

**Addiction as a chronic disease**

*physiology and neurochemistry  
pharmacokinetics  
pharmacodynamics  
dependence  
withdrawal*

**SUD Curriculum  
PRIMARY CARE**  
NJAFP NJSAM

CHAPTER 3

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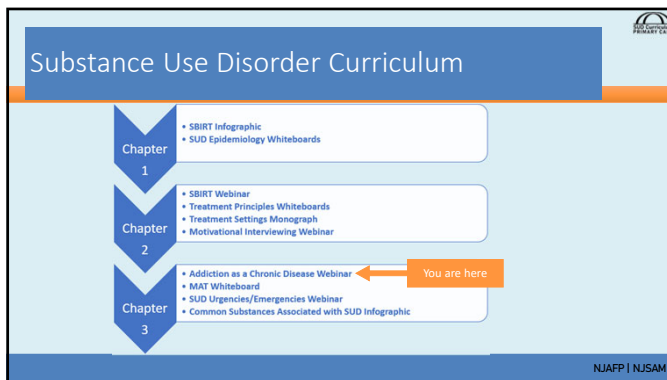
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**Substance Use Disorder Curriculum**

Chapter 1

- SBIRT Infographic
- SUD Epidemiology Whiteboards

Chapter 2

- SBIRT Webinar
- Treatment Principles Whiteboards
- Treatment Settings Monograph
- Motivational Interviewing Webinar

Chapter 3

- **Addiction as a Chronic Disease Webinar** ← You are here
- MAT Whiteboard
- SUD Urgencies/Emergencies Webinar
- Common Substances Associated with SUD Infographic

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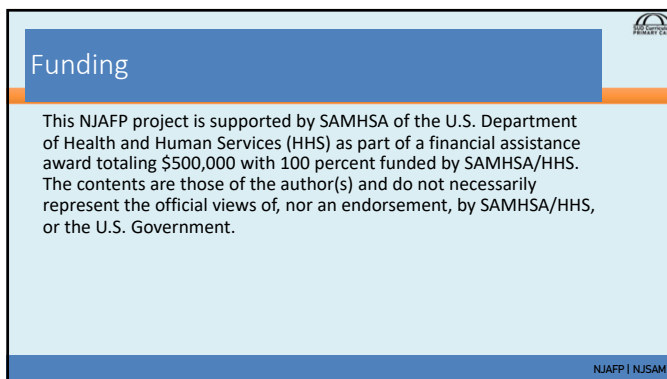
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## Disclosures

The following individuals have no relevant financial relationships with ineligible companies to disclose:

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## Following this Presentation...

- Please return to the course page for CME information and references



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## Addiction as a chronic disease

physiology and neurochemistry  
pharmacokinetics  
pharmacodynamics  
dependence  
withdrawal

Indra Cidambi, MD, FASAM

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## Addiction as a chronic disease

- Many factors are involved in addiction
- Addiction is a chronic disease like other chronic diseases such as type II diabetes, cancer, and cardiovascular disease
- Drug addiction shares many features with other chronic illnesses, including
  - Tendency to run in families (heritability)
  - Onset and course that is influenced by environmental conditions and behavior
  - Ability to respond to appropriate treatment, which may include long-term lifestyle modification
- Research of addiction has implicated both environmental and genetic influences, as well as interactions between the two

The diagram illustrates the complex interplay of factors in addiction. At the center is a blue oval labeled 'ADDICTION'. Surrounding it are four main categories: 'HISTORICAL' (top left), 'DRUGS' (top center), 'BIOLOGICAL' (top right), and 'ENVIRONMENT' (bottom). Arrows point from each of these categories towards the central 'ADDICTION' oval. Below 'ENVIRONMENT', specific factors are listed: 'Social Interactions', 'Family', 'Stress', and 'Conditioned Stimuli'. Above 'BIOLOGICAL', factors listed include 'Genetics', 'Circadian Rhythms', 'Disorder States', and 'Gender'. The 'HISTORICAL' section lists 'Previous History', 'Expectation', and 'Learning'. The 'DRUGS' section is represented by a downward arrow pointing to the central oval.

