Alcohol & Drugs 101+

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Midwest Conference on
Problem Gambling &
Substance Abuse

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Learning Objectives

1. Participants will review the basic principles of addiction.
2. Participants will differentiate between use, abuse, and addiction.
3. Participants will review the biological processes of alcohol and other drugs.
4. Participants will identify the six categories of drugs and the biological mechanisms underlying addiction.
Epidemiology

- 20-40% hospital admissions
- Outpatient setting
- 100,000 deaths per year
- Alcoholics who continue drinking have a shortened life-span of 15 years
Three “C’s” of Addiction

**Control**
- Early social/recreational use
- Eventual loss of control
- Cognitive distortions (“denial”)

**Compulsion**
- Drug-seeking activities
- Continued use despite adverse consequences

**Chronicity**
- Natural history of multiple relapses preceding stable recovery
- Possible relapse after years of sobriety
Addiction Risk Factors

- Genetics
- Young Age of Onset
- Childhood Trauma (violent, sexual)
- Learning Disorders (ADD/ADHD)
- Mental Illness
  - Depression
  - Bipolar Disorder
  - Psychosis
Addiction is a Brain Disease

Prolonged Use Changes the Brain in Fundamental and Lasting Ways.
Habit Versus Addiction

- Habit – a repeated behavior in which the repetition may be unconscious
- Compulsion – habit is repetitive and discomfort occurs if the behavior is not performed
Signs of Addiction

Four common symptoms:

- **Compulsion** – obsession, or excessive preoccupation with the behavior and the need to perform it
- **Loss of control** – inability to predict reliably whether any isolated occurrence of the behavior will be damaging or healthy
- **Negative consequences** – physical damage, legal trouble, financial problems, academic failure, family dissolution
- **Denial** – inability to perceive that the behavior is self destructive
The Addictive Process (continued)

- **Tolerance** – larger drug doses needed to obtain desired effects
- **Withdrawal** – the body physically requires the drug to obtain the effect it has been able to produce
- **Symptoms**: mild to severe (delirium tremens).
Cycle of Psychological Addiction

1. Emotional pain
2. Craving for relief
3. Preoccupation with substance or behavior
4. Substance use or compulsive behavior
5. Short-term pain relief (numbness)
6. Negative consequences resulting from behavior
7. Depression, guilt, or shame
8. More pain, low self-esteem
DSM-IV substance dependence:

3 of following in 12 month period:

- tolerance
- withdrawal symptoms
- increasing doses
- unsuccessful effort to cut down intake
- much time spent obtaining or using the drug
- interference with social, occupation, or recreational activities
- continued use despite recognition of problems
Tolerance: Significance

Why is tolerance to alcohol important?

- One of the determinants of increased alcohol consumption
  - maintains or aggravates alcohol dependence
  - increases risk of organic complications of alcoholism
- Diagnostic criteria for alcoholism by DSM-IV
- Cross-tolerance to other depressant drugs
- Genetic determinants exist
- Low Response predicts alcoholism
ETOH

- Repeated use of ETOH in certain concentrations is toxic to body tissue.

- ETOH is converted to acetaldehyde which is more toxic than the original compound-ethanol.

METABOLISM - The process of breaking down a substance and distributing it throughout the body.

ABSORPTION - The process of “taking in” a substance for use in body.

CONVERT - Change to another substance or form.

ENZYME - A chemical that breaks down another substance into a different form.
Average man will metabolize one drink in one hour-Average women will absorb the same amount of ETOH faster & have a higher BAL.

After the ETOH is absorbed into the bloodstream, it is carried to the liver where the toxic agents in the alcohol are removed by enzymes. The enzyme responsible for this breakdown is called Alcohol Dehydrogenase (ADH).

Acetaldehyde interferes with the normal function of the brain. It combines with other chemicals in the brain. These chemicals control our mood, energy, and feelings of pleasure.
PROBLEMS ASSOCIATED WITH ETOH ABUSE

Fatty Liver Disease

- Normal breakdown of fats is disrupted by ETOH and the fat accumulated & is deposited in the liver.

