

***Medical and Psychiatric Complications
for Patients with Alcohol
and Other Substance Use Disorders***

Learning Objectives

- Discuss the substances most often used and possible routes of administration.
- Identify the typical signs and symptoms of intoxication or withdrawal from alcohol or other substances.
- Discuss the common medical and psychiatric complications associated with alcohol or other substance use, including problems specific to routes of administration.
- Review the common interactions between alcohol and substance use and chronic or acute medical and psychiatric conditions.
- Discuss how the consequences of these conditions can be impacted with the application of SBIRT.

Medical and Psychiatric Complications

This module presents many **commonly misused substances** the associated pharmacology, intoxication and withdrawal syndromes and potential medical and psychiatric consequences of misusing these substances.

This module may be presented straight through from beginning to end or the user may navigate through as many or as few of the different substances in any sequence.

After reviewing each of the substances, read about the potential consequences of **different routes of exposure** to these substances and then apply your knowledge to the four **cases**.

Commonly Misused Substances and their Consequences

Common Substances

<u>Alcohol</u>	<u>Sedatives/Hypnotics/Anesthetics</u>
<u>Cannabis/ Tetrahydrocannabinol (THC)</u>	<u>Steroids</u>
<u>Hallucinogens</u>	<u>Stimulants</u>
<u>Opioids</u>	<u>Volatile Substances</u>

Medical and Psychiatric Complications of Substance Use

Consequences based on Route of Exposure to Substance

Cases for Module 2: Medical and Psychiatric Consequences

Alcohol



Alcohol Pharmacology

- Alcohol binds to GABA receptors and increases chloride influx into a neuron, hyperpolarizing the cell and inhibiting neuronal firing.
- Alcohol functions as an antagonist of NMDA receptors, blocking sodium and calcium influx into neurons and further inhibiting neuronal firing.
- Decreased GABA and NMDA functioning may cause an increase in dopamine concentrations in the nucleus accumbens.

Alcohol Use: Intoxication

- Slurred speech
- Reddened conjunctiva
- Dilated pupils with sluggish response to light
- Lateral nystagmus
- Loss of coordination/ataxia
- Hypoglycemia
- Decreased attention span
- Impaired judgment/disinhibition/euphoria/dysphoria

Alcohol Use: Chronic

- Shuffling broad-based gait
- Bruising and other injuries
- Gouty tophi
- Gynecomastia
- Striae
- Telangiectasia
- Plethoric facies
- Reddened conjunctiva
- Palmar erythema
- Dupuytren's contracture
- Acne rosacea

Alcohol Withdrawal: Incidence

- 20% of dependent drinkers experience some degree of withdrawal
- 75 to 80% have only minor symptoms
- 5% experience delirium tremens
- 3% have seizures

Alcohol Withdrawal: Onset

- Symptoms may present before blood alcohol is zero
- Symptoms are generally present within 6 hours of cessation of drinking
- Symptoms may not begin until up to 4 days after cessation of drinking
- Typically resolve within 24-48 hours

Alcohol Withdrawal: Signs and Symptoms

- Headache
- Insomnia
- Anxiety/Tremulousness
- Nausea/vomiting
- Dysphoria/irritability
- Autonomic hyperactivity (hypertension/tachycardia/sweating/anxiety)
- Specific symptoms in a given patient are typically consistent from one episode to the next

Alcohol Withdrawal: Complications

- Hallucinosiis
- Delirium Tremens
- Seizure
- Death from aspiration

Alcohol Withdrawal: Alcoholic Hallucinosi

- Occurs within 1 day of abstinence
- Usually visual
- Patient is aware of hallucinations
- Patient is alert
- Resolves within 24 to 48 hours

Alcohol Withdrawal: Delirium Tremens

- Seen in 5% of patients with ethanol withdrawal
- Occurs 48-96 hours after stopping alcohol
- Resolves in 24 hours in only 15% of patients
- Lasts 3 or more days in the remaining percent
- Mortality of up to 5%
 - mostly due to aspiration pneumonia or arrhythmias
- Distinguished from hallucinosis by autonomic hyperactivity and depressed level of consciousness.