NIDA, <https://archives.drugabuse.gov/publications/drug-abuse-addiction-one-americas-most-challenging-public-health-problems> NJAFP | NJSAM

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## Genetics

- While genetics play a major role in defining who we are, the environment in which we are raised is just as influential
- Evidence from adoption and twin studies demonstrate that addiction, like other chronic diseases, is a heritable disorder and that genes play a role in vulnerability to addiction
- Genes can also play a role in protecting individuals from addiction

The diagram is titled 'Addiction, Like Cardiovascular Disease, Has Genetic Contributions'. It compares genetic factors for 'Drug Abuse' and 'Cardiovascular Disease'. For 'Drug Abuse', factors listed include 'CYP2A6 (nicotine metabolism) tobacco dependence', 'FIAH (lentiginous carnitine regulator) problem drug use', and 'Mu-opioid receptor in heroin addiction'. For 'Cardiovascular Disease', factors listed include 'APO-E (Apolipoprotein E) coronary artery disease' and 'LOX-1 (lectin-like oxidized low density lipoprotein receptor) coronary artery disease in Caucasian women'. A central graphic shows a DNA double helix structure.

NIDA, <https://archives.drugabuse.gov/publications/drug-abuse-addiction-one-americas-most-challenging-public-health-problems> NJAFP | NJSAM

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## Environment

- As with all complex diseases, environmental risk and protective factors interact with genetics to determine the course and outcome of disease

The diagram is titled 'Addiction, Like Cardiovascular Disease, Has Environmental Contributions'. It compares environmental factors for 'Drug Abuse' and 'Cardiovascular Disease'. For 'Drug Abuse', factors listed include 'Early Physical or Sexual Abuse', 'Witnessing Violence', 'Stress', 'Peers Who Use Drugs', and 'Drug Availability'. For 'Cardiovascular Disease', factors listed include 'Obesity', 'Sedentary Lifestyle', 'Stress', and 'Drug and Alcohol Abuse'. A central graphic shows a human heart with a lightning bolt striking it, labeled 'STRESS & DRUG ABUSE'.

NIDA, <https://archives.drugabuse.gov/publications/drug-abuse-addiction-one-americas-most-challenging-public-health-problems> NJAFP | NJSAM


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## Healthy Lifestyle Choices

- No one chooses to be addicted to drugs, or to develop heart disease
- However, sometimes people do choose behaviors that have undesirable effects
- Personal responsibility and behavioral change are major components of any credible treatment program
- Addiction, like heart disease, cancers, and type II diabetes, is a real and complex disease


**Drug Abuse:**

- Stay active in healthy activities: sports, arts, education
- Know your family history
- Reduce stress and develop positive coping strategies
- Get treatment when needed and adhere to the regimen



**Cardiovascular Disease:**

- Engage in healthy eating and exercise
- Know your family history
- Reduce stress and develop positive coping strategies
- Monitor your cholesterol blood pressure
- Get treatment when needed and adhere to the regimen



NIDA. <https://archives.drugabuse.gov/publications/drug-abuse-addiction-one-americas-most-challenging-public-health-problems>

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## The Neurobiology of addiction

- Dopamine is thought to play a central role



**Dopamine:** is a neurotransmitter present in regions of the brain that control movement, learning, motivation, and feelings of pleasure. The concentration of this system, which normally responds to natural behaviors that are linked to survival (eating, spending time with loved ones, etc.) produces euphoric effects in response to the drug. The dopamine system is a pattern that "teaches" people to repeat the behavior of seeking drugs.

ASAM. [https://www.asam.org/docs/default-document-library/nccbh-infographic.pdf?sfvrsn=d6787ab\\_0](https://www.asam.org/docs/default-document-library/nccbh-infographic.pdf?sfvrsn=d6787ab_0)

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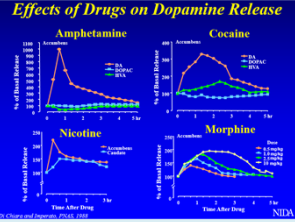
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## Dopamine surges

- Dopamine surges in response to activities (eating, sex) but the surges in response to drugs can be massive, causing a downward spiral and endless cycle

**Effects of Drugs on Dopamine Release**



in Chang and Benveniste, 2008, p. 100

<https://www.pnas.org/content/pnas/105/24/12714.full.pdf>

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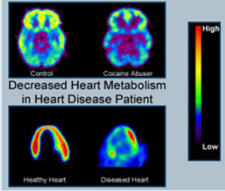
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## Tissue malfunction