- Reversible condition and the symptoms should disappear if the person is abstinent from alcohol in about two weeks.
Alcohol Hepatitis

- Inflammation of the liver. 10-30% mortality rate.
- May see jaundice, very painful and serious.
- Can occur after heavy bout of drinking.
- Reversible if the person is abstinent.
Alcoholic Cirrhosis (Scarring)

- Wide spread destruction of liver tissue because of the build up toxins.
- Blood flow is disrupted and backs up.
- Liver cannot work to detoxify poisons so they are carried back to the brain to do more damage.
Alcoholic Cirrhosis (Scarring)

- Back up of blood causes pressure in the vascular system causing esophageal and gastric varices. (distended veins)
- Affects normal blood clotting mechanisms
- Affects blood sugar regulation
- Not reversible, but treatable in some cases.
- Symptoms include: jaundice, pain, fever, irritability and large, swollen abdomen.
Gastrointestinal Problems

- **Esophageal & Gastric Varices**
  - As pressure builds up in the vascular system due to scarring, the veins in the esophagus and stomach get distended and sometimes tear.
  - Extremely serious medical emergency – complete hemorrhage is possible.
Gastritis (irritation of the stomach)

- Alcohol is very irritating to the stomach – it increases the secretion of gastric acid
- May see ulcers or erosion along the entire GI tract
- The irritating effect of the ETOH is intensified with the use of some medications – especially ASA and Ibuprofen
NUTRITION

- Affects mental, emotional, and physical well-being
- Linked to cancer, cardiovascular disease, diabetes, anemia, and digestive disorders
- Requirements and eating habits change across life span
  - Differences in metabolism
Malnutrition

- Heavy drinking causes a decrease in appetite – up to ½ of the daily caloric intake is ETOH

- As the liver is damaged, it cannot process nutrients so even though a person may be eating the nutrients are not absorbed and used by the body

- You may see someone who has a great big stomach who initially appears obese – with very thin legs and arms that are wasted away
Pancreas

- Fish shaped organ behind the stomach
- Irritable, fussy little organ
- Function is to produce enzymes for the digestion of food and to secrete insulin
- Breaks down the starches – secretions are alkaline neutralizing acids to protect the stomach
- ETOH damages the pancreas – Pancreatitis - is seen in heavy drinkers – Mortality is about 30%
Cardiovascular System

- ETOH is an irritant to the heart muscle, and can cause abnormal rhythm (Holiday Heart Syndrome)

- Same process of fatty buildup as in liver, - causes high blood pressure by clogging the arteries

- Cardiac myopathy may occur in heavy drinkers - very serious condition – heart muscle is weakened; cannot pump effectively; NOT reversible – transplantation is the only cure
Alcoholic Cardiomyopathy

Control

Alcoholic
Endocrine System

- Production of sex hormones is altered by chronic substance abuse.
- Sexual interest may be heightened by release of inhibitions – ability to perform is impaired.
- Testosterone levels and sperm counts are lowered.
- Alters the hormone responsible for regulating the balance of sodium resulting in puffiness.
Endocrine System

- The skin, thyroid glands, pituitary gland and breast are all affected by the change in the hormones caused by ETOH.
Immune System

- Purpose of this system is to fight infection
- Alcohol slows down the movement of the white blood cells – preventing them from doing their job to fight infections
- Addicts are more prone to infections that last longer and are harder to treat
- Pneumonia and tuberculosis are often seen in the chronic population
Musculoskeletal System

- Increased risk for developing osteoporosis (thinning of the bones)
- Chronic alcoholism can cause generalized muscle weaknesses – myopathy – cramps, weakness, and gradual loss of function
- Increased risk for avascular necrosis (death of the hip bone – due to blood lack of blood flow)
Kidney

- ETOH increases excretion of water so when the BAL is high the normal hormone that performs that function is suppressed
- When BAL is constant, or falling, hormone does not work resulting in water retention
SKIN

- Palmer erythema, spider angioma and darkened skin are seen in chronic alcoholics.
Blood

- Alcohol decreases the production of all blood cells causing increased risk of bleeding and infection

- Red blood cells swell in response to chronic alcohol use (Lab marker)
Conclusion

- Alcohol affects every living cell in the body because it is distributed through the bloodstream.

- Moderate drink MAY decrease heart disease. Red wine is considered the most beneficial.

- Moderate drinking is defined as:
  - Men: 1-1/2 ounce of alcohol a day not to exceed 5 times per week.
  - Women: 1 ounce of alcohol a day not to exceed 3 times per week.