Alcohol Withdrawal: Seizures

- Usually occur within 48 hours after the last drink
- Last 30 to 90 seconds
- Generalized, tonic clonic
- Most only have one seizure but up to 40% will have a second one

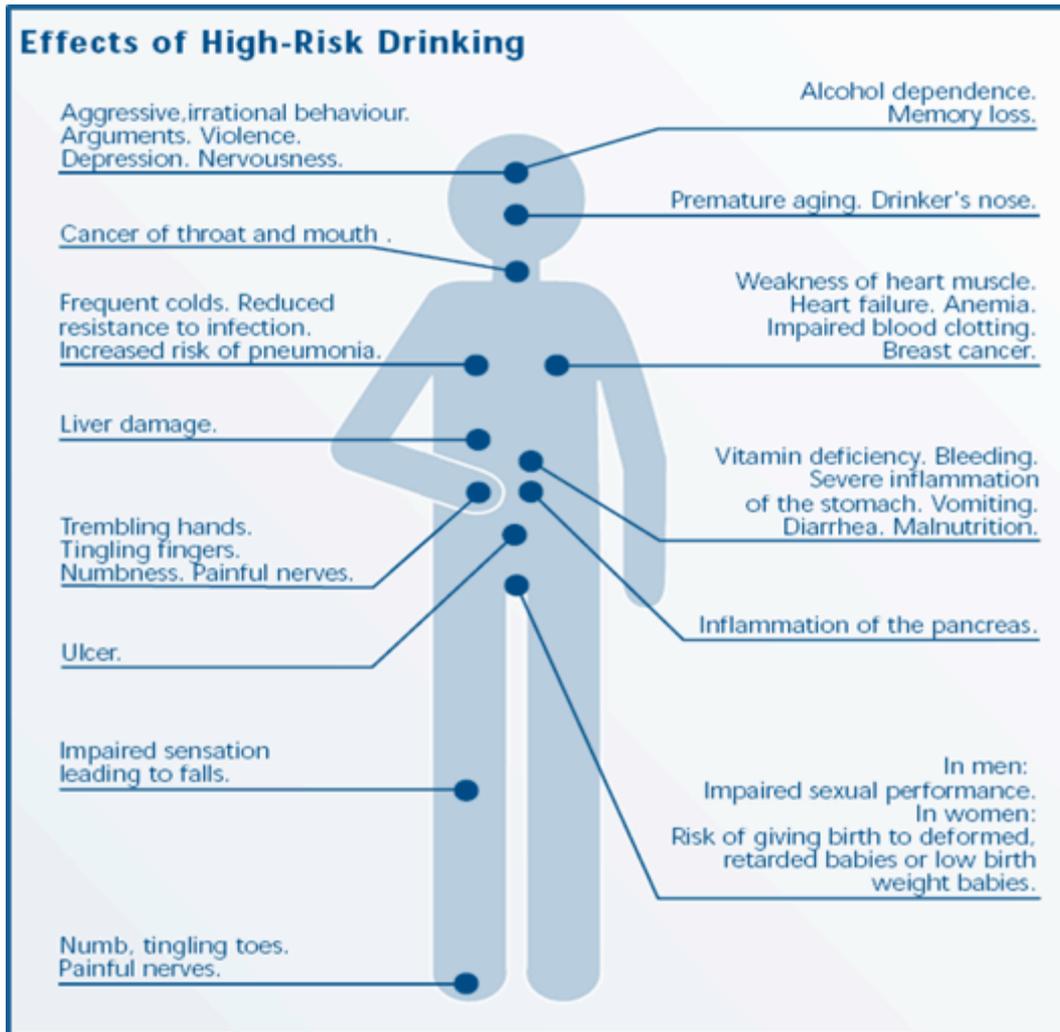
Management of Alcohol Withdrawal

- Course of alcohol withdrawal is unpredictable.
- Past severe withdrawal is associated with future withdrawal.
- There are no clear indications for when NOT to use medication to manage withdrawal.
- Medication should be provided BEFORE symptoms become severe.
- Use the Clinical Institute Withdrawal Assessment (CIWA) scale and protocol.

Medical Consequences of Hazardous and Harmful Alcohol Use

- Alcohol poisoning (stupor, hypoxia, hypothermia)
- Toxic hepatitis
- Acute pancreatitis
- Injuries (fractures/lacerations/subdural hematomas)
- Peripheral nerve palsies (ulnar nerve)
- Mallory-Weiss tears
- Sexually transmitted disease/unplanned pregnancy
- Dysphoria/Anxiety

