CARN & CARN-AP Review Course © 2015

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Logan – “The Alpha Male”

LUKE – “The Million $ Dog”

TAKING THE CERTIFICATION EXAMINATION
Program Objectives

1. State one way in which to better prepare to take the CARN & CARN-AP certification exams.
2. Understand eligibility requirements for taking the CARN & CARN-AP exams.
3. List resources available from IntNSA to assist with test preparation for the CARN & CARN-AP exams.

Why Certify?

- Validates your specialty knowledge
- Reflects commitment to the profession of nursing
- Demonstrates accountability to the public at large
Eligibility Requirements for the CARN

Eligibility Criteria:
- Three years experience as an RN
- Hold a current, full, and unrestricted license as a registered nurse (RN) in the United States, its possessions or Canada. Have a minimum of 2000 hours (one year) of nursing experience related to addictions as an RN within the last three years.

Fee:
CARN Examination Fees
IntNSA Members $195
New Member $335
Non-Members $395

Eligibility Criteria for the CARN-AP

Eligibility Criteria:
- Hold a current, full, and unrestricted license as a registered nurse (RN) in the United States, its possessions or Canada. A Master's degree or higher in nursing. Minimum of 500 hours of supervised, direct client contact in advanced clinical practice working with individuals and families impacted by addictions/dual diagnoses. All 500 hours may be earned while in the master's program.

Fee:
CARN-AP Examination Fees
IntNSA Members $295
New Member $435
Non-Members $495

About the Test

The examinations administered from October 2012 on include a total of 145 items; scores are computed on 120 items specified by the content outline and the remaining 25 items are unscored pretest items.

A candidate needs to get approximately 75% of the questions correct in order to pass the test.
### Blueprint for CARN and CARN-AP related to client problems

<table>
<thead>
<tr>
<th>CONTENT AREA</th>
<th>PERCENT/QUEST#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>21%/28</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>10%/12</td>
</tr>
<tr>
<td>Identifying Outcomes</td>
<td>12%/14</td>
</tr>
<tr>
<td>Planning of Care</td>
<td>17%/20</td>
</tr>
<tr>
<td>Implementation of Care</td>
<td>30%/36</td>
</tr>
<tr>
<td>Evaluation of Care</td>
<td>8%/10</td>
</tr>
</tbody>
</table>

### About the Test

- Computerized Test
- 145 Questions
- 120 Scored Questions
- 25 Validation Questions

- Administered by C-NET (Center for Nursing Education & Testing, Inc.)
- C-NET contracts various testing centers in locations throughout the USA
- Exam is Offered from May 1 to May 30
- Exam is Offered from October 1 to October 30
Survey Says….

Individuals Retain:
- 10% of what they READ
- 20% of what they HEAR
- 30% of what they SEE
- 50% of what they SEE & HEAR

Personal Resources

- Addiction Texts
- INTSA Core Curriculum 2015
- IntNSA offers a newly revised study guide for the CARN & CARN-AP exams.
- The Journal of Addictions Nursing
- ANA - Code for Nurses with Interpretative Statements
- ANA-Scope & Standards for Addictions Nursing Practice
- Professional Journals

Some Good References

Some Good References


Some Good References


Some Good References

- Other relevant current literature in the field
WEB URLs

- http://www.nih.gov/  
  (National Institutes of Health)
- http://www.samhsa.gov/about/csat.aspx  
  (Centers for Substance Abuse Treatment)
- http://www.samhsa.gov/  
  (Substance Abuse and Mental Health Services Administration)

Information Materials from IntNSA

- Review and refer to materials frequently to gain insight into test content and sample questions
- ** Keep entry ticket to exam in a safe place and bring it with you to the test.
- Be clear about the % of questions in each section of the test.

General Suggestions for Test Preparation

- Control your anxiety by using good relaxation techniques that work for you.
- Do not listen to gossip about the exam. Expect changes year to year.
- Know your test taking style.
- Prepare mentally and physically.
- Institute a study plan.
Set Reasonable Expectations

- Do not expect to know everything. You do not need a perfect score to pass the test.
- The exam is designed to be at a moderate experience level.
- Learn the general rules not the exceptions

Assess Current Knowledge

- Depth of knowledge
  - Judge depth of knowledge by studying information sent to you from the testing agency, what you were taught in school, what is covered in this text, and general guidelines.
  - What do you need to know?

Know Your Test Taking Style

- Do not rush through exam - pace yourself.
- Do not dwell on one question for a long time.
- Spend an average of 45-60 seconds per question and move on. Then return at end to review answers you were unsure of.
General Suggestions for Test Preparation

- Control your anxiety by using good relaxation techniques that work for you.
- Do not listen to gossip about the exam. Expect changes year to year.
- Know your test taking style.
- Prepare mentally and physically.
- Institute a study plan.

Institute a Study Plan

- You must have basic content knowledge and be able to use this information critically to think and make decisions about facts.
- Memorize the basics.

Implement Your Study Plan

- Refer to your study plan regularly
- Set a schedule and stick to it
- Allow for breaks as you study
- If you procrastinate get help from a friend or reorganize your plan
- Adjust plan when you learn where you need to spend time
- Consider taking a review course to help you prep for the exam
Specific Test Taking Skills

- A multiple choice question consists of 3 parts:
  - Information (Stem)
  - Question
  - 4 possible answers (1 correct, 3 distracters)
- Analyze the information given
  - Read the stem carefully!!

Specific Test Taking Skills

- What kind of question is asked?
  - Analyze the question carefully
    - Look for key words or phrases that lead you
- Read all the answers
  - Many questions do not have one right answer, be sure you answer the question asked
  - When more than one suggested answer is correct, you must identify the one that best answers the question asked.

Specific Test Taking Skills

- Eliminate answers you know aren't right.
- In a question with an "All of the above" choice, if you see that at least two correct statements, then "All of the above" is probably the answer
- Usually the correct answer is the choice with the most information
- Only one answer can be correct
- Avoid changing answers
- Time yourself to complete the whole exam
  - There is no penalty for a wrong answer
More Study Tips

- Keep a positive attitude throughout the whole test and try to stay relaxed, if you start to feel nervous take a few deep breaths to relax.

The Night Before the Exam

- Don't try to pull an all nighter, get a good night's sleep before the test.
- Eat before a test, having food in your stomach will give you energy and help you focus, but avoid heavy foods which can make you groggy. Eat sensibly and avoid alcohol.
- Know directions and how long it will take you to get to the exam, park, and get to room assigned.
- Assemble required material:
  - IDs, admission ticket

Dress for Success

- BRIGHT Colors, especially reds and yellows are invigorating.
- Comfortable Clothing.
- Looking Good = Feeling Good.
- Prepare Well ..... Anticipate Success.
Other Study Aides

- IntNSA Study Guide – revised in 2013
- Journal of Addictions Nursing – published quarterly by Lippincott
- Webinars posted on IntNSA WEB Site: www.intnsa.org

Theoretical Framework for Addictions: Theories for Addictions & Counseling/Education

- Al Rundio, PhD, DNP, RN, CARN-AP, APRN-BC
The Disease Model

The Disease Model of alcoholism/addiction, which was credited to Mr. E.M. Jellinek, is probably the most controversial and debated topic in the entire field of substance abuse/addiction.

The Disease Model

As with many concepts and theoretical models in the addiction field, the disease concept was originally applied to alcoholism and has been generalized to addiction to other drugs as well. The "disease of addiction" is viewed as a primary disease. That is, it exists in and of itself and is not secondary to some other condition.

The Biopsychosocial Model

According to Francesc Borrell Carrió et. al (2004), the biopsychosocial model is both a philosophy of clinical care and practical clinical guide. Philosophically, it is a way of understanding how suffering, disease, and illness are affected by multiple levels of organizations, from the societal to the molecular.
The Biopsychosocial Model

- At the practical level it is the way of understanding the patient's subjective experience as an essential contributor to accurate diagnosis, health outcomes, and humane care.

Advanced Practice Roles

- Clinician – individual client care; care of a group of clients; counselor
- Consultant – expert in field of addictions
- Educator – client education; education of other nurses
- Leadership/Management – leader in field of addictions, manager in some circumstances
- Researcher – conducts/participates in research; utilizes research evidence in practice

Steps 1 & 2

AA Step 1

- We admitted we were powerless over alcohol and that our lives had become unmanageable.

AA Step 2

- "Came to believe that a power greater than ourselves could restore us to sanity."
Steps 3 & 4

- **AA Step 3**
  - "Made a decision to turn our will and our lives over to the care of God as we understood Him."

- **AA Step 4**
  - "Made a searching and fearless moral inventory of ourselves."

Steps 5 & 6

- **AA Step 5**
  - "Admitted to God, to ourselves and to another human being the exact nature of our wrongs."

- **AA Step 6**
  - "Were entirely ready to have God remove all these defects of character."

Steps 7 & 8

- **AA Step 7**
  - "Humbly asked Him to remove our shortcomings."

- **AA Step 8**
  - "Made a list of all persons we had harmed and became willing to make amends to them all."
Steps 9 & 10

- **AA Step 9**
  - "Made direct amends to such people wherever possible, except when to do so would injure them or others."

- **AA Step 10**
  - "Continued to take personal inventory and when we were wrong, promptly admitted it."

AA Step 11

- **AA Step 11**
  - "Sought through prayer and meditation to improve our conscious contact with God as we understood Him, praying only for knowledge of His will for us and the power to carry that out."

AA Step 12

- **AA Step 12**
  - "Having had a spiritual awakening as the result of these steps, we tried to carry this message to alcoholics, and to practice these principles in all our affairs."
Defense Mechanisms

- Repression
- Projection
- Denial
- Displacement
- Intellectualization
- Rationalization

Behavior Therapy

- Behavior Therapy: a general approach to therapy that focuses primarily on the learned aspects of behavior. The general assumption underlying behavior therapy is that much behavior is termed sick, pathological, or maladaptive and is acquired by conditioning or observational learning. The three basic types of therapies are systematic desensitization, behavior modification, and assertiveness training.

Behavioral Theory

- Focuses on observable behaviors
- Client determines goals; therapist helps develop the treatment plan
- Behavior is learned and conditioned by external influences through reinforcement, thus behavior can be unlearned
- Abnormal behavior is equated to faulty learning
Behavior Theory

- Deals with present behaviors
- Goal – to eliminate maladaptive behavior and assist in learning new patterns
- Therapist – active, directive, serves as teacher and trainer
- Techniques – systematic, assertiveness training, operant conditioning (Skinner), contingency contracting, social skills training, stress management, flooding.
- Can be done in individual, group, schools or other learning institutions

Cognitive Therapy

- An approach to psychotherapy that focuses on replacing maladaptive automatic thoughts with adaptive voluntary ones. Most often associated with the work of Aaron Beck. Can be loosely used to label any cognitive approach to therapy inclusive of cognitive-behavior therapy.

- Cognitive distortions are oftentimes the result of irrational thought processes. The therapist helps the client to develop the logical tools necessary to modify the impact of automatic thoughts.
Transactional Analysis

- Developed by Berne in the early 1960s
- Person has potential for choice.
- Individual has 3 sides: parent (values, beliefs, morals); adult (realistic, logic-based); and child (creative, intuitive, emotional, conforming)
- Transaction – exchange of strokes (refer to any behavior that recognizes a person’s presence, touch, smile, frown, whether positive or negative) between two individuals.

Motivational Interviewing

- Definition
  - Motivational interviewing is a directive, client-centered counseling style for eliciting behavior change by helping clients to explore and resolve ambivalence. This technique is focused and goal-directed. The examination and resolution of ambivalence is its central purpose, and the counselor is intentionally directive in pursuing this goal.
  - Stephen Rollnick, Ph.D. & William R. Miller, Ph.D.

Factors of Motivational Interviewing

- Motivation to change is elicited from the client, and not imposed from without
- It is the client’s task, not the counselor’s, to articulate and resolve his or her ambivalence.
- Direct persuasion is not an effective method for resolving ambivalence.
- The counseling style is generally a quiet and eliciting one.
Factors of Motivational Interviewing

- The counselor is directive in helping the client to examine and resolve ambivalence.
- Readiness to change is not a client trait, but a fluctuating product of interpersonal interaction.
- The therapeutic relationship is more like a partnership or companionship than expert/recipient roles.