- 1 ounce of alcohol is defined as:
  - 1 – 12 ounce beer
  - 1 - 4 ounce glass of wine
How Drugs Work

- Interact with neurochemistry

Results:

- Feel Good – Euphoria/reward
- Feel Better – Reduce negative feelings
Natural Rewards

- Food
- Sex
- Excitement
- Comfort
Brain Reward Pathways

prefrontal cortex

nucleus accumbens

VTA
Dopamine Spells REWARD

Release

Activate

Recycle
Activation of Reward

Activation of the reward pathway by addictive drugs

- alcohol
- cocaine
- heroin
- nicotine
Other Chronic Drug Effects

- Cell Death
  - Neurons don’t grow back
- Alcohol, ecstasy, meth
- Effect: memory, mood, learning

Ecstasy Causes Degeneration of Serotonin Nerve Terminals
Drug Ingestion
# ROUTE OF ADMINISTRATION

Determines how much drug reaches its site of action and how quickly the drug effect occurs

<table>
<thead>
<tr>
<th>Route of Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intravenous injection</td>
</tr>
<tr>
<td>2. Intramuscular injection</td>
</tr>
<tr>
<td>3. Subcutaneous administration: injection or pellet</td>
</tr>
<tr>
<td>4. Intraperitoneal injection</td>
</tr>
<tr>
<td>5. Oral administration</td>
</tr>
<tr>
<td>6. Sublingual administration</td>
</tr>
<tr>
<td>7. Inhalation (7-10 Sec)</td>
</tr>
<tr>
<td>8. Topical Application</td>
</tr>
<tr>
<td>9. Intracranial Administration</td>
</tr>
</tbody>
</table>
ORAL

20 to 30 minutes

Prairie lands Addiction Techno

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INHALING

7 to 10 Seconds
INJECTING

3 to 5 minutes- skin popping

15 to 30 seconds- IV
SNORTING

3 to 5 minutes
CONTACT
Addiction = Dog with a Bone

- It never wants to let go.
- It bugs you until it gets what you want.
- It never forgets when/where it is used to getting its bone.
- It thinks it’s going to get a bone anytime I do anything that reminds it of the bone.
WITHDRAWAL & DEPENDENCE

- sudden elimination of drug: withdrawal symptoms
- almost always opposite of initial effects of drug
- signs of physical dependence

* not all physical: learning component as well
## Concentration-Effect Relationship

<table>
<thead>
<tr>
<th>BAC [%]</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02-0.03</td>
<td>Mood elevation. Slight muscle relaxation.</td>
</tr>
<tr>
<td>0.05-0.06</td>
<td>Relaxation and Warmth. Increased reaction time. Decreased fine muscle coordination.</td>
</tr>
<tr>
<td>0.08-0.09</td>
<td>Impaired balance, speech, vision, hearing, muscle coordination. Euphoria.</td>
</tr>
<tr>
<td>0.14-0.15</td>
<td>Gross impairment of physical and mental control.</td>
</tr>
<tr>
<td>0.20-0.30</td>
<td>Severely intoxicated. Very little control of mind or body.</td>
</tr>
<tr>
<td>0.40-0.50</td>
<td>Unconscious. Deep coma. Death from respiratory depression</td>
</tr>
</tbody>
</table>
CATEGORIES OF DRUGS

CNS Depressants
- alcohol, hypnotics (barbiturates), anxiolytics

CNS Stimulants
- amphetamine, cocaine, caffeine, nicotine, Ritalin, weight-loss products

Opiates
- heroin, morphine, methadone, prescription pain killers
CATEGORIES OF DRUGS...

**Cannabinoids**
- marijuana, hashish

**Hallucinogens**
- LSD, mescaline, psilocybin

**Others**
- PCP
Alcohol-Drug Interactions

- **Illicit drugs**
  (e.g., cocaine, heroin)

- **Prescription drugs**
  (e.g., benzodiazepines, metronidazole)

- **Over-the-counter drugs**
  (e.g., acetaminophen)
BASIC DRUG ACTION

- Influence subjective experience & behaviour
- Blood stream carries drug to CNS
- Blood-brain barrier (BBB)

- Actions:
  - Diffusely
  - Bind to specific receptors
  - Influence synthesis, transport, release, or deactivation of NTs
  - Activate postsynaptic receptors
Cannabis-Marijuana-Hashish

- **Cannabis** – Plant

  - **Marijuana** – Leafy material from the Cannabis plant that is smoked
  - **Hashish** – Concentrated resin from the Cannabis plant
Methods of Ingestion

1. Smoked as a cigarette (joint, nail)
   - In a pipe (bong).
   - In blunts, cigars that have been emptied of tobacco and refilled with marijuana, often in combination with another drug.

