

Alcohol Use and Abuse

Targeted Communities

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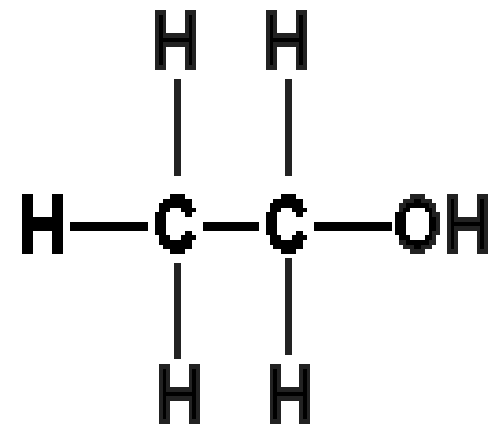
Alcohol Research Center





Alcohol

- Fermented grain, fruit juice and honey have been used to make alcohol (ethyl alcohol or ethanol) for thousands of years



Structure of Ethanol

In the United States:

- ☐ 18 million Americans suffer from alcohol abuse or dependence**
- ☐ 100,000 alcohol-related deaths annually**
- ☐ One in four children under age 18 is exposed to family alcohol problems**
- ☐ Between 20%- 40% of hospital admissions are alcohol-related**
- ☐ Alcohol problems cost U.S. society an estimated \$185 billion annually**

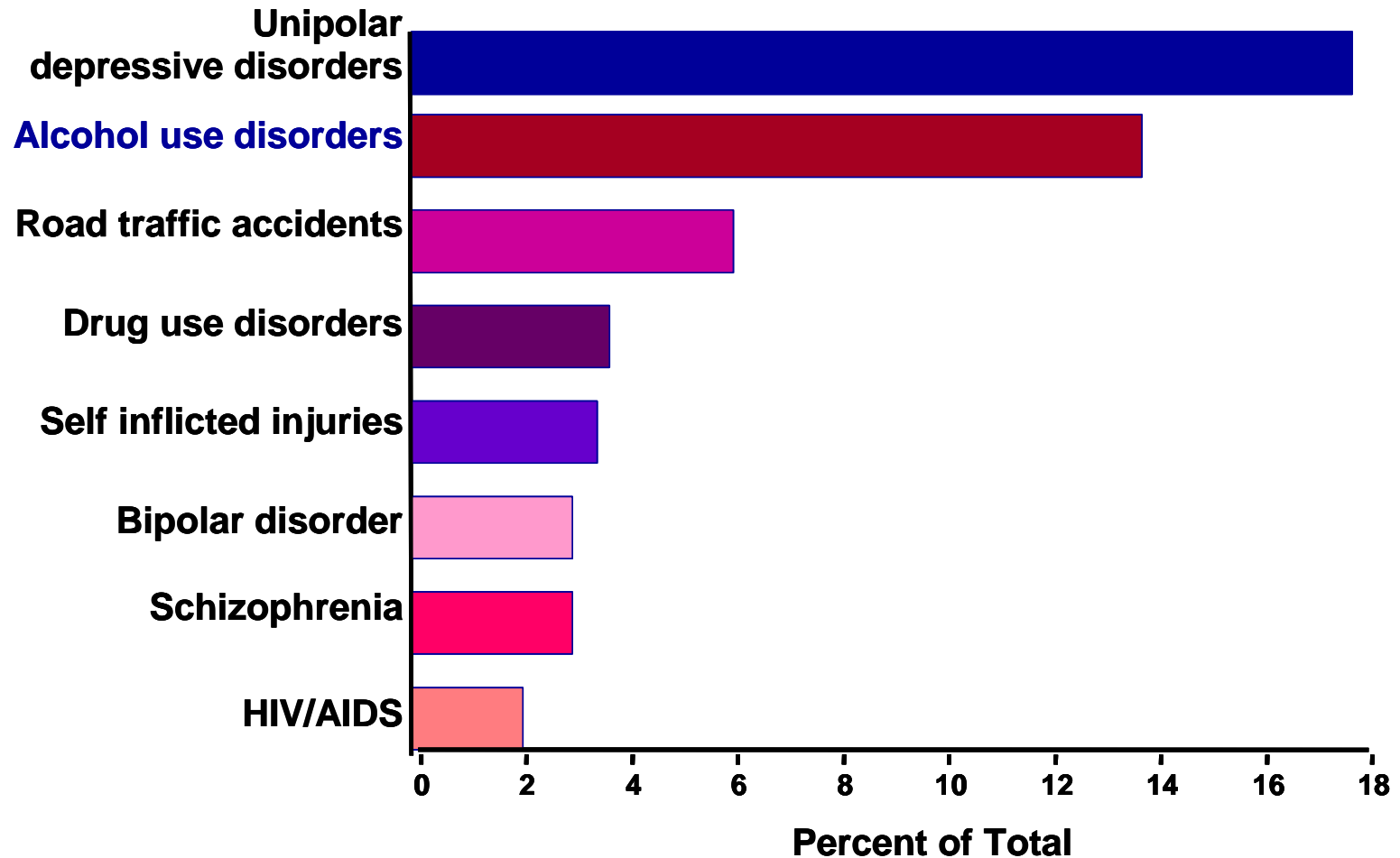
Alcoholism

Definition:

Alcoholism is a chronic relapsing and progressive disease with symptoms that include alcohol craving, impaired control, physical dependence and tolerance. Drinking continues despite repeated alcohol related problems. It has a generally predictable course, has recognized symptoms and is influenced by both genetic and environmental factors

NIAAA

Disease Burden by Illness - United States, Canada and Western Europe, 2000 15 - 44 year olds



Source: WHO – Burden of Disease Statistics, 2001

Causes of Disability by Illness Category

United States and Canada
all ages

**Percent of Total Years
Lost to Disability**

Mental Illness*	26.1
Alcohol and drug use	11.5
Respiratory disease	7.6
Musculoskeletal disease	6.8
Sense organ disease	6.4
Cardiovascular disease	5.0
Alzheimer's and other dementia	4.8
Injuries, including self-inflicted	4.7
Digestive diseases	3.4

Psychiatric Comorbidity with Substance Use Disorders

<u>Disorder</u>	<u>% w/ Substance use disorder</u>
Schizophrenia	47
Major Depression	17
Bipolar	56
Panic	36
Any anxiety	36
PTSD	30-50
ADHD	23
Antisocial Personality	60-80

Why Some People Drink/Do Not Drink

- **Reinforcing Effects**

 - Positive**

 - Negative**

- **Aversive Effects**

- **Peer/Cultural Influences**

Negative Reinforcement

tension reduction
stress dampening

The Self-Medication Hypothesis

Drinking to obtain relief from:

stress

anxiety

depression

dysphoria

Why Some Drink More Than Others

- Individual differences in:
 - metabolism
 - “level of response” to alcohol
 - neuroadaptation (tolerance and/or sensitization with chronic drinking)
- Differences in environmental exposure
 - cultural and peer influences (expectancies)

High-Risk Drinking

Drinking that results in:

- *Personal harm, psychological and/or physical*
- DSM-IV-TR *Alcohol Abuse* diagnosis
- DSM-IV-TR *Alcohol Dependence* diagnosis



???