Medical and Psychiatric Harms of Hazardous Drinking



Medical Consequences of Chronic Alcohol Consumption

Organ System	Early Consequences	Late Consequences
Gastrointestinal		
Digestive Tract	Gastritis, Peptic Ulcer Disease, Gastroesophageal Reflux Disease, Esophageal Varicies, Mallory-Weiss Tears	Esophageal Cancer, Oropharyngeal Cancer
Liver	Elevated Liver Enzyme Levels	Fatty Liver, Alcoholic Hepatitis, Cirrhosis, Liver Cancer
Pancreas	Acute Pancreatitis	Acute/Chronic Pancreatitis, Pancreatic Hypofunction, Pancreatic Cancer
Cardiovascular	Hypertension	Cardiomyopathy, Arrhythmia, Stroke
Heme/Onc	Red Blood Cell Abnormalities	Anemia, Iron Deficiency, Neoplasm of the Head and Neck, Breast Cancer
FEN	Protein-Calorie Malnutrition	Folate Deficiency, B12 Deficiency
Musculoskeletal	Fractures, Myopathy	Osteoporosis
Nervous System Central, Peripheral	Headaches, Peripheral Nerve Palsey, Acute Amnesia	Peripheral Neuropathy,

Medical Consequences of Chronic Alcohol Consumption

Organ System	Late Consequences
Infectious	Sexually Transmitted Disease, HIV, Hepatitis, Tuberculosis
Psychiatric	Substance use and/or co-occurring Mood Disorders, Liability
Reproductive	Amenorrhea, Early Menopause, Spontaneous Abortion, Sexual Dysfunction, Hypogonadism, Breast Cancer (women)
Social Problems	
Legal Problems	MVA, DUI, Public Intoxication, Misdemeanor/Felony Offenses
Employment Problems	Tardiness, Sick Days, Inability to concentrate, Decreased Productivity, Workplace Accidents/Injury, Job Loss/Chronic Unemployment
Effects on Children of Abusing/Dependent Parents	Fetal Alcohol Effects/Syndrome, Over Responsibility, Acting Out, Withdrawal, Inability to Concentrate, Social Isolation, Learning Disorders, Behavioral and Emotional Disturbances

Psychiatric Consequences of Hazardous and Harmful Alcohol Use

Substance Induced Affect Disorders:

- Due to direct pharmacological effects of alcohol on neurotransmitters/brain function
- Symptoms present while intoxicated or ≤ 1 month post-discontinuation

Psychiatric Consequences: Depression

- Patients with alcohol use disorder are 2-4 times more likely to have depression than the general population.
- Alcohol-induced depression should resolve through abstinence.
- Alcohol ***dependence*** is a major risk factor for suicidal behavior so ***ALL*** individuals with alcohol use disorders should be assessed for suicide risk.
- Both secondary and primary depression should be treated regardless of the patient's ability to abstain.

Psychiatric Consequences: Anxiety

- There is a high co-occurrence of anxiety and alcohol use disorders.
- Patients may develop hazardous alcohol use disorders due to preexisting anxiety in an effort to relieve their own symptoms.
- Generalized Anxiety may be co-occurring and independent of alcohol use disorders although exacerbated by alcohol use.
- Alcohol use disorder may induce anxiety by creating stressful situations/lifestyles.

Psychiatric Consequences: PTSD

- Alcohol use disorders are especially prevalent in patients with Post Traumatic Stress Disorder (PTSD).
- Individuals with alcohol use disorders are more likely to experience physical/sexual and psychological trauma putting them at risk for development of PTSD.
- Alcohol worsens PTSD symptoms and decreases effectiveness of PTSD treatment.

Psychiatric Consequences: Personality Disorders

- **Personality disorders are highly prevalent among substance abusers.**
- **Generally development of a personality disorder precedes substance use disorder.**
- **Anti-social personality disorder is most strongly associated with alcohol dependence.**
- **Anti-social personality disorder traits:**
 - **Complete disregard for/violation of rights' of others.**
 - **Inability to form meaningful relationships.**

Opioids



- The word “opium” is derived from the Greek word for juice
- All natural forms are derived from the poppy plant *Papaver somniferum*
- Soon derivations of morphine (1806), codeine (1832), papaverine (1848) and heroin (1898) increased availability
- “Opioid” are synthetic drugs, not derived from the plant, which mimic opiate actions
- All opioids can produce analgesia, somnolence and stupor.

Types of Opioids

- Oxycodone
- Morphine
- Hydromorphone
- Methadone
- Fentanyl
- Codeine
- Hydrocodone
- Heroin

Opioids: On the Street

- Some opioid users are considered “chippers,” occasional non-dependent users.
- A dependent opioid user often keeps to a regular schedule of use and attempts to maintain a steady supply.
- Opioids are often used with other substances
 - Stimulants (“speedball”) increase euphoria while decreasing the sedating effects of the opioid
 - Benzodiazepines delay withdrawal symptoms

Heroin

- Heroin may be a white powder or dark tarry substance
- Sold in “stamp bags” or “balloons”
- Stamp bags are small glassine envelopes usually marked with an image or words to indicate its batch or “brand”
- Balloons are actual tiny balloons which can be held to the nostril for insufflation
- A “bundle” or “brick” is usually 10 of either of these