2. Mixed in food

3. Brewed as a tea
Effects of Marijuana

Effects begin immediately and last 1 to 3 hours:

- Sleepiness
- Difficulty keeping track of time, impaired or reduced short-term memory
- Reduced ability to perform tasks requiring concentration and coordination, such as driving a car
- Increased heart rate
- Bloodshot eyes
- Dry mouth and throat
- Decreased social inhibitions
- Paranoia, hallucinations
Marijuana

- Motor vehicle accidents
- Learning
- Respiratory
- Immune system
## Street Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>420</strong></td>
<td>Marijuana use</td>
<td><strong>Homegrown</strong></td>
<td>Marijuana</td>
</tr>
<tr>
<td><strong>BC bud</strong></td>
<td>High-grade marijuana from Canada</td>
<td><strong>Hydro</strong></td>
<td>Marijuana grown in water</td>
</tr>
<tr>
<td><strong>Bud</strong></td>
<td>Marijuana</td>
<td><strong>Indo</strong></td>
<td>Marijuana term from Northern CA</td>
</tr>
</tbody>
</table>
# Street Terms

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<tbody>
<tr>
<td>Chronic</td>
<td>Marijuana</td>
<td>King Bud</td>
<td>High Quality Marijuana</td>
</tr>
<tr>
<td>Shake</td>
<td>Marijuana</td>
<td>Herb</td>
<td>Marijuana</td>
</tr>
<tr>
<td>Mary Jane</td>
<td>Marijuana</td>
<td>Ganja</td>
<td>Marijuana; term from Jamaica</td>
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</table>
Health Consequences

1. Acute:
   - Impairs short term memory
   - Impairs attention, judgment, other cognitive functions
   - Impairs coordination and balance
   - Increases heart rate
   - Impairs memory and learning skills
Stimulants
(Cocaine and Amphetamine)

- Cardiovascular
- Neurological
- Injection risks
STIMULANTS

Cocaine & Amphetamine:

- Health consequences: Can be lethal – very addictive.
- Effects on the cardiovascular system –
  - hypertension, tachycardia, and vasospasm, stroke arrhythmias
- An additional concern is that a small percentage of stimulant users take the drug intravenously, which heightens the risk for contracting hepatitis B and HIV, as well as blood-borne infections and bacterial endocarditis.
STIMULANTS

- Stimulants are the second group of drugs that cause a clinically significant withdrawal syndrome, albeit, not lethal.

- Stimulant withdrawal = can cause hypersomnia, hyperphagia (overactive appetite), mood swings and depressed mood.

- The course is temporary and usually subsides within a few days after stopping the drug.
Opioids/Narcotics

- Overdose
- Injection risks
- Gastrointestinal
- Musculoskeletal
NARCOTICS

TERM ORIGINATION

GREEK – MEANS TO MAKE NUMB

NARCOTICS CONTAIN OPIUM AND ITS DERIVATIVES

References to Opium date back to 3,000 B.C.
Medical Uses of Narcotics

- Opiates have been used to kill and control pain as well as suppress terrible coughing, induce sleep and prevent diarrhea.

- The use of Opiates as a cough suppressant has dwindled over the years as less addictive drugs have been developed.
COMMON NARCOTICS

- Opium
- Morphine
- Codeine
- Hydromorphone (Dilaudid)
- Meperidine (Demerol)
- Oxycodone (Percodan, Percocet, Oxycotin)
- Hydrocodone (Vicodin, Lortab, Lorcet)
HOW DO NARCOTICS AFFECT YOU?

- Act mostly on the central nervous system.
  - Autonomic Affects
  - Sedation
  - Euphoria
  - Tolerance
  - Dependency
Other Drugs

- PCP & LSD
- Inhalants
LSD Physical Effects

- Increased blood pressure
- Increased heart rate
- Higher body temperature
- Dizziness
- Loss of appetite

- Numbness tremors
- Dilated pupils
- Nausea
- Sleeplessness
- Sweating
- Dry mouth
- Rapid Tolerance develops
LSD Emotional and Sensory Effects

- Emotions shift rapidly from fear to euphoria
  - Shifts can be so rapid the user may seem to experience several emotions simultaneously.