Motivational Interviewing Counseling Characteristics

- Seeking to understand the person's frame of reference, particularly via reflective listening
- Expressing acceptance and affirmation
- Eliciting and selectively reinforcing the client's own self motivational statements expressions of problem recognition, concern, desire and intention to change, and ability to change
- Monitoring the client's degree of readiness to change, and ensuring that resistance is not generated by jumping ahead of the client.
- Affirming the client’s freedom of choice and self-direction
Learning Objectives

- Describe at least three assessment techniques for identifying clients who abuse substances.
- Identify those clients with life-threatening substance abuse disorders.

Substance Abuse

- Alcohol
- Anxiolytics
- Marijuana
- Opioids
- Cocaine/Amphetamines
- Hallucinogens
- Inhalants
- Anabolic Steroids
- Club Drugs
- Nicotine
Substance Abuse in the USA

- Total economic cost in USA was estimated to be $276.3 billion for 1995
- Current economic cost estimates exceed $400 billion annually
- It is estimated that 26.2 million patients are affected by substance abuse in the USA each year
- One of the fastest growing populations is those who abuse prescription opioids
- 132,000 premature deaths were related to chemical dependency in 1992

Substance Abuse

- 40% of the population above age 25 years have at some time used marijuana, hallucinogens, cocaine, or heroin
- Results of use may be adverse behavioral and/or health consequences
- May patients have dual diagnoses today, for example, multiple substances abused and psychiatric disorders such as major depression or bipolar disorders

Pathophysiology of Substance Abuse

- Alterations to brain metabolism and activity
- Neurochemical cascade within the brain’s reward systems
- Mesolimbic reward pathways are midbrain neuronal tracts that transmit intense pleasure messages from the primitive hindbrain tracts to higher cortical brain levels where these messages are experienced as the “rush” and then the “high” after ingestion of drugs & ETOH
Pathophysiology (continued)

- Profound changes in receptor physiology and neurochemical modulation of the pleasure centers mediate the powerful obsessive-compulsive brain behavior linkage between drug craving and compulsive drug-seeking consumption.
- Substance abuse fits a biopsychosocial disease model.

Biopsychosocial/Spiritual Disease Model

- Biological – changes to neurotransmitters and neurochemistry of the brain.
- Psychological – there are many psychological manifestations to chemical dependency and substance abuse. New research has discovered that many addicted persons having underlying psychological disease manifestations such as a bipolar disorder.

Biopsychosocial Disease Model

- Sociological – this pertains to society and its relationship to chemical dependency and substance abuse. Cost of living, family structure and peer group pressure are some examples.
- Spirituality – a much higher place than religion. 12 step programs are rooted in spirituality and belief in a higher power.
Four Primary Areas

- Ventral Tegmental Area (VTA)
- Nucleus Accumbens
- Amygdala
- Prefrontal Cortex
What is the name of the brain cell shown in the picture below?

N E U R O N!

Can you identify the four major parts of a neuron?

In what direction do electrical signals travel in a neuron?

CELL BODY

TERMINAL

Neuron Cells
Neurons communicate by sending signals to each other at specialized connections.

What is the connection between two neurons called?

SYNAPSE!
The Synapse: Sending and Receiving

The terminals of the sending neuron have vesicles packed with neurotransmitters.

Neurotransmitters are released when the sending neuron fires.

Neurotransmitters send the signal by binding to specific receptors on dendrites of the receiving neuron.

SYNAPSE!
Neuroplasticity

Old school of thought – brain neurons could not change after a developmental time period

New school of thought - Our brains have the ability to rewire themselves, can actually change structure and function in response to changes in the environment and experience

The human brain retains a significant ability to change, which is called "plasticity," into adulthood and old-age

Neuroplasticity

Neurological research demonstrates that experience can actually change both the brain’s physical structure and functional organization

The brain can actually grow new neurons

Evidence demonstrated through fMRI and PET scanning

Examples

Serious injuries
CVAs
Other diseases that disable or disrupt some area of brain function
Neuroplasticity

Pathway to Addiction

Natural Rewards
Dependence
A state in which an organism functions normally only in the presence of a drug
- manifested as a physical disturbance when the drug is removed (withdrawal)

Tolerance
A state in which an organism no longer responds to a drug
- a higher dose is required to achieve the same effect

Addiction
A state in which an organism engages in a compulsive behavior
- behavior is reinforcing (rewarding or pleasurable)
- loss of control in limiting intake
Substance Abuse

- Substance Abuse - a pattern of pathologic use that produces impaired social or occupational functioning
- Dependence - the impaired control and continued use of psychoactive substances despite adverse consequences
- Tolerance - the need for progressively larger doses to maintain the desired effect

Symptoms of Dependence

- Physiologic symptoms of tolerance and withdrawal
- Drug-seeking behavior
- Inability to limit intake
- Continued use despite social, psychological, and occupational problems related to the substance abuse
Withdrawal

- When substances are abruptly discontinued, the adaptive changes are unmasked and withdrawal symptoms result
  - Tremor
  - Tachycardia & Hypertension
  - Insomnia
  - Hyperreflexia
  - Seizures

Withdrawal

- Febrile States
- Diaphoresis
- Hallucinations
- Muscle cramping and pain
- Nausea, Vomiting, & Diarrhea
- Symptoms are dependent upon the quantity and duration of the substance use

General Rules

- Substances with long half-lives (methadone and phenobarbital) require more prolonged use to cause dependence than substances with short half-lives (heroin and secobarbital)
- Withdrawal symptoms associated with long-acting substances are generally milder and appear later than those related to short-acting substances
Factors Linked to Substance Abuse

- Peer pressure
- Thrill-seeking behavior
- Depression
- Personality Disorders
- Family discord
- Family history of dependence
- Environmental factors

Primary Care Providers are Key to Identification & Assessment of SA

- Substance Use
- Where Use Occurs
- Method of Use
- Prior Treatment
- Family Issues
- Depression
- Suicide Ideation
- Legal Issues
- Financial Issues
- Job Issues

Primary Care Providers are Key to Identification of SA

- Intoxication related injuries
- DUIs
- ETOH induced gastritis
- Elevated LFTs
- Pancreatitis
- Excessive requests for excuse notes
- Blackout periods
PCP Identification (continued)

- Insomnia related to ETOH intake
- Early morning tremors
- Depressive symptoms/lability of mood
- Remorse related to ETOH and drug episodes
- ETOH on breath
- Significant others complaining about patient’s drinking/drugging
- Deterioration in work/school performance

Results from the 2011 National Survey on Drug Use and Health (NSDUH) on self-reported Alcohol use among persons aged 12 and older. (SAMHSA, 2012)

<table>
<thead>
<tr>
<th>Use Type</th>
<th>Description</th>
<th>Prevalence (%)</th>
<th>Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>At least one drink in the past 30 days</td>
<td>51.8%</td>
<td>133.4 million</td>
</tr>
<tr>
<td>Binge</td>
<td>Five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days</td>
<td>22.6%</td>
<td>58.3 million</td>
</tr>
<tr>
<td>Heavy</td>
<td>Five or more drinks on each of 5 or more days in the past 30 days</td>
<td>6.2%</td>
<td>15.9 million</td>
</tr>
</tbody>
</table>

What Is This?

\[
\text{\text{CH\textsubscript{3}-CH\textsubscript{2}-OH}}
\]

\[
\text{H - C - C - OH}
\]

\[
\text{H - H}
\]
Historical Development

- **Beer**
  - 10,000 years ago – accident from grain?
  - 1100 AD guild formed devoted to brewing
  - 1722 – a nourishing drink for potters and laborers created called Potter

- **Wine**
  - 8,000 years ago –
  - 5,000 years ago the vineyards
  - 2,000 BC - Hammurabi ruler of Babylon sets rules for the sale and purchase of wine
  - 1,500 BC Greek god of wine – Dionysus / Bacchus
Historical Awareness

Alcohol

- Alchemist of the 16th century saw alcohol as the essence from distillation.
- The middle of the 18th century alcohol took on its current meaning of the intoxicating ingredient of many common beverages.

Ancient Awareness

"You will conceive and bear a son... now then be careful to take no wine or strong drink and to eat nothing unclean".

Bible - Judges 13:3-4

Historical Perspective

"'T is not the drinking that is to be blamed, but the excess."

John Selden (1584–1654)
In “Table Talk” 1689
Alcohol is the number one drug of choice among our Nation’s youth. Yet the seriousness of this issue does not register with the general public or policymakers.

Enoch Gordis, M.D. Director, National Institute on Alcohol Abuse and Alcoholism.

Production of Alcohol

Fermentation – Sugar to Alcohol and Carbon dioxide

$C_6H_{12}O_6 \rightarrow 2(CH_3-CH_2-OH) + 2CO_2$

Some Current Facts

- 7.4% of adult population in U.S. alcoholic
- $185$ Billion – cost of alcohol abuse in U.S.
- 100,000 deaths annual in U.S. related to
- $1.2$ Billion spent on wine, beer and liquor advertisements in U.S.
Fetal Alcohol Syndrome (FAS)

Most common preventable cause of adverse CNS development

4,000-12,000 infants per year in US

**Characteristics**
- Growth retardation
- Facial malformations
- Small head
- Greatly reduce intelligence

Fetal Alcohol Syndrome (FAS)

1 to 3 births per 1,000 worldwide??

1968 first association by French researchers at the University of Nantes

Early 1970's FAS as condition – University of Washington, Seattle WA, USA

4,000-12,000 infants per year in US

Fetal Alcohol Effect (FAE)

Milder form of FAS

7,000-36,000 infants per year in US

**Characteristics**
- Growth deficiency
- Learning dysfunction
- Nervous systems disabilities
Effects of Prenatal Alcohol

Small head

Undeveloped pinna (outer ear)

Short nose

Missing groove above lip

Pointed, small chin

Small eye openings

Flat face

Thin lips

FETAL ALCOHOL SYNDROME

(National Geographic, George Steinmetz, Feb 1992)
Consumption

Have you ever drank alcohol?

Why?

Have you ever drank too much alcohol?

Health Effects

What are the pleasant effects of alcohol?

The adverse effects (toxicity)?
Acute Effects

- CNS Depressant
- Depression of inhibitory control
- Vasodilation, warm, flushed, reddish skin
- Emotional outbursts
- Decreased memory & concentration
- Poor judgment
- Decreased reflexes
- Decreased sexual response

Long Term Adverse Effects

- **Obvious**
  - Alcoholism, death, cancer (oral cavity, esophagus, liver), fetal effects (FAS)
- **Alcoholism**
  - Cirrhosis of liver, appetite loss, poor judgment
- **Subtle**
  - Lost productivity, impaired performance, motor impairment, cost to society

Alcohol & Cancer

Ethanol consumption increases risk of cancer

- Oral Cavity
- Pharynx and Larynx
- Esophagus
- Liver
Absorption

- Rapidly absorbed from stomach, small intestine, and colon
- Maximal blood concentration within 30 to 90 minutes
- Can be absorbed through the lungs

Distribution

- Uniformly distributed throughout tissues and body fluids
- Readily crosses placenta, to exposure fetus

Elimination

Urinary Excretion
Exhalation
Metabolism
Metabolism of Alcohol

- When alcohol is consumed, it passes from the stomach and intestines into the blood, a process referred to as absorption. Alcohol is then metabolized by enzymes, which are body chemicals that break down other chemicals. In the liver, an enzyme called alcohol dehydrogenase (ADH) mediates the conversion of alcohol to acetaldehyde.

- Acetaldehyde is rapidly converted to acetate by other enzymes and is eventually metabolized to carbon dioxide and water. Alcohol also is metabolized in the liver by the enzyme cytochrome P450IIE1 (CYP2E1), which may be increased after chronic drinking.

- Most of the alcohol consumed is metabolized in the liver, but the small quantity that remains unmetabolized permits alcohol concentration to be measured in breath and urine.

- The liver can metabolize only a certain amount of alcohol per hour, regardless of the amount that has been consumed. The rate of alcohol metabolism depends, in part, on the amount of metabolizing enzymes in the liver, which varies among individuals and appears to have genetic determinants.
Metabolism of Alcohol

- In general, after the consumption of one standard drink, the amount of alcohol in the drinker's blood (blood alcohol concentration, or BAC) peaks within 30 to 45 minutes.
- A standard drink is defined as 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits, all of which contain the same amount of alcohol.

