Geriatric Behavioral Health Conference

Substance Use Disorders and the Brain In the Geriatric Population

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Geriatric Behavioral Health Conference

DISCLOSURE

- **Dr. Davids and Dr. Patel do not have any financial relationships with commercial interest companies to disclose.**
- **We will not be discussing off-label use of a commercial product.**

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Geriatric Behavioral Health Conference

Learning Objectives

- Define Substance Use Disorders
- Understand ways in which to screen substances use disorders in the geriatric population
- Common substances of misuse
- Treatment of substance use disorders in the geriatric population

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What is a Substance Use Disorder? Per DSM-5

- **Impaired Control**
  - larger amounts or for longer then intended
  - Unsuccessful efforts or desire to cut back or control substance use
  - Excessive amount of time spend obtaining, using or recovering from its effects
  - Craving- Intense desire/urge for substance

Social Impairment

- Failure to fulfill major role obligation at work, school or home as a result of recurrent use
- Continue use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by effects of sub
- Imp social, occupational or recreational activities given up or reduced because of sub use.

Risky Use

- Sub use in physically hazardous situation
- Continued Substance use despite knowledge of persistent physical or psychological problem that is likely caused by substance.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

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DSM-5 Continued

Pharmacological criteria

- **Tolerance** as demonstrated by increased amounts of substance needed to achieve desired effect; diminished effect with continued use of the same amount.
- **Withdrawal** as demonstrated by symptoms of specified substance withdrawal syndrome
  - Blood or tissue concentrations of a substance decline in an individual who had maintained prolonged heavy use of the substance. After developing withdrawal symptoms, the individual is likely to consume the substance to relieve the symptoms

- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing

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DSM-5 Continued

- Pathological pattern of behaviors
- 12 month period
- At least 2 out of 11 items (any of the 4 following categories)
- Mild (2-3), Moderate (4-5) or Severe (6+)
- Specifiers
  - Early remission (3-12mo)
  - Sustained remission (12+ mo)
  - Maintenance therapy
  - In a controlled environment

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DSM-5 Continued

- Mild: 2-3 symptoms
- Moderate: 4-5 symptoms
- Severe: 6 or more symptoms

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Question

Diagnosis of substance use disorder is divided in to 4 criteria. What criteria are needed?

A. Impaired control
B. Social Impairment
C. Risky use
D. Pharmacological Criteria
E. At least 2 out of 11 items (any of the 4 following categories)

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Substance Use Disorders in the Geriatric Population are often overlooked

- Patients are stereotyped as young
- Providers may be embarrassed to ask
- Patients may fear judgment and under report their use
- The baby boom generation is unique in its exposure to, attitudes toward, and prevalence of substance use. We should expect the rates of substance use to increase over the next twenty years.

Source: Kuerbis A, Sacco P, Blazer DG, Moore AA. Substance abuse among older adults. Clin Geriatr Med. 2014 Aug;30(3):629-54. doi: 10.1016/j.cger.2014.04.008. Epub 2014 Jun 12. PMID: 25037298; PMCID: PMC4146436.

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Waves of Change

- In1900, individuals aged 65 years and older made up 1% of the global population, that proportion is estimated to top 20% in 2050

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Why should we be concerned?

- Ongoing, undiagnosed substance use further complicates co-occurring medical problems
- Patients are at higher risk for falls and delirium
- Substance use worsens co-occurring psychiatric diagnosis and may increase the risk of suicide
- Older adults take more prescribed and over-the-counter medications than younger adults, increasing the risk for harmful drug interactions and misuse

Kennedy GJ, Ehrenova I, Frazier A, et al. The emerging problems of alcohol and substance abuse in late life. J Soc Distress Homel. 1999;8(4):227–239

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Standard Drink- World Health Organization

	Adult males <65 years old	Adult females (all ages) and adult males ≥65 years old
Abstinence	0 g	0 g
Low risk	1–40 g	1–20 g
Medium risk	41–60 g	21–40 g
High risk	61–100 g	41–60 g
Very high risk	101+ g	61+ g

The number of grams in a standard drink varies across countries. The US has one of the largest standard drinks (14 g), topped only by Austria (20 g), whereas Iceland and the UK have the smallest, with 8 g of ethanol considered to be a standard drink. The vast majority of countries across the world considers a standard drink to contain 10–12 g ethanol.