- Imaging studies have shown evidence of tissue malfunction in the brains of those with addiction, analogous to what is seen the hearts of people with heart disease



Normal Disease State  
Decreased Heart Metabolism in Heart Disease Patient

Healthy Heart Diseased Heart

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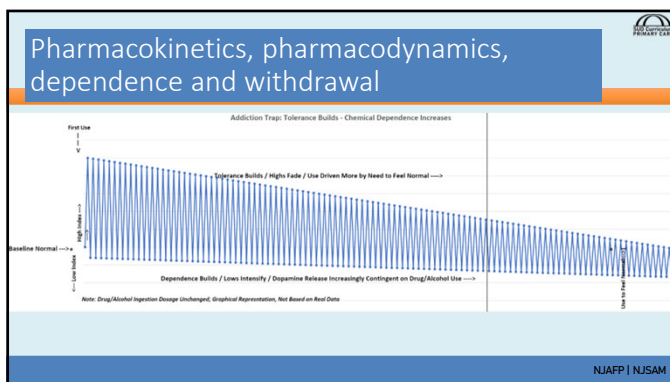
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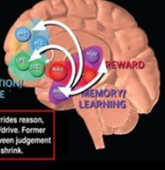
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## Addiction hijacks the brain

**BEFORE substance use/addiction**



**AFTER substance use/addiction**



<https://www.boardprecovery.com/rehab-blog/addiction-hijacks-brain/>

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Cognitive Behavioral Therapy (CBT)



- CBT is a form of talk therapy which connects a person's thoughts and feelings to their behaviors in order to change maladaptive behaviors
- CBT alters volume and activity of the brain
- CBT influences neuroplasticity of the brain and hence it helps with unlearning negative learn behaviors and replacing it with positive learnt behaviors
- Learning model helps overcome addiction through CBT

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Cognitive Behavioral Therapy (CBT)



- CBT is proven for treating substance abuse disorders and also other comorbid disorders, such as; anxiety disorder, depression, bipolar, OCD, PTSD, sleep disorder, eating disorder, and chronic pain
- CBT is a current problem-oriented therapy and it's both cognitive and behavior therapy
- CBT uses both cognitive and behavioral techniques and mindfulness-based therapy
- Aaron Beck was the first to practice CBT

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Cognitive Behavioral Therapy (CBT)



- Beck outlined three levels of cognition; core beliefs, dysfunctional assumptions, and negative automatic thoughts
- The cognitive triad of negative core belief (from Aaron Beck 1976)
- A – Negative views about the world "Everybody hates me because I am worthless"
- B – Negative views about oneself "I am worthless"
- C – Negative views about the future "I will never be good at anything because everybody hates me"
- Event → thoughts/feelings → behaviors

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## Cognitive Behavioral Therapy (CBT)

- CBT treatment for alcohol or drug use:
  1. identify internal and external triggers for relapse
  2. teach healthy coping skills
  3. drug refusal skills training
  4. functions analysis of substance use
  5. develop healthy, sober activities

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## Cognitive Behavioral Therapy (CBT)

- CBT can be used for individual sessions, group sessions and family therapy sessions
- The duration is approximately 12-16 sessions over a 12-week period, but it varies
- Each session lasts between 60-90 minutes
- CBT uses the 20/20/20 rule

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## Cognitive Behavioral Therapy (CBT)

- CBT 20/20/20 rule:
  - The first 20 minutes – set agenda for session, update since last session (high risk situations), get the patient to talk about their life
  - The second 20 minutes – introduce today's topic, and discuss topic
  - Final 20 minutes – explore patient's understanding of today's topic, assign homework, and review homework

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## Cognitive Behavioral Therapy (CBT)

- CBT uses the following techniques:
  1. foster the motivation for abstinence
  2. teach coping skills
  3. change reinforcement contingencies
  4. train to recognize and cope with urges to use
  5. improve interpersonal functioning

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## Cognitive Behavioral Therapy (CBT)

1 – Foster the motivation for abstinence by using a decisional analysis

Use of substance	Positives	Negatives
Not using substance	Positives	Negatives

- Decisional analysis clarifies to the person who is using their loss or gain by continued substance use