**Metabolism I**

\[
\text{Ethanol} \rightarrow \text{Acetaldehyde} \\
\text{C}_2\text{H}_5\text{OH} \rightarrow \text{CH}_3\text{CHO} \\
(ADH – Alcohol Dehydrogenase)
\]

**Metabolism II**

\[
\text{Acetaldehyde} \rightarrow \text{Acetate} \\
\text{CH}_3\text{CHO} \rightarrow \text{CH}_3\text{COOH} \\
(ALDH – Acetaldehyde Dehydrogenase)
\]
Metabolism III

- 80-90% Metabolized
- Rate is constant (not increased by concentrations in the blood)
- About 30 ml (1 oz) in 3 hours

Gender Differences

Females have higher blood alcohol levels than males

Males have higher stomach metabolism of alcohol than females

Genetic Variation in ALDH

Acetaldehyde Dehydrogenase (ALDH) varies in Caucasians, Blacks and Asians.

50% of Asians have inactive ALDH

Elevated acetaldehyde cause increased flushing, tachycardia (elevated heart rate), nausea, vomiting & hyperventilation.

Disulfiram – inhibits ALDH
Alcoholism - Disulfiram

Alcoholism Treatment with Disulfiram

Inhibits acetaldehyde dehydrogenase (ALDH)

Elevated acetaldehyde cause increased flushing, tachycardia (elevated heart rate), nausea, vomiting & hyperventilation.

Alcoholism – Alcohol Dependence

Characterized by the following:

• Craving: A strong need, or compulsion, to drink.
• Loss of control: The inability to limit one’s drinking on any given occasion.
• Physical dependence: Withdrawal symptoms, such as nausea, sweating, shakiness, and anxiety, occur when alcohol use is stopped after a period of heavy drinking.
• Tolerance: The need to drink greater amounts of alcohol in order to “get high.”

(from: U.S. Alcohol & Drug Information - http://ncadi.samhsa.gov/)

Alcoholism – Alcohol Dependence

Approximately 14 million Americans—7.4 percent of the population—meet the diagnostic criteria for alcohol abuse or alcoholism

(from: U.S. Alcohol & Drug Information - http://ncadi.samhsa.gov/)
## Alcohol Withdrawal Effects

- Tremor
- Nausea
- Irritability
- Agitation
- Tachycardia
- Hypertension
- Seizers
- Hallucinations

## Treatment

- Detoxification with a benzodiazepine, i.e. Librium, Ativan, Valium, Serax
- Clonidine (Catapres)
- Counseling
- Therapy
- 12 Step Meetings

## Relapse Prevention

- Naltrexone (Revia)
- Vivitrol
- Acamprosate (Campral)
- Disulfiram (Antabuse)
- On-going counseling, therapy, 12 step meetings
Ethanol as Antidote

Antidote for Poisoning by:
- Methanol
- Ethylene glycol
- Diethylene glycol

Inhibits metabolic activation by alcohol dehydrogenase (ADH)

U.S. Government Warning

The Alcoholic Beverage Labeling Act of 1988 requires that the following health warning statement appear on the labels of all containers of alcohol beverages offered for sale or distribution in the United States:

U.S. GOVERNMENT WARNING: (1) According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects. (2) Consumption of alcoholic beverages impairs your ability to drive a car or operate machinery, and may cause health problems.

Regulatory Status

- 1981 - U.S. Surgeon General first advised that women should not drink alcoholic beverages during pregnancy.
- 1988 - U.S. requires warning labels on all alcoholic beverages sold in the United States.
- 1990 - U.S. Dietary Guidelines state that women who are pregnant or planning to become pregnant should not drink alcohol.
- 1998 - 19 states require the posting of alcohol health warning signs where alcoholic beverages are sold
Alcoholism

- 90% of US population uses alcohol
- Amount & frequency of use vary
- Approximately 10% of men meet DSM-IV criteria
- Approximately 3% to 5% meet DSM-IV criteria
- Elderly drink less frequently and lesser amounts of alcohol resulting in their disease being less identifiable according to the criteria established

Medical Complications of Alcoholism

- GI Tract
- Cardiovascular System
- Metabolic Changes
- Central Nervous System Changes
- Nutritional Deficiencies
- Hematopoietic System Changes

GI Tract

- Esophagitis, Gastritis, Peptic Ulcer
- Diarrhea
- Pancreatitis
- Liver - fatty degeneration, alcoholic hepatitis, cirrhosis
- Decreased absorption of folate, vitamin B12, calcium
Cardiovascular System
- Exacerbation of Angina and CHF
- Hypertension
- Cardiomyopathy
- Dysrhythmias

Metabolic Changes
- Ketoacidosis, lactic acidosis
- Hypomagnesemia, Hypocalcemia, Hypokalemia
- Hyperuricemia
- Hypertriglyceridemia

CNS Changes
- Acute Intoxication
- Amnesia
- Cerebellar Degeneration
- Marchiafava-Bignami Disease
- Central Pontine Myelinosis
- Cerebral Atrophy, Myopathy
- Withdrawal Syndromes: Tremulousness, Hallucinations, Seizures, Delirium Tremens
Nutritional Deficiencies

- Wernicke’s and Korsakoff’s Encephalopathies
- Folate Deficiency
- Pellagra

Hematopoietic System

- Anemia (direct toxic effect of alcohol, folate deficiency)
- Thrombocytopenia

SBIRT – Screening, Brief Intervention, Referral to Treatment

- CAGE Questionnaire
- AUDIT Tool
- Elevated Liver Enzymes, especially GGT (gamma glutamyl transpeptidase)
- Increased Mean Corpuscular Volume
CAGE

- CAGE
  Have you tried to **CUT DOWN** on your drinking?
- Are you **ANNOYED** by people telling you to stop drinking?
- Do you feel **GUILTY** about your drinking?
- Do you drink on first getting up in the morning (**EYE OPENER**)?
- Two or more yes responses = (+) test

Complications

- Social & Psychological Domains
- Family Discord
- Poor employment history
- Legal Difficulties
- Physical Trauma
- Mood Disorders
- Serious Metabolic Disturbances
- Pathologic Effects on a Diversity of Organs

Complications

- Nutritional deficiencies (thiamine & B12) occur despite good dietary intake.
- Results from direct toxicity of alcohol, impaired absorption and utilization of nutrients, and toxicity of alcohol metabolites with resulting neuropathies, bone marrow toxicity, cognitive changes, and intracranial hemorrhages
Complications

- In the malnourished alcoholic, the resumption of a regular diet can cause severe rhabdomyolysis, hemolysis, and cellular hypoxia caused by acute hypophosphatemia associated with the cellular uptake of glucose. The underlying Thiamine (B1) deficiency is accentuated with the cellular uptake of glucose.

Electrolyte Disturbances

- Potassium, magnesium, and phosphate deficiencies are common in nutritionally compromised alcoholics.

Wernicke’s Disease

- B1 deficiency is causative factor
- Ocular disturbances, ataxia, and confusion
- 10% to 20% mortality rate
Korsakoff’s Psychosis

- Cognitive dysfunction
- Loss of recent memory
- Inability to learn new information
- Thought to be a chronic form of Wernicke’s disease

Cirrhosis of the Liver

- 90% of cases are attributable to alcohol
- Ninth leading cause of death in the US
- Amount & duration of alcohol ingestion required to cause cirrhosis vary among individuals and between males & females
- Ingestion of more than 1 pint of alcohol (80 proof) daily for 10 years is associated with a 10% risk of cirrhosis and up to 50% after 25 years of the same pattern of use

- Esophageal varices secondary to portal hypertension may become irreversible, and variceal bleeding is often the immediate cause of death.
- Patients with cirrhosis may also experience hypoglycemia and/or acidosis
Cirrhosis of the Liver

- Hypoglycemia results from limited glycogen storage and the high reduced nicotinamide-adenine dinucleotide (NADH/NAD) ratio that depresses gluconeogenesis.
- Acidosis results from increased free fatty acid utilization, the synthesis of ketone bodies, and exaggerated lactic acid production with exercise.

Withdrawal

- 4 - 8 hours of the last drink, symptoms begin
- 24 - 48 hours increased tremulousness, diaphoresis, agitation, tachycardia, hypertension, hyperreflexia, and insomnia develop
- More severe withdrawal symptoms are seen in 5% to 10% of patients

Alcoholic Seizures

- A minority of alcoholics may suffer nonfocal multiple or single motor seizures
- Treat with diazepam, phenobarbital, and carbamazepine
- DO NOT use Dilantin - it does not work!!
Delirium Tremens

- Symptoms include disorientation, hallucinations (without lucid periods), hyperadrenergism, hypervigilence, and fever.
- Most cases of DTs are self-limiting and resolve within 72 hours, but there is a fatality rate of 10% to 15%.

Detoxification Treatment

- Thiamine 100 mg IM or PO either daily or BID for 3 days, then Thiamine 100 mg po daily for LOS
- Folate 1 mg po daily for LOS
- Tegretol 200 mg po BID for LOS
- Serum Tegretol level after 5 - 7 days
- Patients must be weaned off of Tegretol

Detoxification Treatment

- Librium 50 mg po every 6 hours
- Librium 25 mg po every 6 hours prn for increased s/s of withdrawal
- Decrease dosing daily according to patient response until completely weaned off of medication
- Clonidine 0.1 mg po every 6 hours with holding parameters of systolic BP< 100 or heart rate < 50 - decrease dose on daily basis until weaned off of medication
Detoxification Treatment

- Ativan instead of Librium
- Serax effective when liver impairment is present
- Counseling/psychotherapy
- AA
- 12 Step Program
- ALANON

Relapse Prevention

- Campral 666 mgs. TID
- Naltrexone (Revia) 25 mgs. daily at bedtime x 3 nights then increase
  Naltrexone to 50 mgs. daily at bedtime daily thereafter
- Naltrexone oral challenge
- Vivitrol 380 mgs. once monthly
- Combination of Vivitrol and Campral therapy

Relapse Prevention

- Remember – relapse prevention drugs are only effective with ongoing counseling, 12 step meetings and psychotherapy.
Depressants/Anxiolytics

- Slows down the CNS and all body functions
- Causes euphoria and calmness
- Decrease inhibitions
- Used medically as tranquilizers and anticonvulsants
- Causes addiction
- Difficult to withdraw from

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Benzodiazepines Dose Equivalencies

- Alprazolam (Xanax) 0.5 mgs
- Chlordiazepoxide (Librium) 25 mgs
- Clonazepam (Klonopin) 0.25 mgs
- Diazepam (Valium) 5 mgs
- Lorazepam (Ativan) 1 mgs
- Oxazepam (Serax) 15 mgs
- Temazepam (Restoril) 10 mgs
Detox Treatment

- Long Librium or Phenobarbital taper
- Antiseizure medication with Tegretol as previously described or Depakote ER (up to 2000 mgs. daily in split dosage)
- Monitoring of serum levels of Tegretol or Depakote

Cannabis

- Marijuana or hashish
- Most widely used illicit drug
- Active chemical is delta-9 tetrahydrocannabinol or THC
- Binds to fat cells
- Much more potent today than in the 1960s
- Laced with solvents, embalming fluid
- Psychologically addicting

### Cannabis

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<td>Smoked or injected</td>
<td>Poor concentration, short term memory loss, anxiety, &gt; appetite</td>
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Morphine is a powerful pain killer used in hospitals.

What street drug of abuse is related to morphine?

Heroin (also opium & methadone)

**What's happening outside?**
Behavioral effects of heroin use include:
- "rush" = euphoria, reduced anxiety, nausea, drowsiness
- "withdrawal" = intense muscle aches & pain, piloerection, fever, diarrhea, irritability, increased lacrimation (rhinorrhea, tearing of eyes)
- Primarily snorted or used intravenously
- DEATH by respiratory arrest

**What's happening inside?**
Activation of opiate receptors = increased transmission = "rush"
Narcotics/Opioids
- Derived from the opium poppy
- Used medically as pain killers with the exception of heroin
- Blocks pain, produces euphoria
- Highly addictive
- Found in snortable, smokable, injectable forms
- ER visits have increased by 50% over the past 2 years

Opioid Addiction
- Morphine
- Heroin
- Codeine
- Oxycodone
- Meperidine
- Fentanyl

Action of Heroin
Action of Morphine

Morphine and Opiate Binding Sites

Opioids

- If dependence develops, drug procurement often dominates the individual’s life and often leads to criminal behavior.
**Opioids**
- Heroin (diacetylmorphine) is more lipid soluble than Morphine and therefore crosses the blood brain barrier more easily
- Causes more intense euphoria and sedation
- Quickly metabolized
- Excreted in the urine as free or conjugated morphine
- Euphoria, sedation, and analgesia are the desired effects

**Heroin**
- Overdoses may cause respiratory depression, bradycardia, hypothermia, and death.

**Method of Use**
- Intravenous
- Nasal Insufflation (snorting)
Complications

- Overdoses may result from variability in the potency of the heroin purchased on the street, rapid loss of tolerance after abstinence, and concurrent use of other central nervous system depressants.

