U.S. DEPARTMENT
OF TRANSPORTATION

Preliminary Training For Drug Evaluation and Classification Program

"The Pre-School"

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Student Manual

NHTSA
People Saving People

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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:

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

GOAL AND OBJECTIVES

Welcome to the Drug Evaluation and Classification (DEC) Program. This course is the first in a series of three training programs that, collectively, prepare police officers and other qualified persons to serve as Drug Recognition Experts (DREs).

Throughout this manual, the term "DRE" is used to designate an individual who is specially trained to conduct drug evaluations of suspected drug impaired drivers. In some participating agencies, the term stands for "Drug Recognition Expert", in others it means "Drug Recognition Examiner", and in others, "Drug Recognition Evaluator". In addition, some agencies use the term "DRT" - "Drug Recognition Technician", and others use "DRS" - "Drug Recognition Specialist". All of these are acceptable and synonymous. But for the training program, the standard term is "DRE".

The Drug Evaluation and Classification (DEC) Program is a national effort to deter impaired driving by increasing the likelihood that people who drive under the influence of drugs will be detected, caught, convicted and punished. The DEC Program is sponsored by the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA). It is administered and coordinated by the International Association of Chiefs of Police (IACP), and supported by the State's Highway Safety offices, and state and local law enforcement agencies. It is endorsed by the U.S. Department of Justice, the American Bar Association and the National Commission Against Drunk Driving, to name just a few supporters. It is based on techniques that were first developed by the Los Angeles Police Department. **But its ultimate effectiveness depends totally on people like you**. The men and women who are trained to serve as drug recognition experts (DREs) are the solid foundation of the DEC Program. You and your brother and sister DREs are the ones who investigate suspected drug impaired drivers and obtain the detailed, convincing evidence that allows prosecutors to convict them. It may sound like a cliche, but this country <u>is</u> in a war against drug abuse. You are going to help us win it.

This is the <u>pre</u>liminary phase of your training. That's why we call it the Pre-School. Once you've successfully completed these two days, you will have begun to learn to do the things DREs need to do to diagnose drug impairment accurately. But you will only have just begun. You will still need to complete the next phase of training, the seven day DRE School, <u>and</u> the final phase of training, when you will conduct examinations of people suspected of drug impairment. We call that final phase **certification training**, because once you have completed it you will receive your certificate as a DRE from the IACP. But right now, you still have a lot of training ahead of you.

Our goal for these first two days is simple: **to prepare you to participate successfully in the seven-day DRE School**. Through your participation in lectures, discussions and -- most importantly -- hands-on exercises, we expect that you will be able to do seven things:

- Define the word "drug", as DREs use the term, and name the seven categories of drugs.
- Identify the twelve components, or steps, in the DEC drug influence examination to diagnose a drug impaired subject.
- Administer and interpret the psychophysical (or "divided attention") tests used by DREs during the drug influence evaluation.
- Check and measure a subject's vital signs.
- List the major signs and symptoms of impairment for each drug category.
- Conduct the eye examinations that are part of the drug influence evaluation.
- Describe the history and physiology of alcohol as a drug.

We don't expect you to become perfect at doing these tasks by the end of the day tomorrow. You'll become even better at doing these and other tasks during the DRE School, and during certification training. But this Pre-School will help you get started.

1. <u>What is a "drug"?</u>

   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.

   Some sample definitions from dictionaries:

   "A drug is a substance used as a medicine or in making medicines." (Webster's <u>Seventh New Collegiate Dictionary</u>, 1971)

   This definition seems to exclude any substance that has no medicinal value. But there are many non-medicinal substances that regularly are abused. Model airplane glue is one such substance.

"A drug is a narcotic substance or preparation." (Also from Webster's). Clearly, not all drugs that are of concern to police officers are narcotics. Cocaine, for example, is very different from a narcotic.

"A drug is a chemical substance administered to a person or animal to prevent or cure disease or otherwise to enhance physical or mental welfare." (From Random House's College Dictionary, 1982)

Drug:

1. Substance taken by mouth, injected, or applied locally to treat a disorder (i.e. to ease pain).

2. A chemical substance introduced into the body to cause pleasure or a sense of changed awareness, as is the non-medical use of lysergic acid diethylamide (LSD).

   (From the Medical Dictionary for the non-professional, 1984)

Here again, anything that has no medicinal value apparently doesn't fit the dictionary notion of a "drug".

From your perspective as a traffic law enforcement officer, a non-medicinal concept of "drug" is needed. The definition we will use is adapted from the California Vehicle Code:

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

2. Categories of drugs

Within the simple, enforcement oriented definition of "drug" that we have adopted, there are seven broad categories. The categories differ from one to another in terms of how they affect people and in terms of the observable signs of impairment they produce.

Central Nervous System Depressants

This category includes a large number of different drugs. The most familiar drug of all--alcohol--is a central nervous system depressant. Depressants slow down the operation of the brain and other parts of the central nervous system.

Central Nervous System Stimulants

This category also includes a large number of drugs, all of which act quite differently from the depressants. Central nervous system stimulants impair by "speeding up", or over stimulating the brain. Cocaine and Methamphetamine are examples of CNS stimulants.

Hallucinogens

This category includes some natural, organic substances, and some synthetic chemicals. Hallucinogens impair the user's ability to perceive the world as it really is. Peyote (which comes from a particular variety of cactus) is a naturally occurring hallucinogen. LSD is an example of a synthetic hallucinogen.

Dissociative Anesthetics

This category consists of various drugs or substances that inhibit pain by cutting off or "disassociating" the brain's perception of pain. PCP and it's analogs are examples of this drug category.

Narcotic Analgesics

This category includes the natural derivatives of opium, such as morphine, heroin, codeine and many others. The category also includes many synthetic drugs, such as Demerol, Methadone and others. All narcotic analgesics relieve pain (that is what "analgesic" means) and produce addiction.

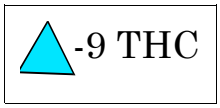
Inhalants

This category includes a large number of breathable chemicals, most of which are familiar household items that can be purchased without prescription. Indeed, most of the things that we call inhalants are not at all intended by their manufacturers to be used as drugs. The inhalants include such things as the volatile solvents found in glue, gasoline, paint thinner, etc; the aerosols found in spray cans, such as hair sprays, insecticides, and similar things; and certain anesthetic gases, such as nitrous oxide and amyl nitrite.

Cannabis

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

There is also a synthetically produced form of THC known as Marinol. It too is a member of the Cannabis category of drugs.



Each category of drugs produces a distinct set of observable effects. No two categories affect people in exactly the same way.

3. Frequency of drug use

No one knows with any appreciable degree of certainty how many Americans use drugs, or how frequently the various drugs are used. Estimates of drug use vary widely, and the estimates apparently depend on the kinds of people who were surveyed, where they were surveyed and the methods used. But all estimates agree that an appreciable segment of this country's population do use drugs.

Alcohol remains the most familiar and abused drug. The exact number of people who abuse alcohol is not exactly known. However, it was reported in the National Survey on Drug Use and Health (NSDUH) that an estimated 119 million Americans age 12 years or older reported being current drinkers of alcohol in 2003 (51.0 percent of the population). About 54 million (22.9 percent) also reported participating in binge drinking at least once in the 30 days prior to participating in the survey, and 15.9 million (6.7 percent) were heavy drinkers.

The same NSDUH survey reported that the prevalence of current alcohol use increased with increasing age in 2002, from 2.0 percent at age 12 years to 6.5 percent at age 13, 13.4 percent at age 14, 19.9 percent at age 15, 29.0 percent at age 16, and 36.2 percent at age 17. The rate peaked at 70.9 percent for persons 21 years old.

There are several statistics that suggests the potential magnitude of America's substance abuse problem: In 2002, more than three billion prescriptions were filled for over 500,000 different drugs; 234 million for controlled prescription drugs. Plus approximately six percent of the U.S. population (15.1 million people) reported abusing controlled prescription drugs in 2003. At the same time there were approximately 6.3 million Americans age 12 years or older who admitted using prescription drugs for non-medical reasons.

According to the 2004 NSDUH report, about 6.1 percent of Americans admit using marijuana and another 2.4 million persons admitted abusing non-prescription drugs in the past year (2003).

Drug abuse also seriously effects driving as well. In 2002 and 2003, almost 16.6 percent of adult drivers aged 21 years or old reported that they had driven while under the influence of alcohol and/or illicit drugs during the past year. More than one in three adult drivers aged 21 to 25 years (33.8 percent) reported having driven under the influence of alcohol or drugs in the past year.

Non-medical use of prescription drugs is increasing with 2.4 million Americans admitting abuse in the past year (2003).

Many substance abusers apparently routinely use more than one drug at a time. For example, some like to drink alcohol while smoking marijuana. Others prefer to use PCP by sprinkling it on marijuana cigarettes, or "joints". While others prefer their heroin mixed with cocaine.

Polydrug use is defined as ingesting drugs from two or more drug categories. The prefix "poly" derives from the Greek word for "many". People who routinely use drugs from two or more categories are polydrug users.

Polydrug use appears to be very common, at least among people involved in impaired driving incidents. For example, the National Highway Traffic Safety Administration (NHTSA) and the LAPD conducted a study of blood samples drawn from 173 suspected drug impaired drivers arrested in Los Angeles. Nearly three-quarters of those arrestees had two or more drug categories in their systems.

Because polydrug use is so common, it is highly likely that you will encounter suspects who are impaired by a <u>combination</u> of drug categories. Do not be fooled by the fact that a suspect may have a strong odor of alcoholic beverage on his or her breath: other drugs often are taken in combination with alcohol.

When you come in contact with a polydrug user, you may observe a <u>combination of effects</u>, as the different drugs in his or her system affect the suspect in their various ways. The effects you observe may vary widely, depending on exactly what combination of drugs is involved, how much of each drug was ingested, and when they were ingested.

REVIEW QUESTIONS

Test your knowledge of the subject matter covered in this module by answering the following questions. Answers are given on the next page.

1. What is a "drug" as the term is used in this course?

2. What are the seven major categories of drugs?

3. What kind (category) of drug is alcohol? What about Cocaine? What about Heroin?

4. How would you respond to someone who suggests that the "drug problem" basically occurs only in a few metropolitan areas, and doesn't apply to their community?

5. What category of drug is PCP classified? What about Marijuana? What about Valium?

6. What category of drug is Methamphetamine? What about LSD? What about Peyote?

7. What does the term "polydrug use" mean?

ATTACHMENT

DRUG EVALUATION AND CLASSIFICATION PROGRAM

GLOSSARY OF TERMS

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

ADDICTION
The 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 when they were taken, the suspect's pupils could be constricted, 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

1. One of the seven drug categories. Cannabis includes marijuana, hashish, hash oil and marinol.

2. Several species of plants from which marijuana and related products are made (e.g. Cannabis Sativa and Cannabis Indicia).

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 and 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 his or her 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 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 inhibit pain by cutting off or "disassociating" the brain's perception of pain. PCP and it's 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 producing hormones or neurotransmitters to counteract the effects of the drug consumed.

DRUG

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

DYSPNEA
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, he/she 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/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 THC content usually 10% to 12%.

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 pulsating of the pupils of the eyes, as they dilate and constrict within fixed limits.

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.

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.

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, percodan and oxycodone), 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 state of deep relaxation, 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

The study of living organisms and the changes that occur during activity.

PILOERECTION

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

POLYDRUG USE

Ingesting drugs from two or more drug categories.

PSYCHEDELIC

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

PSYCHOPHYSICAL TESTS

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

PSYCHOTOGENETIC

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

PSYCHOTOMIMETIC

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

PTOSIS

Droopy eyelids.

PULSE

The expansion and 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.

REBOUND DILATION

A period of constriction followed by dilation with a change equal to or greater than 2 mm.

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 unpollenated 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. An example of this would be a person “hearing” a phone ring and “seeing” the sound as a flash of light. Synesthesia sometimes occurs with persons under the influence of hallucinogens.

SYSTOLIC

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

TACHYCARDIA

Abnormally rapid heart rate; 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.

VOIR DIRE

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

VOLUNTARY NERVE

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

WITHDRAWAL

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

TAB

SESSION II

SESSION II

OVERVIEW OF DRUG EVALUATION AND CLASSIFICATION PROCEDURES

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

- Identify the twelve major components of the Drug Evaluation and Classification Program drug influence evaluation.

- Discuss the purposes of each component.

THE SYSTEMATIC AND STANDARDIZED PROCESS

You are going to become a DRE. What exactly is it that you will do?

You will conduct what amounts to detailed, physical diagnostic evaluations of persons who have been arrested for impaired driving or similar offenses. Based on the information you obtain in the evaluation, you will form an expert opinion about three issues:

- Is the person, right now, impaired? In other words, would he or she be unable to operate a vehicle safely? And if you conclude that the person is impaired...
- Is the impairment due to an injury, illness or other medical complication, or is it drug-related? And if you conclude that the impairment is due to drugs...
- Which category, or combination of categories, of drugs is the most likely source of the impairment?

You will always conduct these diagnostic evaluations in a controlled environment, typically at a precinct, jail intake station, troop headquarters or some other place where impaired drivers are brought for booking after arrest. You will not conduct the examination at the roadside, because the measurements and observations you need to make cannot accurately be performed under roadside conditions.

In some cases, the people you examine will be drivers that you personally arrested. But it is likely that most of the time they will be persons arrested by other officers. You'll get involved in those cases because your special expertise as a DRE is needed to find out exactly what is wrong with the person in question. In other words, you will be called in to the precinct or jail or headquarters and asked to examine the suspect. Is the suspect on drugs, or under the influence of alcohol alone? Is the suspect sick, or perhaps emotionally disturbed? Most basically, is he impaired right now? It will largely be up to you to answer these questions.

The evaluation that you will conduct will be totally **systematic**. In other words, you will conduct an evaluation in a standardized and systematic manner. You will evaluate their appearance. You will assess the suspect's behavior. You will carefully measure and record the vital signs. You will make precise observations of the automatic responses and reactions of their eyes. You will administer carefully designed psychophysical tests that will allow you to evaluate the suspect's judgment, information processing ability, coordination and various other characteristics. In other words, you will systematically consider everything observable about the person that could indicate the influence of drugs.

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

The systematic and standardized evaluation breaks 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.

1. **Breath Alcohol Test**

   When you are summoned to evaluate a subject, the first question you will ask is "What were the results of the subject's breath alcohol test?" You need to know the results of the breath alcohol test because you must determine whether alcohol alone accounts for the impairment you observe. If the arresting officer has not already administered a breath test to the subject, you will request that the test be given. Remember: Many of the subjects you examine will turn out to be under the influence of a combination of alcohol and other drugs.

2. **Interview of the Arresting Officer**

   If you did not personally arrest the subject, you will need to spend a few minutes with the arresting officer before you begin the evaluation. The arresting officer witnessed the driving, saw how the subject reacted to the command to stop, interacted with the subject at the roadside, administered some Standardized Field Sobriety Tests, and in general was exposed to a great deal of information bearing on the subject's mental and physical condition. Very likely, the arresting officer won't be as knowledgeable about drugs as you are. It is possible that the arresting officer saw or heard something that could be a clue of drug use, but didn't recognize its significance. So you will draw the officer aside for a brief conversation. Ask about the subject's driving: Was it fast or slow? Was the car drifting or swerving? Was a collision involved, and if so, did the subject suffer any apparent injuries? Ask about the subject's behavior: What kind of attitude have they exhibited? How has the subject responded to the officer's questions? Has the officer observed any unusual behaviors from the subject and if so, what? Did the officer observe the subject smoking or eating anything? Has the subject used any unusual or unfamiliar words or expressions? Has the subject admitted drinking or using drugs? Ask about any unusual or unfamiliar objects that might have been found in the subject's possession.