How much is too





much

???



A “Standard” Drink

WHAT IS A STANDARD DRINK?

1 Standard Drink	1 shot of liquor (whiskey, vodka, gin, etc.) 1.5 oz.	1 regular beer 12 oz.	1 glass of wine 5 oz.
	 or 	= 	= 

Each of these drinks has about ½ oz. of pure alcohol.

HOW MUCH IS TOO MUCH?

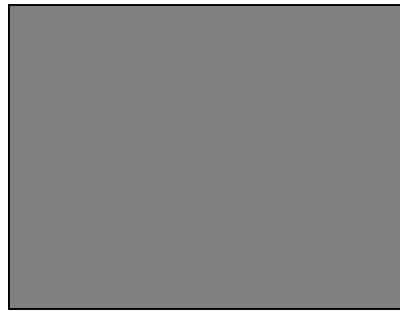
If you drink more than this you can put yourself at risk for illness and/or injury:

MEN > 14 DRINKS PER WEEK OR > 4 DRINKS PER OCCASION

WOMEN > 7 DRINKS PER WEEK OR > 3 DRINKS PER OCCASION

AGE over 65 > 7 DRINKS PER WEEK OR > 1 DRINK

Alcohol Metabolism

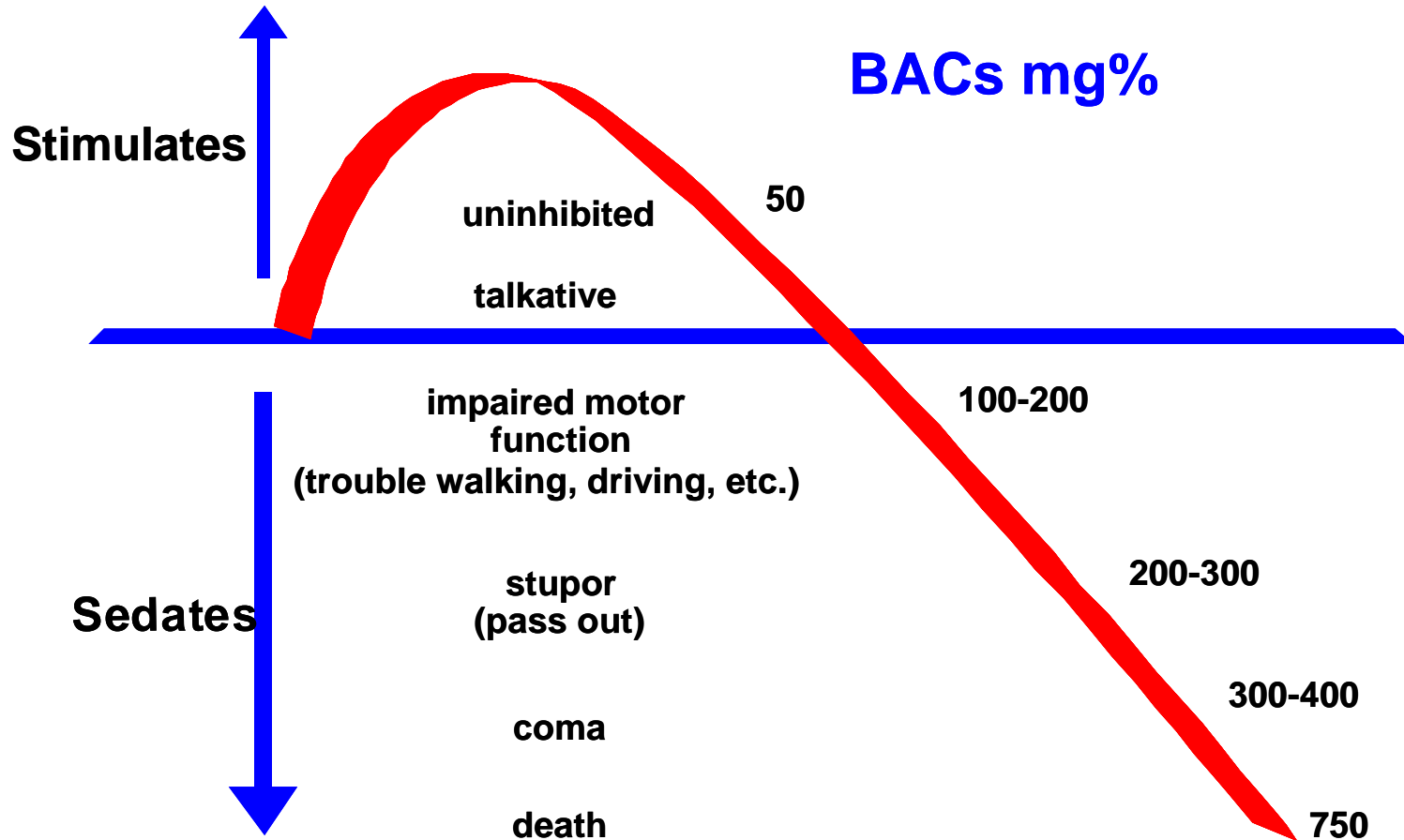


CO_2
 H_2O
E

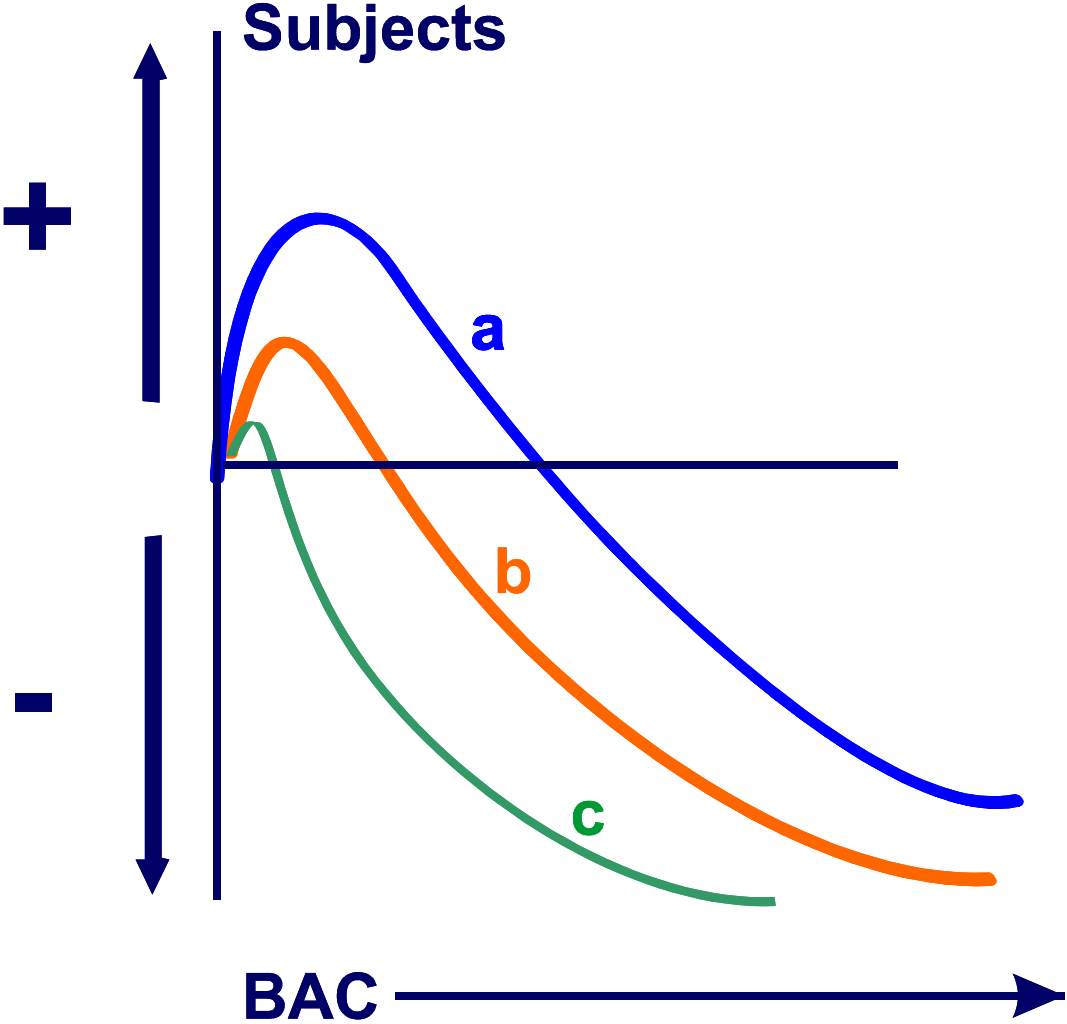


Tissue Damage

Pharmacodynamic Effects on Central Nervous System



Individual Variation in Response to Alcohol



Between Individual Variations in Responses to Alcohol

? Pharmacokinetics: absorption, distribution, and metabolism of alcohol

3-4 fold

? Pharmacodynamics: subjective and objective responses to alcohol

2-3 fold

Concentration-Effect Relationship

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

U.S. Drinking Patterns

2001-2002

	Percent of U.S. adults aged 18+	Abuse without dependence	Dependence with or without abuse
Exceeds <i>only</i> the daily ¹ limit less than once a week	16%	1 in 8 (12%)	1 in 20 (5%)
Exceeds <i>only</i> the daily limit once a week or more	3%	1 in 5 (19%)	1 in 8 (12%)
Exceeds <i>both weekly</i> ² and daily limits	9%	1 in 5 (19%)	more than 1 in 4 (28%)

¹Daily: 4 drinks (men); 3 drinks (women)

²Weekly: 14 drinks (men); 7drinks (women)