Visual hallucinations

- Distort or transform shapes and movements
- Perception that time is moving very slowly
- Or that the user's body is changing shape.
LSD Emotional and Sensory Effects

- Sensations seem highly intensified
  - Colors, sounds, smells
- Sensations may seem to “cross over”
  - Giving the user the feeling of hearing colors and seeing sounds.
- Enjoyable, mentally stimulating with a sense of heightened understanding
- Bad Trip
  - Terrifying thoughts, nightmarish feelings of anxiety, panic, despair that includes fears of insanity, death or losing control.
Psychological Effect of PCP

- Feelings of detachment from reality
- Distortion of space, time and body image
- Hallucinations
- Panic and fear
- Feelings of invulnerability
- Exaggerated strength
- May become severely disoriented
- Violent
- Suicidal
PCP Effects on the Brain

- Snorted or smoked rapidly passes to the brain
- Disrupts function of neurotransmitter glutamate
  - Glutamate role in perception of pain, cognition, learning, memory, and emotion
- Alters the actions of dopamine-responsible for the euphoria and rush associated with the drug
Peyote

- Small, spineless, carrot-shaped cactus
crown is sliced into disks dried “mescal buttons”
- Buttons are chewed, brewed for drinking, or swallowed.
- Active chemical is mescaline
- Bitter taste, initial feeling of nausea, then visions and changes in perception, time sense and mood.
- Last for about 12 hours
- No uncomfortable aftereffects
- Is used by Native-Americans for religious ceremonies
Medications

Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioral therapies.

- **Alcohol:** Naltrexone, Disulfiram, Acamprosate, Odansetron
- **Opiates:** Naltrexone, Methadone, LAAM, Buprenorphine
- **Nicotine:** Nicotine replacement (gum, patches, spray), bupropion
- **Stimulants:** [None to date]
Concept of Addiction

- When a person engages in an addiction behavior, his or her feelings are altered.
- The medication of emotions in this context refers to the temporary relief of stress and the creation of happier or euphoric feelings.
- At times, the behavior temporarily quiets the chaos of the mind.
- For a time life feels better.
- The truth and danger of this is that addictive behaviors are more consistent than any relationship.
- This is more reliable than any friend or any other relationship and it is this consistency that makes the addiction the strongest relationship in the addict's life.
Nearly all addicted individuals believe in the beginning that they can stop using drugs on their own, and most try to stop without treatment.

Most of these attempts result in failure to achieve long-term abstinence.

Research has shown that long-term drug use results in significant changes in brain function that persist long after the individual stops using drugs.

These drug-induced changes in brain function may have many behavioral consequences, including the compulsion to use drugs despite adverse consequences which is the defining characteristic of addiction.
Understanding that addiction has such an important biological component reveals the difficulty in achieving and maintaining abstinence without treatment.

Psychological stress from work or family problems, social cues or the environment can interact with biological factors to hinder attainment of sustained abstinence and make relapse more likely.

Research studies indicate that even the most severely addicted individuals can participate actively in treatment and that active participation is essential to good outcomes.
Categories of Toxicity

- Behavioral toxicity
- Physiological toxicity
- Difference between acute (short-term) vs. chronic (long-term) toxicity
Paradox of Addiction

Initially Voluntary
Paradox of Addiction

- Willpower
Model of Addiction

Biopsychosocial Model – addiction is caused by variety of factors operating together

- Biological or disease influences – metabolization of substances is different for addicted versus non-addicted persons
- Environmental Influences – cultural expectations and mores
- Social Learning Theory – people learn by modeling behaviors
- Psychological Factors – individual psychological makeup a factor for potential addiction
THEORIES OF ADDICTION

1. Physical dependence (internal need)

2. Positive incentive theory (anticipated effects)

* CAN WE BE ADDICTED TO THINGS OTHER THAN DRUGS?
Types of Addiction

- Money addiction – gambling, spending, borrowing
- Compulsive shopping and borrowing
- Work addiction – compulsive use of work to fulfill intimacy needs, power and success
- Exercise addiction – compulsive activity to meet needs of nurturance, intimacy and self-esteem
- Internet addiction – related to compulsive needs
BIOPSYCHOSOCIAL THEORY

1. Positive reinforcement of drug
2. Stimuli conditioned to drug effects
3. Cues effects of the drug
4. Aversive consequences of taking the drug
THANK YOU

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