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Substance Use Breakdown

- Out of all geriatric psychiatric patients with Substance Use Disorders admitted between 1999-2009:
  - 73.3% alcohol related disorders
  - 11% sedative-hypnotic use disorders
  - 2.9% opioid use disorders
  - 1% cannabis use disorders

- Source: Dombrowski D, Norrell N, Holdroyd S. Substance use disorders in elderly admissions to an academic psychiatric inpatient service over a 10-year period. Journal of Addiction. Volume 2016, Article ID 4973018

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Question

Which parts of the brain play very important roles in reward Circuit?

A. Prefrontal cortex and Orbitofrontal cortex
B. Anterior cingulate gyrus
C. Raphe Nucleus
D. Nucleus Accumbens and VTA
E. Putamen and thalamus

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Question

Which is the final common pathway for substance use disorder/addiction?

A. MesoCortico-Limbic dopamine pathway
B. Mesocortico pathway
C. NigroStriatal pathway
D. Tuberoinfundabular pathway
E. Mesolimbic pathway

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Neuroscience of how drugs hook people.

- Drug of abuse activate brain reward system.
- Reward–is defined as any event that increases the probability of response and has a positive hedonic effect.
- Principal focus of neurobiology of reporting effects of drugs with addiction potential has been the origins and terminal areas of mesocortico-limbic dopamine system

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Neuroscience cont.

- Two lines of investigation led to the conclusion that addictive drugs, although chemically different from one another, all affect a brain system involved in the control of motivated behavior.
- The first set of experiments were performed in rats in the 1950s and involved stimulating discrete brain regions (Olds and Milner, 1954)
  - the discovery was made that there were a small number of brain regions in which stimulation was "pleasurable" or "rewarding" because the rats would press a lever tens of thousands of times in succession, ignoring normal needs for food, water, and rest, to gain electrical stimulation
  - In the popular literature these regions were called "the pleasure center" but scientifically they are better described as "brain reward regions" (i.e., regions in which electrical activation profoundly reinforces the lever-pressing behavior) (Wise, 1978

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Neuroscience cont.

- The second set of clues concerning the substrates of addiction showed that each of **these highly addictive drugs mimics or enhances the actions of one or more neurotransmitters** in the brain that are involved in the control of the brain reward circuit (Cooper et al., 1996).
- The opioids mimic endogenous opioid-like compounds called endorphins; **cocaine and related drugs enhance the actions of dopamine itself**; **nicotine mimics the action of acetylcholine** (another transmitter) at its nicotinic receptors; and **alcohol**, among its many effects, **facilitates the activation of a particular receptor for gamma-aminobutyric acid (GABA)**, one of the most prevalent neurotransmitters throughout the brain.
- Although each of these **four mimicked neurotransmitters** has many actions in the brain, they all share one common property: all regulate the activity of the brain reward pathway that extends **from the VTA to the NAc** (Di Chiara and Imperato, 1988).

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Neuroscience cont.

- These dopaminergic axons project and primarily terminate in the nucleus accumbens (NAc) in the ventral striatum, but also extend into the **amygdala**, **Bed nucleus of stria terminalis (BNST)**, **lateral septal area, and lateral hypothalamus.**
- **NAc** is interesting, occupies the crossroads between Limbic system and the Striatum
- **Limbic system** - controls the basic emotions (fear, pleasure, anger) and drives (hunger, sex, dominance, care of offspring).
- **Striatum** – Involved in initiation and control of movement.
- The VTA is in, close proximity to the substantia nigra, another dopamine-rich nucleus. Whereas the substantia nigra projects primarily to the dorsal striatum (via the mesostriatal pathway) and mediates motor activity, the mesolimbic pathway mediates reward.

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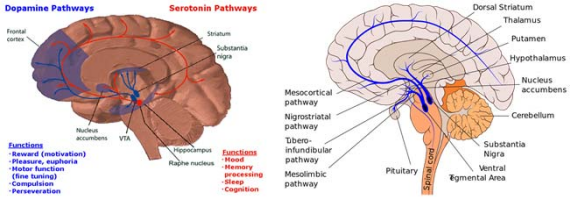
Neuroscience cont.



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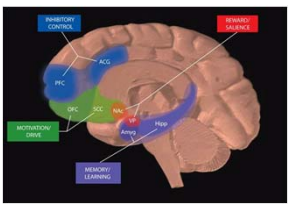

- Substances take over
- Conditioned behaviors and cues
- Prefrontal cortex loses override power
- Stress/memory can independently activate

Prefrontal cortex (PFC), Anterior cingulate gyrus (ACG) , orbitofrontal cortex (OFC), Subgenual cingulate cortex (SCC)

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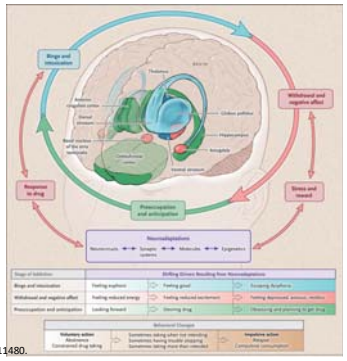
Neuroscience cont.