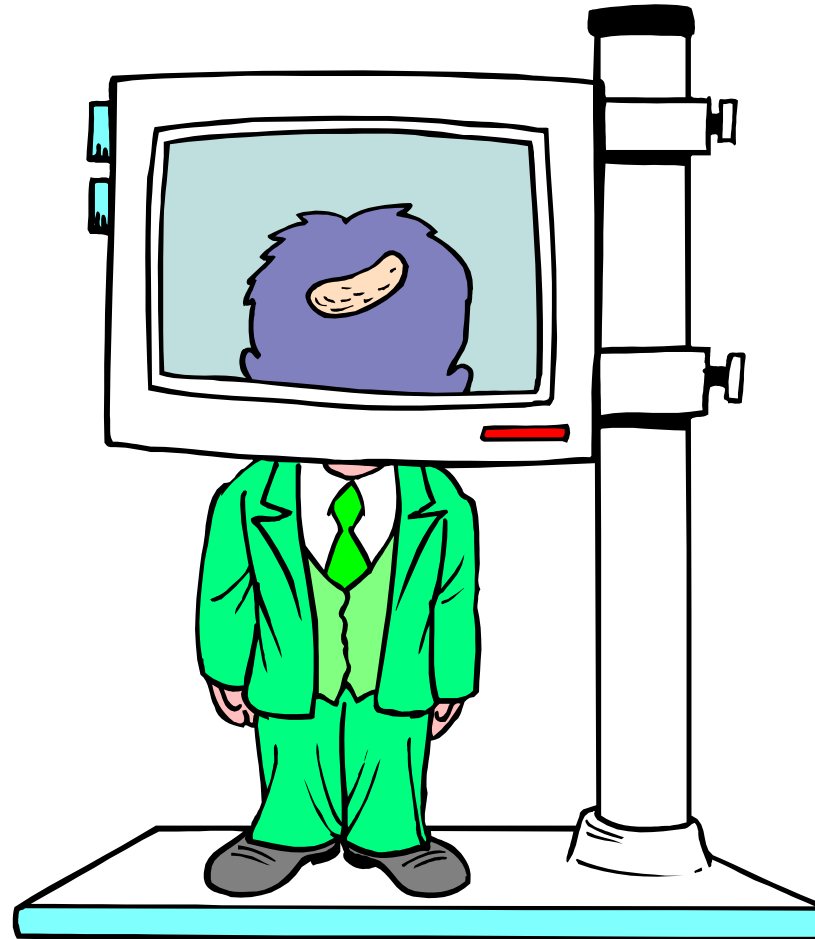
Biological Measures of Alcohol Use

*** There is NO diagnostic test for Alcoholism**

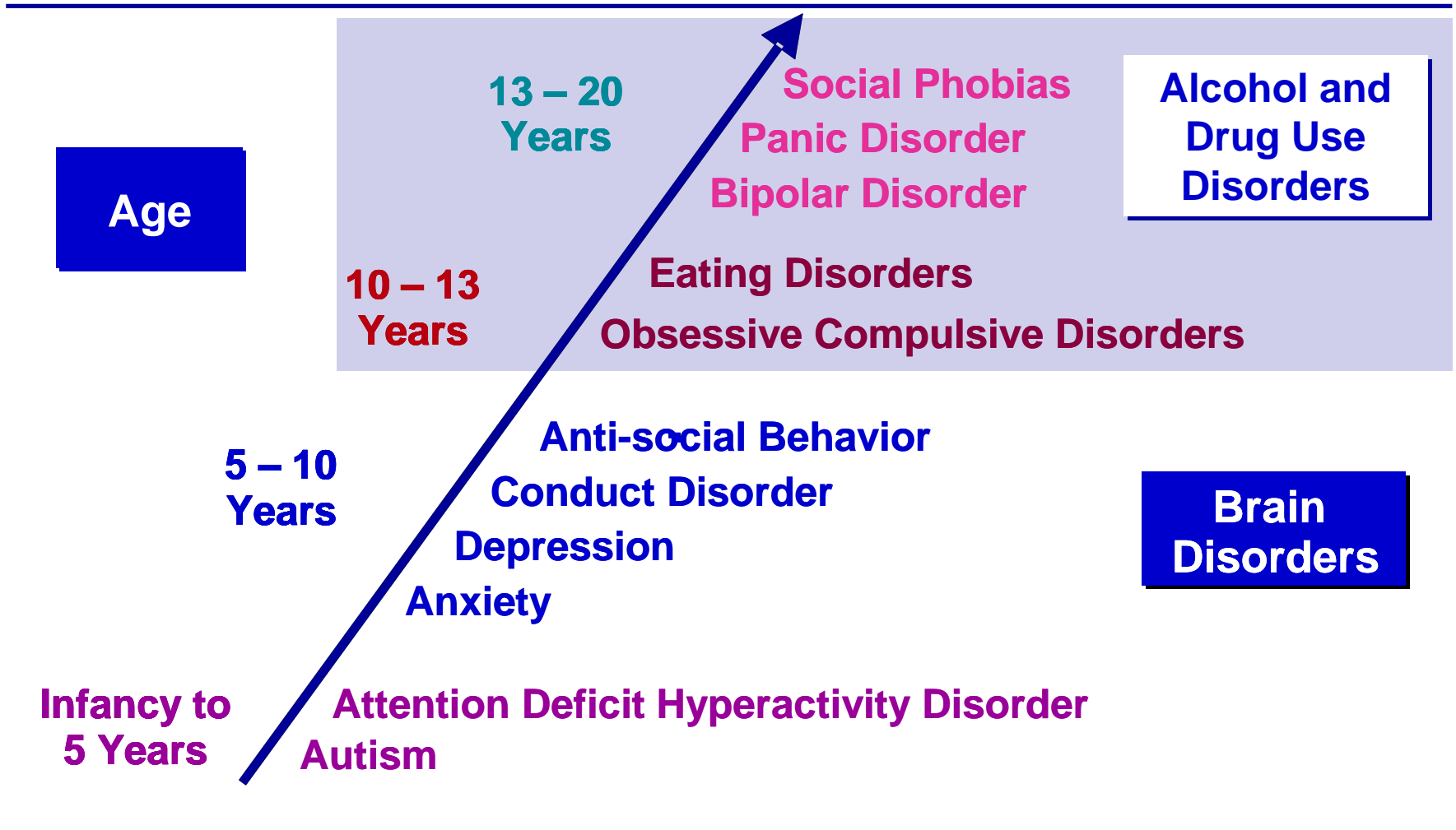
- Blood Alcohol Level/Breathalyzer
- MCV (Mean Corpuscular Volume)
- GGT (Gamma-Glutamyl Transferase)
- CDT (Carbohydrate-Deficient Transferrin)
- Urine Toxicology Screens



Effects of Alcohol on the Nervous System

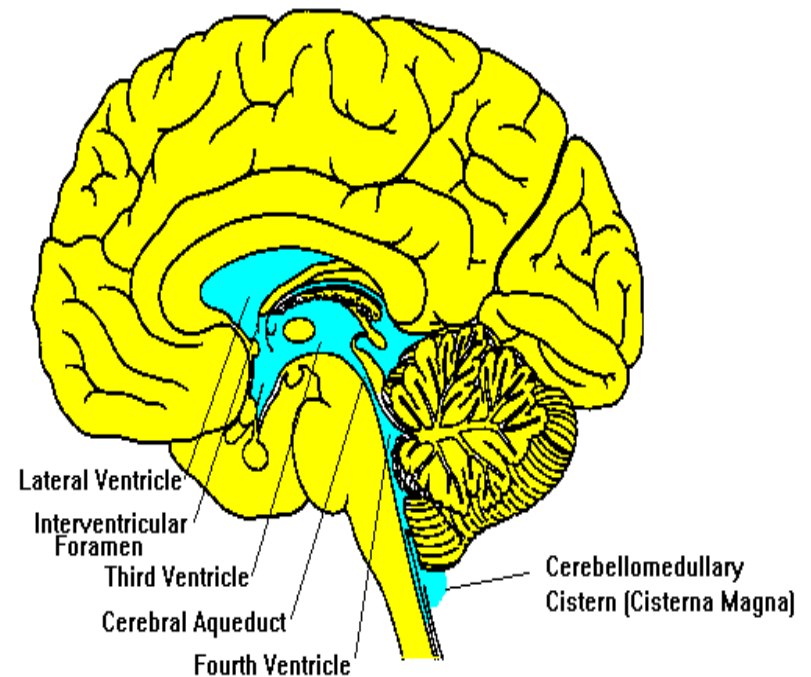


Age of Onset of Brain Disorders



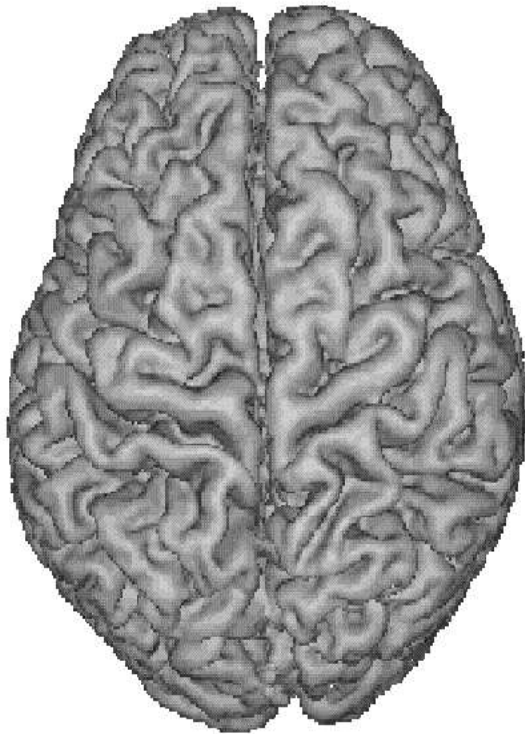
Chronic alcohol use can:

- Damage the frontal lobes of the brain.