Complications

- Skin abscesses
- Septic phlebitis
- Endocarditis
- HCV Infection
- HIV/AIDS
- Staphylococcus aureus infection is the most common, however, gram-negative bacteria, fungi, tetanus, malaria, and other unusual infections also have increased frequency

Complications

- Other contaminants (talc, quinine, lactose, & cotton fibers) used to dilute the heroin or to prepare the injection may lead to pulmonary hypertension and fibrosis, transverse myelitis, amblyopia, and rhabdomyolysis
- Cirrhosis, chronic persistent hepatitis, HCV, hepatitis B infection is found in up to 50% of heroin abusers
- A nephrotic syndrome that may or may not evolve to chronic renal failure has been described
Withdrawal

- Symptoms start within 2 to 48 hours of last use
- Abrupt withdrawal of heroin, which has a short half-life, causes prompt and severe withdrawal symptoms

Withdrawal Symptoms

- Restlessness
- Lacrimation
- Rhinorrhea
- Nausea
- Mydriasis
- Muscle Aches
- Diarrhea

Withdrawal Symptoms

- Piloerection
- Tachycardia
- Hypertension
Management

- Clonidine
- Phenobarbital
- Librium
- Suboxone or Subutex
- Symptomatic, for example, Tigan for nausea and vomiting
- Levsin & Robaxin, Flexeril
- Counseling/Psychotherapy/Alternative Therapies

Treatment

- Phenobarbital 30 - 60 mg po q 6 hours decreasing dose on a daily basis until weaned
- Phenobarbital 15 - 30 mg po q 6 hours prn
- Vistaril 100 mg IM or po q 3 hours prn for nausea, vomiting, anxiety x 72 hours

Treatment

- Clonidine 0.1 mg po q 6 hours with same holding parameters as previously described
- Decrease dose daily until weaned-off of medication
- Levsin 0.125 mg sl qid x 2 days
- Robaxin 1500 mg po Tid x 2 - 5 days
- Flexeril 10 mg po at bedtime x 2 – 5 days
- Motrin 600 mg to 800 mg po prn
Relapse Prevention

- Naltrexone in dosages previously described
- Note – Can NOT begin Naltrexone Rx. until the patient is opioid naïve for 10 days
- Suboxone
- Subutex
- Methadone

What street drug was an ingredient in Coca-Cola from 1886 – 1906?

This street drug was also utilized as a health tonic and was made into a wine.
Behavioral effects of cocaine use include:

- "high" = excitement and euphoria, headaches and anxiety, elevated heart rate, blood pressure
- "crash" = depression, paranoia, exhaustion – patients are at high risk for suicide
- DEATH by heart attack or stroke secondary to vasoconstriction and/or vasospasm of vessels; tamponade also occurs

Blocking of dopamine removal = increased dopamine = "high"

**Stimulants**

- Speeds up the brain and the body
- Causes temporary excess energy, a false sense of power, and erratic behavior
- Rapidly addicting

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<td>Coke, blow, crack, rock</td>
<td>Snorted, smoked, injected</td>
<td>&gt; alertness, False sense of power</td>
</tr>
<tr>
<td>Amphetamines, Methamphetamine</td>
<td>Speed, uppers, cross-tops</td>
<td>Ingested, same as above</td>
<td>Itchy skin, compulsive tooth grinding</td>
</tr>
<tr>
<td>MDMA (methylene dioxyamphetamine)</td>
<td>Ecstasy, X, XTC, the club drug, the love drug, rolls, Adam</td>
<td>Ingested</td>
<td>Hallucinations, nausea, insomnia</td>
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Recreational use of cocaine has increased in the past decade.

Cocaine
- Inhaled nasally
- Smoked
- Ingestion
- Intravenous use
- Smoking and injection produce the highest serum concentrations and greatest toxicity, as does free basing (produced by heating with diethyl ether).

Amphetamines
- Have effects similar to those of cocaine but a substantially longer duration of action.
Cocaine & Amphetamines

- Euphoria
- Feeling of elation probably as a result of central nervous system release of catecholamines
- Larger doses may cause restlessness, tremor, tachycardia, and hypertension

Complications of Cocaine

- Acute myocardial infarction
- Cardiac dysrhythmias
- Rupture of the ascending aorta
- CVA
- HTN
- Hyperpyrexia
- Seizures in acute overdoses

Chronic Use of Cocaine

- Rhinitis
- Nasal mucosal atrophy
- Nasal perforation
- Acute & chronic paranoid psychoses with both heroine and cocaine
- Diffuse vasculitis in amphetamine use, which may lead to renal failure, CVS and Cor pulmonale
Withdrawal

- Dependence is characterized by binge use - the main purpose of which is to maintain the euphoria and sense of power that these drugs provide
- After bingeing, a period of intense depression, anxiety, and agitation follow
- Craving for sleep

Withdrawal

- Lassitude
- Sleep disorders
- Nightmares
- Depression
- Psychomotor retardation may persist for 6 to 18 weeks after the period of hypersomnolence

Withdrawal

- Symptoms similar to major depressive disorder
- Risk of suicide increases
- Period of anhedonia may induce a strong craving for the euphoric effects of the drug, and reuse starts another cycle of abuse
- Oftentimes users abuse sedatives and anxiolytic drugs to alleviate the unpleasant after-effects of cocaine intoxication
Management

- Phenobarbital as previously described
- Antidepressants, such as desipramine
- Counseling Therapy
- Management of Symptoms
- Baclofen has been trialed for relapse prevention – has not been demonstrated to be effective to date

Cannabis

- Marijuana or hashish
- Most widely used illicit drug
- Active chemical is delta-9 tetrahydrocannabinol or THC
- Much more potent today than in the 1960s
- Psychologically addicting

Cannabis

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<td>joints, bong, hits, hash,</td>
<td>injected</td>
<td>loss, anxiety, &gt; appetite</td>
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Depressants/Anxiolytics

- Slows down the CNS and all body functions
- Causes euphoria and calmness
- Decrease inhibitions
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CAGE Questionnaire

- Have you tried to **CUT DOWN** on your drinking?
- Are you **ANNOYED** by people telling you to stop drinking?
- Do you feel **GUILTY** about your drinking?
- Do you drink on first getting up in the morning (**EYE OPENER**)?

Two or more yes responses = (+) test

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Hallucinogens

- Psychedelic drugs
- Causes users to see, hear, and sense things that do not exist
- LSD is the most common hallucinogenic
- Users include young teens, high school students, and dance party-goers

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Inhalants

- Include hundreds of ordinary household products and medical gases
- Abusers concentrate their fumes and inhale them to feel intoxicated
- Abusers feel the products are safe
- Products can cause major organ and tissue damage
- Responsible for Sudden Sniffing Death Syndrome, which can kill on the first use
Some Inhalants
- Acetone
- Amyl nitrate
- Nitrous oxide
- Gasoline
- Glue
- Paint thinners
- Spray paints
- Cleaners
- Furniture polish
- Benzene
- Typewriter correction fluid
- White-Out

Anabolic-Androgenic Steroids
- Related to the male hormone testosterone
- Anabolic effects enhance muscle repair, endurance and strength
- Makes females more masculine
- Makes males more feminine
- Addictive in nature
- Cause major organ damage
- Lead to emotional disturbances

Club Drugs
MDMA (Ecstasy)
- MDMA is a stimulant with mild hallucinogenic properties
- Similar in structure to amphetamine and mescaline
- Form is a small tablet with any one of a number of logos.
MDMA (Ecstasy)

- Tablets are marketed in a variety of colors
- The diamond “Mitsubishi” corporate logo is a common design scored into Ecstasy tablets
- Common street names are E, Adam, XTC, X, M, Bean, Roll, and Hug Drug
- Ingested orally
- Users claim Ecstasy provides them with an increased sense of energy and heightened sensory perception to enhance their experience at the “clubs” or “raves”
What we know: Ecstasy has short-term & long-term effects on the brain

Short term: changes brain chemistry, behavior

Long term: changes brain structure, behavior

How Do We Know? Scientific research in animals and humans
Short Term Effects after Ecstasy is Gone

- Normal
- During Ecstasy: elevated mood
- After Ecstasy: depression-like feelings, irritability

Long Term Effects of Ecstasy: Animal Studies Indicate Neurotoxicity

- Brain chemistry changes:
  - serotonin reduced
  - serotonin metabolites reduced

- Brain structure changes:
  - serotonin transporters reduced
  - serotonin terminals degenerate

Serotonin Present in Cerebral Cortex Neurons

- Control
- 2 weeks after Ecstasy
- 7 years after Ecstasy
Effects

- Mental confusion, depression, sleep disorders, drug cravings, restlessness, severe anxiety, and paranoia
- Elevated heart rate and blood pressure
- Elevated body temperature reaching up to 106 degrees F
- Loss of appetite, dehydration, muscle tension, involuntary teeth clenching, nausea, blurred vision, fully dilated pupils, rapid eye movement, faintness, and chills or sweating
Effects

- Long term damage to parts of the brain critical to thought and memory
- Duration of the short term effects last up to 4 – 6 hours

GHB

- Synthetically produced central nervous system depressant
- Usually sold as liquid by a capful
- Put into water guns and users buy it by the “squirt”
- Dipped into candy, such as a lollipop and sold

GHB

- In liquid form, GHB is colorless and odorless
- GHB has a salty or soapy taste
- GHB is sold in powder or capsule form
- It is made of lye or drain cleaner mixed with GBL, a chemical cousin of GHB and an industrial solvent to strip floors
GHB

- GBL itself is often abused and produces the same effects as GHB
- GBL and another chemical cousin, 1,4 butanediol (1,4BD), convert to GHB in the body
- Recipes for GHB can be easily found on the internet
- Some GHB users brew the drug in bathtubs at home

Who Abuses GHB?

- Majority of users are young adults
- Most common use is among white, middle-class males between ages 13 and 30
- Many do not realize that GHB affects each person differently
- Differences vary in the purity and strength of the dose, which can mean the difference between life and death
- Misinformation on the Internet, a medium widely used by young adults, may also contribute to the problem

Other Uses of GHB

- Bodybuilders (stimulates the release of growth hormones)
- Alcoholics may use it to try to eliminate alcohol cravings
- Sleep aid
Legitimate Use of GHB

- Treatment for cataplexy, a symptom of the sleep disorder narcolepsy in which muscles lose strength
- US Food and Drug Administration approved GHB under the brand name of Xyrem on July 17, 2002
- US Food and Drug Administration mandated some of the most severe restrictions ever imposed on a medicine
- On February 18, 2000, the Hillary J. Farias and Samantha Reid Date-Rape Drug Prohibition Act of 2000 became law, making GHB a Schedule 1 drug

GHB Dependence and Withdrawal

- Dependence develops with daily use of varying amounts over a period of time ranging from 2 months to 3 years
- Withdrawal symptoms start between 1 to 6 hours after the last dose and lasts from 5 to 15 days

GHB Withdrawal Symptoms

- Psychosis and severe agitation requiring self-protection procedures and sedation
- Mild tachycardia and HTN
- Neurological effects, inclusive of prolonged delirium
- Hallucinations
- Diaphoresis, nausea and vomiting
Symptoms of GHB Overdose

- Nausea
- Bradycardia
- Decreased Level of Consciousness
- Alcohol, opioids, barbiturates, and benzodiazepines potentiate the effects of GHB

Treatment of GHB

- In GHB overdose, it is imperative to keep patient’s airways patent with assisted ventilation if necessary and supportive care
- GHB use should be considered when any patient presents with a coma of unknown origin

K2/Spice (Synthetic Cannabis)

- Incense laced with synthetic chemicals that are cannabinoids
- Spice Diamond/Spice Gold/Dream
- Produces Marijuana effects that are 4X stronger
- Drug testing is now available
Bath Salts

- Stimulants combined (meth and cocaine) for methcathadone
- Synthetic cathinone
- 09/09/11 DEA made it a schedule I controlled substance
- Can be used in bongs, injected and snort
- Results in psychotic state and may cause permanent damage and ongoing psychoses

Bath Salts/Flakka

- Synthetic Cathinone
- Use has increased since 2013
- Cost is $5.00 or less per vial
- The synthetic cathinones in bath salts can produce euphoria and increased sociability and sex drive, but some users experience paranoia, agitation, and hallucinatory delirium; some even display psychotic and violent behavior, and deaths have been reported in several instances.