3. **Preliminary Examination**

The third step begins your extensive physical contact with the subject. Make sure you are wearing protective gloves at this time. Your primary purpose at this time is to look for any evidence of a medical complication that would warrant terminating the evaluation and summoning medical assistance. You will ask the subject a series of questions, and you will examine their eyes to determine if the pupils differ significantly in size, or if the eyes are unable to "track" together. You will also check for an estimation of the angle of onset of nystagmus at this point. This will assist you in making the decision whether the subject is under the influence of alcohol alone. You will also take the first of three measurements of the subject's pulse at this point. If you find evidence of a medical problem, you will terminate the evaluation, and seek medical help for the subject if appropriate. Otherwise, you will proceed with the evaluation. This stage of the evaluation is commonly called the "fork in the road" as you will be deciding whether to continue with the evaluation at this point.

4. **Examinations of the Eyes**

This is the time when you will administer three tests of the subject's eyes. The first is Horizontal Gaze Nystagmus; that is the same test with which you are familiar from your training in Standardized Field Sobriety Testing. The test will be more precise for the DRE as you will be estimating the angle of onset of the nystagmus. The second test is Vertical Gaze Nystagmus, this involves an up-and-down jerking of the eyeball that occurs as the eyes gaze upward in the vertical plane. The third test is Lack of Convergence, which is 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 the nose.

Nystagmus is caused by three of the seven drug categories: Central Nervous System Depressants; Inhalants; and by Dissociative Anesthetics, such as PCP and it's analogs. It may help you remember this if you call them the "DID" drugs. If a person is under the influence of any of the DID drugs, he or she usually will exhibit Horizontal Gaze Nystagmus. And if the person is sufficiently impaired by a DID drug, Vertical Gaze Nystagmus often will be visible. (Vertical Gaze Nystagmus is caused by a high dosage, for that individual, of a DID drug.) But none of the other four drug categories will cause nystagmus. So a subject might be under the influence of a Stimulant, Hallucinogen, Narcotic, or Cannabis, but no Horizontal or Vertical Gaze Nystagmus will be observed in their eyes.

What about Lack of Convergence? First, the same drugs that cause nystagmus also cause Lack of Convergence. So, if a person is under the influence of any of the DID drugs, they usually will be unable to cross the eyes. In addition, **C**annabis causes Lack of Convergence. So when we check for Lack of Convergence, we try to remember the "**DID-C**" drugs: any of those four will usually prevent the eyes from converging. The other three categories, CNS Stimulants, Hallucinogens and Narcotics, will not cause Lack of Convergence.

5. **Divided Attention Psychophysical Tests**

At this stage of the evaluation you will collect the evidence that will solidly establish whether the subject, right now, is impaired and cannot operate a vehicle safely. We all know, as do judges and juries, that safe driving demands that we are able to attend properly to many things at the same time. We have to be able to steer, control the accelerator, look for other traffic, identify stop signs and signal lights, etc. This means that we have to be able to **divide our attention** among all of the individual tasks that constitute driving a car. One thing that all drugs have in common is that they impair a person's ability to divide attention. Drugs simply make it very difficult for people to handle several tasks at the same time. As a DRE, you will administer four divided attention psychophysical tests to your subjects. The tests are called Romberg Balance, Walk and Turn, One Leg Stand and Finger to Nose. Each test is designed to require the subject to do two or more tasks at the same time. Some of these things are **physical** tasks, like walking or standing on one leg. Others are mental, or **psychological** tasks, such as recalling instructions, counting, or estimating the passage of time. (That's why we call these tasks **psychophysical** tests.) People who are impaired by drugs won't be able to perform these tests very well, and the mental and physical mistakes they make will go a long way toward convincing the judge or jury that they were in fact impaired.

6. **Examination of Vital Signs**

The sixth component of the drug influence evaluation requires you to make precise measurements of the subject's pulse rate, blood pressure and body temperature. You will measure the subject's pulse rate at three different times: once during the preliminary examination, a second time during the vital signs examination, and a final time during the injection site examination of the subject. In order to measure blood pressure, you will learn to use medical instruments, including a **stethoscope** and a **sphygmomanometer** (i.e. blood pressure cuff). For body temperature, you will use an oral thermometer, always protected by a disposable mouthpiece.

The vital signs provide some very important clinical evidence of drug impairment. Two drug categories, i.e., the Depressants and the Narcotic Analgesics, usually lower the pulse rate, while the other five categories usually elevate the pulse. Depressants, Narcotic Analgesics and some Inhalants will usually lower blood pressure, while CNS Stimulants, Hallucinogens, Dissociative Anesthetics, such as Phencyclidine, Cannabis and most Inhalants usually cause the blood pressure to rise. Narcotic Analgesics usually cause the temperature to be lower than normal. CNS Stimulants, Hallucinogens, some Inhalants, and some Dissociative Anesthetics, such as PCP usually elevate temperature. Depressants, Cannabis and other Inhalants typically don't affect body temperature.

7. **Dark Room Examinations**

At this point in the evaluation, you will take the subject into a separate room. Depending on the policies established by your agency, you might handcuff the subject at this time or request another officer to accompany you. The first thing you will do in the room is to obtain a estimate of the subject's pupil size in room light. You will use a device called a **pupillometer** to do this. It is simply a cardboard or plastic card on which a number of circles or semi-circles appear. You will hold the pupillometer next to the subject's eye, and you will locate the particular circle or semi-circle that is closest in size to the subject's pupil, and you will record the size of that circle. You will do this first for the left eye, then for the right. Then, you will turn out the lights in the room. You and the subject will remain in the dark for ninety seconds, this will allow your eyes to adapt to the darkness. You will then use a penlight to introduce different levels of illumination into the subject's eyes. At first, a very low level of light will be used, just enough to allow you to see the pupils and obtain an estimate of their size. Next, you will shine the penlight directly into the subject's eyes. For each level of illumination, you will hold the pupillometer up next to the eyes and obtain a numeric estimate of pupil size. While you are directly illuminating the eyes, you will hold the light steadily on the eye for fifteen seconds, and observe how quickly the pupil reacts to the direct light. Pupil size and pupil reaction to light are affected by some, but not all of the drug categories. Narcotic Analgesics usually cause the pupils to become very **constricted**, i.e., smaller than normal. CNS Stimulants and Hallucinogens typically cause the pupils to **dilate**, i.e. grow larger than normal. Cannabis often causes some dilation of the pupils, although usually not as severe as that caused by CNS Stimulants or Hallucinogens. Some but not all Inhalants cause dilation. The Dissociative Anesthetics such as Phencyclidine and CNS Depressants usually will not affect the size of the pupils.

Before you leave the dark room, you will also use your penlight to illuminate the subject's nasal area and mouth. The purpose of this is to check for any signs of ingestion in the oral or nasal area. Many times you will be able to

observe evidence of ingestion of various drugs. Often you will spot debris or discoloration caused by snorting, smoking or eating certain drugs. In some cases you might even find that the subject has attempted to conceal drugs in the mouth, usually wrapped in small balloons or bits of foil and lodged between the gum and teeth. You will also be very close to the subject and may detect odors on their breath.

8. **Examination of Muscle Tone**

After you leave the dark room, you will have the subject sit down and place his or her arms on a table. Make sure you are wearing protective gloves, and "work" the muscles of the subject's arms with your hands. Some drug categories, i.e. Depressants and Narcotic Analgesics, often will cause the muscles to be very flaccid, or loose and rubbery. Dissociative Anesthetics such as Phencyclidine and its analogs and possibly CNS Stimulants and Hallucinogens, cause a rigid, stiff or tense feeling in the muscles.

9. **Examination for Injection Sites**

At the same time that you inspect the subject's arms for muscle tone, you will carefully inspect the arms, the hands, the fingers, etc. for signs of recent or past hypodermic needle injections. Look for the characteristic scarring, or "track marks", of the habitual "hype". Search especially in and around tattoos and scabs. Feel with your fingers for "bumps" or welts that might be fresh injection marks. You will use an illuminating magnifying lens (called a **schematic light**) for a close visual inspection of possible injection sites.

When we think of drug use by hypodermic needle, we usually think primarily of Narcotic Analgesics, especially Heroin, but many people routinely inject other drugs. Cocaine and Methamphetamine for example, are often "shot", and hypodermic injection of certain Depressants, Phencyclidine and LSD is not unheard of.

10. **Subject's Statements and Other Observations**

By this time, you have probably spent at least thirty minutes with the subject, you have completed your physical evaluation, and have made note of any statements made by the subject. If you have determined that the subject is impaired, you should by now have a clear opinion of the category or combination of categories of drugs affecting the subject. Interview the subject in a way that conveys the fact that you already know what he or she has been doing.

For example, don't ask a question such as "have you been using any drugs tonight?" Instead, phrase the question in an assertive, confident manner. For example you believe that he or she is under the influence of Cannabis. You might begin the interview by asking "when did you smoke your last joint tonight?" If the subject responds "I never said I smoked a joint", your response might be "we both know you've been smoking Marijuana; I can see it in your eyes, in your pulse, and in everything about you. Now, how many joints did you smoke, and when did you finish the last one?" Make sure that you carefully and accurately record the subject's statements.

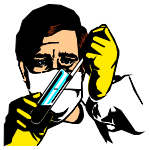
11. **Opinions of the Evaluator**

In the next to the last step of the evaluation process, you will document your conclusions. Remember: your job is to render an expert opinion about the condition of the subject right now; it is not your function to speculate about their condition at the time of arrest, unless of course, you witnessed the arrest. IF YOU CONCLUDE THAT THE SUBJECT IS NOT NOW IMPAIRED, SAY SO. But if you conclude that the subject is impaired, your opinion should be written in the following form:

> "In my opinion, (subject's name) is under the influence of (category or combination), and is unable to operate a vehicle safely."

It is important to include the phrase "unable to operate a vehicle safely." That is a key element of the offense with which the subject will be charged. IT IS ALSO VERY IMPORTANT THAT YOUR OPINIONS REFER TO DRUG CATEGORIES AND NOT TO SPECIFIC DRUGS. The sole exception is alcohol. Because you have administered a breath test to the subject, you know whether or not alcohol is present. If the subject has a positive Blood Alcohol Concentration (BAC), your opinion should always state that the subject is under the influence of a combination of alcohol and some other category or categories. You know how much alcohol the subject has in their system, but as far as other drugs are concerned, you do not have access to a chemical test when you form your opinion. Suppose you examine a subject, and find that everything about them is consistent with impairment by a CNS Stimulant. Furthermore the subject admits to having injecting Cocaine, and further you find in their possession, a packet of white powder that resembles Cocaine. Despite all of this, your opinion will not mention Cocaine. Instead, you will write that the subject "...is under the influence of a CNS Stimulant..." For all you know, the subject may have thought it was Cocaine that they had injected, but in reality it was Methamphetamine. Do not go beyond the bounds of your expertise. Of course, in your narrative report you would document the subject's admission of Cocaine use, and your recovery of a substance that appeared to be Cocaine.

12. **Toxicologic Examination**



Your final responsibility will be to obtain the specimen that will be sent to the laboratory for chemical analysis. Follow the proper procedures of your lab and your department to determine the type of specimen to be obtained, and to ensure proper control over the collection process, as well as to ensure proper handling, packaging and delivery of the specimen. Remember that some laboratories participating in this program want to receive a copy of the drug influence evaluation face sheet along with the specimen. Others may require a statement of the DRE's opinion.

Note: In some cases, the arresting officer may have already obtained the specimen prior to your arrival. If so, ensure that the arresting officer submits the sample to the laboratory for analysis. Also remember that some subject's may refuse to provide a specimen during this step in the evaluation. If so, follow local procedures and guidelines that address refusals. Just because the subject refuses to provide a specimen for analysis does not effect the evaluation or your ability to form an opinion.

REVIEW QUESTIONS

1. Study the checklist that appears near the beginning of this section, then put it aside, and list the twelve components of the Drug Evaluation and Classification drug influence evaluation in the sequence in which they are to be performed.

2. Name the four divided attention psychophysical tests used to assess a subject's impairment.

3. When is the first measurement of a subject's pulse rate taken?

4. Name the two medical instruments that are needed to measure a subject's blood pressure.

5. What is the name of the device used to estimate the size of the subject's pupils?

6. Which categories of drugs usually cause nystagmus? Which usually cause Lack of Convergence?

7. Which categories usually elevate the pulse rate? Which usually lower the pulse rate?

TAB

SESSION III

SESSION III

THE PSYCHOPHYSICAL TESTS

SESSION III THE PSYCHOPHYSICAL TESTS

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

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

OVERVIEW OF THE TESTS

You will always use four divided attention psychophysical tests to evaluate someone suspected of drug impairment. These tests are **standardized** in their administration, documentation and interpretation. That means that we always give exactly the same instructions to subjects when we use these tests; we always record the subjects' performance in a prescribed manner; and we always look for a specific set of cues to determine to what extent the subjects are impaired.

The four tests are:

Romberg Balance
Walk and Turn
One Leg Stand
Finger to Nose

These tests are listed in the proper sequence.

Two of the tests, namely the Walk and Turn and the One Leg Stand, have been **scientifically validated**. That means that they were subjected to controlled research, involving hundreds of volunteer drinkers, in which it was demonstrated that they could reliably discriminate between impaired and unimpaired subjects. That same research program also demonstrated the scientific validity of Horizontal Gaze Nystagmus for identifying alcohol impairment. The other two tests, Romberg Balance and Finger to Nose, have not been subjected to that sort of scientific scrutiny, so they have not been validated. But saying that they haven't been validated is **not** the same thing as saying they are invalid. Properly administered and recorded, Romberg Balance and Finger to Nose produce very important and very credible evidence of a subject's impairment.

ROMBERG BALANCE

This test requires the subject to stand with the feet together, the head tilted slightly back, the 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 the feet together and the arms down at the sides.

- Tell the subject to maintain that position while you give the instructions. Emphasize that he or she must not start the test until 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 <u>not allowed</u> 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.

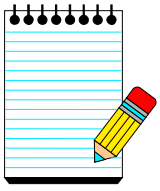
- Tell the subject to begin.

- Keep track of time while the subject performs the test.

- When the subject opens the eyes, ask them "how much time was that?"

- If 90 seconds elapse before the subject opens their 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 remain 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 training. The test requires the subject to stand in a heel to toe fashion with the arms at the 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 the arms at the sides. The subject must not stop walking until the test is completed.

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" (real or imaginary). Demonstrate.
   - "Place your right foot on the line ahead of the left foot, with the heel of your right foot against toe of left foot." Demonstrate.

- o "Place your arms down at your sides." Demonstrate.

- o "Keep this position until I tell you to begin. Do not start to walk until told to do so."

- o "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:

   - o "When I tell you to start, take nine heel-to-toe steps, turn, and take nine heel-to-toe steps back." (Demonstrate 3 heel-to-toe steps.)

   - o "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).

   - o "While you are walking, keep your arms at your sides, watch your feet at all times, and count your steps out loud."