Opioid Pharmacology

- μ opioid receptor agonists
- Some effect at other receptors
- Include pharmaceuticals and illicit substances
- Most opioids may be used orally
- They are sometimes used intranasally, by injection or smoked
- Long-acting formulations and patches may be chewed

Opioid Use: Intoxication

- Pinpoint pupils
- Bradycardia
- Constipation
- Nausea/Vomiting
- Relaxed State ("nodding")
- Euphoria
- Decreased level of consciousness

Opioid Use: Overdose

- The “classic triad” –
 1. Pinpoint Pupils
 2. Respiratory depression
 3. Coma
- Death usually occurs secondary to respiratory depression and respiratory acidosis.
- Risk of overdose is increased when there is a change in purity of heroin, a change in individual tolerance, or co-occurring medical illness.

Opioid Use: Chronic

- Development of tolerance to euphoria/analgesia (but not to pupillary response)
- Sexual dysfunction
- Amenorrhea
- Opiate withdrawal occurs with cessation of use
- Develops after as little as a few days of regular use

Opioid Use: Withdrawal

- Yawning
- Rhinorrhea
- Lacrimation
- Piloerection
- Diaphoresis
- Nausea/vomiting
- Myalgia
- Abdominal cramps
- Diarrhea
- Tremor
- Insomnia
- Autonomic hyperactivity
- Dysphoria
- Malaise
- Anxiety

Opioid Use: Withdrawal

- Withdrawal occurs 4-8 hours after the last use
- Peak withdrawal symptoms can occur in 2-3 days
- Symptoms can persist for months
- Withdrawal is not fatal but is extremely uncomfortable and aversive to patients. The aversion to withdrawal symptoms leads patients to be continuous users.

Medical Consequences of Opioid Use

Organ System	Complication
Infectious	Abcesses/cellulitis, pulmonary infections, endocarditis, rhinosinusitis, hepatitis C, HIV septic emboli
Musculoskeletal	Rhabdomyolysis
Respiratory	Asthma, pulmonary edema, respiratory depression, pulmonary emboli
Nervous	Seizures, cerebral dysfunction, hypoxemia
Ocular	Strabismus, fungal infections
Urological	Renal disease
Gyne/OB	Fetal growth restriction, placental changes, neonatal abstinence syndrome, congenital disease, amenorrhea
Cardiovascular	CAD, endocarditis, arrhythmias
Nutrition	Calcium inhibition, hypercholesterolemia, hypo-/hyper-thermia, hyperkalemia, protien calorie malnutrition
Endocrine	Pituitary enlargement, hormonal alterations, decreased testosterone

A Note about Dextromethorphan

- μ -opioid receptor agonist and NMDA antagonist blocks NMDA receptor antagonist.
- In medications...
Each bottle of Robitussin contains ~7.5 mg of DXM
- Dextromethorphan Hydrobromide (DXM)
A “Poor Man’s” PCP
- Can produce profound delirium and delusions

Stimulants

- Cocaine
- Amphetamines
- Prescription Stimulants:
Methylphenidate, Amphetamine
and Dextroamphetamine
- All of these substances may be
used orally, intranasally or by
injection



Cocaine

- Cocaine is a product of the alkaloid extract from leaves of the *Erythroxylum* plant originally grown in the Andes Mountains of western South America.
- William Halsted used cocaine for anesthesia in 1884.
- Early use occurs in 500 AD, evidenced by coca leaves in tombs in Bolivia and Peru.

Cocaine: On the Street

Cocaine exists in many forms:

- Cocaine alkaloid (freebase) is a colorless, odorless crystalline substance that is insoluble in water, but soluble in alcohol, acetone, or ether. Heating freebase converts cocaine to a stable vapor that can be inhaled.
- Cocaine, treated with hydrochloric acid becomes cocaine hydrochloride salt (crack) It is usually smoked but may be injected.
- Crack cocaine is usually smoked in a glass pipe or regular pipe or by mixing it with tobacco or marijuana.

Cocaine Pharmacology

- Cocaine blocks reuptake of dopamine from the neural synapse, increasing stimulation of dopamine receptors on the receiving neuron.
- Cocaine acts most strongly on neurons originating in the ventral tegmental area (VTA) of the midbrain, which in turn stimulate the nucleus accumbens. The nucleus accumbens is a key area of the brain's reward system.