How Can Treatment Providers Help?

- Learn about the drug
- Assess the client’s lifestyle and drug use habits
- Alert patients to the consequences of use
- Assess bodybuilders for GHB use
- Warn clients about misinformation on the WEB
- Refer clients to appropriate care
Nicotine Dependence

- 29% of the US population smokes
- Decreasing by 0.5% annually
- CDC estimates that 434,000 smoking-related deaths occur annually
- Over 1.2 million years of life before age 65 are lost each year as a result of smoking
- Diagnosis is well accepted and based on the DMS IV-R criteria

Diagnosis

- 2 Key Questions
- Does the patient smoke within 30 minutes of awakening?
- Does the patient smoke more than 25 cigarettes a day?
- Patients who answer yes to both questions benefit most from drug therapy

Withdrawal - 4 S/S within 24 Hours of Abrupt Cessations

- Craving for nicotine
- Irritability
- Frustration or anger
- Anxiety
- Restlessness
- Difficulty in concentrating
- Decreased heart rate
- Increased appetite or weight gain
Management

- Smoking cessation programs
- Counseling
- Nicotine patch
- Zyban 150 mg po daily x 3 days, then 150 mg po BID x 8 - 12 weeks (patient continues to smoke with initiation of therapy - many prescription insurance plans will not cover the cost of Zyban – (about $3.00 per day)
- Chantix (Varenicline)
- OTC Therapy – i.e. Cigarrest

Pharmacology for Relapse Prevention

- ANTABUSE (disulfiram)
- WARNING – “Antabuse should never be administered to a patient when he is in a state of alcohol intoxication, or without his full knowledge.” (PDR).

ANTABUSE

- Produces a sensitivity to alcohol which results in a highly unpleasant reaction when the patient ingests even a minimal amount of alcohol.
- Blocks oxidation of alcohol at the acetaldehyde stage.
- Absorbed slowly from the gastrointestinal tract and eliminated slowly. 1 or 2 weeks after the last dose of Antabuse, ingestion of alcohol may produce symptoms.
- Prolonged ingestion of antabuse does not induce tolerance.
ANTABUSE

- Indication is an aid in the management of selected chronic alcoholic patients who want to maintain sobriety so that supportive and psychotherapeutic therapy may be utilized for long term sobriety.
- Antabuse is not considered a cure for alcoholism.
- Barbiturates and Antabuse have been administered concurrently with no untoward effects – must consider other substance abuse.

ANTABUSE

- Contraindications
- Patients who are or who have recently received metronidazole, paraledhyde, alcohol or alcohol containing preparations, i.e. cough syrups, tonics, etc. should not be given antabuse.
- Pregnancy
- Rubber contact dermatitis history

Antabuse-Alcohol Reaction

- Flushing, throbbing in the head and neck, throbbing headache, respiratory difficulty, nausea, copious vomiting, sweating, thirst, chest pain, palpitations, dyspnea, hyperventilation, tachycardia, hypotension, syncope, marked uneasiness, weakness, vertigo, blurred vision, and confusion.
Antabuse-Alcohol Reaction

- In severe reactions, the following may occur:
  - Respiratory depression, cardiovascular collapse, dysrhythmias, myocardial infarction, acute congestive heart failure, unconsciousness, convulsions, and death.
  - Intensity of reactions will vary with each individual.

Antabuse-Alcohol Reaction

- Blood alcohol levels of 5 – 10 mg/ml – mild reactions in sensitive individuals
- Blood alcohol levels of 50 mg/ml – full reactions
- Blood alcohol levels of 125 to 150 mg/ml - unconsciousness

ANTABUSE

- Drug Interactions:
  - Phenytoin – increases serum levels
  - Oral anticoagulants
  - INH
ANTABUSE

- **Concomitant Conditions:**
  - Diabetes mellitus, hypothyroidism, epilepsy, cerebral damage, chronic and acute nephritis, hepatic cirrhosis or insufficiency.
- **Precautions:**
  - Patients with a history of rubber contact dermatitis

Nursing's Role

- Assess the patient for contraindications
- Assess lab values, i.e. LFTs, etc.
- Educate the patient and family, i.e. Antabuse/Alcohol Reaction
- Advise patient’s to secure an identification card from Wyeth-Ayerst Laboratories

Campral

- Campral (acamprosate calcium) delayed release tablets is another drug in the arsenal of medications for relapse prevention.
- In a 13 week study conducted by the pharmaceutical firm that manufactures Campral, 38% of study group participants maintained sobriety. In a clinical trial of Campral in alcoholics, who were not detoxified and abstinent at the time of treatment, Campral demonstrated no efficacy and no difference in patients who were administered a placebo.
**Campral**

- **Mechanism of Action**
  - Long-term excessive use of alcohol may alter the brain's chemistry. Although the exact mechanism of action is not known with Campral, it is felt that Campral helps to restore the chemical balance in the brain.

- Campral is available as 333 milligram tablets. The standard dose of Campral is two tablets (666 milligrams) three times per day (2 tablets in the morning; 2 tablets in the afternoon; and 2 tablets in the evening). Effective blood levels are reached after about 5 days of therapy.

- If a patient misses taking a dose of Campral, they should be advised NOT to take extra tablets of Campral. They should take the missed dose as soon as they remember that they have missed a dose. They should then resume their normal dosing schedule. As Campral is manufactured as a delayed release tablet, these tablets should not be cut or broken.
Campral

- Campral is NOT metabolized through the liver. The pharmacokinetics of Campral is not altered in patients with mild to moderate hepatic impairment. Lower dosing adjustments are NOT recommended in such patients.

Campral

- **Adverse Reactions**
  - The most common side effects of Campral are diarrhea, weakness, nausea, flatulence, and itching. The majority of side effects occur early in treatment with Campral.

- **Contraindications**
  - Hypersensitivity to acamprosate calcium or any of its components and in patients with severe renal impairment (creatinine clearance < 30 mL/min).

Campral

- **Special Populations**
  - Campral is listed as a Pregnancy Category C and has been shown to be teratogenic in rats. Campral should also be used with caution in lactating women as studies in rats demonstrated that Campral was excreted in breast milk.
  - The safety and efficacy of Campral has not been evaluated in pediatric patients.
**Campral**

*Special Populations*

The safety and efficacy of Campral in geriatrics has been difficult to evaluate secondary to small sample sizes in studies conducted on this population. As Campral is primarily excreted through the kidney, caution needs to be exercised in administering this medication to geriatric patients.

---

**ReVia (Naltrexone HCL)**

- Opioid antagonist
- Related to Naloxone (Narcan)
- Markedly attenuates or completely blocks the subjective effect of intravenous opioids
- Effective in alcoholism, mechanism of action is not understood
- Pre-clinical data suggests that involvement of the endogenous opioid system may be mechanism of action

---

**ReVia**

- 96% of drug is absorbed rapidly from the gastrointestinal tract
- Metabolizes at extra-hepatic sites
- Cleared by the renal system via glomerular filtration
- Dosage is 25 milligrams po daily at bedtime x 3 nights, then increase the dose to 50 milligrams po daily at bedtime thereafter
ReVia

- Contraindications:
  - Patients receiving opioid analgesics
  - Patients currently dependent on opioids
  - Patients in acute opioid withdrawal
  - Any individual who has failed the naloxone challenge test or who has a positive opioid drug screen
  - Sensitivity to this drug
  - Any individual with acute hepatitis or liver failure

Vivitrol

- Long-acting injectable naltrexone
- Primary indication is for alcoholism; now approved for opioid relapse prevention
- One monthly injection
- Need to assess clients for compliance and failure of other therapies
- Currently practice is that the provider completes a form that is sent to the pharmaceutical firm
- Drug is then supplied to an approved dispenser/provider
- Not all insurances provide coverage

Topiramate (Topamax); Baclofen

- Clinical trials show promise for this medication to be utilized as a relapse prevention strategy for the treatment of alcoholism.
- Baclofen – trials in progress as a relapse prevention strategy for the treatment of cocaine.
Suboxone (buprenorphine HCL/Naloxone HCL Dihydrate); Subutex; Zubsolv; Bunavill

- 4.4 million people use prescription pain relievers nonmedically
- Estimated 2.4 million have used heroin at some time in their lives
- An estimated 1.9 million people 12 years of age and older have used oxycodone nonmedically

Other commonly prescribed pain medications are:
- Fentanyl
- Hydrocodone
- Morphine
- Codeine
- Propoxyphene
- Meperidine

Opioid dependence is generally a chronic, relapsing medical condition
- Continued drug use causes neurochemical and molecular changes in the brain
- Changes in metabolic brain activity, receptor systems, gene expression, and sensitivity to environmental cues can result
- Addictive substances activate the brain’s reward system, reinforcing drug taking behavior
- Opioid dependence is not always the result of misuse
Suboxone

- Buprenorphine, a partial opioid receptor agonist
- Drug Addiction Treatment Act of 2000 allows qualified physicians to treat opioid-dependent patients with sublingual Suboxone in their practices
- Suboxone provides a new management option for opioid dependent clients

Suboxone

- Physicians must complete an approved 8 hour course on Suboxone treatment
- Physicians can only have a maximum of 30 (recently changed to 100) clients in their practice at one time
- If more than one physician is in the practice, then an additional clients can be added per physician as long as above requirements are met
- DEA monitors physicians prescribing Suboxone
  - Advanced Practice Nurses can not prescribe Suboxone

Suboxone

- Occupies opioid receptor sites
- Blocks effects of opioid agonists
- Not easily displaced by other opioids
- Lower potential for abuse
- Less physical dependence
- Reduced cravings
- Greater safety in accidental overdose
**Suboxone**
- Initiation of therapy can vary
- Administered orally as a film
- Once daily dosing
- Milder withdrawal profile
- Can be dispensed for take home use
- Maintains clients in outpatient treatment
- Best results are when pharmacology is combined with psychosocial treatment and counseling

**Bunavail**
- Developed by BioDelivery Sciences
  - BUNAVAIL™ (Buprenorphine/Naloxone buccal film) previously referred to as BEMA® bup/nx
- Utilizes BDSI's proprietary BioErodible MucoAdhesive (BEMA) delivery technology
- Bunavail has double the bioavailability of Suboxone Film
- Only half the buprenorphine dose is required
  - The lower dose may also reduce saliva buildup and side effects.

**Bunavail**
- Bunavail was FDA approved June 6th, 2014 and should reach pharmacies by October 2014.
  - Bunavail 2.1/0.3 mg = Suboxone 4/1 mg SL
  - Bunavail 4.2/0.7 mg = Suboxone 8/2 mg SL
  - Bunavail 6.3/1 mg = Suboxone 12/3 mg SL
Methadone

- A frequently used medication for opioid addiction treatment
- Allows patients to socialize and function normally
- Prevents physical withdrawal symptoms
- Relieves the craving of opioids

Benefits of Methadone

- Administered orally as a film
- Once daily dosing
- Minimal side effect profile
- Safe and effective when dosed correctly

Pharmacology of Methadone

- Long-acting full opioid receptor agonist
- Functions at mu receptor sites
- Mu receptor sites exist on the surfaces of brain cells
- Belief is that the activation of the mu receptors are responsible for the analgesic and euphoric effects of opioids
Methadone Kinetics

- 80% bioabsorption
- Blood levels peak within 2 – 4 hours
- Pain relief within 4 – 6 hours
- Half life is 24 – 36 hours
- Steady state reached within 5 – 7.5 days
- Note: Blood levels are influenced by absorption, metabolism, protein binding, urinary pH, other medications, diet, age, physical activity level, pregnancy & vitamins

Methadone Induction

- Induction is the most risky phase of methadone maintenance treatment.
- START LOW & GO SLOW!!!
- Treatment must be individualized
- Optimal doses for patients will vary
- Understand the cumulative property of methadone
- Communicate with patients

Initial Dose

- Use COWS (Clinical Opiate Withdrawal Scale)
- Score Maximum Initial Dose
  - 0 – 5 (no wd) 0 mg.
  - 5 – 12 (mild wd) up to 15 mg.
  - 13 – 24 (Moderate wd) up to 20 mg.
  - 25 – 36 (Mod.Sev.wd) up to 25 mg.
  - > 36 (Severe wd) up to 30 mg.
- Note: If withdrawal does not follow, methadone treatment cannot be initiated.
Goals of Methadone Therapy

- Ensure individualized and “adequate dose.”
- Titrate dose to achieve a steady-state with methadone levels (clinically determined) in the “comfort zone” throughout and beyond the dosing interval.
- Allow time to react to the initial dose
- Allow time to react to a dose increase (3-5 days).
- Avoid overly aggressive (toxicity, overdose) and ultra-slow titration of dosing (continued illicit drug use).
- Continued assessment and monitoring of the patient is essential.