   - o "Once you start walking, don't stop until you have completed the test."

   - o "Do you understand the instructions?" (Make sure subject understands.)

   - o "Begin, and count your first step from the heel-to-toe position as 'One.'"

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

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. subject breaks away from the heel to toe stance);

- Starts too soon (i.e. subject starts walking before you say "begin").

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 or performance stage of the test. They are:

- Stops while walking
- Does not touch heel to toe
- 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 stare at the elevated foot, and count out loud in this fashion: "one thousand and one, one thousand and two, one thousand and three, ..." until told to stop. You will time the subject as this test is performed, and will tell the subject to stop when 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 with your arms by your 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.)
   - "Keep both legs straight and your arms by your side."
   - "While holding that position, count out loud in the following manner: "one thousand and one, one thousand and two, one thousand and three, and so on, until told to stop." (Demonstrate a count, as follows: "one thousand and one, one thousand and two, one thousand and 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.)
   - Instruct the subject to begin the test.

NOTE: It is important that this test last for thirty seconds. You must keep track of the 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 and twenty". On the other hand, if the subject is counting rapidly, they may count to “one thousand and 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.

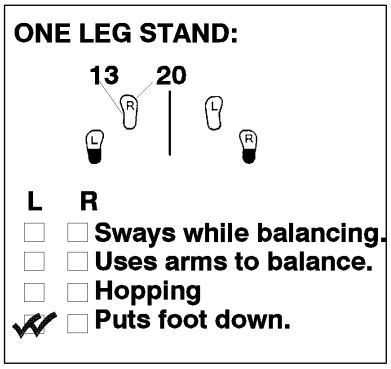
AFTER the subject completes the test while standing on the left leg, repeat the instructions and confirm that the subject understands them. Then have the subject perform the test while standing on the right leg.

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. Of course, 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 the 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, suppose that, when standing on the left leg, the subject lowered the right foot at a count of "one thousand and thirteen", and again at "one thousand and twenty"; Your diagram should look like the box 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.



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 process. 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 the index finger up to touch the tip of the nose. They will preform this test with their eyes closed and the 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 their feet together and to stand straight.

- Tell the subject to place their arms down by their sides, make a fist with the index finger extended and rotate the palms forward.

- Tell the subject that, when you say to "begin", they 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 they are supposed to touch the tip of the nose.

  NOTE: The arm is brought directly from the subject's side in front of the body touching the tip of the nose with the tip of the 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 they tilt their head back and close their eyes. EMPHASIZE to the subject that they 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 the 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 drug influence evaluation report diagram, you will draw a line to indicate exactly 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 worthy of note. Document all such observations on the face sheet or in your narrative report.

REVIEW QUESTIONS

1. List the four divided attention tests in the sequence in which they must be administered.

2. On which foot must the subject stand the first time he or she performs the One Leg Stand?

3. How much time must the subject estimate during the Romberg Balance?

4. List all of the scientifically validated clues of impairment for Walk and Turn.

5. List all of the scientifically validated clues of impairment for Finger to Nose.

6. What sequence of finger commands must you give for the Finger to Nose?

7. List all of the scientifically validated clues of impairment for Romberg Balance.

8. List all of the scientifically validated clues of impairment for One Leg Stand.

TAB

SESSION IV

SESSION IV

THE EYE EXAMINATIONS

SESSION IV THE EYE EXAMINATIONS

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

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

THE EYE EXAMINATIONS

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 injuries causing the nystagmus is present. Resting Nystagmus may also be observed at this time.

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 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.

DRE's 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 (SFST) for alcohol impairment. In fact, HGN not only is a powerful indicator of alcohol impairment, but it 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.

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


Check #1: Does the eye track smoothly?

Once again, 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 <u>able to pursue smoothly</u>. 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 <u>distinct and sustained nystagmus at maximum deviation</u> 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 <u>and sustained</u> 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.

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:

BAC = 50 - ANGLE.

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.

For DRE purposes, you will be expected to be able to estimate onset angle 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. NOTE: It is important to use the full four seconds to determine the onset of nystagmus. 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**. 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 onset angle would be completely consistent with the alcohol level alone.

VERTICAL GAZE NYSTAGMUS (VGN)

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. 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. 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 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

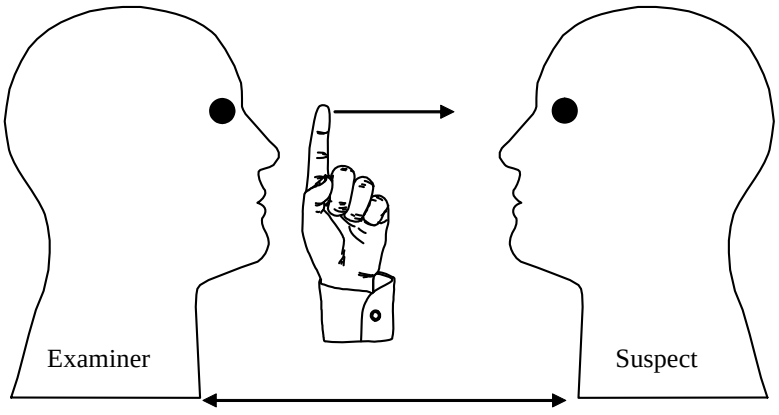
In simplest terms, **Lack of Convergence** means an inability to cross the eyes. We start to check for Lack of Convergence by positioning the stimulus approximately 12 to 15 inches in front of the subject's face in the same position we use for the HGN test. Inform the subject that you are going to move 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. <u>You will not touch the subject's nose with the stimulus.</u> 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.

Note: 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.

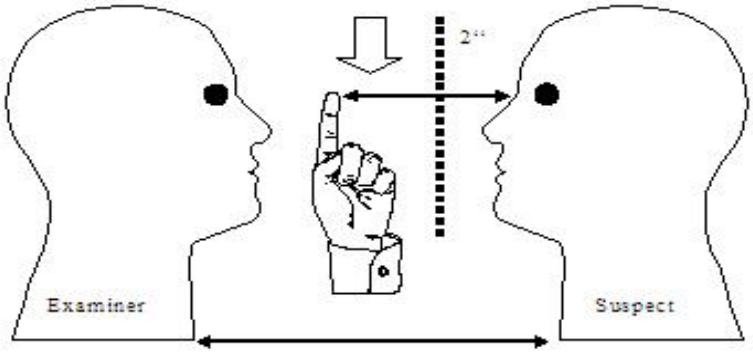


We record the results of this test by diagraming the movement of the subject's eyes. The diagram above depicts the proper position of the stimulus prior to moving it towards the subject's nose.

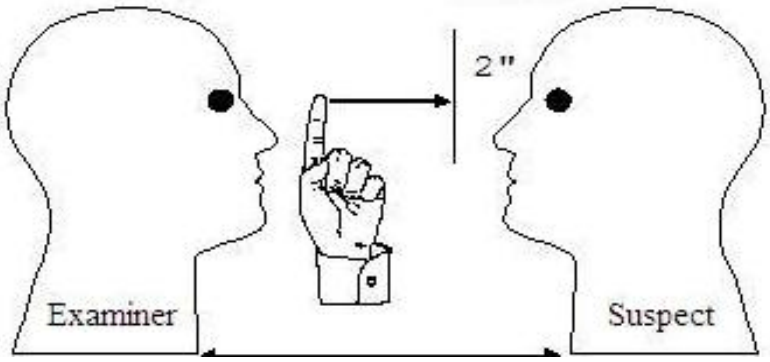
Lack of Convergence usually occurs with people who are under the influence of any drug that causes HGN. Thus, Depressants, Inhalants, and Dissociative Anesthetics usually will cause Lack of Convergence. Cannabis also will usually cause Lack of Convergence, even though it doesn't cause HGN. Other kinds 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.

If the eyes are able to cross (converge) when the stimulus is approximately (but no closer than) two inches (2") from the bridge of the nose, Lack of Convergence is "**not present**". But, if one or both eyes drift away or outward toward the side instead of converging towards the center (crossing), then Lack of Convergence is "**present**". Refer to the diagrams below.

If one or both eyes drift away or outward toward the side instead of converging towards the center, or otherwise unable to cross (converge), Lack of Convergence is "**Present**".



Normal convergence is at a distance approximately two inches from the bridge of the nose. If the eyes converge (cross) when the stimulus is approximately two inches from the bridge of the nose, the Lack of Convergence is "**Not Present**".



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 it 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/semi-circle that is closest in size to the subject's pupil in each lighting condition.

It is not uncommon to find people whose pupils differ by as much as one-half millimeter in size, but larger than one-half millimeter are more unusual.

We always 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 also vary.

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

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 hippus or rebound dilation.

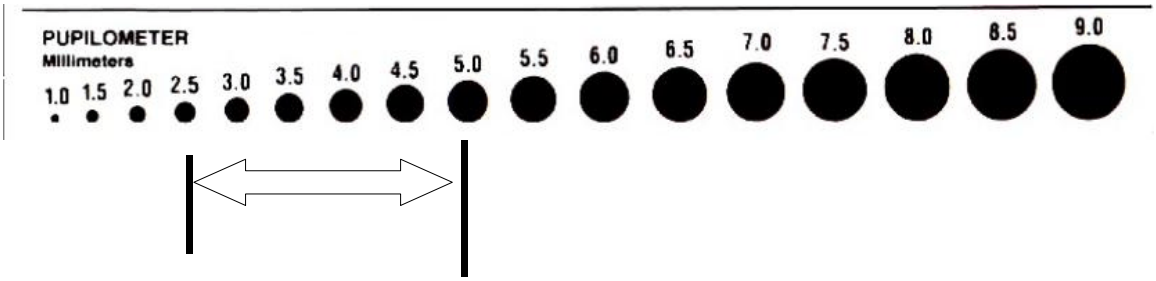
Pupil Size	Room Light	Darkness	Direct
Left Eye			
Right Eye			

Normal Sizes for the Pupil

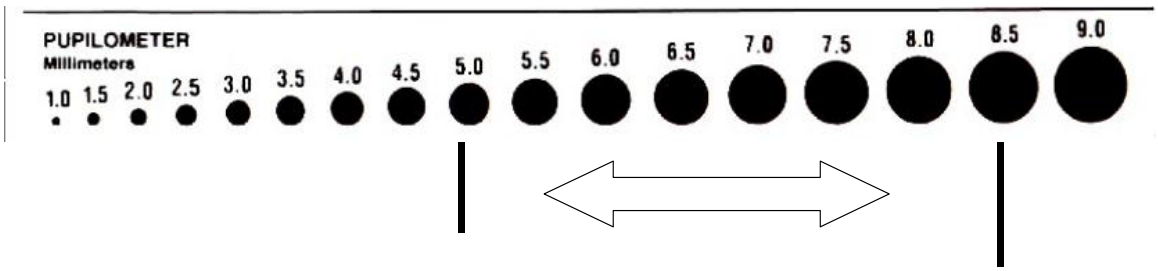
Since we estimate pupil size under three different lighting conditions; Room Light, Near Total Darkness and Direct Light, the range of pupil sizes will vary. For most non-impaired people, even under very bright light the pupils won't constrict much below a diameter of 2.5 millimeters (mm); and even under near total dark conditions, the pupils usually will only dilate to a diameter of not more than 8.5 mm. However, results of studies indicated there are significant differences between the average pupil size in these three test conditions. Consequently, the use of three distinct pupil size ranges for each of the three different testing conditions may be considered more useful in the evaluation to determine impairment verses non-impairment.

For a normal non-impaired person, the average pupil size and range for:

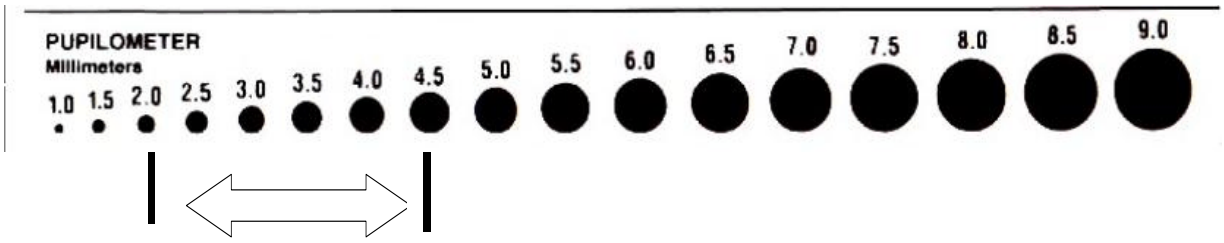
- **Room Light** is approximately **4.0 mm** with an average range of normal pupil sizes ranging from **2.5 to 5.0 mm.**



- **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.**



- Many drugs, however, will effect the dilation or constriction of the pupils and may cause the pupil size to go outside these normal ranges. CNS Stimulants and Hallucinogens, for example, normally will induce pupil dilation. Cannabis also may induce some dilation, as will certain (but not all) Inhalants. On the other hand, Narcotic Analgesics normally cause the pupils to constrict. Dissociative Anesthetics such as PCP and its analogs do not affect pupil size and neither do most CNS Depressants. However, there are two exceptions for the depressants: **Methaqualone** (also known as Quaalude) and **Soma**, which normally cause pupil dilation.

The Reaction of the Pupils to Light

When we conduct the direct light estimation of the pupil size, we also look for another clue of possible drug influence. That clue is the 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 that 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. Some Inhalants will usually slow pupillary reaction.

Relationship of the Eye Examinations to the Drug Categories

The table below indicates what we usually will find when we conduct the eye examinations of people who are under the influence of the seven drug categories. You should now be starting to see how the evidence gathered by a DRE fits together like the pieces of a jigsaw puzzle. Each category has its own unique set of clues. This will become even more evident when we consider the vital signs examinations in Session VI.

Drug Category	CNS Depressants	CNS Stimulants	Hallucinogens	Dissociative 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 (1)	Dilated	Dilated	Normal	Constricted	Normal (4)	Dilated (6)
Reaction to Light	Slow	Slow	Normal (3)	Normal	Little or None Visible	Slow	Normal

(1) Soma and Quaaludes usually dilate pupils

(2) Quaaludes and ETOH may elevate

(3) Certain psychedelic amphetamines cause slowing

(4) Normal but may be dilated

(5) Down with anesthetic gases, up with volatile solvents and aerosols

(6) Pupil size possibly normal

Note: Although effects displayed in the table on the previous page are what we will usually find when we examine persons impaired by various types of drugs, we may not always find them. Human beings differ from one another in many respects, including how they react to drugs. A DRE needs to remember that, when describing drug effects, it is best "never to say never" and "always avoid saying always".

REVIEW QUESTIONS

1. Name the three clues of impairment associated with Horizontal Gaze Nystagmus.

2. Complete this formula:

   BAC = 50 - ????

3. Which categories of drugs will not cause Vertical Gaze Nystagmus?

4. Which categories of drugs usually will cause Lack of Convergence?

5. Name the three lighting conditions under which a DRE makes pupil size estimations.

6. What is the normal range of pupil size for Room Light?

7. Which categories of drugs will usually slow down the reaction of the pupils to light?

TAB

SESSION V

SESSION V

ALCOHOL WORKSHOP

SESSION V ALCOHOL WORKSHOP

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

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

The Alcohol Workshop is intended to allow you to practice the skills you have started to learn today. You will work in a team with one or two other students. You and your partners will have an opportunity to examine several people who have been drinking. Some of these people may have had relatively little to drink, and may not be noticeably impaired. Others may show definite evidence of impairment.