N Engl J Med 2016 Jan 28;374(4):363-71. doi:10.1056/NEJMra1511480.

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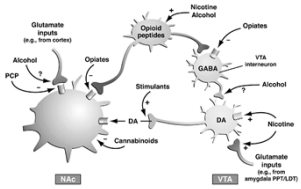
Drugs of Abuse and its common effect on VTA and NAc



Nestler EJ: "Is There a Common Molecular Pathway for Addiction?" Nature Neuroscience 8:1445–1449, 2005

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Question

With statement differentiate the action of cocaine and amphetamines?

A. Cocaine prevents dopamine reuptake, and amphetamine blocks dopamine and norepinephrine transporters in addition to vesicular monoamine transporters 2 (VMAT-2) inhibition and monoamine oxidase activity inhibition.
B. Amphetamine prevents dopamine reuptake, but cocaine both slows uptake of dopamine and induces dopamine release.
C. Both cocaine and amphetamines slow dopamine reuptake and induces dopamine release
D. Cocaine prevents dopamine reuptake, but amphetamine includes dopamine release
E. Amphetamine prevents dopamine reuptake, but cocaine includes dopamine release

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Question

What is considered the size of one standard drink?

- A. 16 oz of regular beer
- B 8 oz of wine
- C 1.5 oz of distilled spirits
- D All of the above

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Understanding Alcohol Use

- Equivalent of the following is considered one drink in the USA
  - 12 oz of regular beer
  - 5 oz of wine
  - 1.5 oz of distilled spirits
- National Institute on Alcohol Abuse and Alcoholism in the elderly recommends the following for healthy people who do NOT take medication
  - One drink a day on average for an elderly man. No more than 2 drinks at any one time.
  - Women should drink even less.
  - People taking medication should further limit use or should not drink at all
  - According to the Dietary Guidelines, adults who do not drink alcohol should not start drinking for any reason.

Source: National Institute of Alcohol Abuse and Alcoholism, www.niaaa.nih.gov and SAHMSA TIP 26
https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/guidelines/appendix-9/ Accessed 9/30/2020

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How many shots in a bottle?

(image credit: The Spruce Eats)

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Early Onset vs Late Onset

- Early onset drinkers:
  - 2/3 of older patients
  - Psychiatric co-occurring are common
  - Severe medical complications secondary to heavy use
- Late onset drinkers:
  - Often triggered by stressful life event
  - More mild cases with fewer medical problems
  - More amenable to treatment

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Social Factors Contribute to Drinking

- Play an important role in the initiation of AUD(Alcohol Use Disorder)
- Difficult experiences :
  - Loss
  - Physical limitation
  - Isolation
  - Loss of income
  - Loss of occupation

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Demographics

- Increase the risk of substance use as an older adult:
- Male gender: for EtOH, Cannabis, and tobacco
- Female Gender: For prescription drug use
- Caucasian
- Age (being closer to middle age)

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Physical Factors

The Following increase the risk of substance use:

- Chronic pain
- Disabilities and reduced mobility
- Poor Physical Health
- Polypharmacy

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Increased Impact of Alcohol in the Geriatric Population

- Increased Blood Alcohol Concentration because:
  - Decreased lean body mass
  - Decreased total body water
  - Decreased gastric alcohol dehydrogenase (breaks down toxic alcohol)

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Question

Pt is in ER, BAL is 350mg/d. has no withdrawal symptoms. Has been using Alcohol for 10+ yrs on a daily visit. Has h/o of alcohol withdrawal seizure. Labs are WNL. Poor Social support. He is here is he wants to quit. What will be next step in Management

A. Give banana bag in ER with Thiamine and Folate
B. Admit the pt on medical floor with CIWA protocol and Schedule Lorazepam
C. Admit the pt on observation
D. Discharge pt
E. Start pt on Naltrexone

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Question

Liver biopsy of 65-year-old obese male reveals microvascular fatty globules. He has a 20-year history of heavy alcohol consumption. Lab reveals elevated AST, ALT, low serum albumin, high, globulin and normal bilirubin. What is most likely diagnosis