- Cause an overall reduction in brain size and increase in the size of the ventricles.
- Lead to alcoholism and variety of health problems.
- Cause a vitamin deficiency.

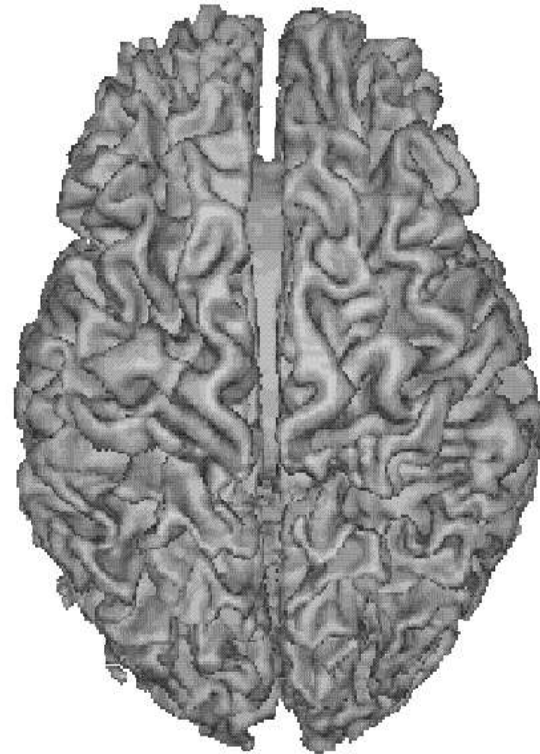


Alcohol's Effects on Brain Structure

Control



Alcoholic



Courtesy A. Pfefferbaum

Wernicke-Korsakoff Syndrome

- Neurological symptoms include confusion, memory loss, impaired movements, double vision, and blackouts.
- Immediate administration of thiamine is usually successful in treating the symptoms, but sometimes permanent memory loss occurs.

