkbox"/> Normal <input type="checkbox"/> Flacid <input checked="" type="checkbox"/> Rigid		REACTION TO LIGHT: Slow																
RIGHT ARM 		LEFT ARM 																
Comments: Nothing		Nothing observed																
What drugs or medications have you been using? "Nothing"		How much? N/A		Time of use? N/A	Where were the drugs used? (Location) N/A													
Date / Time of arrest: 02-08-10	Time DRE was notified: 2205	Evaluation start time: 2230	Evaluation completion time: 2335	Precinct/Station: North Precinct														
Officer's Signature:		DRE # 7883	Reviewed/approved by / date:															
Opinion of Evaluator:		<input type="checkbox"/> Rule Out <input type="checkbox"/> Alcohol <input checked="" type="checkbox"/> CNS Stimulant <input type="checkbox"/> Dissociative Anesthetic <input type="checkbox"/> Inhalant <input type="checkbox"/> Medical <input type="checkbox"/> CNS Depressant <input type="checkbox"/> Hallucinogen <input type="checkbox"/> Narcotic Analgesic <input type="checkbox"/> Cannabis																

DRUG INFLUENCE EVALUATION NARRATIVE

Suspect: Hedlund, James R.

1. **LOCATION:** The evaluation of James Hedlund was conducted at the Pulaski County Jail.
2. **WITNESSES:** Arresting Officer, TPC Jeff Hust, Arkansas State Police and Pam Mays of the Arkansas Criminal Justice Institute.
3. **BREATH ALCOHOL TEST:** Hedlund's breath test was a 0.00%.
4. **NOTIFICATION AND INTERVIEW OF THE ARRESTING OFFICER:** The writer was contacted by Trooper Hust requesting a drug evaluation. Writer contacted Trooper Hust at the County Jail where it was determined that he had stopped the suspect for driving 100 mph and for driving without headlights on I-30 East. The suspect was excited, talkative and very restless. He performed poorly on the roadside SFST's and was arrested for DUI.
5. **INITIAL OBSERVATION OF SUSPECT:** Writer first observed the suspect in the interview room with Trooper Hust. The suspect was rocking back in forth in his chair and could not remain still. His speech was fast and his reflexes were quick and exaggerated.
6. **MEDICAL PROBLEMS AND TREATMENT:** None observed and none stated.
7. **PSYCHOPHYSICAL TESTS:** Romberg Balance: Suspect swayed approximately 3" front to back and estimated 30 seconds in 22 seconds. Walk & Turn: Suspect started too soon, lost his balance twice during the instructions, raised his arms for balance and made an abrupt quick turn. One Leg Stand: Suspect swayed, raised his arms, hopped and put his foot down once standing on the left foot and once while standing on the right foot. Finger to Nose: Suspect missed the tip of his nose on five of the six attempts.
8. **CLINICAL INDICATORS:** The suspect's pulse, blood pressure and temperature were above the normal ranges. His pupils were dilated in all three lighting levels and they reacted slowly to light.
9. **SIGNS OF INGESTION:** White powder residue was located in the suspect's left nostril.
10. **SUSPECT'S STATEMENTS:** The suspect denied using any drugs.
11. **DRE'S OPINION:** In my opinion Hedlund is under the influence of a CNS Stimulant and unable to operate a vehicle safely.
12. **TOXICOLOGICAL SAMPLE:** The suspect provided a urine sample.
13. **MISCELLANEOUS:**