A. Alcoholic cirrhosis
B. Alcoholic liver disease
C. Wernicke's Korsakoff syndrome
D. Alcoholic hepatitis
E. Hepatocellular carcinoma

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Medical Complications of Alcohol in Geriatric Patients

- Cirrhosis: 60% 1 year death rate > age 60 vs 7% in younger population
- Heart problems (coronary artery disease, and atrial fibrillation)
- Increase in cancers
- Thrombocytopenia
- Neurologic complications (stroke, dementia, Wernicke's encephalopathy)

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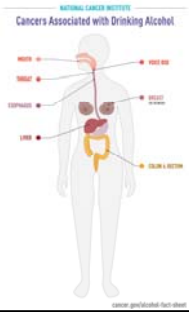
Cancer and Alcohol



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Assessment May Include:

- Skillful Interviewing, willing to ask difficult questions
- Psychiatric evaluation
- Neurological evaluation
- Social Evaluation
- Evaluation of motivation to change
- Functional Evaluation

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Screening Tools

- Questions about quantity and frequency
  - How many days does the individual drink?
  - Maximum number of drinks on any given occasion
- Instruments:
  - CAGE
  - AUDIT-C
  - MAST-G

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AUDIT-C

AUDIT-C

Please circle the answer that is correct for you.

1. How often do you have a drink containing alcohol?					**SCORE**
Never (0)	Monthly or less (1)	Two to four times a month (2)	Two to three times per week (3)	Four or more times a week (4)	_____
2. How many drinks containing alcohol do you have on a typical day when you are drinking?					
1 or 2 (0)	3 or 4 (1)	5 or 6 (2)	7 to 9 (3)	10 or more (4)	_____
3. How often do you have six or more drinks on one occasion?					
Never (0)	Less than Monthly (1)	Monthly (2)	Two to three times per week (3)	Four or more times a week (4)	_____
TOTAL SCORE Add the number for each question to get your total score.					_____

Maximum score is 12. A score of ≥ 4 identifies 86% of men who report drinking above recommended levels or meets criteria for alcohol use disorders. A score of > 2 identifies 84% of women who report hazardous drinking or alcohol use disorders.

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Protective Factors

- Married
- Supportive, safe living environment
- A provider with knowledge of addiction supervising diverse medications
- Adequate income to meet needs (medical expenses likely to far exceed those of younger adult)
- Annual substance abuse screening including psycho-education. (SAMHSA recommends for 60+)
- Wellness factors including eating, sleeping, exercise, spirituality.
- Linkage to age-specific groups and activities
- Access to transportation

Source: SAMHSA 2015

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Treatment and Intervention

- Brief Advice
- Brief Interventions
- Facilitates treatment entry and change in behavior
- Referral Management

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Brief Interventions

- Brief interventions aim to identify a real or potential alcohol problem and motivate an individual to do something about it
- Not designed to treat people with serious dependence

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Brief Interventions

- Avoid the use of pejorative, labeling words such as “alcoholic” and “abuse”
- The WHO (World Health Organization) has a manual online which outlines brief interventions
- Example Script: "I have looked over the results of the questionnaire you completed a few minutes ago. If you remember, the questions asked about how much alcohol you consume, and whether you have experienced any problems in connection with your drinking. From your answers it appears that you may be at risk of experiencing alcohol-related problems if you continue to drink at your current levels. I would like to take a few minutes to talk with you about it.”

Source: WHO: http://www.who.int/substance_abuse/activities/sbi/en/

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Interventions in Geriatric Patients

- Avoid confrontational approaches
- Communicate with empathy in a straightforward, simple manner
- Pay attention to what is important to patients and motivate them (Motivational Interviewing)
- Involve family members or other social support whenever possible, with patient’s permission

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Detoxification in Elderly Patients

- **Confusion** (rather than tremor) is an early withdrawal sign
- Duration of withdrawal/hallucinosis increased
- Rule out Delirium Tremens in confused patients
- Replace electrolytes and nutrients
- Use short acting benzodiazepines (lorazepam, oxazepam)
- Symptomatology monitored with Clinical Institute Withdrawal Assessment for Alcohol (CIWA)
- In the emergency setting, it is imperative to give thiamine, folate and multivitamins early.