Wernicke, Carl

1848-1904



Korsakoff,

1853-1900



С. Корсаков



Alcohol Use



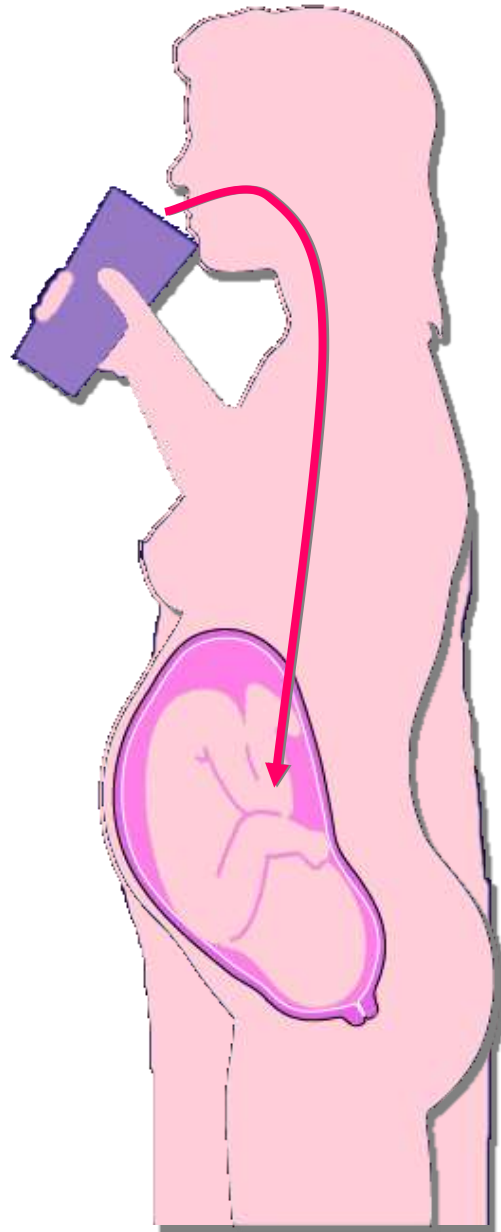
- Psychological Effects
- Fetal Alcohol Syndrome (FAS)
- Alcohol Diagnosis

Psychological/Physical Effects

- More Talkative
- Relaxed
- Focus of attention is limited
- Alcoholic myopia
- Vision blurred
- Hearing less acute
- Motor control decreased



When a mother drinks, her unborn child is exposed to alcohol.



Alcohol-Related Birth Defects

Include:

- **Fetal Alcohol Syndrome (FAS)**
which is characterized by
 1. mental retardation
 2. low birth weight and height
 3. typical facial features
- **Fetal Alcohol Effects (FAE)**
which result from maternal alcohol abuse
but are found in the absence of the full-blown syndrome

Fetal Alcohol Syndrome

- Marked by retardation
- Hyperactivity
- Facial deformities
- Heart defects
- Organ malfunctions



Facial Features

Discriminating Features

Short palpebral fissures

Flat midface

Short nose

Indistinct philtrum

Thin upper lip



Associated Features

Epicanthal folds

Low nasal bridge

Minor ear anomalies

Micrognathia





Children with alcohol-related birth defects typically have:

- attention deficits**
- language difficulties**
- learning disabilities**
- impulsive behavior**
- poor judgment**



The facial features of Fetal Alcohol Syndrome can be seen in both a child and a mouse fetus that were exposed to alcohol during development.

child with FAS



Narrow forehead

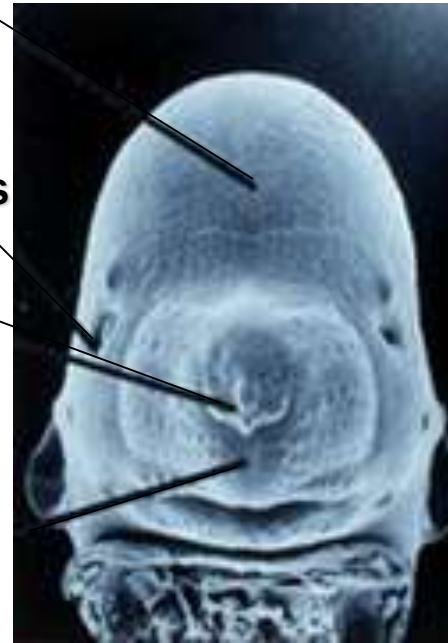
Short palpebral fissures

Small nose

Small midface

Long upper lip with deficient philtrum

mouse fetuses



alcohol-exposed

normal

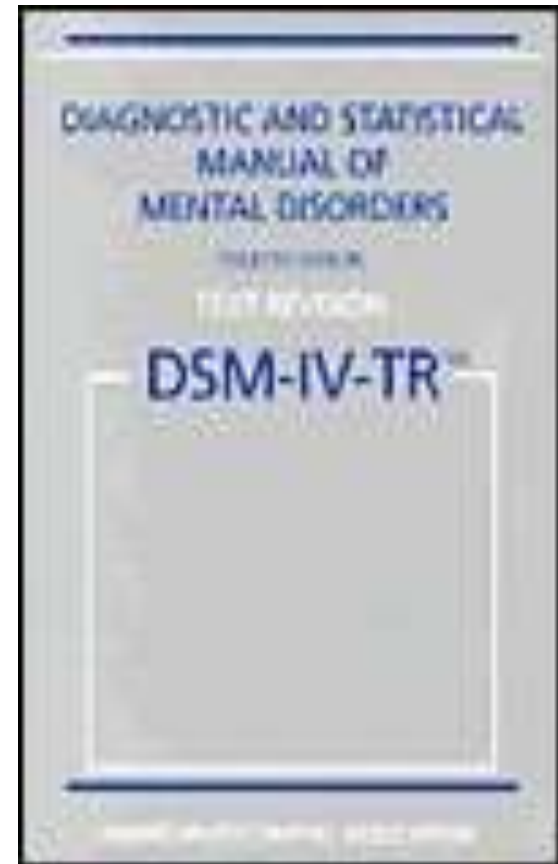
Alcohol Disorders

- Recognize the problem
- How do you make a diagnosis?