Cocaine Use: Intoxication

- Autonomic hyperactivity
- Mydriasis
- Diaphoresis
- Agitation, paranoia
- Brisk reflexes, fine tremor, formication
- Anorexia
- Muscle spasms, chest pain
- Sexual dysfunction

Cocaine Use: Chronic

- Development of tolerance
- Reduced fertility
- Weight loss
- Malnutrition

Cocaine Use: Overdose

Adrenergic stimulus:

- Hypertension
- Vasoconstriction
- Seizure

Cocaine Use: Withdrawal

- Muscle ache
- Tremor
- Hunger
- Irritability
- Depression
- Fatigue
- Prolonged sleep episodes
- Intense craving
- Managed with psychological support and treatment of depression and sleep disorder.

Medical Consequences of Stimulant Use

Organ System	Complication
Infectious	Bacterial, mycoses, parasitic, viral
Neoplastic	Non-Hodgkin's lymphoma, pancreatic cancer
Respiratory	Asthma, respiratory dysfunction
Otorhonorharyngological	Oral lesions, nasal lesions, olfaction dysfunction, midline lesions
Nervous	Cerebrovascular, strokes, subarachnoid hemorrhage, ANS dysfunction in newborns, CNS atrophy, seizures, demyelination, sleep dysfunction
Ocular	Corneal lesions, retinal lesions, iritis, altered color vision, glaucoma
Urological	Genital ulcer disease, PID, sexual dysfunction, priapism, renal disease

Medical Consequences of Stimulant Use

Organ System	Complication
OB/Gyne	Pregnancy complications, infant diseases
Cardiovascular	CAD, Angina, myocardial infarction, arrhythmias, cardiac dys-morphology, coagulation effects
Dermatological	Lesions
Nutritional/Metabolic	Altered plasma cholinesterase, BMI effects, acid-base imbalance, hyperthermia, rhabdomyolysis, delirium
Endocrine	Prolactin dysfunction, diabetes and ketoacidosis
Immune	Autoimmune diseases, monocyte dysfunction
Environmental	Trauma, body stuffer damage
Other	Placental pathology, brain pathology

Methamphetamines: On the Street

- Typically, “meth” or “crystal meth” [methamphetamine] is a white powder that easily dissolves in water.
- Clear chunky crystals are called ‘crystal meth’ or ‘ice’.
- In tablets, capsules, powder, or crystal.
- Can be injected, snorted, smoked, or swallowed.
- Labs most prevalent in rural mid- and southwest communities. *(DEA National Clandestine Laboratory Register 2004-2012)*

Methamphetamine Use: Pharmacology

- Amphetamine is a simple molecule similar to serotonin and acts as an indirect sympathomimetic agent.
- Peak plasma levels are reached in 1-3 hours. Half-life is 6-12 hours. Binges may ensue and can last more than a day.
- The + enantiomer is 2-5 times more potent than the – enantiomer.
- Can be detected in urine up to 2 days after use.
- Primary action is on the 5-HT_{2a} receptor.

Methamphetamine Use: Intoxication

- Intoxication is similar to the effects of cocaine.
- Positive reinforcement, increased energy, and enhanced social and vocational interaction.
- Withdrawal symptoms include: depression, anxiety, fatigue, paranoia, aggression, and intense cravings.
- Can cause violent behavior, anxiety, confusion, insomnia, auditory hallucinations, mood disturbances, delusions, and paranoia.

Medical Consequences of Methamphetamine Use

- Damage to the brain caused by meth usage is similar to Alzheimer's disease, stroke, and epilepsy.
- Other harms are associated with the route of administration.

Prescription Stimulants

(Methylphenidate/Amphetamine and Dextroamphetamine)

- Annual use of Ritalin[®] is decreasing.
(2.5% for high school seniors/1.7% for 19-28 age group)
- Ritalin use is offset by a significant increase in prevalence of Adderall[®] misuse.
(7.9% of college students)
- Diverted pharmaceutical products are the only source for abuse purposes.

Prescription Stimulants: Intoxication

- Elevated blood pressure
- Increased heart rate
- Increased body temperature
- Decreased sleep
- Depressed appetite

Prescription Stimulants: Withdrawal

- Extreme fatigue
- Depression
- Disturbed sleep patterns

Medical Consequences of Prescription Stimulants

- Malnutrition
- Increased Blood Pressure
- Heart Attack
- Stroke

Sedatives/Hypnotics/ Anesthetics

- Benzodiazepines
- Barbiturates
- Anesthetics
 - GHB
 - Ketamine
 - PCP



Primarily used orally, although ketamine is typically injected

Sedatives/Hypnotics/Anesthetics: Intoxication

- Confusion
- Poor attention and concentration
- Ataxia
- Slurred speech
- Dizziness
- Paradoxical/uncharacteristic behavior
- Decreased level of consciousness
- Stupor/coma, apnea, death