When your team receives a volunteer drinker, one of you will be designated as the **examiner** for that volunteer. The examiner will administer all tests and examinations to the volunteer. The tests and examinations always will consist of the following, in the sequence listed:

(1) Horizontal Gaze Nystagmus (including estimation of onset angle to the nearest 5 degrees)

(2) Vertical Gaze Nystagmus

(3) Lack of Convergence

(4) Romberg Balance

(5) Walk and Turn

(6) One Leg Stand, standing on the left foot

(7) One Leg Stand, standing on the right foot

(8) Finger to Nose

Another member of your team will be designated as the **recorder** for that particular volunteer. The recorder will use the standard Drug Influence Evaluation face sheet to document the tests and examinations. In the "Arrestee's Name" block, write the volunteer drinker's name. The volunteer's age, sex and race will be entered in the appropriate spaces, as will the date and time of the examination.

Then starting approximately in the middle of the face sheet, the recorder will use the appropriate spaces to document the HGN test, Vertical Gaze Nystagmus, and the other tests. If there is a third member of your team, they will be designated as the **coach**, and will assist the examiner to make certain that all tests are carried out correctly. As soon as the examination procedures are completed, the examiner, recorder and coach will "put their heads together" and form an opinion about the volunteer's state of impairment. Your team will then be given a new volunteer to examine. At this point, you will switch roles. The student who had been the

examiner becomes the coach; the former recorder becomes the new examiner; and, the former coach becomes the new recorder. This process will continue throughout the workshop.

Copies of the drug influence evaluation face sheet will be provided by your instructors.

TAB

SESSION VI

SESSION VI

EXAMINATIONS OF VITAL SIGNS

SESSION VI EXAMINATIONS OF VITAL SIGNS

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

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

BASIC CONCEPTS FOR MEASURING PULSE RATE

Here are some important terms that we need to understand in order to competently perform our job of measuring a subject's pulse rate:

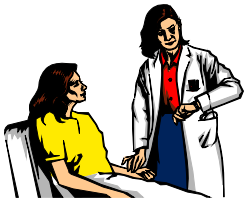
Pulse is the expansion and relaxation of an artery generated by the pumping action of the heart.

Pulse rate is the number of pulsations in an artery per 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 from the body tissues.

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 their arm straight out with the palm of the 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. To find the brachial artery pulse point, it usually helps to have the subject extend the arm straight, or even to attempt to bend the elbow backwards slightly. That procedure pushes the brachial artery a bit closer to the skin making the pulse easier to feel.

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. 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.

- The standard procedure used by all DREs is to count the beats for thirty seconds, then multiply the results by two (2) to obtain the number of beats per minute. **You will always follow that procedure**. Keep in mind that this procedure will always produce an even number; that is, you will never obtain a pulse rate measurement of 67, or 73, or 81, or any other odd number.

BASIC CONCEPTS FOR MEASURING BLOOD PRESSURE

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.

- 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). The pressure bulb can then be squeezed to pump air into the bladder. To deflate the bladder, the pressure control valve must be twisted to the left (counterclockwise). 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.

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, 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:

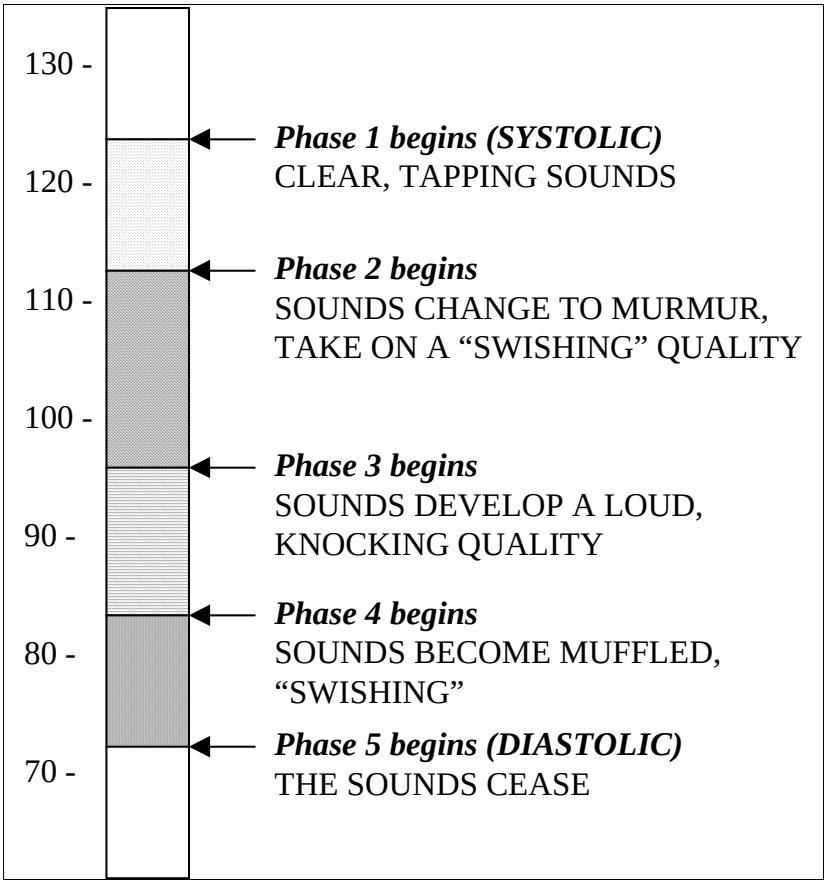
> To measure blood pressure, start by pumping up the bladder until the artery is squeezed completely shut and no blood flows.
>
> Let the air pressure drop slowly until the blood just begins to spurt through the artery. When that happens, the pressure shown on the gauge will be equal to the systolic 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 is applied to the skin, directly at the brachial artery pulse point. We will listen to the sounds that the blood makes when it starts to spurt through the artery, after we allow the pressure in the blood pressure cuff to drop.

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, and take on a swishing quality. They 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 (pressure should drop at about 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.

MEASURING BODY TEMPERATURE

At the same time that a DRE measures a subject's blood pressure, they will measure the subject's body temperature. To do so, we use an oral thermometer, **always protected by a disposable mouthpiece**. To take the temperature measurement using an oral thermometer simply put the mouthpiece over the stem of the thermometer, turn the power switch on and place the stem in the subject's mouth under the tongue. The thermometer will "beep" when the measurement is completed. Remove the thermometer from the subject's mouth and read the temperature on the digital display. MAKE SURE that you are wearing protective gloves when you remove and discard the mouthpiece after completing the temperature measurement.

NORMAL RANGES OF THE VITAL SIGNS

Humans vary widely in their pulse rates, blood pressures and even body temperatures. Factors such as a person's physical fitness (or lack of it), heredity, illness, anxiety and many other factors will affect their vital signs. Nevertheless, there are ranges within which most peoples' vital signs will fall, most of the time. We call these the "normal ranges", and we use them to help distinguish drug impaired persons from non-impaired persons. The normal ranges we use for DRE purposes might not be the same used by doctors to diagnose illness. Our ranges usually are a bit wider than those used by doctors.

These are what all DREs use as the "normal ranges":

Pulse Rate: 60 to 90 beats per minute

Blood Pressure

Systolic: 120 to 140 mmHg

Diastolic: 70 to 90 mmHg

Body Temperature: 98.6 degrees Fahrenheit plus or minus one degree

RELATING VITAL SIGNS TO THE DRUG CATEGORIES

The following indicates what we will usually find when we measure the vital signs of person who are under the influence of the various drug categories. BEAR IN MIND that these may not hold true in all cases: "never say never".

Drug Categories	CNS Depressants	CNS Stimulants	Hallucinogens	Dissociative Anesthetics	Narcotic Analgesics	Inhalants	Cannabis
Pulse Rate	Down (1)	Up	Up	Up	Down	Up	Up
Blood Pressure	Down	Up	Up	Up	Down	Up/Down (2)	Up
Body Temperature	Normal	Up	Up	Up	Down	Up/Down/ Normal	Normal

(1) Quaaludes and ETOH may elevate

(2) Most inhalants usually elevate blood pressure. However, the relatively small subcategory of inhalants known as the anesthetic gases actually lower blood pressure. They do so by partially paralyzing the pumping action of the heart. The volatile solvents and aerosols elevate the blood pressure. However, all inhalants, including the anesthetic gases, usually elevate pulse rate.

REVIEW QUESTIONS

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 pulse rate to be elevated?

9. What is the normal range of body temperature?

10. For how long must a DRE count the beats to obtain a measurement of pulse rate?

11. What is the normal range of pulse rate?

12. Which categories of drugs usually lower body temperature?

13. What is the normal range for the <u>higher value</u> of blood pressure? What is the normal range for the <u>lower value</u>?

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SESSION VII

SESSION VII

OVERVIEW OF SIGNS AND SYMPTOMS

SESSION VII OVERVIEW OF SIGNS AND SYMPTOMS

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

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

REVIEWING YOUR KNOWLEDGE

You are at the very beginning of your training as a DRE, but you've already learned quite a bit. By this time you are much more familiar with drugs and their effects than are most police officers. You are also vastly more knowledgeable about these things than are most of the general public.

Let's test your knowledge.

On the numbered lines below, write the names of the seven drug categories. List them in the same sequence that we have always presented them in this class. Don't worry right now about the boxes to the right of each line. We'll get back to those later.

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

(6) _____

(7) _____

How did you do? You should have come up with the following list:

(1) CNS Depressants
(2) CNS Stimulants
(3) Hallucinogens
(4) Dissociative Anesthetics
(5) Narcotic Analgesics
(6) Inhalants
(7) Cannabis

If you came up with a different set of categories, or if you listed the categories in a different sequence, go back and modify your list so that it conforms to the one above.

Return to the previous page and in the boxes write the names of some specific drugs that belong to each category. You should be able to identify at least two examples for each category. For most categories, you should be able to name three or four examples. Go ahead and do that.

For your final review exercise, fill in the boxes in the chart below by writing what we will usually find when we examine subjects for the major indicators of drug impairment.

CATEGORIES

INDICATOR	CNS Dep	CNS Stim	Hallucinogens	Dissoc. Anesthetics	Narcotic Analgesics	Inhalants	Cannabis
HGN							
Vertical Gaze Nystagmus							
Lack of Convergence							
Pupil Size							
Reaction to Light							
Pulse Rate							
Blood Pressure							
Body Temperature							

TAB

SESSION VIII

SESSION VIII

ALCOHOL AS A DRUG

SESSION VIII ALCOHOL AS A DRUG

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

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

A BRIEF OVERVIEW OF ALCOHOL

Alcohol is the most abused drug in the United States.

"Alcohol" is the name given to a **family** of closely related and naturally occurring chemicals. Each of the chemicals that is called an "alcohol" is made up of molecules that contain a single oxygen atom and varying numbers of hydrogen and carbon atoms. The simplest alcohol has only one carbon atom and four hydrogen atoms. The next alcohol has two carbons and six hydrogens. The third alcohol has three carbons and eight hydrogens. This is how alcohols differ from one another, the next one in the "chain" has one more carbon and two more hydrogen atoms than the one before.

All of these alcohols are molecularly very similar and produce similar effects. The alcohols all produce intoxicating effects when ingested into the human body. However, only one of them can be ingested in substantial quantities without causing death, blindness or other devastation to the human body.

The ingestible alcohol is known as ethyl alcohol, or **ethanol**. Its chemical abbreviation is ETOH. The "ET" stands for "ethyl" and the "OH" represents the single oxygen atom and one of the hydrogen atoms bonded together in what chemists refer to as the "hydroxy radical". Ethanol is the variety of alcohol that has two carbon atoms. Two of ethanol's best known analogs are methyl alcohol (or **methanol**), commonly called "wood alcohol", and isopropyl alcohol (or **isopropanol**), also known as "rubbing alcohol".

Ethanol is what interests us, because it is the kind of alcohol that features prominently in impaired driving. Ethanol is beverage alcohol, the active ingredient in beer, wine, whiskey, liquors, etc. Ethanol production starts with **fermentation**. That is a kind of decomposition in which the sugars in fruit, grains and other organic materials combine with yeast to product the chemical we call ethanol. This can occur naturally, as yeast spores in the air come into contact with decomposing fruit and grains. However, most of the ethanol in the world didn't ferment naturally, but was produced under human supervision.

When an alcoholic beverage is produced by fermentation, the maximum ethanol content that can be reached is about 14 percent. At that concentration the yeast dies and the fermentation stops. Obtaining a higher ethanol content requires a process called **distillation**. This involves heating the beverage until the ethanol "boils off", then collecting the ethanol vapor. It is possible to do this because ethanol boils at a lower temperature than does water.

Distilled spirits is the name we give to high ethanol concentration beverages produced by distillation. These include rum, whiskey, gin, vodka, etc. The ethanol concentration of distilled spirits usually is expressed in terms of **proof**, which is a number corresponding to twice the ethanol percentage. For example, an 80 proof beverage has an ethanol concentration of 40 percent.

Over the millennia during which people have used and abused ethanol, some standard size servings of the different beverages have evolved. Beer for example, is normally dispensed in 12-ounce servings. Since beer has an ethanol concentration of about four percent, the typical bottle or can of beer contains a little less than one-half ounce of pure ethanol. A standard glass of wine has about four ounces of liquid. Wine is about 12 percent alcohol, so the glass of wine also has a bit less than one-half ounce of ethanol in it. Whiskey and other distilled spirits are dispensed by the "shot glass", usually containing about one and one-quarter ounce of fluid. At a typical concentration of forty percent ethanol (80-proof), the standard shot of whiskey has approximately one-half ounce of ethanol. Therefore, as far as alcoholic contents are concerned, **a can of beer, a glass of wine and a shot of whiskey are all the same**.

PHYSIOLOGICAL PROCESSES

Ethanol is a CNS Depressant. It doesn't affect a person until it gets into their central nervous system, i.e. the brain, brain stem and spinal cord. Ethanol gets to the brain by getting into the blood. In order to get into the blood, it has to get into the body.

There are actually a number of different ways in which ethanol can get into the body. It can be **inhaled**. Ethanol fumes, when taken into the lungs, will pass into the bloodstream and a positive blood alcohol concentration (BAC) will develop. Prolonged breathing of fairly concentrated fumes would be required to produce a significantly high BAC. Ethanol can also be **injected** directly into a vein. It would then flow with the blood back to the heart where it would be pumped first to the lungs and then to the brain. Ethanol can also be **inserted** as an enema and pass quickly from the large intestine into the blood. But none of these methods are of any practical significance, because alcohol is almost always introduced into the body orally, i.e. by drinking.

Absorption

Once the ethanol gets into the stomach, it has to move into the blood. The process by which this happens is known as **absorption**. One very important fact that pertains to alcohol absorption is that alcohol doesn't have to be digested in order to move from the stomach to the blood. Another very important fact is that alcohol can pass directly through the walls of the stomach. These two facts taken together, mean that under the right circumstances, absorption of alcohol can be accomplished fairly quickly. The ideal circumstance for rapid absorption is to drink on an empty stomach.

When the alcohol enters the empty stomach, about 20 percent of it will make its way directly through the stomach walls. The remaining 80 percent will pass through the base of the stomach and enter the small intestine, from which it is readily absorbed into the blood. Because the body doesn't need to digest the alcohol before admitting it into the bloodstream, the small intestine will be open to the alcohol as soon as it hits the stomach.