Diagnostic and Statistical Manual of Mental Disorders DSM-IV-TR (Text Revision)

- Diagnostic Criteria for the most common mental disorders including: description, diagnosis, treatment, and research findings.



DSM-IV-TR Alcohol Abuse

(1 or more criteria for at least 1 year)

- Role Impairment (e.g. failed work or home obligations)
- Hazardous use (e.g. Driving while intoxicated)
- Social or interpersonal problems due to alcohol
- Legal problems related to alcohol use



DSM-IV-TR Dependence

(3 or more criteria for at least 1 year)

- 1. Tolerance***
- 2. Withdrawal***
- 3. Larger amounts/longer period than intended**
- 4. Inability to, or persistent desire to, cut down or control**
- 5. A great deal of time spent obtaining, using, or recovering**
- 6. Important activities given up or reduced**
- 7. Use despite problems caused or exacerbated by use**

***Dx: “with Physiological Dependence”**

Treatment

- Pharmacotherapy
- Behavioral therapies



Behavioral Therapy Treatment of Alcohol Use Disorders

- Alcoholics Anonymous (AA)
- Cognitive Behavioral Therapy (CBT)
- Group Therapy
- Brief Intervention / “at-risk” drinkers only

Other Treatments

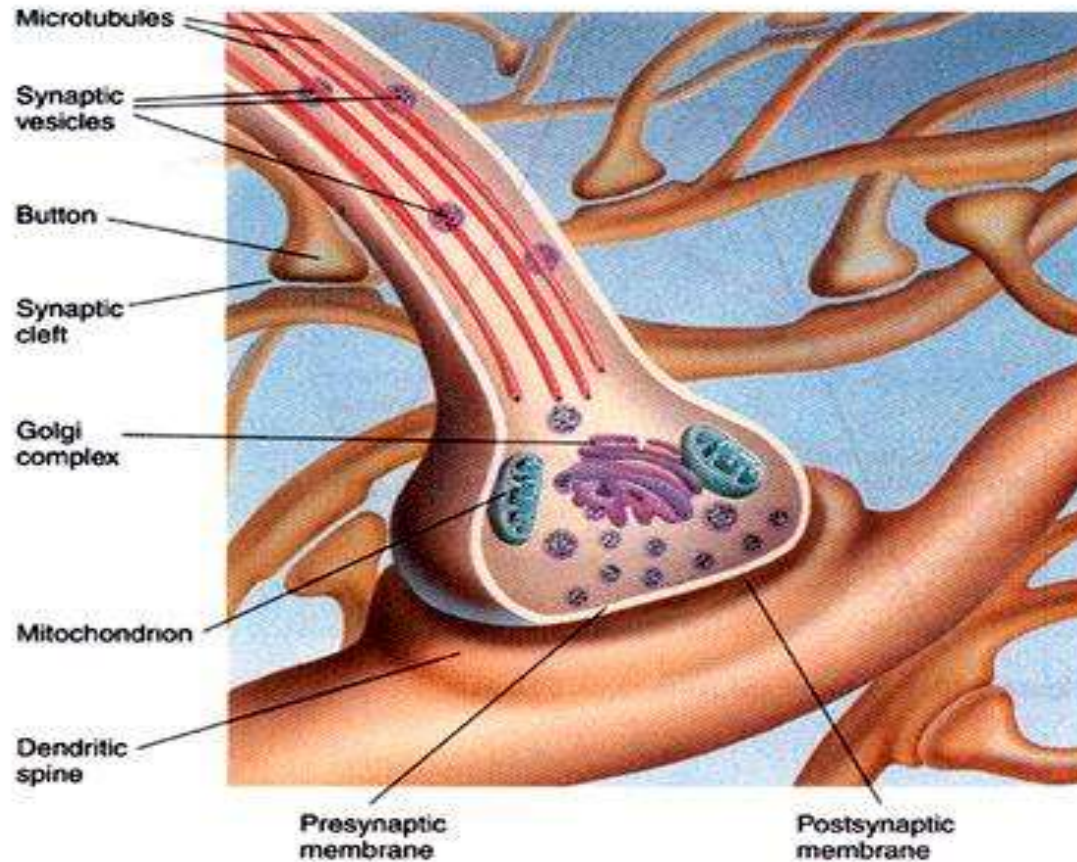
- Detoxification
- Residential
- Intensive Outpatient
- Half-Way Houses



Pharmacotherapy Treatment of Alcoholism

- **Acamprosate / Campral**
- **Naltrexone / ReVia**
- **Antabuse / Disulfiram**

Synaptic Physiology Review



Neurobiological factors

- GABA system – alcohol may serve its anxiolytic (anti-anxiety) function
- Serotonin system – alcohol appears to dampen effects
- Dopamine system – alcohol has its rewarding/pleasurable effects
 - One version of the D2 receptor gene more common among alcoholics than controls

Ethanol

- **Moderate doses**
 - *Facilitates GABA_A Receptors*
 - Dangerous additive effects with BZ and barbiturates
 - *Cognitive deficits and psychotic symptoms*
 - Due to Inhibition of NMDA Glutamate Receptors?
 - *Potentialiation of Serotonin Receptors (ion channel)*
- **High doses**
 - *CNS-depressant effect can lead to coma and death*
 - *Inhibits most ion channels*
 - *General effect on cell membrane*