Methadone’s Cumulative Effect

- Dose A is 30 mgs. daily with no increase for 6 days. Cumulative effect by day 6 is equivalent to 59.0625 mgs. of the drug.
- Dose B has an initial dose of 30 mgs. On day 1 and then the dose is increased daily by 10 mgs. for another 5 days, i.e. day 2 the dose is 40 mgs., 50 mgs., 60 mgs., 70 mgs., 80 mgs. Thus by day 6 the cumulative effect of dosing is 139.6875 mgs.

Keys to Methadone Therapy

- ANY SIGN OR SYMPTOM OF OVER-MEDICATION DURING THE EARLY INDUCTION PHASE REQUIRES A DOSE REDUCTION!!!
- Beware of the subtle signs/symptoms of overmedication; i.e. feeling good, extra energy, staying awake at work, etc.
- Patients may need more TIME, not more MEDICATION!!!
Adverse Reactions
- Constipation
- Excessive sweating
- Paresthesias in hands and feet
- Weight gain
- < libido/sexual dysfunction
- Rash

Health Conditions That May Affect Dose
- Age
- Hepatitis C
- HIV/AIDS
- Cardiac Risk
- Pain
- Pregnancy
- Lactation

Cardiac Adverse Effects
- FDA Black Box Warning
  - Prolonged QT syndrome in doses greater than 200 mgs. or with IV administration
  - QT prolongation may lead to Torsades de Pointes
  - Need to assess individual risks
  - EKG pre administration???
Torsades de Pointes

Drug Interactions

- Multiple drug interactions exists:
- Sedatives
- Antidepressants
- HIV Medications
- Antibiotics & Antifungals especially Cipro, Fluconazole and Rifampin
- Inducers and Inhibitors of the CYP 450 enzyme system

Naloxone, EVZIO

- Opioid reversal agent
- Standard dose is 0.4 milligrams IV
- Must monitor patient as the opioid abused may have a longer half-life than Naloxone
Adolescents & Addictions

- Addictions begins in adolescents
- Adolescents are experimenters, that is, they usually try a variety of substances prior to settling on their drug of choice
- Behaviors in adolescents are different than adults
- Adolescents are attempting to identify who they really are and what makes them different from others

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Adolescents & Addictions

- Research has demonstrated that the human brain is not fully developed until around age 25, in particular, the frontal lobe, which is the center for thought and judgment
- Adolescents feel that they are invincible and that nothing will harm them
- High risk behavior is common in this age group

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Adolescent & Addictions

- The suicide rate is higher for individuals who abuse substances
- The suicide rate is highest among adolescent males (even if they are not substance users)
- Add in substance abuse thus a provider must be constantly vigilant for adolescent suicide
Contributing Factors

- What are the major factors that contribute to an adolescent abusing substances?

Adolescent Treatment

- An environment that is safe and protected
- Acute detoxification services
- Rehabilitation services
- Behavior modification
- Consequences for bad behavior
- CPI training for staff
- Education
- 12 Step Philosophy or like programs

Adolescent Protocol Orders

- Standard set for all routine admissions
- Detox – Opiate
- Detox - Alcohol
Generic Orders in All Protocols

- Diet
- Vital Signs
- Activity
- Routine Lab work – CBC with diff; Chem Profile, UA, urine drug screen, STI testing (RPR, Hepatitis A,B,C, HSV I, HSV II, Chlamydia)
- Consults: Psych, Nutrition, Dental, Gyn

Adolescent Detox Protocol - Opiate

- Clonidine 0.1 mgs every 8 hrs x 48 hrs
- Clonidine 0.1 mgs q 12 hours x 48 hours
- Clonidine 0.1 mgs once daily x 24 hours
- Hold Clonidine for systolic BP equal to or less than 100 or heart rate equal to or less than 60
- COWS assessment prior to each dose

Adolescent Detox - Opiate

- Robaxin 750 mgs TID x 5 days
- Flexeril 5 mgs once daily at hs x 5 days
- Trazodone per provider order for sleep
- Tigan per provider order
- Suboxone per physician order if needed
Adolescent Detox - Alcohol

- Librium 35 mgs q 6 hrs x 24 hrs
- Librium 25 mgs q 6 hrs x 24 hrs
- Librium 15 mgs q 6 hrs x 24 hrs
- Librium 10 mgs q 6 hrs x 24 hrs then d/c
- CIWA assessment for each dose
- Vistaril 50 mgs q 6 hrs prn x 5 days
- Trazodone per provider order
- Tigan per provider order

Counseling and Psychotherapy

- No relapse prevention medication can be effective without counseling and psychotherapy.
- The issues and triggers in a patient's life that contribute to dependence and addiction must be explored and addressed.

Case Study

- Mr. D. presents to an inpatient residential care substance abuse treatment center for admission for ETOH dependency and a history of a generalized anxiety disorder.
- Mr. D. is a 39 year-old, caucasian male who admits to consuming up to a pint of liquor daily for several years.
- When Mr. D. walks into the room, he appears very "dusky," very tremulous and very anxious.
Case Study

- What immediate differential diagnoses come to mind?
- What additional pertinent history questions should the nurse practitioner ask?

Case Study

Mr. D. tells you that he has been treated by his primary care practitioner for elevated liver enzymes and anxiety. He tells you that he does not eat well and usually "drinks" his meals. He has also noticed some dark, tarry stools in the past. He states that his last drink was earlier today.

Case Study – Physical Examination

- General appearance is an anxious appearing caucasian male who is very tremulous.
- BP 130/96 HR 98 RR 18 Temp 99.1 (o)
- BAL 0.312
- Eyes – Conjunctivae Pale
- Neuro – AAO, CN I – XII grossly intact, DTRs (+) 3 of lower extremities
- Chest – CTA all fields
- Heart – RSR, S1 S2, no S3 or S4, no murmurs, gallops, or friction rubs
- Abd – marked hepatomegaly
Case Study

- What is significant about the physical examination findings?

Case Study

- Differential Diagnoses after the physical examination?
- What is your initial treatment plan?
- What will your long term prevention plan include?

Case Study

- What laboratory tests are indicated?
The laboratory verbally notifies you that Mr. D.’s Hgb is 9.2 and his hematocrit is 27.8.

What additional laboratory tests are indicated?

What will you add to your initial treatment plan?

What are your plans for relapse prevention?
Pregnancy & Addiction

Al Rundio, PhD, DNP, RN, CARN-AP, APRN-BC

Pregnancy & Illicit Drug Use

Figure 1. Percentages of Past Month Illicit Drug Use among Women Aged 15 to 44, by Pregnancy Status, Age, and Race/Ethnicity*: 2002 and 2003

http://www.oas.samhsa.gov/

Pregnancy & Alcohol Use

Figure 2. Percentages of Past Month Alcohol Use among Women Aged 15 to 44, by Pregnancy Status: 2002 and 2003

http://www.oas.samhsa.gov/
Alcohol Use by Pregnancy Status
Source: SAMHSA, 2002-2007 NSDUHs.

Figure 1 Table. Trends in Past Month Alcohol Use among Women Aged 15 to 44, by Pregnancy Status*: Percentages, 2002-2007

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>9.8%</td>
<td>12.1%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Recent Mothers</td>
<td>43.3%</td>
<td>44.2%</td>
<td>42.1%</td>
</tr>
<tr>
<td>Nonpregnant, Not Recent Mothers</td>
<td>53.7%</td>
<td>53.7%</td>
<td>54.0%</td>
</tr>
<tr>
<td>Total Women</td>
<td>51.3%</td>
<td>51.5%</td>
<td>51.4%</td>
</tr>
</tbody>
</table>

New Jersey as a Microcosm of the USA

In the year 2000, nearly 15,000 infants were born in New Jersey having been exposed to a damaging substance.
Prenatal Care & Assessment

- APN needs to assess the specific needs of each client
- Identify substance abuse issues
- Strong nurse-client relationship is essential for successful interventions
- Such a relationship needs to be instituted early in the assessment process
- Establish an atmosphere of trust & credibility

Prenatal Care & Assessment

- Prenatal care and appropriate intervention for the substance-using client are dependent on:
  - The type of drug abused
  - The amount of use or abuse
  - The client's current use pattern or withdrawal phase
  - A comprehensive assessment is essential

Prenatal Care

- CBC
- Serology
- Hepatitis B & C Screens
- LFTs
- FBS
- Blood type
- TORCH (Toxoplasmosis, Other Infections, Rubella, Cytomegalovirus, & Herpes)
- Routine ura and urine for c&s
- PAP Smear
- Chlamydia and gonorrhea cultures
- TB skin test
- CxR if needed (shield abdomen)
Other Considerations

- Genetic screening when appropriate
- Nutritional referral
- WIC referral
- HIV testing
- Urine toxicology screening
- AFP (alpha-fetoprotein for Downs Syndrome, neural tube defects, specifically spina bifida)
- Ultrasound
- Glucose tolerance testing

ACOG Recommendations

- American College of Obstetricians and Gynecologists is recommending that all OB/GYN providers screen all patients for alcohol and drug abuse so they can be directed to early treatment

Newborn Onset of Drug Withdrawal Symptoms
Source: American Academy of Pediatrics, Committee on Drugs (1998)

<table>
<thead>
<tr>
<th>DRUG</th>
<th>SYMPTOM ONSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETOH</td>
<td>3 – 12 hours post delivery</td>
</tr>
<tr>
<td>Narcotics</td>
<td>48 – 72 hours post delivery; may be as late as 4 weeks</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>4 – 7 days post delivery; (1 – 14 days possible)</td>
</tr>
<tr>
<td>Cocaine</td>
<td>48 – 72 hours post delivery</td>
</tr>
</tbody>
</table>
Alcohol Use and Abuse

- Estimated 15 – 26 percent of pregnant women continue to drink
- Nutritional status is oftentimes compromised affecting neonatal development
- FAS (Fetal Alcohol Syndrome)

Narcotics (Opioids)

- Heroin and Methadone are the two most common used narcotics in the childbearing population
- Heroin is the most commonly used illegal narcotic
- Over 300,000 infants are exposed prenatally to either heroin or methadone each year
- Maintain pregnant woman on methadone therapy even if incarcerated
- Neonate at high risk for NAS (Neonatal Abstinence Syndrome)

Heroin

- Premature rupture of membranes
- Preterm delivery
- Stillbirths
- Fetal growth restriction
- Increased risk of birth defects
- Signs and symptoms of withdrawal in the neonate are: fever, sneezing, trembling, diarrhea, and excessive crying.
- Increased risk of sudden infant death syndrome

March of Dimes (2006)
### Neonatal WITHDRAWAL Mnemonic

**Source:** American Committee on Drugs (1983)

<table>
<thead>
<tr>
<th>Letter</th>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Wakefulness</td>
</tr>
<tr>
<td>I</td>
<td>Irritability</td>
</tr>
<tr>
<td>T</td>
<td>Tremulousness, temperature instability, tachypnea</td>
</tr>
<tr>
<td>H</td>
<td>Hyperactivity, high-pitched cry, hyperreflexia, hypertonia</td>
</tr>
<tr>
<td>D</td>
<td>Diarrhea, diaphoresis, disorganized suck</td>
</tr>
<tr>
<td>R</td>
<td>Rub marks, respiratory distress, rhinorrhea</td>
</tr>
<tr>
<td>A</td>
<td>Apnea attacks, autonomic dysfunction</td>
</tr>
<tr>
<td>W</td>
<td>Weight loss or poor weight control</td>
</tr>
<tr>
<td>A</td>
<td>Respiratory Alkalosis</td>
</tr>
<tr>
<td>L</td>
<td>Lacrimation</td>
</tr>
</tbody>
</table>