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DRUG INFLUENCE EVALUATION													
Evaluator Sgt. Frank Barnes, Oklahoma City P.D.		DRE # 2894	Rolling Log # 10-08-02		Session X - #2								
Recorder/Witness Sgt. Charlie Phillips, Oklahoma City P.D.		Crash: <input checked="" type="checkbox"/> None <input type="checkbox"/> Fatal <input type="checkbox"/> Injury <input type="checkbox"/> Property		Case # 07-22876									
Arrestee's Name (Last, First, Middle) Kohlhepp, Kim J.		Date of Birth 8/24/73	Sex F	Race W	Arresting Officer (Name, ID#) Officer David Steiner, OKC PD #8895								
Date Examined / Time / Location 08/02/10 2315 Oklahoma Co. Jail		Breath Results: Results: 0.00		Test Refused <input type="checkbox"/> Instrument #: 150024	Chemical Test: Urine <input type="checkbox"/> Blood <input checked="" type="checkbox"/> Test or tests refused <input type="checkbox"/>								
Miranda Warning Given Given By: F. Barnes 2317		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	What have you eaten today? When? Hot dog 1pm		What have you been drinking? How much? "Nothing"		Time of last drink? N/A						
Time now/ Actual Midnight/2322	When did you last sleep? How long Yesterday 4 hours	Are you sick or injured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you diabetic or epileptic? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No									
Do you take insulin? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Do you have any physical defects? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Are you under the care of a doctor or dentist? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No									
Are you taking any medication or drugs? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No "I don't do drugs"		Attitude: Cooperative, restless		Coordination: Poor, jittery, stumbling									
Speech: Very talkative, rapid		Breath Odor: Normal		Face: Normal									
Corrective Lenses: <input checked="" type="checkbox"/> None <input type="checkbox"/> Glasses <input type="checkbox"/> Contacts, if so <input type="checkbox"/> Hard <input type="checkbox"/> Soft		Eyes: <input type="checkbox"/> Reddened Conjunctiva <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Bloodshot <input type="checkbox"/> Watery		Blindness: <input checked="" type="checkbox"/> None <input type="checkbox"/> Left <input type="checkbox"/> Right		Tracking: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal							
Pupil Size: <input checked="" type="checkbox"/> Equal <input type="checkbox"/> Unequal (explain)		Vertical Nystagmus <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Able to follow stimulus <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Eyelids: <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Droopy							
Pulse and time 1. 100 / 2328 2. 108 / 2341 3. 104 / 2355		HGN Lack of Smooth Pursuit Maximum Deviation Angle of Onset	Left Eye No No None	Right Eye No No None	Convergence Right eye Left eye		34 ONE LEG STAND 35 L R <input checked="" type="checkbox"/> Sways while balancing <input checked="" type="checkbox"/> Uses arms to balance <input checked="" type="checkbox"/> Hopping <input checked="" type="checkbox"/> Puts foot down						
Romberg Balance 0" 0" 2" 2"		Walk and Turn test Cannot keep balance Starts too soon Stops walking Misses heel-toe Steps off line Raises arms Actual steps taken		1 st Nine 2 nd Nine <table border="1"><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></table>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												
Internal clock 20 estimated as 30 seconds		Describe Turn Spinning turn, quick movement		Cannot do test (explain) N/A		Type of footwear: Heels (removed)							
Draw lines to spots touched Eyelid tremors		PUPIL SIZE Room light 2.5 - 5.0 Darkness 5.0 - 8.5 Direct 2.0 - 4.5		Left Eye 6.5 9.0 6.0		Right Eye 6.5 9.0 6.0							
Blood pressure 144/104		Temperature 99.8		REBOUND DILATION <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		REACTION TO LIGHT: Slow							
Muscle tone: <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Flaccid <input type="checkbox"/> Rigid		Nothing observed		RIGHT ARM 		LEFT ARM 							
Comments: What drugs or medications have you been using? How much? "I don't use drugs anymore."		Time of use? Refused		Where were the drugs used? (Location) Refused									
Date / Time of arrest: 08/02/10 2240		Time DRE was notified: 2305		Evaluation start time: 2315		Evaluation completion time: 08/03/10 0035							
Officer's Signature:		DRE # 2894	Reviewed/approved by / date:										
Opinion of Evaluator:		<input type="checkbox"/> Rule Out <input type="checkbox"/> Alcohol <input checked="" type="checkbox"/> CNS Stimulant <input type="checkbox"/> Dissociative Anesthetic <input type="checkbox"/> Inhalant	<input type="checkbox"/> Medical <input type="checkbox"/> CNS Depressant <input type="checkbox"/> Hallucinogen <input type="checkbox"/> Narcotic Analgesic <input type="checkbox"/> Cannabis										

DRUG INFLUENCE EVALUATION NARRATIVE

Suspect: Kohlhepp, Kim J.

1. **LOCATION:** The evaluation was conducted at the Oklahoma County Jail.
2. **WITNESSES:** The evaluation was witnessed by the arresting officer; Officer David Steiner and by Sergeant Charlie Phillips of the Oklahoma City P.D.
3. **BREATH ALCOHOL TEST:** Kohlhepp's breath test was 0.00%.
4. **NOTIFICATION AND INTERVIEW OF THE ARRESTING OFFICER:** The writer was contacted by Officer Steiner requesting a drug evaluation. After arriving at the County Jail, Officer Steiner reported that he had stopped the suspect for driving 65 mph in a 30 mph zone and for failing to stop at a traffic signal. The suspect was very talkative and restless. She was unable to perform the SFST's as directed and was arrested for DUI.
5. **INITIAL OBSERVATION OF SUSPECT:** Writer first observed the suspect in the interview room standing next to Officer Steiner. She was very fidgety and could not stand still. When told to sit down she would sit for a few seconds and then quickly get back up.
6. **MEDICAL PROBLEMS AND TREATMENT:** None observed and none stated.
7. **PSYCHOPHYSICAL TESTS:** Romberg Balance: Suspect swayed approximately 2" side to side and estimated 30 seconds in 20 seconds. Walk & Turn: Suspect stepped off the line twice, raised her arms for balance and turned using an abrupt swivel-like movement. One Leg Stand: Suspect swayed, raised her arms, hopped once when standing on the left foot, and put her foot down one time while standing on each foot. Finger to Nose: Suspect missed the tip of her nose on each attempt.
8. **CLINICAL INDICATORS:** The suspect's pulse, blood pressure and temperature were above the normal ranges. Her pupils were dilated in all three lighting conditions.
9. **SIGNS OF INGESTION:** The suspect's nostrils were red and ulcerated.
10. **SUSPECT'S STATEMENTS:** She denied using drugs, stating "I don't use drugs anymore."
11. **DRE'S OPINION:** In my opinion, Kohlhepp is under the influence of a CNS Stimulant and unable to operate a vehicle safely.
12. **TOXICOLOGICAL SAMPLE:** The suspect provided a blood sample.
13. **MISCELLANEOUS:** There was an outstanding warrant for the suspect for failure to appear on a charge of possession of methamphetamine.

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Topics for Study

1. Why is it sometimes difficult for a DRE to obtain evidence of CNS Stimulant influence when examining a Cocaine user?
2. What kinds of illicitly manufactured Amphetamines are most commonly abused?
3. Name two CNS Stimulants other than Cocaine or the Amphetamine compounds.
4. How do CNS Stimulants usually affect the blood pressure and pulse rate?
5. True or false: A person under the influence of a CNS Stimulant alone usually will not exhibit Horizontal Gaze Nystagmus?
6. What is "bruxism"?