Sedatives/Hypnotics/Anesthetics: Chronic Use

- Development of tolerance
- Loss of motivation
- Poor attention and concentration
- Memory impairment
- Poor task completion, ataxia
- Emotional lability
- Nystagmus with accommodation (barbiturates)

Sedatives/Hypnotics/Anesthetics: Withdrawal

- Severe anxiety
- Insomnia
- Autonomic hyperactivity
- Headache
- Hypersensitivity to stimuli
- Disordered perceptions, psychosis
- Seizure
- When used by injection may present with signs/SXS common to injection drug use

Dissociative Anesthetics

PCP, Ketamine, GBH

- **All cause dissociative states (PCP being the most likely to cause psychosis)**
- **Symptoms can progress to stupor, coma and death**
- **Psychiatric symptoms may not clear for weeks to months after last use**

Cannabis/ Tetrahydrocannabinol

- Obtained from hemp plants. Among the oldest and most widely used drugs in the world.
- Increasingly used for medicinal therapy.
- Isolated in 1965.
- Delta-9-tetrahydrocannabinol (THC)
- is the major psychoactive ingredient.
- Newer forms of cannabis have
- higher levels of THC, increasing the
- reward potential.
- Semi-synthetic agents interacting with endogenous cannabinoid receptors are under development for pharmaceutical use.



Marijuana

- Marijuana is the most commonly used illicit drug – an estimated 15.2 million users.
- 56.6% of the 2.9 million persons aged 12 or older who used illicit drugs for the first time in the past year used marijuana.
- Recent reports indicating increased marijuana use, particularly among youth.
- May be smoked, vaporized and inhaled or eaten.
- Often used with alcohol.

Cannabis Pharmacology

- **THC (Delta-9-tetrahydrocannabinol) is the major psychoactive ingredient**
- **Highly lipophilic**
- **The effects of THC are due to peripheral and central nervous system activity**
- **Major effects of THC are at the CB1 receptor**

Cannabis Use: Intoxication

- Euphoria,
- Dry mouth
- Hunger
- Reddened conjunctivae
- Tachycardia
- Hypertension with postural hypotension
- Impaired manual dexterity
- Poor concentration
- Memory impairment
- Agitation
- Anxiety and Paranoia
- Toxic psychosis

Cannabis Use: Chronic

- **Chronic use may produce sensitization to the effects of amphetamines and opioids, including heroin.**
- **Animals develop tolerance to effects of THC upon repeated exposure.**
- **Human chronic heavy cannabis users develop tolerance to the drug's subjective and cardiovascular effects and experience withdrawal symptoms upon abrupt cessation of use.**

Cannabis Use: Withdrawal

- Typically symptoms include those exactly opposite of the intoxication effects:
 - Insomnia
 - Anorexia
 - Irritability
 - Depression
 - Tremor
- Cessation of use results in peak withdrawal effects 10 hours to 5 days.
- Endogenous opioid receptors may influence withdrawal effects.

Medical Consequences of Marijuana Use

Organ System	Complication
Infectious	Bacterial, Viral (Hep C)
Neoplastic	Respiratory Cancer, Bladder Cancer
Musculoskeletal	Spasticity
Stomatognathic	Oral health
Respiratory	Chronic inflammatory change, Allergens
Nervous	Atrophy, Decreased brain volume, Psychomotor Function, Tardive Dyskinesia, Sleep Disturbances
Ocular	Visual dysfunction
Cardiovascular	Acute cardiac effects, cannabis arteritis, CAD risk
Nutrition	Metabolic syndrome, appetite
Environment	Trauma

Medical Consequences of Chronic Cannabis Use and Hepatitis C

- A greater likelihood of disease progression.
- More rapid progression of fibrotic changes in the liver.
- More severe steatosis .

Hallucinogens

- LSD
- Ecstasy (MDMA)
- Peyote, Mescaline, MDMA
- Psilocybin or N,N-Dimethyltryptamine (DMT)



LSD: On the Street

- Lysergic acid is found in ergot, a fungus that grows on grains.
- Sold in small paper squares (blotter acid), but other means include tablets (microdots), sugar cubes, gelatin squares (window pane), and liquid.
- LSD use dropped off by 95% after the DEA made two key arrests by DEA in late 2000 reduced.

LSD Pharmacology

- Structurally similar to serotonin, and binds most potently to the 5-HT₂ receptor subtype.
- Effective oral dose is 20 to 80 mcg.
- Effects occur within 1 hour and can last 10 to 12 hours.