But what if there is food in the stomach? Suppose the person has had something to eat shortly before drinking, or eats food while drinking; will that affect the absorption of alcohol?

Yes it will. Food has to be at least partially digested in the stomach before it can pass to the small intestine. When the brain senses that food is in the stomach, it commands a muscle at the base of the stomach to constrict and cut off the passage to the small intestine. This muscle is called the **pylorus**, or pyloric valve. As long as the pylorus remains constricted, little or nothing will move out of the stomach and into the small intestine. If alcohol is in the stomach along with the food, the alcohol will also remain trapped behind the pylorus. Some of the alcohol trapped in the stomach will begin to break down chemically before it ever gets into the blood. In time, as the digestive process continues, the pylorus will begin to relax and some of the alcohol and food will pass through. The overall effect will be to slow the absorption significantly. Because the alcohol only slowly gets into the blood, and because the body will continue to process and eliminate the alcohol that does manage to get in there, the drinker's BAC will not climb as high as it would have if they had drunk on an empty stomach.

Distribution

Once the alcohol moves from the stomach into the blood, it will be distributed throughout the body by the blood. Alcohol has an affinity for **water**. The blood will carry the alcohol to the various tissues and organs of the body and will deposit the alcohol in them in proportion to their water contents. Brain tissue has a fairly high water content, so the brain receives a substantial share of the distributed alcohol. Muscle tissue also has a reasonably high water content, but fat tissue contains very little water. Thus, very little alcohol will be deposited in the drinker's body fat. This is one factor that differentiates alcohol from certain other drugs, notably PCP and THC, which are very soluble in fat.

The affinity of alcohol for water, and its lack of affinity for fat, helps explain an important different in the way alcohol affects women and men. Pound for pound, the typical female's body contains a good deal less water than does the typical man's. This is because women have additional adipose (fatty) tissue, designed in part to protect a child in the womb. A Swedish pioneer in alcohol research, E.M.P. Widmark, determined that the typical male body is about 68 percent water, the typical female only about 55 percent. Thus, when a woman drinks, she has less fluid -- pound for pound -- in which to distribute the alcohol. If a woman and a man who weighed exactly the same drank exactly the same amount of alcohol under the same circumstances, her BAC would climb higher than his. When we couple this to the fact that the average woman is smaller than the average man, it becomes apparent that a given amount of alcohol will usually cause a higher BAC in a woman than it usually will in a man.

Elimination

As soon as the alcohol enters the blood stream, the body starts trying to get rid of it. Some of the alcohol will be directly expelled from the body chemically unchanged. For example, some alcohol will leave the body in the breath, urine, sweat, tears, etc. However, only a small portion (about 2-10 percent) of the ingested alcohol will be directly eliminated in this manner.

Most of the alcohol a person drinks is eliminated by **metabolism**. Metabolism is a process of chemical change. Alcohol reacts with oxygen in the body and changes through a series of intermediate steps, into carbon dioxide and water. The carbon dioxide and water are then directly expelled from the body.

Most of the metabolism of alcohol in the body takes place in the liver. An enzyme known as **alcohol dehydrogenase** acts to speed up the reaction of alcohol with oxygen. The speed of the reaction varies somewhat from person to person, and even from time to time for any given person. On the average, a person's blood alcohol concentration, after they reach their peak value, will drop by about 0.015 per hour. For example, if the person reaches a maximum BAC of 0.15, it will take about ten hours for that person to eliminate all of the alcohol.

For the average sized male, a BAC of 0.015 is equivalent to about two-thirds of the alcohol content of a standard drink (i.e. about two-thirds of a can of beer, or glass of wine or shot of whiskey). For the average sized female, that same BAC would be reached on just one-half of a standard drink. So the typical male will eliminate about two-thirds of a drink per hour, while the typical female will burn up about one-half of a drink in that hour.

We can control the rate at which alcohol enters our bloodstream. For example, we can gulp down our drinks, or slowly sip them. We can drink on an empty stomach, or we can take the precaution of eating before drinking. We can choose to drink a lot, or a little. But once the alcohol gets into the blood, there is nothing we can do to affect how quickly it leaves. Coffee won't accelerate the rate at which our livers metabolize alcohol. Neither will exercise, deep breathing or a cold shower. We simply have to wait for the process of metabolism to move along at its own speed.

SYMPTOMATOLOGY OF ALCOHOL

The following chart reflects the anticipated signs and symptoms associated with alcohol influence and impairment.

	ALCOHOL
HGN	>
VGN	>
LACK CONV	>
PUPIL SIZE	>
RCTN-LIGHT	>
PULSE RATE	>
BLOOD PRESS	>
TEMP	>

DOSE-RESPONSE RELATIONSHIPS

People sometimes ask, "how 'high' is 'drunk'?" What is the "legal limit" for "drunk driving"? How much can a person drink before they become "impaired"?

There is no simple answer to these or similar questions, except to say that **any** amount of alcohol will affect a person's ability to drive to some degree. It is true that the laws of nearly all fifty States establish a BAC limit at which it is explicitly unlawful to operate a vehicle. That "limit" is 0.08 percent BAC. **Every State makes it unlawful to drive when "under the influence" of alcohol**, and the law admits the possibility that a particular person may be under the influence at much lower BACs.

How much alcohol does someone have to drink to reach these kinds of BACs? As we've already seen, it depends on how much time the person spends drinking, whether the person is a man or a woman, how large the person is, whether the drinking takes place on an empty stomach and on certain other factors. But let's take as an example a 175-pound man. If he drinks two beers, or two shots of whiskey, in quick succession on an empty stomach, his BAC will climb to slightly above 0.04. Two more beers will boost him above 0.08. One more will push him over 0.10. In one respect, it doesn't take very much alcohol to impair someone: "a couple of beers" can do it. But when we contrast alcohol with virtually any other drug, we find that impairment by alcohol requires a vastly larger dose than does impairment by the others. Consider exactly what a BAC of 0.08 means. Blood alcohol concentration is expressed in terms of the "number of **grams** of ethanol in every **100 milliliters** of blood". Therefore, that means that there is 0.08 gram's of ethanol in any given 100 milliliters (ml) sample of blood.

You will find that BAC results are reported in a variety of units. Two common variations are milligrams/milliliters and percent. There are 1000 milligrams (mg) in one gram; therefore, 0.08 grams equals 80 milligrams (mg) and a BAC of 0.08 would be reported as 80 mg of ethanol/100 ml of blood. Percent means parts per one hundred. In this example 0.08 grams/100 milliliters is equivalent to 0.08% BAC.

Grams and milligrams aren't much, compared to weights we're used to dealing with. A gram is only about one-thirtieth of an ounce, or about one five-hundredth of a pound. Since a milligram is only one-thousandth of a gram, one milligram is about one five-hundred-thousandth of a pound. Put this another way: **it takes about half a million milligrams to make just one pound**. We definitely consider a person to be impaired by alcohol if they have only a single milligram of it in every milliliter of his blood.

But what about other drugs? For things like THC, morphine, PCP, LSD and so on, we don't deal with concentrations of milligrams per milliliter of blood. Instead, we speak in terms of **nanograms** per milliliter. And it takes **one million nanograms to make a milligram**. So a person who has a BAC of 0.10 has one million nanograms of the drug ETOH (ethyl alcohol), in every milliliter of their blood.

Now consider someone who is impaired by Marijuana, specifically by its active ingredient, THC. Let's compare the amount of THC to ETOH it would take to impair a person. If we could extract the pure ethanol from five bottles of beer, we would have about two and one-half ounces of ETOH. This amount would be enough to impair one average sized man, assuming he gulped it all down at once. But if we had two and one-half ounces of pure THC, we'd have enough THC to impair ten thousand average sized men.

LSD provides an even more startling example of this key difference between alcohol and other drugs. LSD impairs at very low concentrations. Researchers have concluded that if we had that same two and one-half ounces, but this time of pure LSD, we could impair one million people.

REVIEW QUESTIONS

1. Name three different chemicals that are alcohols. Which of these is beverage alcohol, intended for human consumption? What is the chemical symbol for beverage alcohol?

2. What is the name of the chemical process by which beverage alcohol is produced naturally? What is the name of the process used to produce high-concentration beverage alcohol?

3. Multiple Choice: "Blood alcohol concentration is the number of _____ of alcohol in every 100 milliliters of blood."

   A. grams
   B. milligrams
   C. nanograms

4. True or False: Pound-for-pound, the average woman contains more water than the average man.

5. What do we mean by the "proof" of an alcoholic beverage?

6. Every chemical that is an "alcohol" contains what three elements?

7. True or False: Most of the alcohol that a person drinks is absorbed into the blood via the small intestine.

8. What is the name of the muscle that controls the passage from the stomach to the lower gastrointestinal tract?

9. True or False: Alcohol can pass directly through the stomach walls and enter the bloodstream.

10. Multiple Choice: A man and a woman who both weigh 160 pounds arrived at a party and started to drink at the same time. Two hours later, they both have a BAC of 0.10. Chances are ....

    A. he had more to drink than she did.
    B. they drank just about the same amount of alcohol.
    C. he had less to drink than she did.

11. In which organ of the body does most of the metabolism of the alcohol take place?

12. What is the name of the enzyme that aids the metabolism of alcohol?

13. Multiple Choice: Once a person reaches his or her peak BAC, it will drop at a rate of about _____ per hour.

    A. 0.025
    B. 0.015
    C. 0.010

14. Multiple Choice: If a person has a blood alcohol concentration of 0.10, then there are _____ nanograms of alcohol in every milliliter of his or her blood.

    A. one million
    B. one hundred thousand
    C. ten thousand
    D. one thousand
    E. one hundred

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

TAB

SESSION IX

SESSION IX

PREPARING FOR THE DRE SCHOOL

SESSION IX PREPARING FOR THE DRE SCHOOL

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

THINGS YOU WILL NEED AT THE DRE SCHOOL

1. Your **Certification Progress Log**, that you received at the beginning of this school. Your instructors will collect it from you at the start of the DRE School and return it to you at the completion of the school.

2. A **Physician's Desk Reference (PDR) or other reference sources**. Each student should have access to a PDR or other drug reference resources.

3. Your **DRE "kit"**: penlight, pupillometer, sphygmomanometer, stethoscope, schematic light, oral thermometer with disposable mouthpieces, and protective gloves.

4. Notepaper, pens and pencils.

You <u>will not</u> need to take this book to the DRE School. At the start of the school, you will receive a new and much more detailed student's manual that serves as the text for the school.

THINGS TO DO PRIOR TO THE DRE SCHOOL

Depending upon your training schedule, you may or may not have a gap between the Pre-School and DRE School. Some States elect to go immediately to the next stage of training and others do not. If your schedule provides a gap between the two, this would be a good opportunity to study and prepare yourself for the next phase of the training. Here is what we recommend that you do to make sure of your continuing success. If your curriculum is one that has combined the Pre-school and 7 day school, you will want to ensure you are proficient in these areas as soon as possible.

- Make sure that you are fully proficient with the Standardized Field Sobriety Tests (SFSTs). That means Horizontal Gaze Nystagmus, the Walk and Turn and the One Leg Stand. Maybe you're still a bit "rusty" with those tests. If so, practice with them diligently in the days ahead. The second line of your Certification Progress Log requires an instructor to attest that you are proficient with the SFSTs. NO ONE CAN BE ADMITTED TO THE DRE SCHOOL UNTIL AN INSTRUCTOR HAS SIGNED OFF ON THAT LINE. If you feel that you **are** already proficient with them, ask an instructor for sign off at the completion of this Pre-School.

- Study this manual again. Be sure that you really know the drug categories and the major indicators of impairment that we associate with each category. Make sure that you can correctly answer all of the Review Questions that appeared at the end of Session I, II, III, IV, VI and VIII. Try the "Challenge Quiz" that appears in the final session of this manual; it is intended to give you a head start toward what you'll learn in the DRE school.

- In your field contacts with suspected impaired drivers, start using some of the procedures you've learned here. Obviously, you need to use the three SFSTs every time you suspect a driver of alcohol impairment. But start testing these suspects for Vertical Gaze Nystagmus and Lack of Convergence, too. Use the Romberg Balance and Finger To Nose tests.

- Practice the eye examinations and vital signs examinations. Many students find that the most difficult DRE procedures to master are the darkroom estimations of pupil size and the blood pressure measurement. Enlist the help of your family and friends. Get together with other officers who will also attend the DRE school and practice these procedures together. This will also give you a chance to coach one another.

- Be sure your calendar is clear for the DRE School. Obviously, unforeseen emergencies can arise that would pull you away from a portion of the school. That can't be totally avoided. But the fact remains that NO ONE CAN GRADUATE FROM THE DRE SCHOOL UNTIL THEY HAVE COMPLETED EVERY SEGMENT OF IT. That is a requirement established by the International Association of Chiefs of Police, and is fully endorsed by the National Highway Traffic Safety Administration. If you are unavoidably called away from class one day, you must return as soon as you can. Your instructors will make a note of your absence, and will try to offer an opportunity for an after hours tutoring session to cover what you missed. But suppose you are unable to take advantage of the opportunity. You could continue in the school, and pass the final knowledge examination, but you would not graduate from DRE School until you make up the missing segment. The most important implication of this requirement is that now is the time to clear up any **foreseeable** scheduling conflicts you might have. Notify your supervisor that your presence is required at <u>all</u> portions of the school, and make sure that your supervisor knows the dates and times of your classes. Contact the prosecuting attorneys who are handling pending cases that involve you and schedule your court appearances for times other than during this training.

Do the same thing with Motor Vehicle Department officials who may be handling driver's licensing hearings in which you may be involved. In the event that there is some absolutely unavoidable reason for an absence from class of which you are aware in advance, notify the senior instructor for the DRE School as soon as possible, so that arrangements for remedial tutoring can be made.

- o This is also a good time for you to begin preparation of your professional Curriculum Vitae (C.V). Your C.V. will be used throughout your career as a DRE and will be continually updated as your knowledge and experience grows. A worksheet for the C.V. is provided on the following page.

DRE CURRICULUM VITAE WORKSHEET

Formal Education

High School

College

Specialized College / Vocational Courses

Formal Professional Training

Academy

Specialized Police Training

Other Specialized / Professional Training

Relevant Experience

Job Experience (Law Enforcement)

Other Job related Experiences

Drug Enforcement / Evaluation Experience

Court Qualifications

Outside Readings - (relative to the DEC program)

TAB

SESSION X

SESSION X

CONCLUSION OF THE PRELIMINARY TRAINING

SESSION X CONCLUSION OF THE PRELIMINARY TRAINING

Upon successfully completing this session the student will have:

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

A CONCLUSION THAT IS REALLY A BEGINNING

A high school graduation ceremony is often called the "Commencement". At first glance, that's a peculiar word to use: referring to the conclusion of high school as a "beginning". Of course, what this traditional term means is that the end of high school marks the beginning of a radically new phase in the person's life: the beginning of a job, college, military service, or whatever.

You have just concluded a school. And this conclusion really **is** a beginning. You are not a DRE yet. In fact, you have a long way to go. But you have begun the process. You now know the things you need to know to **start** learning how to do the DRE's job. You now have skills that set you apart from the average police officer, and these new skills give you the foundation for developing even more impressive skills in the weeks and months ahead.