### Cocaine & Crack Cocaine

- 6 – 11 percent of use in metropolitan and suburban settings
- Stimulates early and precipitous labor secondary to vasoconstrictive effects of drug, then vasodilation after stopping drug
- Infants may be on respirators and receive IV fluids and parenteral nutrition
- Infants may suffer intracranial hemorrhages, hydrocephaly, seizures and possibly cerebral palsy
- Problems are consistent with preterm delivery
- All infants may experience NAS
- Avoid environmental stimuli in easily aroused infants

### Cocaine

- Increased risk of miscarriage
- Premature and low birth weight babies
- Cerebral Palsy
- Stroke and heart attack in the neonate
- Smaller heads= smaller brains
- Neonatal death
- Placental abruption
Cocaine (continued)

- Signs and Symptoms of neonatal withdrawal: irritability and jitteriness
- Cocaine exposed children experience learning and behavioral problems

March of Dimes (2006)

Ecstasy and Methamphetamine

- Increased risk of congenital heart defects
- Increased risk of club foot (females only)
- Low birth weight babies
- Signs and symptoms of withdrawal in the neonate are: jitteriness, respiratory problems, and drowsiness

March of Dimes (2006)

Barbiturates

- Barbiturates are among the most frequently abused drugs in the general population
- Maternal barbiturate abuse can cause fetal addiction and withdrawal both in utero and during the neonatal period
- Neonatal withdrawal symptoms of irritability, severe tremors, excessive crying, vasomotor instability, diarrhea, increased muscle tone, vomiting, and disturbed sleep. Symptoms may last up to 4 – 6 months even with treatment
- NAS is common
Marijuana

- Increased risk for preterm birth
- Infants experiencing withdrawal cry and tremble obsessively
- Long term effects may include inability to pay attention

March of Dimes (2006)

Nicotine

- Cigarette smoking is associated with an average birth-weight reduction in neonates whose mothers smoked during pregnancy
- As few as 5 cigarettes per day can cause fetal growth retardation
- Primary physiology for growth retardation is fetal hypoxia and/or ischemia that results from the increased levels of carbon monoxide and nicotine transported to the fetus through the maternal circulation
- Vasoconstriction secondary to nicotine decreases placental and fetal blood vessel flow thus decreasing vital blood circulation to the fetus
- Carbon monoxide binds to fetal hemoglobin thus decreasing O2 to the fetus for tissue growth and development
- APNs are key to educating clients about the effects of smoking
- Mothers need to be advised that nicotine is passed on to the infant in breast milk
- Secondhand smoke causes respiratory problems in the newborn
Helpful Tips to Recognizing Psychopharmacology

- Know a little something about the patient’s diagnosis
- Have a good reference text on pharmacology that is easy to understand
- Have a basic understanding of receptor theory and the major neurotransmitters in the brain
- Attend seminars and read current literature in order to remain current on psychopharmacology as a treatment option
- Access appropriate internet WEB sites
The Brain

Receptors
Dopamine and Opiate Receptors

Bipolar Disorder
- Characterized by acute mania/hypomania
- Characterized by acute depression

Bipolar Terminology
- Mania – a distinct period of abnormally and persistently elevated, expansive, or irritable mood.
- Periods of mania may last at least 1 week with a significant decline in function.
- Hypomania – a distinct period of persistently elevated, expansive, or irritable mood lasting at least 4 days.
- Hypomania differs from the usual non-depressed mood.
- There is no significant decline in functioning.
Bipolar Terminology

- Mixed Episode – criteria is met for a manic episode and for a major depressive episode
- Cyclothymia – alternating mood states that do not meet full criteria for depressive, manic, or mixed episodes for at least 2 years
- Bipolar NOS – a mood episode that does not meet specific criteria for any specific bipolar disorder

Treatment

- Recovery is the primary goal of treatment

Pharmacologic Management

- Mood Stabilizers
  - Lithium
  - Divalproex (Depakote)
  - Carbamazepine (Tegretol)
- Atypical Antipsychotics
Pharmacologic Management

- Acute Mania/Hypomania
- Lithium
- **First generation antipsychotics**
  - Dopamine Receptor Antagonists
    - Chlorpromazine (Thorazine)
    - Trifluoperazine (Stelazine)
    - Fluphenazine (Prolixin)
    - Thioridazine (Mellaril)
    - Haloperidol (Haldol)
    - Mesoridazine (Serentil)

Pharmacologic Management

- **Atypical Antipsychotics**
  - Serotonin-Dopamine Antagonists
    - Clozapine (Clozaril)
    - Risperidone (Risperdal)
    - Olanzapine (Zyprexa)
    - Quetiapine (Seroquel)
    - Ziprasidone (Geodon)
    - Aripiprazole (Abilify)

Pharmacologic Management

- Lithium for Bipolar Depression
- Olanzapine (Zyprexa) & Fluoxetine (Prozac)
- Quetiapine (Seroquel)
- Paroxetine (Paxil) Plus a Mood Stabilizer i.e. Depakote
### Mania vs Depression

<table>
<thead>
<tr>
<th>Mania</th>
<th>Depression</th>
</tr>
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<tbody>
<tr>
<td><strong>Acute</strong></td>
<td><strong>Acute</strong></td>
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<tr>
<td>Lithium</td>
<td>Antidepressants?</td>
</tr>
<tr>
<td>Valproate</td>
<td>Quetiapine</td>
</tr>
<tr>
<td>Carbamazepine</td>
<td>Lamotrigine</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>(Lamictal)?</td>
</tr>
<tr>
<td><strong>Long-Term</strong></td>
<td><strong>Long-Term</strong></td>
</tr>
<tr>
<td>Lithium</td>
<td>Antidepressants?</td>
</tr>
<tr>
<td>Valproate</td>
<td>Lamotrigine</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>Quetiapine</td>
</tr>
</tbody>
</table>

### Some General Guidelines and Side Effects
- Certain medications must have serum level monitoring, i.e. Lithium, Depakote, Tegretol.
- Other lab values also are monitored for certain medications, i.e. CBC, Chemistry Profile, Liver Function Studies.
- Dopamine Receptor Antagonists have extra pyramidal and tardive dyskinesia side effects.
- Serotonin Dopamine Receptor Antagonists can cause sedation, i.e. Seroquel at low dose is very sedating.
- Any time a patient has new symptoms after starting a new medication suspect the medication as the culprit and refer the patient to the prescribing clinician.

### Lithium
- Contraindicated in patients with kidney failure, breast-feeding, heart disease, organic brain syndrome, tardive dyskinesia, diabetes mellitus, kidney disease, cataracts, seizure disorders, Myasthenia Gravis, Parkinson's disease, pregnancy (first trimester), and ulcerative colitis.
Common Side Effects of Lithium

- Metallic taste in mouth
- Nausea
- Loose stools
- Fine resting hand tremor
- Muscular weakness
- Fatigue
- Polyuria
- Polydipsia
- Dry Mouth

Extrapyramidal Symptoms

- Akathisia – motor restlessness/muscle quivering
- Dystonia – hypo/hyper tonicity
- Tremor – trembling, shaking
- Cogwheel Rigidity – stiffness/muscle tightness in an extremity
- Torticollis – spasmodic contraction of the neck
- Opisthotonos – a tetanic spasm in which the spine and extremities are bent with convexity forward; the body resting on head and heels
- Gait Disturbances
- Bradykinesia – extreme slowness in movement

Depakote

- Must monitor the CBC with differential blood count for:
  - Agranulocytosis (destruction of white blood cells)
  - Thrombocytopenia (decreased platelets)
  - Leukopenia (decreased white blood cells)
  - Leukocytosis (increased white blood cells)
**Depression**

- Generally the etiology is a change in body chemistry
- Such chemical disturbances can be influenced by the following:
  - Family History
  - Unhappy Events
  - Stress
  - Personality (low self-esteem, negative attitude)
  - Environment
  - Hormonal Changes
  - Some Medications
  - Illness

**Signs & Symptoms of Depression**

- Depressed, Downhearted, Sorrowful Mood
- Lack of Interest in Life
- Changes in Appetite or Weight
- Problems with Sleeping
- Anxiety
- Tiredness
- Feelings of Guilt and/or Low Self-Esteem
- Difficulty in Thinking, Concentrating, Making Decisions
- Thoughts of Death or Suicide

**Pharmacologic Management**

- Antidepressants
  - These agents enhance the activity of norepinephrine and/or serotonin through one of the following mechanisms: blocking reuptake into the storage sites of nerve endings, affecting enzyme degradation, antagonism of pre or post synaptic receptors, adjustment of autoreceptors.
Monoamine Oxidase Inhibitors

- Tranylcypromine (Parnate)
- Phenelzine (Nardil)
- EMSAM (Selegiline Transdermal System)

These drugs block the action of monamine oxidase (MAO) which is an enzyme responsible for the degradation (break down) of biogenic amines including norepinephrine and serotonin. By blocking the breakdown of MAO, the activity of norepinephrine and serotonin is increased, which provides for an elevated mood.

Monoamine Oxidase Inhibitors – Side Effects

- Constipation
- Excess drowsiness
- Dangerous interactions can occur with simultaneous use of weight loss medications, tranquilizers like Valium, Xanax, Ativan or alcohol.
- Do NOT take with stimulant class of drugs
- Increased risk of seizures when taking Wellbutrin
- If immunosuppressed, call health care provider at first signs of infection
- Medications that contain phenylpropanolamine and ephedrine are contraindicated!!

MAOIs – Foods & Beverages to Avoid

- Aged cheese
- Sour cream
- Chicken liver
- Soy sauce
- Chocolate
- Bologna
- Sauerkraut
- Yeast products
MAOIs – Foods & Beverages to Avoid

- Avocados
- Pickled herring
- Meat tenderizers
- Oriental foods
- Hung game meat
- Restaurant sauces
- Coffee
- Broad Beans
- Chianti wine
- Caviar
- Snails

MAOIs – Foods & Beverages to Avoid

- Overripe fruit
- Packet soup
- Bananas
- Ales and beer
- Yogurt
- Tea
- Cola
- Sausage
- Pepperoni
- It is OK to eat cottage cheese, cream cheese, Cheez Whiz, other wine and spirits. Make certain all food is fresh, stored properly, and eaten quickly.

Cyclic Antidepressants

- Amitriptyline (Elavil)
- Amoxapine (Asendin)
- Comipramine (Anafranil)
- Desipramine (Norpramin)
- Doxepin (Sinequan)
- Imipramine (Tofranil)
- Maprotiline (Ludiomil)
- Nortriptyline (Pamelor)
- Protriptyline (Vivactil)
- Trimipramine (Surmontil)
Major Side Effects of the Cyclic Class

- Anticholinergic Effect (constipation, dry mouth, blurred vision, urinary retention)
- Sedation
- Orthostatic Hypotension
- EKG Changes (T-Wave Flattening, BBB, AV Block, Ventricular Asystole)
- Must do EKG prior to and after initiating treatment

Selective Serotonin Reuptake Inhibitors

- Fluoxetine (Prozac)
- Paroxetine (Paxil)
- Sertraline (Zoloft)
- Fluvoxamine (Luvox)

Major Side Effects of the SSRI Class

- Nausea
- Diarrhea
- Nervousness
- Headache
- Insomnia/Sleepiness
- Sexual Dysfunction
- Seizures in patients with pre-existing seizure disorder
Serotonin-2 Antagonist/Reuptake Inhibitors
- Trazodone (Desyrel)
- Nefazodone (Serzone)

Side Effects of the Serotonin-2 Antagonists/Reuptake Inhibitors
- Nausea
- Dry Mouth
- Constipation
- Blurred Vision
- Abnormal Vision
- Somnolence (sleepiness)
- Dizziness/Lightheadedness
- Confusion
- Numbness

Norepinephrine-Dopamine Reuptake Inhibitor
- Bupropion (Wellbutrin)
Side Effects of Wellbutrin

- Constipation
- Excessive Drowsiness
- Dizziness
- Increased Appetite
- Dry Mouth

Serotonin-Norepinephrine Reuptake Inhibitor

- Venlafaxine (Effexor)
- Desvenlafaxine (Pristique)
- Duloxetine HCL (Cymbalta)