LSD: Intoxication

- Tachycardia
- Hypertension
- Pupillary dilation
- Tremor
- Hyperpyrexia
- Visual hallucinations
- Bizarre/conflicting mood changes
- Abnormal overall behavior
- Panic Attacks
- Disoriented confusion
- Dysfunctional memory
- Suicidal or homicidal ideation
- Impaired judgment

LSD Use: Chronic

- Tolerance develops rapidly to LSD.
- Flashbacks may occur long after heavy or prolonged use.
- There is no prominent withdrawal syndrome associated with LSD use.

Ecstasy: On the Street

- Tablets typically contain 60-120 mg of MDMA, with users commonly taking a second dose as one begins to wear off.
- Usually ingested in tablet form, but can also be crushed and snorted, injected, or used in suppository form.
- In 2011, 14.6 million people age 12 and up reported that they have used ecstasy at least once in their lives.
- The vast majority of ecstasy consumed domestically is manufactured in the Netherlands and Belgium.



Ecstasy Pharmacology

- 3-4 Methylenedioxyamphetamine
- Produces euphoric effects through a serotonergic mechanism.
- High affinity for 5-HT and 5-HT₂ binding sites
- Affects ability of serotonin to modulate brain effects.
- Neurotoxic

Ecstasy Use: Intoxication

- Has both stimulant (amphetamine) and hallucinogen (LSD-like) qualities.
- Suppresses the need to eat, drink, and sleep.
- A side effect of jaw muscle tension and teeth grinding, with Ecstasy users reportedly suck on pacifiers to relieve the tension.
- Confusion, depression, sleep problems, anxiety, paranoia, muscle tension, nausea, blurred vision, faintness, chills, sweating, increased heart rate and blood pressure.

Ecstasy Use: Overdose

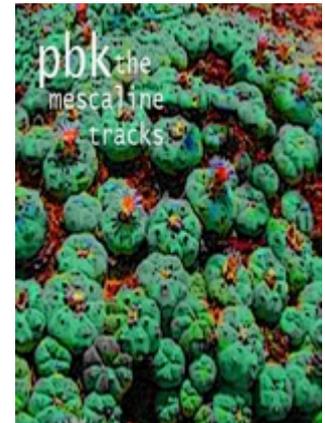
- Rapid heartbeat
- High blood pressure
- Faintness
- Muscle cramping
- Panic attacks
- Loss of consciousness or seizures.

Medical Consequences of Ecstasy Use

- Malignant hyperthermia leading to organ failure – liver, kidney, cardiovascular.
- Long term damage to parts of brain critical to thought, memory, and pleasure.
- Profound dehydration.

Mescaline: On the Street

- Mescaline is principal active ingredient in peyote.
- “Buttons” are cut from the top of the Peyote cactus and dried.
- Chewed, ground and smoked with tobacco, rehydrated by soaking in water, or brewed as a tea to produce an intoxicating liquid.
- Onset of effect is 30 minutes after ingestion and the first hour is often unpleasant.



Mescaline Pharmacology

- Structurally similar to norepinephrine and amphetamine.

Have greatest affinity for 5-HT and 5-HT₂ serotonin receptors.

- The hallucinogenic effects are most likely mediated through a serotonergic mechanism.
- Unpleasant sensations disappear within an hour, then synesthesia and visual illusions and/or hallucinations develop.
- Peyote produces more physical symptoms than intoxication with extracted or synthetic mescaline (due to other alkaloids present in cactus)

Mescaline: Intoxication

- Common findings:
 - Illusions and hallucinations
 - Altered perception of space and time
 - Nausea and vomiting
 - A rise in body temperature
 - Headaches
 - Muscle weakness
- Intoxication usually does not start for a few hours after ingestion, and can last up to 12 hours.
- There are no prominent withdrawal syndromes.

Psilocybin or DMT: On the Street

- DMT is sniffed, snorted or injected. Active orally only if taken with MAO inhibitor to inhibit its absorption.
- Psilocybin mushrooms are ingested orally. They may be brewed as a tea or added to other foods to mask their bitter flavor. Once the mushrooms are ingested, the body breaks down the psilocybin to produce psilocyn.
- Both are similar to LSD in effect.