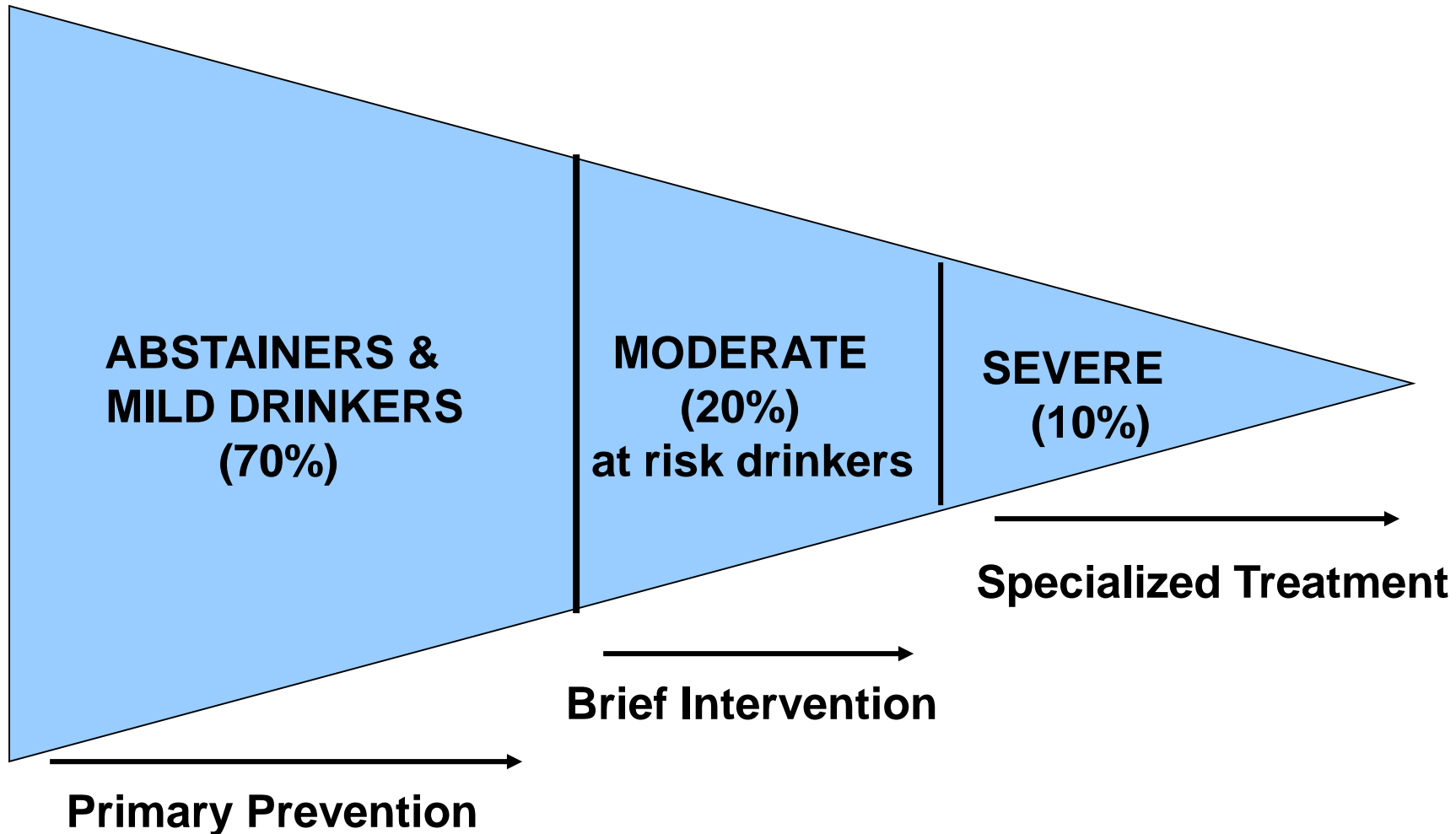
Nonbarbiturate Sedatives - Ethanol (Continued)

- **Chronic large doses causing gastritis, cirrhosis, malnutrition**
 - Excess NADH from Alcohol Dehydrogenase (ADH):
 - Oxidative stress in liver
 - Blocked gluconeogenesis
 - Inhibited fatty acid utilization
 - Increased O₂ utilization
 - Decreased respiration reduces O₂ causing necrosis
 - Increased activity of Na⁺/K⁺ATPases causes gastritis

Current Pharmacological Agents for Treatment of Alcohol Dependence

- BZD, Anti-Seizure Medications, Anti-Hypertensive Medications for Withdrawal
- Disulfiram/Calcium Carbamide
- Naltrexone (ReVia)
- Acamprosate (Amino Acid Derivative)-Mimics GABA_A Receptor/Amino Acid derivative
- Ondansetron-SHT₃ antagonist

UNIVERSAL SCREENING WIDENS THE NET



Alcohol Screening

NASD National Alcohol Screening Day®

SCREENING FORM

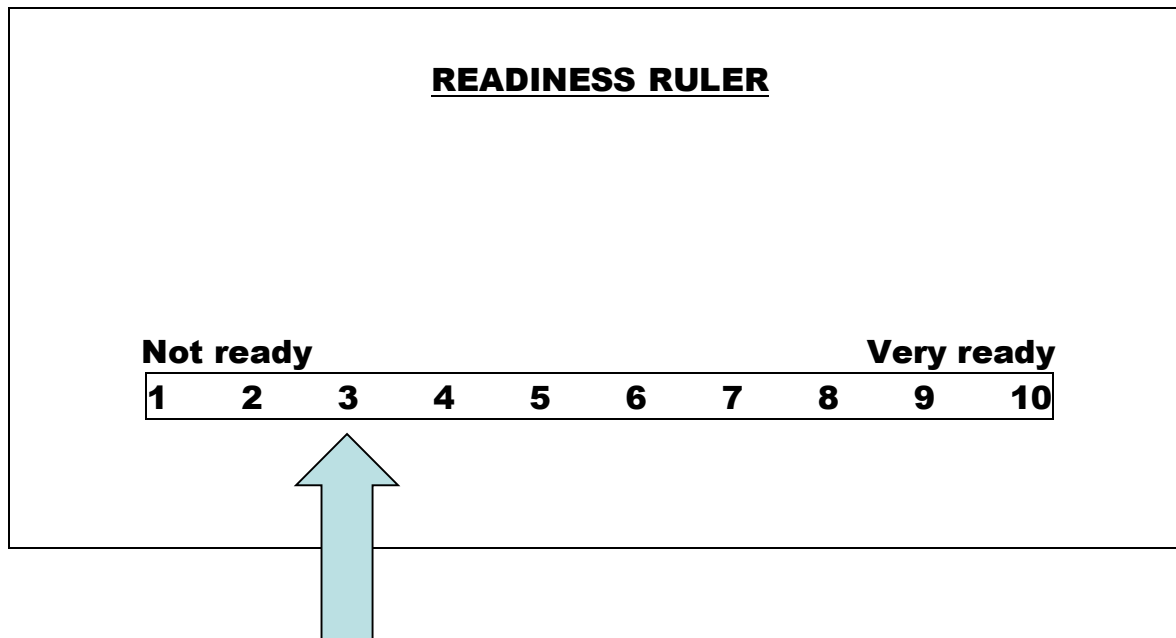
PART I.	
A. Sex	<input type="radio"/> Male <input type="radio"/> Female
C. Ethnic/Racial Group: (check all that apply)	<input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Hispanic or Latino <input type="checkbox"/> Asian <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> Black or African American <input type="checkbox"/> White
B. Age	<input type="text"/> <input type="text"/>
PART II.	
<i>For the next 7 questions, check the box that best describes your answer for the period covering the past 12 months.</i>	
1. On average, how many days a week to you drink alcohol (for example: beer, wine or liquor)?	<input type="radio"/> None <input type="radio"/> Less than 1 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
2. On a typical day when you drink, how many drinks* do you have? <small>*A drink is defined as one 12-ounce bottle of beer or wine cooler, one 5-ounce glass of wine, or 1.5 ounces of distilled spirits.</small>	<input type="radio"/> None <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 <input type="radio"/> 10 <input type="radio"/> 11 <input type="radio"/> 12+
3. What is the maximum number of drinks you had on any given day in the past month?	<input type="radio"/> None <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 <input type="radio"/> 10 <input type="radio"/> 11 <input type="radio"/> 12+
4. Have you ever felt that you should cut down on your drinking?	<input type="radio"/> Yes <input type="radio"/> No
5. Have people annoyed you by criticizing your drinking?	<input type="radio"/> Yes <input type="radio"/> No
6. Have you ever felt bad or guilty about your drinking?	<input type="radio"/> Yes <input type="radio"/> No
7. Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover?	<input type="radio"/> Yes <input type="radio"/> No
PART III.	
8. Are you taking any medication (over-the-counter or prescription)? <small>If yes, have you been told by your doctor or pharmacist that alcohol may interact with one of your current medications (over-the-counter or prescription)?</small>	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No
9. At any time in his/her life, has your father, mother, sister or brother ever been an alcoholic or problem drinker?	<input type="radio"/> Yes <input type="radio"/> No
10. For women: Are you pregnant, breastfeeding or planning a pregnancy?	<input type="radio"/> Yes <input type="radio"/> No
11. Alcohol Treatment History: (check all that apply) <input type="checkbox"/> I am currently being treated for an alcohol problem <input type="checkbox"/> I was treated in the past for an alcohol problem <input type="checkbox"/> I have never been treated for an alcohol problem	
12. Do you have a medical or mental health condition? <small>If yes, have you been told by your doctor that a current medical or mental health condition might be affected by drinking alcohol?</small>	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No
13. During the past 12 months, have you driven when you've had perhaps too much to drink?	<input type="radio"/> Yes <input type="radio"/> No
14. Have you or has someone else been injured as a result of your drinking? <input type="radio"/> No <input type="radio"/> Yes, but not in the last year <input type="radio"/> Yes, during the last year	
<i>Please return this form to the administrator or your clinician. Thank you!</i>	
Screening Recommendation - To be filled out by clinician <input type="checkbox"/> No follow-up <input type="checkbox"/> Advised talking with health provider <input type="checkbox"/> Outpatient referral <input type="checkbox"/> Advised reducing drinking levels <input type="checkbox"/> Inpatient referral <input type="checkbox"/> Advised to stop drinking	