Side Effects of Effexor

- Blurred Vision
- Sweating
- Rash or Hives
- Nervousness, irritability, insomnia – SSNRIs can cause mania in bipolar disorder
- Weakness, Tiredness, Sleepiness
- Sexual Dysfunction
- Confusion
- Tremor
- Loss of Appetite with Weight Loss
- High Blood Pressure
- Headache
Alpha 2 Antagonist

- Mirtazepine (Remeron)

Side Effects of Remeron

- Constipation
- Excessive Drowsiness
- Dizziness
- Increased Appetite
- Weight Gain (can be significant)
- Dry Mouth
- Sore throat
- Infections that will not heal

Other Thoughts on Remeron

- Avoid concomitant use with alcohol, sleeping pills, allergy medicine, cold preparations, pain medication
- Dangerous interactions can occur with monoamine oxidase inhibitors, weight loss medications (amphetamines), tranquilizers like Valium, Xanax, Ativan
- Patient is more prone to infection when on steroids
Other Thoughts About the Antidepressants

- Start lower dose and titrate up gradually
- Generally, it takes 3 to 4 weeks to obtain the full therapeutic effect of the medication
- Never abruptly stop the medication (wean down slowly – the only exception is an acute allergic reaction)
- Combining certain classes of medication can be dangerous (that is why God made Psychiatrists and Psychiatric Nurse Practitioners)

Anxiety Disorders

- Panic Disorders
- Generalized Anxiety Disorders (GAD)
- Social Anxiety
- Post Traumatic Stress Disorders (PTSD)

Comorbidity with Anxiety Disorders

- Personality Disorders
- Affective Disorders
- Medical Disorders
- Substance Abuse
- Need to pay attention to the comorbidities associated with anxiety disorders
Goal of Therapy
- Free of panic attacks
- Free of anticipatory anxiety
- Return to avoided situations
- Free of situational anxiety
- Return to normal functioning and quality of life

Psychopharmacology
- SSRIs (Selective Serotonin Reuptake Inhibitors) are first-line agents for the treatment of depression, obsessive-compulsive disorder (OCD), and panic/anxiety disorders

Psychopharmacology
- SSRIs (Selective Serotonin Reuptake Inhibitors)
- Benzodiazepines (only for short term therapy – a very addictive class of medications)
- Antihistamines
- Serotonin Dopamine Antagonists (off label use at present)
Psychopharmacology - SSRIs

- Paroxetine (Paxil)
- Sertraline (Zoloft)
- Citalopram (Celexa)
- Fluoxetine (Prozac)
- Escitalopram (Lexapro)

Side Effects

- Sexual inhibition is the most common, hence, SSRIs are useful to treat premature ejaculation
- GI side effects include nausea, vomiting, diarrhea, anorexia, vomiting, and dyspepsia
- Initially weight loss, then weight gain occurs
- Headaches

Side Effects

- Anxiety
- Insomnia and Sedation
- Vivid Dreams and Nightmares
- Seizures (generally contraindicated in patients with seizure disorders)
- Extrapyramidal symptoms may occur but are extremely rare
- Suicide especially in the adolescent population – patients need to be carefully monitored during the first few months of therapy
Benzodiazepines

- Diazepam (Valium)
- Lorazepam (Ativan)
- Alprazolam (Xanax)
- Triazolam (Halcion)
- Estazolam (ProSom)
- Clonazepam (Klonopin)
- Flurazepam (Dalmane)
- Prazepam (Centrax)
- Quazepam (Doral)
- Halazepam (Paxipam)

Benzodiazepines

- Oxazepam (Serax)
- Temazepam (Restoril)

Nonbenzodiazepine Agonists

- Zolpidem (Ambien)
- Zaleplon (Sonata)

Benzodiazepines are effective for the immediate treatment of panic disorder, phobias, and agitation associated with Bipolar I disorder, GAD, Social Anxiety and other anxiety disorders.

Benzodiazepines are also used as anesthetics, anticonvulsants, and muscle relaxants.

Side Effects

- Benzodiazepines generally have a long half life.
- Benzodiazepines major side effect is sedation. Caution must be exercised when driving and operating machinery.
- This class of drugs are very addictive.
- Seizures is common during withdrawal from Benzodiazepines.
- Concomitant use with alcohol and other sedative type drugs are contraindicated.
Antihistamines

- Benadryl
- Vistaril (Atarax)

Side Effects

- Most common side effect is sedation
- Some patients have a reverse reaction to these medications, i.e. they become more awake and agitated.
- Benadryl is now an over-the-counter medication and does not require a prescription.

Buspar

- Busprione (Buspar)
- Anxiolytic psychoactive drug of the azapirone chemical class
- Primary use is to treat generalized anxiety disorder (GAD).
ADHD

- A heterogeneous behavioral disorder with multiple possible etiologies

Etiology

- Neuroanatomic
- Neurochemical
- CNS insults
- Genetic origins
- Environmental factors

Core Symptoms

- Inattention
- Impulsivity
- Hyperactivity
ADHD: DSM-IV Criteria

- Six or more of the following symptoms that are manifested frequently: **Inattention**
  - Inattention to details/makes careless mistakes
  - Difficulty sustaining attention
  - Seems not to listen
  - Fails to finish tasks
  - Difficulty organizing
  - Avoids tasks requiring sustained attention
  - Loses things
  - Easily distracted
  - Forgetful

ADHD: DSM-IV Criteria

- Six or more of the following symptoms that are manifested frequently: **Impulsivity/Hyperactivity**
  - Blurs out answer before question is finished
  - Difficulty awaiting turn
  - Interrupts or intrudes on others
  - Fidgets
  - Unable to remain seated
  - Inappropriate running/climbing (restlessness)
  - Difficulty in engaging in leisure activities quietly
  - “On the go”
  - Talks excessively

Variation in Symptoms

- Pervasiveness
- Frequency of Occurrence
- Degree of Impairment
ADHD: DSM-IV Subtypes

- ADHD Predominately Inattentive Type
- ADHD Predominately Hyperactive-Impulsive Type
- ADHD Combined Type
- MRIs have demonstrated anatomic brain changes in patients with ADHD, i.e. smaller right frontal area

Pharmacologic Management of ADHD

- Stimulant Therapy
- Methylphenidate (Ritalin & Concerta)
- Amphetamine/Detroamphetamine (Adderall XR)
- Daytrana (methylphenidate transdermal patch) – applied to hip area. Worn for 9 hours; relieves symptoms for 3 hours after it is removed.

Newer Agent – Not FDA Controlled

- Atomoxetine (Strattera)
Common Side Effects

- Stomach pain
- Anxiety
- Irritability
- Insomnia
- Tachycardia
- Cardiac dysrhythmias
- Dysphoria
- Hypertension
- Palpitations
- Decreased appetite

Other Drugs

- Gabapentin (Neurontin)
- Tiagabine (Gabatril)
- Topiramate (Topamax)
- Lamotrigine (Lamictal)

These drugs are utilized primarily for the treatment of mania.

Gabatril and Neurontin are also effective for controlling and relieving neuropathic pain.

Side Effects

- Diplopia
- Visual changes
- Gastrointestinal problems
- Nausea
- Drowsiness
- Ataxia (staggering gait)
- Blurred vision
- Dizziness
- Headache
- Vomiting
- Skin rash
Side Effects

- Peripheral edema
- Myalgias
- Nystagmus
- Topamax causes weight loss

Professional Issues

Al Rundio, PhD, DNP, RN, CARN-AP, APRN-BC
Legal Issues in Health Care

- The Definition of Law
- Types of Law
  - Public v. Private
  - Criminal v. Non-Criminal
  - Case v. Code-Based

Legal Terminology

- Res Judicata
- Stare Decisis
- Respondeat Superior
- Charitable Immunity
- Res Ipsa Loquitur
- Tort
Tort
- Law includes negligence and professional negligence
- Law protects others from unreasonable & foreseeable risks of harm
- A civil wrong other than breach of conduct
- Law provides a remedy for injured person to seek damages

Anatomy of a Malpractice Case
- Duty to Provide Care
- Breach the Duty
- A Tort is Committed
- An Untoward Outcome Results
- Events Were Foreseeable

Standards of Care
- Regional
- National
Contracts

- Verbal
- Written
- Implied
- Informed Consent

Ethics Definition

- Ethics is a discipline in which one attempts to identify, organize, analyze, and justify human acts by applying certain principles to determine the right thing to do in a given situation

Ethical Premise for Nursing Practice

- Help Regain Health
- Help Maintain Health
- Help Attain a Maximum Potential
- Help the Dying
Ethical Definitions

- Autonomy – Freedom to be self-regulating
- Fidelity – Duty to be faithful & loyal and honor promises made
- Justice – Fairness & Equity
- Beneficence – Duty to be a patient advocate
- Nonmaleficence – Duty to provide care without intentional or unintentional harm
- Veracity - Truthfulness

Landmark Cases

- Karen Ann Quinlan
- Nancy Ellen Jobes
- Nancy Beth Cruzan – PSDA of 1990
- Terri Schiavo

Nancy Beth Cruzan Tombstone
Scopes and Standards of Practice

- **Scope and Standards of Practice**: Standards of practice published by the American Nurses Association and other professional organizations

- Describes standards, practice settings, professional conduct and role

  - Clinician
  - Educator
  - Consultant
  - Collaborator
  - Researcher

- Does not confer authority to perform acts or prescribe
- Must refer to respective State Board of Nursing

Health Care Systems

- Per diem payment
- DRGs/Prospective Payment
- Medicare – 1965, Parts A, B & D
- Medicaid – 1965 Title XIX
- Managed Care
- Capitation
- HMOs
- PPOs
- IPAs
- Case Management

PhD versus DNP

Al Rundio, PhD, DNP, RN, CARN-APAPRN-BC
Overview of DNP Program

- Commission on Collegiate Nursing Education (CCNE)
- The 8 Essentials of Doctoral Education for Advanced Nursing Practice (AACN, 2006)
- Practice-focused doctoral program
- Prepare experts in specialized advanced nursing practice
- Evidence-based practice

Comparing the DNP and PhD Roles

**DNP**
- Practice-focused
- Integrative practice experiences
- Intense practice immersion
- DNP Capstone

**PhD**
- Research-focused
- Theory, methodology, statistics
- Knowledge generating research
- Dissertation

Similarities-DNP & PhD

- Access and critical analysis of the literature
  - Knowledge of methodologies, statistics
- Rigorous and demanding expectations
- Scholarly approach to the discipline
- Advancement of the profession
  - Dissemination of experiences and findings
  - Strong writing skills are ESSENTIAL
AACN DNP Essentials

- Applies interprofessional collaboration concepts for improving patient and population health outcomes.
- Synthesizes nursing research and integration of best practice for change in professional practice based on scientific underpinnings for practice.
- Integrates clinical scholarship and analytical methods for evidence-based practice.
- Impacts health care outcomes through clinical prevention and population health for improving the nation’s health.

AACN DNP Essentials

- Integrates nursing science as the basis for the highest level of nursing practice.
- Develops and evaluates new practice approaches based on nursing theories and theories borrowed from other disciplines.
- Provides clinical nursing change through organizational and systems leadership for quality improvement and systems thinking.
- Utilizes information systems/technology and patient care technology to improve and transform health care.

Components of EBP
DNP

- PICOT Format for Practice Capstone Project

- **P** Patient/Population
- **I** Intervention
- **C** Comparative Group/Intervention
- **O** Outcome
- **T** Time Frame

Clinical-Defined

- Those experiences that students engage in as they develop expertise and transition to achieve DNP student learning outcomes.
Clinical Experiences
- Gaining/applying advanced skills in a clinical setting
- Linking policy making within clinical systems or organizations
- Translating evidence-based research into practice through policy or practice innovation
- Serving as change agents in health care delivery settings

Clinical Experiences?

The Capstone Project
- Design, implement, and evaluate an evidence-based practice change project
- Identify problem of interest
- Critical review of the evidence
- Design a practice change project
- Implement the project
- Evaluate effectiveness
- Dissemination of project-manuscript
- Identify implications for nursing practice
- Prepare a written capstone

Examples of EBP Projects
- Substance Abuse: Evidence-Based Detoxification Protocols for Medical & Nursing Management
  © 2008 Rundio
- Evidence-Based Interventions to Reduce Medication Errors in the Acute Care Hospital Environment
  © 2010 Rundio
THANKS FOR YOUR ATTENTION

BEST WISHES FOR YOUR SUCCESS

Questions

• That’s All Folks!!!
That's All Folks!!

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THE END