Psilocybin or DMT: Intoxication

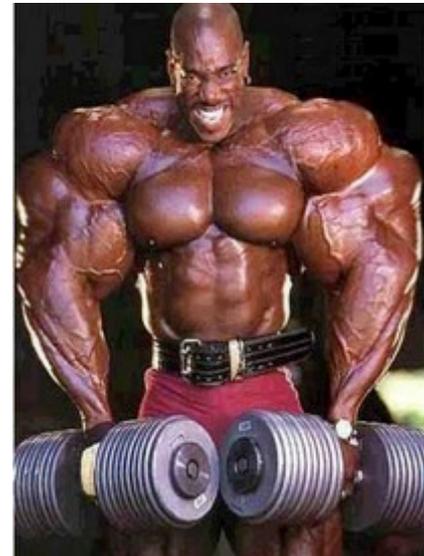
- Abnormal overall behavior
- Disoriented confusion
- Dysfunctional memory
- Depression and elation
- Hallucinations and delusions
- Suicidal or homicidal ideation
- Impaired judgment

Medical Consequences of Hallucinogens

- Rhabdomyolysis
- Acute renal failure with large doses
- Elevated liver enzymes

Steroids

- Dianabol, nandrolone
- Typically by injection



Steroid : On the Street

- Stacking: cyclical use of different steroids
- Pyramid: sequential use of increasing doses to achieve desired effect.



Medical Consequences of Steroid Misuse

- Toxic Hepatitis
- Increased LDL and decreased HDL
- Infertility
- Gynecomastia
- Virilization in Women
- Aggression
- Disordered Sleep
- Affect Disorder
- Hallucination, delusion, paranoia

Volatile Substances

- Toluene
- Acetone
- Butane, Fluorocarbons



Volatile Substances: On the Street

- Sniffing or Huffing
- Substances are highly lipid soluble and readily cross the blood brain barrier, so there is a rapid onset of effects.
- Effect onset is rapid, generally lasting 5-15 minutes.
- Most frequently used illicit drug among adolescents aged 12-13.
- Annually, over half a million adolescents, aged 12-17, are first time users of inhalants.

Volatile Substance: Intoxicatio

- Euphoria and disinhibition
- Somnolence, slurred speech, ataxia, nystagmus
- Nausea, vomiting, diarrhea, cough, sneezing
- Headache
- Sudden death due to dysrhythmia
- No specific withdrawal syndrome

Volatile Substance: Chronic Use and Medical Consequences

- Peri-oral eczema
- Impaired concentration and memory
- Depression
- Anorexia
- Tolerance, psychological dependence
- Renal failure, bone marrow suppression,
- dementia, peripheral neuropathy
- Lead poisoning

Medical Consequences Based on Route of Exposure

Injection

Inhalation

Intranasal

Medical Consequences of Injection

- Bloodborne pathogens
- Skin and soft tissue infection and injury
- Endocarditis
- Pulmonary infection, granulomas
- Osteomyelitis
- Septic arthritis
- Infections and foreign body emboli

Medical Consequences of Inhalation

- Acute and chronic pulmonary diseases
- Granulomatous responses
- COPD
- Bronchospasm
- Barotraumas
- Upper airway and facial burns

Medical Consequences of Intranasal

- Rhinorrhea
- Eczema localize to nares
- Septal perforation
- Infections related to necrosis, including fungal infections (aspergillosis)
- Nasal burns

Case 1: Routine Follow-up Appointment

A 55 year old female complains of fatigue/malaise and poor sleep. She works as a dispatcher for local utility company and is divorced. Her adult daughter lives with her and has expressed concern about her daily drinking pattern and diabetic condition. She acknowledges feelings of guilt during weekly discussions with daughter.

Case 1: (Continued)

Routine Follow-up Appointment

She reports having two drinks every evening. The first one after she returns from work and the second after dinner. She typically drinks vodka with cranberry juice and ice out of a “large tumbler”. She has done this “since the kids started high school and I went back to work full time”. On weekends she will usually have a third drink and have her first drink in the afternoon.

States she takes all of her medications as prescribed. Pharmacist confirms she has been filling her prescriptions regularly and on time.

Case 1 (continued)

PMHx: Diabetes, Hypertension, Hyperlipidemia, GERD, wrist fracture 4 years ago, osteoporosis, obesity, tobacco use

Meds: Metformin 850mg BID; glipizide 10mg BID; Lisinopril/HCTZ 20/25mg Daily; Coreq 6.5mg BID; Atorvastatin 40mg Daily, omeprazole 20mg BID; Fosamax 70mg weekly

BP: 155/96; HR: 100; Random CBS: 300

AUDIT score: 12

ASSIST score: 18

Case 1: Discussion

- What education can you provide this patient?
- Describe a Brief Intervention with this patient.
- Propose a plan for ongoing management.

Case 1: Assessment

- Patient's alcohol consumption is hazardous.
- Problems aggravated or caused by alcohol:
- Hypertension
- Diabetes
- GERD
- Fracture
- Insomnia
- Fatigue/Malaise
- Depression