You are beginning what we trust will be one of the most interesting learning experiences of your life. You'll find it challenging; there's no doubt about that. You will have to become very knowledgeable about complex and fairly technical concepts, facts and principles. You'll have to become proficient with some pretty impressive equipment and with some pretty elaborate procedures. You'll have to develop a degree of expertise that will prove unmistakable in court. Getting there will be long, hard work. But you've already shown that you are up to it. And once you've made it, you will be something that fewer than one percent of police officers will ever be: a DRE, certified by his/her state and credentialed by the International Association of Chiefs of Police and recognized by the U.S. Department of Transportation, National Highway Traffic Safety Administration.

On the following pages is something that we hope will help you get there. It tests your knowledge of virtually everything a DRE needs to know. Obviously, we don't expect that you could score 100% on the quiz right now; we don't even expect that you could achieve a passing grade. But you might be surprised to see how much you **do** know already. Give it a try now, then check the answer key at the end of the book to see how you've done. The answer key has been designed to serve as a teaching vehicle, to help you learn as you go along. After you've had a chance to study this manual again, give the "Challenge Quiz" another shot, just before you begin the DRE School; see if you don't do much better the second time. Take the "Challenge Quiz" with you to the DRE School and try it again after the first several days of the school. You probably will want to try it one final time, just before the end of the school. Use it as both a learning experience and as a means of keeping track of your progress in learning.

THE CHALLENGE QUIZ

1. For each of the listed drugs, write the drug category to which it belongs on the line provided.

   A. _____Xanax
   B. _____Secobarbital
   C. _____Thorazine
   D. _____Chloral Hydrate
   E. _____Valium

2. The phenomenon known as **synesthesia** is most commonly associated with ...

   A. Hallucinogens
   B. Phencyclidine
   C. Narcotic Analgesics
   D. CNS Depressants
   E. CNS Stimulants

3. **Morphine** can best be described as ...

   A. an analog of Opium
   B. an Opiate
   C. synthetic Opium
   D. a heroin withdrawal symptom
   E. a metabolite of Opium

4. The sub-category of Inhalants known as the **Anesthetic Gases** is unique because it usually produces ...

   A. Reddened sclera
   B. Lowered pulse rate
   C. Constricted pupils
   D. Lowered blood pressure
   E. Elevated blood pressure

5. The technical term for **constricted pupils** is ...

   A. orbytitis
   B. optosis
   C. miosis
   D. lumenesis
   E. astygosis

6. For each of the listed drugs, write the category to which it belongs on the line provided.

   A. _____Desoxyn
   B. _____Darvon
   C. _____Dilaudid
   D. _____Demerol
   E. _____Diazepam

7. The technical term for an **abnormally slow** pulse rate is ...

   A. Myocardia
   B. Hystocardia
   C. Bradycardia
   D. Dypsocardia
   E. Tachycardia

8. For purposes of the DRE evaluation, the "normal range" of adult human pupil size in room light is ...

   A. 2.5 - 5.0 mm
   B. 3.5-6.5 mm
   C. 2.5-6.0 mm
   D. 3.5-6.0 mm
   E. 3.0-6.0 mm

9. Suppose you evaluate a subject that you <u>know</u> is under the combined influence of PCP and Cocaine, and you observe that the suspect exhibits horizontal gaze nystagmus. This is an example of ...

   A. The Null Effect
   B. An Overlapping Effect
   C. A Synergistic Effect
   D. An Additive Effect
   E. An Antagonistic Effect

10. For each of the listed drugs, write the category to which it belongs on the line provided.

    A. _____Psilocybin
    B. _____Phenobarbital
    C. _____Peyote
    D. _____Preludin
    E. _____Phenyl Cyclohexyl Piperdine

11. Suppose a person has a BAC of 0.10. Then, the person has _____ of alcohol in every 100 milliliters of blood.

    A. one gram
    B. one million nanograms
    C. one-tenth of a gram
    D. one milligram
    E. ten milligrams

12. Which of the following **usually will** cause horizontal gaze nystagmus? (Check all that apply)

    A. THC
    B. LSD
    C. MDMA
    D. ETOH
    E. PCP

13. For purposes of the DRE evaluation, the normal range of adult human pulse rate is ...

    A. 70-90
    B. 60-80
    C. 70-100
    D. 60-100
    E. 60-90

14. Persons under the influence of CNS Stimulants often exhibit **bruxism**. This means ...

    A. goose bumps
    B. short attention span
    C. rapid speech
    D. leg and arm tremors
    E. grinding the teeth

15. Suppose you examine a subject that you know is under the combined influence of Marijuana and Methamphetamine, and you find that the subject's pulse rate is 102. This is an example of ...

    A. A Synergistic Effect
    B. An Additive Effect
    C. The Null Effect
    D. An Antagonistic Effect
    E. An Overlapping Effect

16. For each of the listed drugs, write the category to which it belongs on the line provided.

    A. _____Numorphan
    B. _____OxyCodone
    C. _____Fentanyl
    D. _____Thebaine
    E. _____Dilaudid

17. The **Afferent Nerves** are also known as the _____ Nerves.

    A. Sensory
    B. Sympathetic
    C. Parasympathetic
    D. Motor
    E. Autotrophic

18. Which of the following usually will be true in a subject who is under the influence of Xanax? (Check **all** that usually will be true)

    A. Blood pressure will be lowered
    B. Eyes will <u>not</u> be able to converge
    C. Pupil size will be within the normal range
    D. Horizontal gaze nystagmus will be present
    E. Body temperature will be within the normal range

19. Another word for "nerve cell" is ...

    A. Axon
    B. Dendrite
    C. Neuron
    D. Synapse
    E. Ergon

20. The pulse point that is located in the crease of the wrist nearest the thumb is called the _____ pulse point.

    A. Brachial
    B. Radial
    C. Carotid
    D. Femoral
    E. Diurnal

21. Which of the following drugs is (or are) CNS Depressants? (Check **all** that apply)

    A. Valium
    B. Soma
    C. Chloral Hydrate
    D. Alcohol
    E. Xanax

22. For each of the listed drugs, write the category to which it belongs on the line provided.

    A. _____Nitrous Oxide
    B. _____Toluene
    C. _____Isopropanol
    D. _____Chlordiazepoxide
    E. _____Alprazolam

23. The technical term for an **abnormally rapid** pulse rate is ...

    A. Myocardia
    B. Hystocardia
    C. Bradycardia
    D. Dypsocardia
    E. Tachycardia

24. Suppose you examine a subject that you know is under the combined influence of Heroin and Cocaine, and you find that the subject's pulse rate is 72. This is most likely caused by ...

    A. An Antagonistic Effect
    B. The "downside" of Cocaine
    C. A Synergistic Effect
    D. An Overlapping Effect
    E. The Null Effect

25. Every chemical that is called an "alcohol" is composed of carbon, oxygen and ...

    A. Nitrogen
    B. Hydrogen
    C. Potassium
    D. Sodium
    E. Glucose

26. The **Efferent Nerves** are also known as the _____ Nerves.

    A. Autonomic
    B. Sensory
    C. Sympathetic
    D. Motor
    E. Autotrophic

27. Which of the following is (or are) **not** a scientifically validated clue of impairment for the One Leg Stand test? (Check **all** that apply)

    A. Swaying
    B. Failing to count out loud
    C. Raising the foot less than six inches
    D. Raising the arms at least six inches
    E. All of the above **are** validated clues of impairment

28. How many carbon atoms does a molecule of **ethanol** have?

    A. one
    B. two
    C. three
    D. four
    E. five

29. When taking a blood pressure measurement, we use the stethoscope to listen to the _____ Sounds.

    A. Kasparoff
    B. Korkonoff
    C. Korotkoff
    D. Katkoroff
    E. Kopkoroff

30. Narcotic Analgesics usually will produce ... (Check **all** that usually will be produced)

    A. Lack of Convergence
    B. Eyelid tremors
    C. Muscle rigidity
    D. Lowered pulse rate
    E. Constricted pupils

31. Persons who are under the influence of Heroin often will exhibit **ptosis**. This means ...

    A. Shallow breathing
    B. Droopy eyelids
    C. Raspy voice
    D. Ulcerated sores
    E. Dry mouth

32. Which of the following usually will produce **dilated pupils**? (Check **all** that apply)

    A. MPTP
    B. LSD
    C. ETOH
    D. STP
    E. MDMA

33. For each of the listed drugs, write the category to which it belongs on the line provided.

A. _____Dexedrine
B. _____Dronabinol
C. _____Flurazepam
D. _____Soma
E. _____Ritalin

34. Suppose you examine a subject that you know is under the combined influence of Soma and Dexedrine, and you find that the subject's pupils are 8.5 mm in room light. This is an example of ...

A. An Additive Effect
B. The Null Effect
C. A Synergistic Effect
D. An Antagonistic Effect
E. An Overlapping Effect

35. Where is the **Carotid** pulse point located?

A. On the wrist
B. In the neck
C. On the bicep
D. On the forearm
E. At the crook of the arm

36. **"Starting too soon"** is a scientifically validated clue of impairment for which of the following tests? (Check **all** that apply)

A. Romberg Balance
B. Walk and Turn
C. One Leg Stand
D. Finger to Nose
E. It is not a scientifically validated clue for any of the tests

37. Experiences such as **"seeing sounds"** and **"smelling colors"** are known as ...

A. Dysphoria
B. Synesthesia
C. Cytogenesia
D. Symphysia
E. Cymphasia

38. Suppose a subject exhibits all of the following: BAC of 0.00; no Horizontal or Vertical Gaze Nystagmus; the eyes do converge; pupils of both eyes are 2.0 mm in room light, 2.5 in near-total darkness, and 1.5 in direct light; pulse rate is 54 on all three measurements; blood pressure is 116/66; noticeable sway on the Romberg Balance test, with a time estimate of 42 seconds; unable to keep balance for Walk and Turn instructions; unable to perform One Leg Stand.

    In your opinion, this subject is ...

    A. Under the influence of a CNS Depressant
    B. Suffering from a medical complication
    C. Under the combined influence of Cannabis and an Hallucinogen
    D. Under the influence of a Narcotic Analgesic
    E. Under the combined influence of a Narcotic Analgesic and Cannabis

39. Persons under the influence of Cocaine usually exhibit **mydriasis**, which means ...

    A. lack of appetite
    B. dilated pupils
    C. ulcerated nostrils
    D. sensation of "crawling" skin
    E. eyelid tremors

40. The proper sequence of commands for the **Finger to Nose** test is ...

    A. Left, Right, Right, Left, Left, Right
    B. Left, Right, Left, Right, Right, Left
    C. Left, Right, Right, Left, Right, Left
    D. Left, Left, Right, Left, Right, Right
    E. Left, Right, Left, Left, Right, Left

41. How many **distinct** scientifically validated clues of impairment have been identified for the Finger to Nose test?

    A. Eight
    B. Six
    C. Four
    D. Two
    E. None

42. Which of the following is (or are) not one of the six **sub-categories** of CNS Depressants? (Check **all** that apply)

    A. Natural Alkaloids
    B. Anti-Anxiety Tranquilizers
    C. Anti-Psychotic Tranquilizers
    D. Non-Barbiturates
    E. Anti-Depressants

43. Consider the following situation: A long-time stimulant abuser "shoots up" a drug he believes is Cocaine. Two hours later, he is examined by a DRE who finds that the pulse rate is 74, the blood pressure is 128/82. The body temperature is 98.6, and the pupils are 5.5 in near-total darkness and 3.5 in direct light. The subject performs reasonably well on the divided attention tests and exhibits no nystagmus or Lack of Convergence. The subject appears calm, and frequently yawns.

    What is the most likely explanation for this situation?

    A. The subject has developed a high tolerance to Cocaine
    B. The effects of the Cocaine have already worn off
    C. What he **thought** was Cocaine was actually a "speedball" (combination of Cocaine and Heroin)
    D. The effects of the Cocaine have not yet started to be felt
    E. What he thought was Cocaine was actually a placebo (i.e., a harmless substance that does not impair)

44. **Sinsemilla** belongs to which category of drugs?

    A. Hallucinogens
    B. Cannabis
    C. CNS Depressants
    D. CNS Stimulants
    E. Narcotic Analgesics

45. The part of a nerve cell that **receives** a neurotransmitter is called the ...

    A. Neuron
    B. Axon
    C. Ergon
    D. Dendrite
    E. Synapse

46. Suppose you examine a subject that you know is under the combined influence of Heroin and Xanax, and you find that the blood pressure is 110/66. This is an example of ...

    A. The Null Effect
    B. An Additive Effect
    C. A Synergistic Effect
    D. An Overlapping Effect
    E. An Antagonistic Effect

47. How many **distinct** scientifically validated clues of impairment have been identified for the One Leg Stand test?

    A. Eight
    B. Six
    C. Four
    D. Two
    E. None

48. The effects of impairment from Morphine and Demerol are the same with the exception of...

    A. Demerol will not cause miosis
    B. Morphine will not cause ptosis
    C. Morphine will not usually cause lowered pulse
    D. Demerol will induce nystagmus
    E. The effects are the same

49. Someone who is under the influence of Diazepam usually will have...

    A. normal size pupils
    B. constricted pupils
    C. fixed pupils
    D. dilated pupils
    E. unequal pupils

50. How many **distinct** scientifically validated clues of impairment have been identified for the Walk and Turn test?

    A. Eight
    B. Six
    C. Four
    D. Two
    E. None

ANSWERS TO THE CHALLENGE QUIZ:
AN EXERCISE IN INDEPENDENT STUDY

1. **For each of the listed drugs ...**

All five of the listed drugs are CNS Depressants. The first and last of them, Xanax and Valium, are examples of **Anti-Anxiety Tranquilizers**, one of the six subcategories of the CNS Depressants. You'll also hear toxicologists refer to Xanax, Valium and other similar drugs as the Benzodiazepines; they are a very popularly prescribed group of drugs used (and abused) by many people trying to cope with stress and anxiety. The second drug listed, Secobarbital, is a member of the subcategory known as the **Barbiturates**. The members of this group derive from Barbituric Acid. A tip-off that you're dealing with one of them is the fact that their names usually end in "-barbital" (e.g., secobarbital, amobarbital, phenobarbital, etc.). Thorazine, the third one listed, is a powerful CNS Depressant that belongs to the subcategory known as **Anti-Psychotic Tranquilizers**. They are also sometimes called the "major tranquilizers" to distinguish them from the Anti-Anxiety (or "minor") tranquilizers. Thorazine and the others in this group are prescribed for persons who have very serious mental and emotional problems. you probably won't encounter them too often, since patients receiving Anti-Psychotic Tranquilizers usually are institutionalized. The fourth drug listed, Chloral Hydrate, is the second oldest CNS Depressant (only alcohol is older). Chloral Hydrate is an example of the subcategory called the **Non-Barbiturates**. Drugs in this group are prescribed for pretty much the same purposes as are the Barbiturates, and produce the same effects, but are chemically distinct from the Barbiturates. Chloral Hydrate, by the way, is the infamous "knock out" drops so popular in spy movies. Put some Chloral Hydrate in a person's beer, wine or whiskey glass and you'll produce an additive effect with the alcohol that will usually knock him out. Used in that way, Chloral Hydrate is sometimes called a "Mickey Finn", after a British prize fighter of the mid-19th Century, who was famous for his knock out punch.