Source: LeRoux C, Tang T, Drexler K. Alcohol and Opioid Use Disorder in Older Adults: Neglected and Treatable Illnesses. Curr Psychiatry Rep(2016) 18:87

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A Note About Wernicke's Encephalopathy

- Clinically the classic triad is: ocular findings, cerebellar dysfunction and confusion
- Thiamine needs to be given BEFORE glucose to avoid Wernicke's encephalopathy because glucose depletes thiamine in the body.
- If Wernicke's is suspected, immediate, high dose thiamine is required, some suggest 200mgTID, IV or IM for 3-5 days

Source: Gavin et al. EFNS guidelines for diagnosis, therapy, and prevention of Wernicke encephalopathy. Eur J Neurol. 2010;17(12):1408-18.

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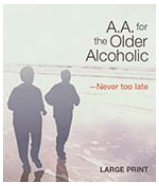
Treatment Strategies

- Age-specific psychosocial approaches are indicated for persons who are not affected with dementia
- Psychotherapy
- Medication management
- Self help groups
- Crisis Management may be needed



(Literature above is available for free virtually at https://www.aa.org/assets/en_us/aa-literature/p-22-aa-for-the-older-alcoholicnever-too-late)

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Pharmacology

- 3 FDA approved medications for Alcohol Use Disorder:
  - naltrexone
  - acamprosate
  - disulfiram
- Disulfiram is generally not recommended in older adults

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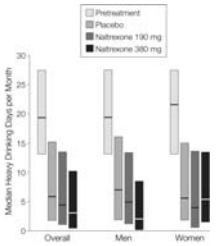
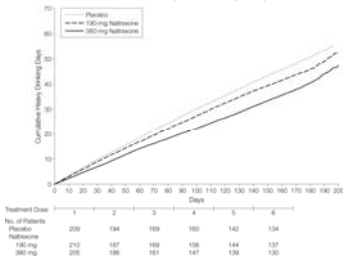
Naltrexone XR vs Placebo



Result: Reduces heavy drinking days



Garbutt et al, JAMA. 2005;293(13):1617-1625.doi:10.1001/jama.293.13.1617

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Why are sedatives in the elderly concerning?

- Absorption: slower
- Protein binding: elderly patients with low albumin have increased sedation
- Metabolism: slower hepatic metabolism in the elderly; several benzodiazepines have a complicated liver metabolism
- Older patients are at risk of BZD-related harms
  - Fractures
  - Falls
  - Sedation

Take a multifaceted stepwise approach when deprescribing benzodiazepines in older patients. Drugs Ther Perspect 35, 72–76 (2019)

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Benzodiazepines

- Sedation
- Cerebellar toxicity
- Cognitive impairment
- Psychomotor impairment
- The longer a person is prescribed these medications, the more likely they are to develop misuse
- The longer they are prescribed these medications, the harder it is to taper off

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How to discontinue Benzodiazepines

- Gradual taper of benzodiazepines is best, especially if medication has been taken chronically, recommendations vary but generally reducing dose by 12-25% every week to month
- Slower clearance of medication attenuates withdrawal symptoms, thus elderly patients *may* report fewer symptoms
- The severity of the distress experienced by a patient during withdrawal is associated with high levels of anxiety, lower educational levels, lower baseline health-related Quality of life, and low levels of social support

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Guidelines for Prescribing Benzodiazepines

- Prescribe only small dosages
- Prescribe benzodiazepines without active metabolites
- Avoid prescribing benzodiazepines to confused patients or to patients with dementia
- Prescribe benzodiazepines for short periods of time, if at all
- Be aware of potential interaction amongst CNS depressant substances

Salzman C et al. Clinical Geriatric Psychopharmacology, 3rd Edition,1998, William & Wilkins 343-355.

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Prescription drug use

- Elderly patients account for 30% of prescriptions, mainly benzodiazepines and prescription opioids
- One forth of patients in intermediate care facilities are on benzodiazepines
- Rates of benzodiazepine and opioid prescriptions in those 65+ have continued to increase from 2006-2007 to 2014-2015
  - Benzodiazepines from 4.8% to 6.2%
  - Opioids from 5.9% to 10%
  - Benzodiazepines and opioids combined from 1.1% to 2.7%
- The more medications a patient takes, the more likely the medications will be taken improperly

Source: Beers, Avorn et al 1995

Source: Rhee. Coprescribing of Benzodiazepines and Opioids in Older Adults. The Journals of Gerontology December 2019.