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## Cognitive Behavioral Therapy (CBT)

- 2 – teach coping skills
  - Teaching healthy coping skills to replace the existing, unhealthy coping skills
- 3 – change reinforcement contingencies
  - Identify and decrease habits associated with the drug using lifestyles and substituting it with more positive activities and rewards
- 4 – train to recognize and cope with urges to use
- 5 – improve interpersonal functioning
  - To help them enhance their social support network to obtain and sustain substance free lifestyle

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## Cognitive Behavioral Therapy (CBT)

The foundations of CBT:

- Classical conditioning
- Operant conditioning
- Modeling

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## Cognitive Behavioral Therapy (CBT)

CBT uses the following steps;

- 1 – functional analysis
- 2 – trigger analysis
- 3 – teach to avoid high risk situations
- 4 – teach to cope and understand with cravings

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## Cognitive Behavioral Therapy (CBT)

Step 1 – functional analysis – 5 Ws:

- A – social “Who did you use with?”
- B – environmental “Where do you use?” “Where do you buy?”
- C – emotional “What mood are you typically in prior to using?”
- D – cognitive “What thoughts do you have before using?”
- E – physical “Were you experiencing withdrawal symptoms?”

Teach them high risk situations record

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### Cognitive Behavioral Therapy (CBT)

Teach them high risk situations record

Antecedent Situation	Thoughts	Feelings	Behavior	Consequences
"Where was I?" "Who was with me?" "What was happening?"	"What was I thinking?"	"How was I feeling both physically and physiologically?"	"What did I use?" "How much did I use?" "What paraphernalia did I use?"	"What happened after?" "How did I feel right after?" "How did other react to my behavior?"

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### Cognitive Behavioral Therapy (CBT)

Step 2 – trigger analysis

- Identify triggers, both internal and external
- External triggers – people (dealers, friends), places (bars, liquor streets, home), things (paraphernalia, money, drugs, alcohol, movies with drug use), time periods (paydays, after work, holidays, stressful periods)
- Internal triggers – anxiety, anger, boredom, happiness, excitement, frustration, and fatigue
- Triggers → thoughts → cravings → use

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### Cognitive Behavioral Therapy (CBT)

Step 3 – teach to avoid high risk situations

- By using functional analysis and the trigger analysis

Step 4 – teach to cope and understand with cravings

- By using thought stopping, engage in non-drug related activity, talk to someone who is on the support list
- Cravings is a combination of thoughts and feelings that physiological component of cravings makes it very hard to resist

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## Cognitive Behavioral Therapy (CBT)

How to manage cravings:

- 1 – distracting activities
- 2 – self talk (the craving does not last long)
- 3 – talking it through (with those who understand – AA sponsor)
- 4 – urge surfing (let the thoughts, emotions, physical feelings flow until it passes)

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## Summary

- CBT initiated with educating patient about CBT
- Identify and involve their support network into treatment
- Teach to cope with urges/cravings
- Teach refusal skills then maintain changes
- Terminate sessions

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## Summary

- Addiction is a chronic disease, not a moral failure or a behavioral problem.
- Addiction has a genetic component, but environment and lifestyle choices play a role.
- Addiction changes brain function at various levels of the brain, such as; the cortex, limbic region, and hippocampus.
- Addiction has similar relapse rates, medication compliance issues, and compliance with lifestyle changes, just like any other chronic disease.
- Substance use disorders are preventable and treatable with medication, behavioral interventions and peer support.
- Remaining in treatment for an adequate period of time is critical.
- Substance use disorder is a disease that affects the family.

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## Questions are welcome!

Please send any questions for the faculty to [shockenberry@njafp.org](mailto:shockenberry@njafp.org)

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## Completing this Course

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## Continue to Learn

**Chapter 1**

- SBIRT Infographic
- SUD Epidemiology Whiteboards

**Chapter 2**

- SBIRT Webinar
- Treatment Principles Whiteboards
- Treatment Settings Monograph
- Motivational Interviewing Webinar

**Chapter 3**

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- MAT Whiteboard
- SUD Vigilance/Emergencies Webinar
- Common Substances Associated with SUD Infographic

- Residents: Follow your residency program faculty's guidance to your next SUD course on the Course Catalog
- Other Physicians: Return to the Course Catalog for more CME accredited SUD courses

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