There are two other subcategories of CNS Depressants that aren't represented in this list of five drugs. One of them is the **Anti-Depressants**. It seems strange to say that there is a group of Depressants known as the Anti-Depressants, but you must understand that is it Psychological Depression that they are "anti". To avoid this confusion of terms, the Anti-Depressants are sometimes also called the Mood Elevators. The final subcategory of Depressants is the **Combinations**. These are drugs formed by combining the members of the other five subcategories.

2. **The phenomenon known as synesthesia ...**

The correct answer is (A), **Hallucinogens**. Synesthesia refers to a "scrambling" of sensory input to the brain, and Hallucinogens often cause this. For example, the Hallucinogen user may look at a friend's bright red shirt, and suddenly seem to smell the fragrance of roses. Or, he or she might hear a telephone ring, and every time the bell sounds, "see" a brilliant flash of lightning. We'll encounter this word again, in Question #37 of the "Challenge Quiz".

3. **Morphine can best ...**

The correct answer is (B), an Opiate. Narcotic analgesic drugs are divided into two subcategories. The Opiates, which are derived from Opium, and the synthetics. The synthetics do not derive from opium in any way, but are classified as Narcotic Analgesics based on the symptoms they produce. Methadone and Demerol are other examples of a synthetic Narcotic Analgesic. Codeine and Heroin are other examples of Opiates.

4. **The sub-category of Inhalants known as the Anesthetic Gases ...**

This was covered in the Pre-School. The correct answer is (D), **lowered blood pressure**. Other subcategories of Inhalants (the Volatile Solvents and the Aerosols) elevate blood pressure.

Do you recall why the Anesthetic Gases produce lower blood pressure? We'll give the answer on the next page.

5. **The technical term for constricted ...**

The correct answer is (C), **miosis**. The other four possible answers are meaningless gibberish -- nonsense terms that we concocted.

By the way, do you know the technical term that is the opposite of miosis? In other words, what is the technical term for dilated pupils? We'll get to it in Question #39.

6. **For each of the listed drugs ...**

Those five drugs all start with the letter D, but they're not all from the same family. Desoxyn is a prescriptive form of Methamphetamine, so it is a CNS Stimulant. The next three, Darvon, Dilaudid and Demerol, are all Narcotic Analgesics. Darvon and Demerol are both synthetic Narcotics; they do not derive from Opium. Dilaudid, on the other hand, is an Opiate; it is produced by chemically treating Morphine. This sort of makes Dilaudid Heroin's "brother", since they have the same "mother" (Morphine). In fact, Dilaudid is sometimes called "drugstore Heroin". The last drug listed, Diazepam, is the generic name for the drug Valium; so, it is a CNS Depressant.

7. **The technical term for an abnormally slow pulse ...**

The correct answer is (C), **Bradycardia**. How about its opposite? What is the technical term for an abnormally fast pulse? It's **Tachycardia**, the word given in answer (E). These words derive from the Greek for heart (cardia), slow (Brady) and fast (tach). The other three possible answers listed are either nonsense terms that we've made up, or terms that have no relevance to a DRE.

Remember the follow-up to Question #4, from the previous page? The Anesthetic Gases lower blood pressure because they partially paralyze the pumping action of the heart. So the heart pumps faster (pulse goes up) in an effort to send enough blood to the brain, but it pumps more weakly (blood pressure goes down).

8. **... the "normal range" of ... pupil size in room light...**

This was covered in the Pre-School. The only acceptable answer is (A), **2.5-5.0 mm**

9. **Suppose you evaluate a subject that ...**

This is an opportunity to introduce some concepts concerning drug combinations. Think about what PCP and Cannabis usually do individually, as far as Horizontal Gaze Nystagmus is concerned. PCP usually **does** cause it, and usually there will be a very distinct jerking of the eye. Cannabis does not cause HGN, but doesn't cancel out HGN, either. As long as the PCP is in his system at a high enough dose to impair, his eyes will continue to exhibit nystagmus. And that is precisely the situation identified in Question #9.

When we have this kind of a situation, i.e., someone has taken a combination of drugs, one of which causes an effect (like HGN) while the other doesn't, we call it an **Overlapping Effect**. So the correct answer here is (B). Cannabis takes no action, as far as nystagmus is concerned. But PCP takes an action: it causes HGN. In this instance, PCP's action **overlaps** the lack of action by Cannabis.

But suppose we change Question #9. Suppose instead of HGN, we say the subject "exhibits Lack of Convergence". Well, PCP by itself usually causes Lack of Convergence. And Cannabis by itself causes Lack of Convergence. So the combination will usually cause Lack of Convergence! In this case, PCP takes an action, and Cannabis takes the same action. As far as Lack of Convergence is concerned, the combination of PCP and Cannabis causes an **Additive Effect**. That is, they add their individual actions toward a common goal, in this case, it is the goal of causes Lack of Convergence.

Now, let's change Question #9 again. This time, let's focus on "reaction of the pupils to light". That is one indicator of impairment that PCP doesn't affect.

Cannabis also doesn't affect how quickly the pupils respond to light. Neither drug, individually, will slow down the pupils' reaction. So ... neither will the two drugs in combination. Here we have a case where PCP takes no action, and Cannabis also takes no action. We call this the **Null Effect**.

Let's look at all of our major indicators of impairment, and see what we will expect to find due to the combination of PCP and Cannabis.

IMPAIRMENT INDICATOR	PCP USUALLY	CANNABIS USUALLY	TYPE OF COMBINED EFFECT	SO USUALLY WE WILL SEE
Horizontal Gaze Nystagmus	**present**	none	OVERLAPPING	**present**
Vertical Gaze Nystagmus	**present**	none	OVERLAPPING	**present**
Lack of Convergence	**present**	**present**	ADDITIVE	**present**
Pupil Size	normal	**dilated(1)**	OVERLAPPING	**dilated(1)**
Reaction to Light	normal	normal	NULL	**normal**
Pulse Rate	**UP**	**UP**	ADDITIVE	**UP**
Blood Pressure	**UP**	**UP**	ADDITIVE	**UP**
Body Temperature	**UP**	normal	OVERLAPPING	**UP**

(1) Possibly normal

The chart makes it clear that PCP and Cannabis, in combination, produce a series of Overlapping and Additive Effects, and one Null Effect, on the major indicators of impairment.

Our possible answers to Question #9 included two more new terms. One of these is **Antagonistic Effect**. The combination of PCP and Cannabis doesn't give us an opportunity to illustrate this, so let's try a different combination. Suppose we examine a person who's taken Heroin and Cocaine (i.e., a so-called "speedball"). What are we going to find when we examine the size of that person's pupils?

Cocaine usually dilates pupils; Heroin usually constricts them. So as far as pupil size is concerned, Cocaine takes one action while Heroin takes an opposing, or antagonistic, action. The two drugs struggle against each other, one trying to draw the pupils out, the other trying to shut them down.

Which one is going to win? It's really not possible to say. It depends on many factors: How much of each drug did the person take? How long ago did he or she take them? How tolerant is the person to each drug? Three outcomes are possible at any given moment:

(1) Maybe, right now, the Cocaine is the dominant drug in the subject's system. So maybe we'll see some dilation, but maybe not as much as the Cocaine ordinarily will produce.

(2) Or maybe, at this moment, the Heroin is more powerful. So possibly we'll see some constriction, although maybe less than the Heroin would produce if the Cocaine weren't there.

(3) It is even possible that, at this particular moment, the effects of the Cocaine and the Heroin are fairly evenly balanced.

In that case, the pupils might be within the normal range of size!

When we have a combination of drugs that produces an **Antagonistic Effect** on some indicator of impairment, it is simply impossible to predict what we will find when we examine that indicator.

One other possible answer was listed for Question #9: Synergistic Effect. That is a term used by some researchers and physicians who study drug effects. They use the term to describe a sort of "super-additive" effect, in which the person's reaction to a drug combination is somehow much more than would be expected from his or her reaction to the two drugs separately. There is little doubt that this type of reaction occurs. Emergency room physicians can attest to the numerous cases in which persons have suffered fatal or near fatal reactions to combinations of alcohol and barbiturates, for example, when the amounts of the individual drugs in the persons' systems were far below typically dangerous levels. However, the word "synergistic" conveys the notion that we can somehow quantify this super-additive reaction, e.g., "two plus two equals ten". Since the DRE's ability is limited to observing and recording reactions, and not to quantifying them, the concept and term Synergistic Effect has no place in the Drug Evaluation and Classification program.

10. **For each of the listed drugs ...**

Psilocybin and Peyote are Hallucinogens; the former derives from a species of mushroom, the latter from a species of cactus. Phenobarbital is a CNS Depressant, and specifically a Barbiturate (remember that "-barbital" at the end of the name). Preludin is a CNS Stimulant. Phenyl Cyclohexyl Piperidine of course has the initials "PCP", and that's exactly what it is; the more commonly-used name "Phencyclidine" is actually a contraction of Phenyl Cyclohexyl Piperidine.

11. **If a person has a BAC ...**

This was covered in the Pre-School. Remember the definition: "Blood Alcohol Concentration is the number of grams of alcohol in every 100 milliliters of blood." So if a person has a BAC of 0.10, that means there is 0.10 gram of alcohol in 100 milliliters of his or her blood. And of course, 0.10 gram is the same thing as one-tenth of a gram, so the correct answer is (C).

What about the other answers? One million nanograms (Answer B) is one million times one-billionth of a gram, which is the same as one-thousandth of a gram, or one milligram. Ten milligrams (Answer E) is ten times one thousandth of a gram, or one-hundredth of a gram. So only Answer (C) is correct.

12. **Which of the following usually will cause horizontal ...**

    Remember that only three of the seven categories cause HGN: CNS Depressants, Phencyclidine and Inhalants. THC, of course, is the active ingredient in Cannabis, so it will not cause HGN. LSD is probably the best known Hallucinogen; it also will not cause HGN. MDMA is another Hallucinogen, sometimes known as "Ecstasy"; so it, too, won't cause HGN. But **ETOH** is ethyl alcohol, the most commonly-used CNS Depressant. It will usually cause HGN. And **PCP** is Phencyclidine, another drug that usually causes HGN. So the two correct answers are (D) and (E).

13. **... the normal range of ... pulse rate ...**

    The correct answer, of course, is (E): 60 to 90 beats per minute.

14. **Persons under the influence of ...**

    All five of the things listed are commonly associated with impairment by CNS Stimulants. The term bruxism is simply a medical expression for the last item listed, i.e., "grinding the teeth".

15. **Suppose you evaluate a subject ...**

    You might want to refer back to the discussion of Question #9, and the 4 types of drug combination effects: Null, Overlapping, Additive and Antagonistic.

    The subject has a pulse rate of 102; that is an elevated pulse. What will marijuana (Cannabis) usually do to the pulse rate? What will methamphetamine (Stimulant) usually do to pulse rate?

    Both of those drugs usually elevate pulse rate. So what we have is an **Additive Effect** (Answer B).

16. **For each of the listed drugs ...**

    All five of the listed drugs are Narcotic Analgesics. Thebaine, Oxycodone and Dilaudid, are **Opiates**. The other two listed drugs, Numorphan and Fentanyl, are **Synthetic Narcotics**.

17. **The Afferent Nerves are ...**

The two subdivisions of the nervous system are best known as the **sensory** nerves and the **motor** nerves. The sensory nerves carry messages to the brain, e.g., from the eyes, the ears, pain sensors, etc. The motor nerves carry messages away from the brain, to the muscles, the lungs, the heart, etc. The sensory nerves tell the brain about things that affect the body; the motor nerves are the tools the brain uses to effect its control over the body. For these reasons, the sensory nerves are also known as the **Afferent** nerves (Answer A), while the motor nerves are known as the Efferent nerves.

18. **Which of the following usually will be true ...**

The key thing to remember is that Xanax is a CNS Depressant. If a person is under the influence of a Depressant, we usually will see lowered blood pressure; eyes unable to converge; pupils that are within the normal range of size; Horizontal Gaze Nystagmus is present; and, body temperature within the normal range. In other words, **all** of the listed answers are correct.

19. **Another word for "nerve cell" is ...**

Nerves are the things that carry messages between the brain and the body's muscles, tissues, organs, etc. A simple way of depicting a nerve is to imagine that it consists of a string of small "wire" segments, separated from each other by narrow gaps. Messages to and from the brain can be thought of as electrical impulses that run along the wire segments. When the electrical impulse reaches the end of a wire segment, it triggers the release of chemicals that flow across the gap to the next wire segment. When the chemicals reach the next wire segment, the electrical impulse is generated, and runs along the wire to its end, where once again chemicals are passed across to the next wire. Thus, nerves carry messages by means of a series of electrical and chemical transmissions.

In this simple model, the "wire segments" are nerve cells; the technical name for a nerve cell is **neuron**. So, the correct answer to this question is (C). At one end of each neuron or nerve cell is a receptacle where the chemical messenger is stored for release to the next cell. That storage-and-release area is called the axon. At the other end of the nerve cell we find a receptacle that receives the chemical messenger from the previous cell. That receiving area is called the dendrite. The gap between two neurons is called the synapse, or synaptic gap. The fifth answer listed, "ergon", is a nonsense word that we've made up.

20. **The pulse point that is located ...**

The **radial pulse point** (Answer B) is the one we find In the crease of the wrist nearest the thumb.

21. **Which ... is (are) CNS Depresants ...**

Valium, Soma, Choral Hydrate, Alcohol and Xanax are all CNS Depressants.

22. **For each of the listed drugs ...**

Nitrous Oxide is an Inhalant, and is probably the most widely abused anesthetic gas. Toluene is also an Inhalant, and is an active ingredient in many volatile solvents. Isopropanol is an alcohol, and therefore a CNS Depressant; it is also known as "rubbing alcohol". Chlordiazepoxide is the generic name for Librium, and Alprazolam is the generic name for Xanax; both are anti-anxiety tranquilizers, and therefore are CNS Depressants.

23. **The technical term for an abnormally rapid pulse ...**

The correct answer is (E), **Tachycardia**. It may help you remember this if you recall that your car or motorcycle tachometer measures how rapidly the engine is turning over. The exact opposite, i.e., an abnormally slow pulse rate, is called Bradycardia. The other three possible answers listed for this question are either nonsense terms that we have made up, or quasi-medical terms that have no relevance to a DRE.

24. **Suppose you evaluate ... the combined influence of Heroin and Cocaine ...**

The subject's pulse rate is 72, which is well within the normal range. But we know that he or she is under the combined influence of Heroin and Cocaine. Heroin (like all Narcotic Analgesics) usually lowers pulse rate. Cocaine (like all CNS Stimulants) usually elevates pulse rate. The delicate "balancing act" that produced the normal pulse rate is due to the **Antagonistic Effect** (Answer A) between these two drugs.

25. **Every chemical that is ... "alcohol" ...**

Every "alcohol" is made up of carbon, oxygen and **hydrogen** (Answer B).

26. **The Efferent Nerves ...**

Remember the discussion of Question #17: The **Motor Nerves** (Answer D) are also known as the Efferent Nerves. Actually, two of the other answers listed could be considered partly correct: The Autonomic Nerves (Answer A) are a sub-classification of Motor Nerves; and, the Sympathetic Nerves (Answer C) are a sub-sub-classification. So both of those are Efferent Nerves, too. But only the Motor Nerves, as a complete group, encompass all of the Efferent Nerves.