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Opioids

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Most commonly misused opioid medications

- Oxycodone (OxyContin)
- Oxycodone/acetaminophen (Percocet)
- Hydrocodone (Vicodin)

(Prescription Drugs April 13, 2010)

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Signs of Opioid Misuse

- Confusion
- Depression
- Delirium
- Insomnia
- Parkinson's-like symptoms
- Weakness or lethargy
- Loss of appetite
- Falls
- Changes in speech; slurring

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Signs of Opioid Misuse Continued

- Loss of motivation
- Memory loss
- Family or marital discord
- New difficulty with activities of daily living (ADL)
- Drug seeking behavior
- Doctor shopping
- ****Always Check the Physician Monitoring Program (PMP) Before Prescribing! ****

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Medication Assisted Treatment

- Naltrexone: Oral and Long acting injectable
  - Mu-opioid receptor Antagonist
  - Paucity of research for IM Naltrexone in older adults

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Medication Assisted Treatment

- **Buprenorphine**: is a partial mu-opioid receptor agonist with a very high affinity for the mu-opioid receptor
  - Comes in several formulations (SL, Buccal)
  - Must be prescribed by a provider with a DEA X waiver
  - Must be administered when patient is exhibiting symptoms of withdrawal or has already completed withdrawal. In the setting of active intoxication, may precipitate a withdrawal

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Medication Assisted Treatment

- **Methadone**: A full mu-opioid receptor agonist
  - May only be dispensed from federally regulated opioid treatment programs "methadone clinics"
  - Monitoring required for sedation and respiratory depression
  - May cause CNS depression if used with alcohol, sedatives, hypnotics, or opioids.

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Naloxone

- Naloxone: Opioid Antagonist
- Patients receiving MAT should have an emergency naloxone kid prescribed
- Consider discussing Naloxone in patients on high dose opioids
- Helpful to engage the patient's family on overdose risk and availability of Naloxone

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Methamphetamines

Growing Old With Ice: A Review of the Potential Consequences of Methamphetamine Abuse In Australian Older Adults

More Grandmas, Grandpas Using Meth

Meth striking older generations

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Marijuana

- The medical use of marijuana is legalized in 36 states and DC
- Recreational use is legalized in 18 states
- Use remains federally illegal
- Paucity of research in use in older adults

Mahvan TD, Hilaire ML, Mann A, Brown A, Linn B, Gardner T, Lai B. Marijuana Use in the Elderly: Implications and Considerations. Consult Pharm. 2017 Jun 1;32(6):341-351. doi: 10.4140/TCP.n.2017.341. PMID: 28595684.

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Marijuana

- Acute adverse impact of marijuana use:
  - Anxiety
  - dry mouth
  - tachycardia
  - high blood pressure
  - palpitations
  - wheezing
  - confusion
  - Dizziness

Volkow ND, Baler RD, Compton WM, Weiss SRB, 2014. Adverse health effects of marijuana use. N. Engl. J. Med 370, 2219–2227

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Marijuana

- Between 2015-2016, prevalence of past year use was 9% in adults ages 50-64 and 2.9% in adults 65 and older
- Based on the National Survey on Drug Use and Health
- Other substance use disorders and misuse of prescription medications were higher in people who used marijuana compared to non-users
- Some concern that older adults who use MJ medically have a higher rate of recreational use too

Han BH, Palamar JJ. Marijuana use by middle-aged and older adults in the United States, 2015-2016. Drug Alcohol Depend. 2018 Oct 1;191:374-381

Choi NG, DiNitto DM, Marti N, 2017a. Nonmedical versus medical marijuana use among three age groups of adults: associations with mental and physical health status. Am. J. Addict 26, 697–706.

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Question

What drugs are FDA approved to treat Tobacco use disorder?

A. Nortriptyline
B. Clonidine
C. Sertraline
D. Bupropion
E. Varenicline
F. All –ab&c
G. Both d&e

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Question

What is current prevalence of smoking in United States in Older Adults?

A. 8%
B. 16.7%
C. 17%
D. 8.2 %

Ref: Cornelius ME, Wang TW, Jamal A, Loretan C, Neff L. Tobacco Product Use Among Adults – United States, 2019.

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Tobacco Use

- Tobacco use is the leading cause of cancer and death from cancer.
- There is no safe level of tobacco use.
- People who quit smoking, regardless of their age, have gains in life expectancy compared with those who continue to smoke.
- The NCI quitline, 1-877-44U-QUIT (1-877-448-7848), is available Monday through Friday, 9:00 a.m. to 9:00 p.m. ET.

Source: NIH National Cancer Institute: https://www.cancer.gov/about-cancer/causes-prevention/risk/tobacco Accessed on 9/30/2020

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Thank you

- Questions?

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