Screening Recommendation:

- Advised talking to health provider
- Advised reducing drinking levels
- Advised to stop drinking
- Outpatient Referral
- Inpatient Referral
- No-Referral

Screening, Brief Intervention, Referral to Treatment

- Assess “**Readiness to Change**”



Remember that a “standard drink” consists of:

A mug of
ordinary
beer, ale, or
malt liquor
12 oz.



A single shot
of spirits --
whiskey, gin,
vodka, etc.
1.5 oz.



A glass
of wine
5 oz.



A wine cooler
12 oz.



A small glass
of sherry,
liqueur, or
aperitif
4 oz.



The Psychology of Alcohol Advertising







one tequila,

two tequila,

three tequila,

four.

five tequila,

six tequila,

seven tequila,

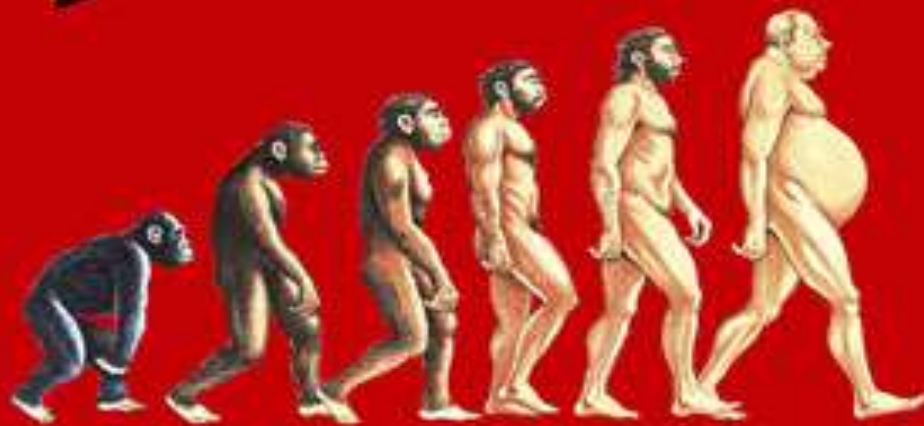
floor



► For fast relief of ugly dates, lame parties, boredom, stress, hangovers, cottonmouth or any prolonged exposure to academic endeavors.

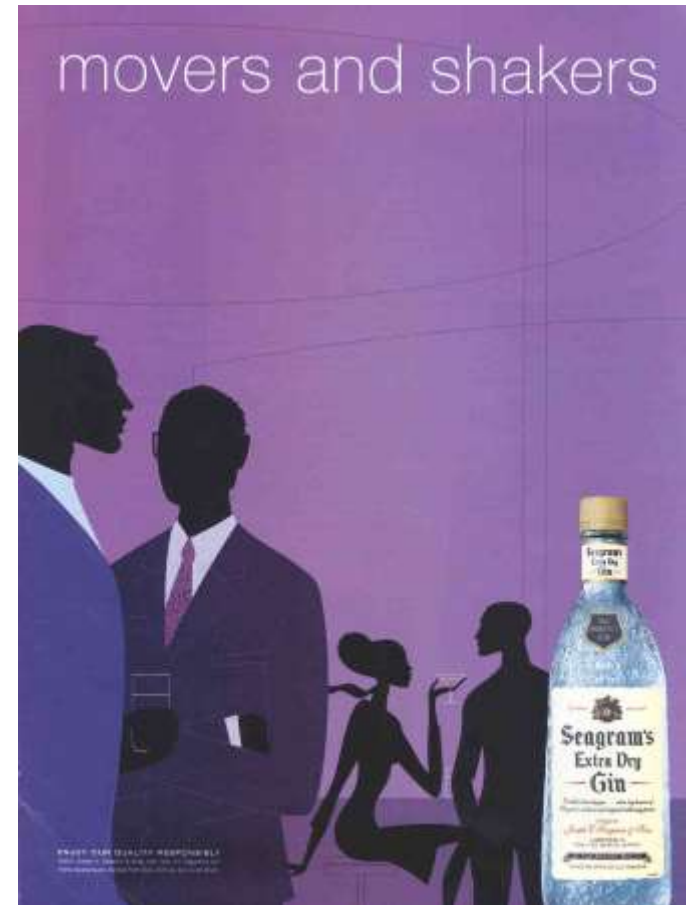


BEER!



Honour your ancestors, they drank it too.

Target Communities







DO NOT DISTURB

Blood Alcohol Experiment In Progress

Scoring Questions 1 - 3

ASK	IF YOU RECEIVE THESE ANSWERS		THEN
<p>Weekly Average</p> <p>Multiply the answers to the following two questions.</p> <p>a. How often? On average, how many days a week do you drink alcohol? <input type="text"/></p> <p>b. How much? On a typical day when you drink, how many drinks do you have? <input type="text"/></p> <hr/> <p style="text-align: right;">= <input type="text"/></p>	<p>FROM MEN</p> <p></p> <p>more than 14</p>	<p>FROM WOMEN</p> <p></p> <p>more than 7</p>	<p>Your patient may be at risk for developing alcohol-related problems.</p> <p>go to step 1B CAGE Questions</p>
<p>Daily Maximum</p> <p>How much? What is the maximum number of drinks you had on any given day in the past month? <input type="text"/></p>	<p>more than 4</p>	<p>more than 3</p>	