The Sensory Nerves, you will recall, are known as the Afferent Nerves. The fifth possible answer, "Autotrophic", is a nonsense word.

27. **Which of the following is ...**

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

- o Swaying
- o Hopping
- o Raising the Arms
- o Putting the Foot Down

Therefore, neither "Failing to Count Out Loud" (Answer B) nor "Raising the Foot Less than Six Inches" (Answer C) is a **validated** clue of impairment. However, this doesn't mean you should ignore these behaviors. If the subject stops counting out loud, you must remind him or her to do so: it is one of the elements of the test that are designed to divide the subject's attention. If he or she doesn't raise the foot high enough, the test will be easier than it should be, so you must tell the subject to raise it higher.

28. **How many carbon atoms ...**

Ethanol is the type of alcohol that has **two** carbon atoms in its molecule (Answer B).

29. **... we use the stethoscope to listen to the ...**

The correct spelling is **Korotkoff** (Answer C).

30. **Narcotic Analgesics usually will ...**

The correct answers are (D) and (E), **Lowered pulse rate** and **Constricted pupils**. Lack of Convergence would not be expected to be observed, since that indicator of impairment associates with the "DIP-C" drugs (Depressants, Inhalants, PCP and Cannabis). Eyelid tremors are often observed with Cannabis and CNS Stimulants, but not with Narcotic Analgesics. And, Narcotic Analgesics usually induce muscle flaccidity, not muscle rigidity.

31. **Persons who are under the influence of Heroin ...**

Heroin abusers often will exhibit all of the characteristics listed in this question. One of those characteristics, **"droopy eyelids"**, is also known by the medical term ptosis.

32. **Which of the following ... dilated pupils?**

The "alphabet soup" of possible answers includes two drugs that won't dilate the pupils; they are MPTP (a synthetic Narcotic Analgesic) and ETOH (ethyl alcohol, a CNS Depressant). The other three listed drugs are all Hallucinogens, and all usually will dilate the pupils. So the correct answers are **LSD**, **STP** and **MDMA**.

33. **For each of the listed drugs ...**

Dexedrine is a **CNS Stimulant**; Dronabinol is synthetic THC, so it is an example of **Cannabis**; another name for Dronabinol is "Marinol". Flurazepam is one of the Benzodiazepines, so it is a **CNS Depressant**; it also goes by the trade name "Dalmane". Soma is another **CNS Depressant**, and it is a special one at that. Unlike the vast majority of Depressants, Soma usually dilates the pupils and can cause an elevated pulse rate. Ritalin is a **CNS Stimulant**.

34. **Suppose you evaluate a subject ...**

At 8.5 mm, the subject's pupils are dilated. We know that he or she is under the combined influence of a Stimulant (Dexedrine) and a Depressant (Soma). Of course, CNS Stimulants usually produce dilated pupils, but Depressants usually don't affect pupil size. **But here we have an exception**. As we saw in the last question, Soma is a very special Depressant, because it dilates the pupils. So what we have is two drugs that both dilate the pupils, producing an **Additive Effect** (Answer A). It is interesting to note that, had this been a combination of Dexedrine and any other Depressant, we would probably still see dilated pupils, but it would be due to an Overlapping Effect, rather than an Additive Effect.

35. **Where is the Carotid ...**

As you know from the Pre-School, the Carotid pulse point is **in the neck**.

36. **"Starting too soon" is a scientifically ...**

This is one of the eight scientifically validated clues of impairment for **Walk and Turn**, so Answer (B) is correct. One Leg Stand has four scientifically validated clues, but none of them comes into play until the subject actually is told to start performing; therefore, "starting too soon" is irrelevant with that test. Neither Romberg Balance nor Finger to Nose have **any** scientifically validated clues.

37. **Experiences such as "seeing sounds" ...**

This sort of weird mixing of senses is often found with persons under the influence of Hallucinogens. It is almost as if a stimulation of one sense (e.g., hearing) triggers a message to the brain that travels along the wrong sensory nerve and produces the perception of a different sense (e.g., sight). So perhaps the hallucinogen abuser "sees" a brilliant flash of fireworks every time he hears a nearby telephone ring. He might be heard to say something like,"Man, look at that phone explode! It's beautiful!"

The scientific or medical term for this sort of experience is **synesthesia**, so Answer B is correct. The other possible answers listed are either medical terms of no relevance to a DRE, or nonsense words that we've made up.

38. **Suppose a subject exhibits ...**

Often, the best way for a DRE to proceed with a diagnosis is to **rule out** as many categories as possible. We know the BAC is 0.00, so **alcohol** cannot be contributing to this subject's impairment. We see no nystagmus, so **Depressants, Inhalants and PCP** are not reasonable candidates as the source of this person's impairment. Pulse rate and blood pressure are both lower than normal, and pupils are not dilated -- in fact, they are constricted; those facts argue against **CNS Stimulants, Hallucinogens or Cannabis**. What's left? Narcotic Analgesics. Now, are the facts in evidence consistent with that category? Narcotic Analgesics usually produce:

- o no nystagmus
- o no Lack of Convergence
- o constricted pupils
- o lowered pulse rate
- o lowered blood pressure
- o "sloppy" performance of divided attention tests

It is clear that the best available explanation for all of the facts is that the subject is under the influence of a Narcotic Analgesic. So you should choose Answer D.

But wait a minute: Answer E also includes Narcotic Analgesics. Isn't it possible that this subject has taken a Narcotic Analgesic, but has also smoked some marijuana? Isn't it possible that he or she is under the influence of a combination of Narcotic Analgesics and Cannabis?

Yes, it is possible. If you were to obtain a toxicological sample from this subject, it would not be too surprising to find that it tests positive for both Narcotic Analgesics and Cannabis. But as a DRE, it is **not** your job to try to predict or guess what the chemist will find in the sample. Your job is to determine if the subject is impaired right now, and if so, to identify the most likely cause of that impairment. And in the facts presented to you, there is nothing at all that suggests Cannabis.

There is nothing that cannot be explained on the basis of a Narcotic alone. As a DRE, you must always strive to identify the simplest and most believable explanation for the impairment you observe.

In formulating your opinion, never go "out on a limb". Mention only the category or categories that you can confidently identify in the facts at hand.

The urine or blood specimen collected from this subject could contain many things. Maybe he or she smoked a marijuana joint several hours before being arrested, then shot up a "speedball" (combination of Heroin and Cocaine). Then, after waiting an hour or two, he drove a car, was stopped and arrested, and brought to you. It is very likely, depending on the circumstances, that the effects of the marijuana and Cocaine had worn off by the time you examined him, but the Heroin

was still active in his system. If so, when you saw him, he was under the influence of a Narcotic Analgesic, but not under the influence of Cannabis or a Stimulant. Of course, the urine or blood will probably test positive for all three drugs, because the chemist will find evidence that the subject used them recently. **This doesn't mean that you "missed" in your diagnosis of this subject!** Far from it: the chemical test corroborated your conclusion. You said he was under the influence of a Narcotic Analgesic, and the toxicologist confirmed that he had that kind of drug in his system.

39. **Persons under the influence of Cocaine ...**

Cocaine usually will produce all of the characteristics listed in this question. One of them, **"dilated pupils"**, is also known by the medical term mydriasis.

So we've finally answer the question we hinted about in Question #5.

40. **The proper sequence of commands ...**

The only acceptable answer is (B): **Left, Right, Left, Right, Right, Left**.

41. **How many distinct scientifically ...**

As we have observed in the answers to some previous questions, the Finger to Nose test has never been scientifically validated. Hence, it has **no** scientifically validated clues of impairment. The correct answer is (E).

But remember: Saying that the test has not been validated does not at all mean that it is invalid. Properly administered, it will supply very important evidence of subject's impairment.

42. **Which of the following is ...**

Way back in the response to Question #1 we listed the six sub-categories of CNS Depressants. Four of those six appear in the possible answers to Question #42:

B. Anti-Anxiety Tranquilizers
C. Anti-Psychotic Tranquilizers
D. Non-Barbiturates
E. Anti-Depressants

One of the possible answers, **Natural Alkaloids**, is not a sub-category of CNS Depressants. So the correct answer to this question is (A).

43. **Consider the following situation: A long-time ...**

Two key factors in this scenario steer us toward the most logical answer: (1) the person "shot up" the drug, i.e., injected it into a vein via hypodermic needle; and, (2) he was not examined by the DRE until two hours had elapsed.

Cocaine is a very fast acting drug, especially when it is smoked or injected. The user, even a long-time user, experiences a "rush" within seconds, and the vital signs and pupils begin to exhibit the influence of the drug almost immediately. Therefore, possible answers (A) and (D) are very implausible. Cocaine is also a rapidly dissipating drug, i.e., its effects don't last very long. The user "comes down" from the high fairly quickly, usually within 30 to 60 minutes after injecting. It is very likely that two hours after "shooting up" the user's vital signs and pupils would exhibit downside effects. The agitation and extreme alertness associated with this drug also would likely have disappeared by that time, and the user might even appear drowsy. So the correct answer to this question is (B).

But what about the other two possible answers listed? First, isn't it possible that the person actually shot up a "speedball", and we're seeing normal vital signs and pupils because of the antagonistic effects of the two drugs?

That really isn't very likely. On the one hand, the Cocaine probably would have worn off by this time, as we've already mentioned. That would leave the Heroin still active in the system. Unlike Cocaine, Heroin very likely would still be affecting the user two hours after injecting, so we'd probably see depressed vital signs and constricted pupils, and some definite impairment on the divided attention tests. But none of that is evident here.

How about the final possibility: Could the person have unwittingly injected a placebo, and experienced no impairment at all? The subject really doesn't exhibit either clinical or psychophysical indicators of impairment. Maybe this fellow was cheated by his dealer, and shot up nothing but sugar or talcum powder, and never got a "rush".

Odds are good that this is the best explanation for the situation discribed. Remember: DREs always try to find the simplest, most logical explanation for the facts they observe.

44. **Sinsemilla belongs to which ...**

Sinsemilla (a Spanish word meaning "without seeds") is a particular variety of the Cannabis Sativa plant. Marijuana produced from Sinsemilla usually has a very high concentration of THC.

So the correct answer is (B).

45. **The part of a nerve cell that receives ...**

Back in Question #19, we discussed a simplified concept of nerves, and identified some of the technical terms used for the various parts of the nervous system. One of the terms that we did not define at that time was neurotransmitter. That is the technical expression for the "chemical messengers" that flow across the gap (synapse) between two nerve cells (neurons). One end of the neuron is designed to send out the neurotransmitter, toward the next nerve cell. That end is called the

Axon. The other end of the neuron is designed to receive the neurotransmitter from the previous nerve cell. That end is called the **Dendrite**. So the correct answer to this question is (D).

46. **Suppose you evaluate a subject ...**

This subject has a below the normal range blood pressure. Heroin (a Narcotic Analgesic) usually causes lowered blood pressure. Xanax (a CNS Depressant) also usually causes lowered blood pressure. So as far as blood pressure is concerned, these two drugs tend to produce the same effect. That situation is called the **Additive Effect** (Answer B).

Bonus Question: Do you recall the generic, or chemical, names for the drugs we call Heroin and Xanax?

Answer: The chemical name for Heroin is Diacetyl Morphine. The generic name for Xanax is Alprazolam.

47. **How many distinct scientifically validated clues ...**

One Leg Stand was submitted to scientifically controlled experimentation during the 1970's. The results of the experimentation disclosed that One Leg Stand, along with Walk and Turn and Horizontal Gaze Nystagmus, can reliably discriminate between alcohol-impaired and non-impaired subjects. **Four** validated clues of impairment were identified for One Leg Stand:

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

So the correct answer is (C).

48. **The effects of impairment from Morphine and Demerol are the same with the exception of..**

Both Morphine and Demerol are Narcotic Analgesics. Morphine is an Opiate and Demerol is a synthetic. Since both drugs belong to the same category, the observed effects of impairment would be the same. The correct answer is (E).

49. **Someone who is under the influence of Diazepam usually will have ...**

Diazepam, the generic name for Valium, is a CNS Depressant. The drug categories which usually will not affect pupil size are CNS Depressants, Phencyclidine, and Inhalants.

50. **How many distinct ...**

For Walk and Turn, **eight** clues have been shown to discriminate reliably between alcohol impaired and non-impaired subjects. Two of these apply while the subject is standing in a heel to toe fashion, listening to the instructions:

- o Cannot keep balance
- o Starts too soon

The other six clues come into play after the instructions are completed and the subject begins to walk:

- o Stops walking
- o Misses touching heel to toe
- o Steps off line
- o Raises arms
- o Wrong number of steps
- o Turns improperly

Course Location _____ Date _____

Preliminary Training For Drug Evaluation and Classification
Student's Critique Form

A. Course Objectives

Please indicate whether you feel that you personally achieved the following course objectives.

	Yes	No	Not Sure
Can you define the term "drug" and name the seven drug categories?			
Can you identify the twelve major components of the drug recognition process?			
Can you administer and interpret the psychophysical tests used in a drug evaluation?			
Can you conduct the eye examinations used in the evaluations?			
Can you check the vital signs used in the evaluation?			
Can you list the major signs and symptoms associated with each drug category?			
Can you describe the history and physiology of alcohol as a drug?			

B. Course Activities

Please rate how helpful each workshop session was for you personally. Also, please rate the quality of instruction (subject knowledge, instructional techniques and learning activities). Use a scale from 1 to 5 where: 5=Excellent, 4=Very Good, 3=Good, 2=Fair, 1=Poor.

	Session/ Activity	Quality
Overview of Drug Evaluation and Classification Procedures		
The Psychophysical Tests		
The Eye Examinations		
Alcohol Workshop		
Examination of Vital Signs		
Overview of Signs and Symptoms		
Alcohol as a Drug		
Preparing for the DRE School		

C. Course Design

Please indicate your own personal feeling about the accuracy of each statement.

	Agree	Disagree	Not Sure
1. I wish we had more practice with drinking volunteers.			
2. There was too much "bull throwing" in this course.			
3. I now have a much better idea as to what the drug recognition process is all about.			
4. The course was at least one-half day too long.			
5. I got a great deal of practical, useful information from this course.			
6. I'm still pretty confused as to what the drug recognition process is all about.			
7. I think I could do a pretty good job conducting a drug evaluation right now, without additional training.			
8. This course should have been at least one-half day longer.			
9. We spent too much time with the volunteer drinkers session.			
10. Some of the practice sessions in this course were dragged out a bit too much.			
11. I don't think that our instructors were as well prepared as they should have been.			
12. This course was a good review, but it really didn't teach me anything new.			
13. I am very glad that I attended this course.			
14. The instructors seemed to be more interested in practicing their teaching skills than in seeing to it that we learned what we were supposed to learn.			
15. I would have to say that this course was not quite as good as I expected it to be.			

D. Suggestions for Deletion and Additions

If you absolutely had to cut four hours out of this course, what would you delete or shorten?

If you could add four hours to this course, how would you spend the extra time?

E. Ratings of the Course and the Instructors

On a scale from 1 (=very poor) to 5 (=excellent), please give your opinion of the course as a whole.

The course as a whole: _____

On a scale from 1 (=very poor) to 5 (=excellent), please give your opinion of each instructor.

Instructor	Rating

F. Final Comments and Suggestions

Please offer any final comments that you wish to make.