



Chronic Illness Model & Neurobiology of Substance Use Disorder

Using science to reduce stigma

Epigenetics at the intersection of SUD, ACEs and Trauma

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Disclosures and Contact Info

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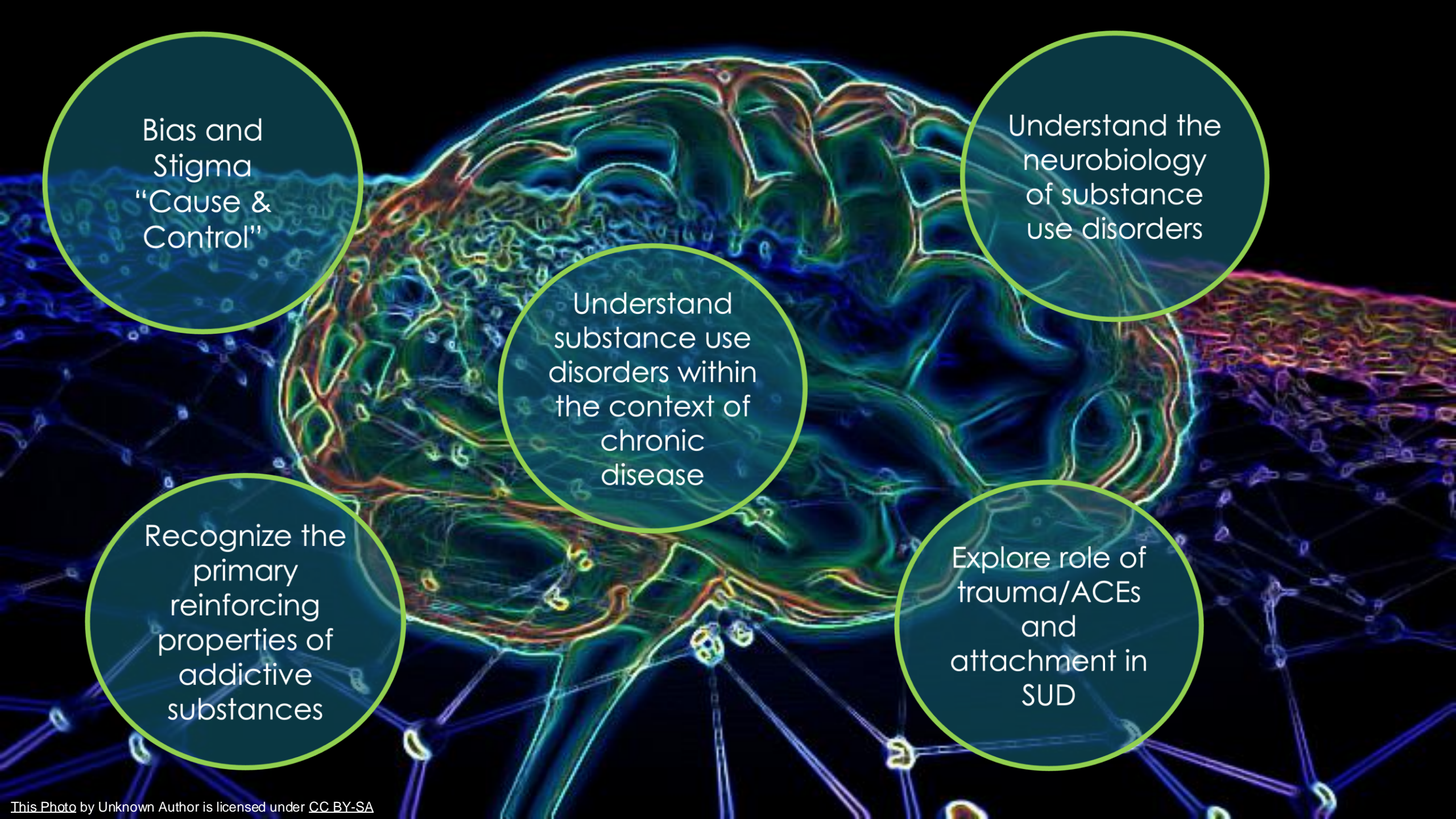
Medical Director – Steve Rummler Hope Network





Learning Objectives

- Reduce the stigma related to substance use disorders (SUDs)
- Understand substance use disorders within the context of chronic illness
- Understand the neurobiology of substance use disorders and how the neurobiology relates to direct clinical interactions with patients with SUDs
- Recognize the neurobiological underpinnings to the three stages of addiction
- Explore how attachment and trauma play a role in the development and maintenance of SUDs

A stylized, colorful brain scan image, possibly a functional MRI or PET scan, showing various brain regions in shades of blue, green, yellow, and red. The image is overlaid with five circular text bubbles with green borders, each containing a topic related to substance use disorders. The background is dark, making the brain's structure stand out.

Bias and Stigma
"Cause & Control"

Understand the neurobiology of substance use disorders

Understand substance use disorders within the context of chronic disease

Recognize the primary reinforcing properties of addictive substances

Explore role of trauma/ACEs and attachment in SUD



Bias – Substance Use Disorders

Did the person **CAUSE** it?

The appearance of intentional participation in the development of a condition.

Can the person **CONTROL** it?

Are there factors within a person's abilities to interrupt the course of illness?

“They found a way to get drugs, why can't they find their way to get treatment?”



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ASAM Definition

Addiction is a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual's life experiences. People with addiction use substances or engage in behaviors that become compulsive and often continue despite harmful consequences.

Prevention efforts and treatment approaches for addiction are generally as successful as those for other chronic diseases.

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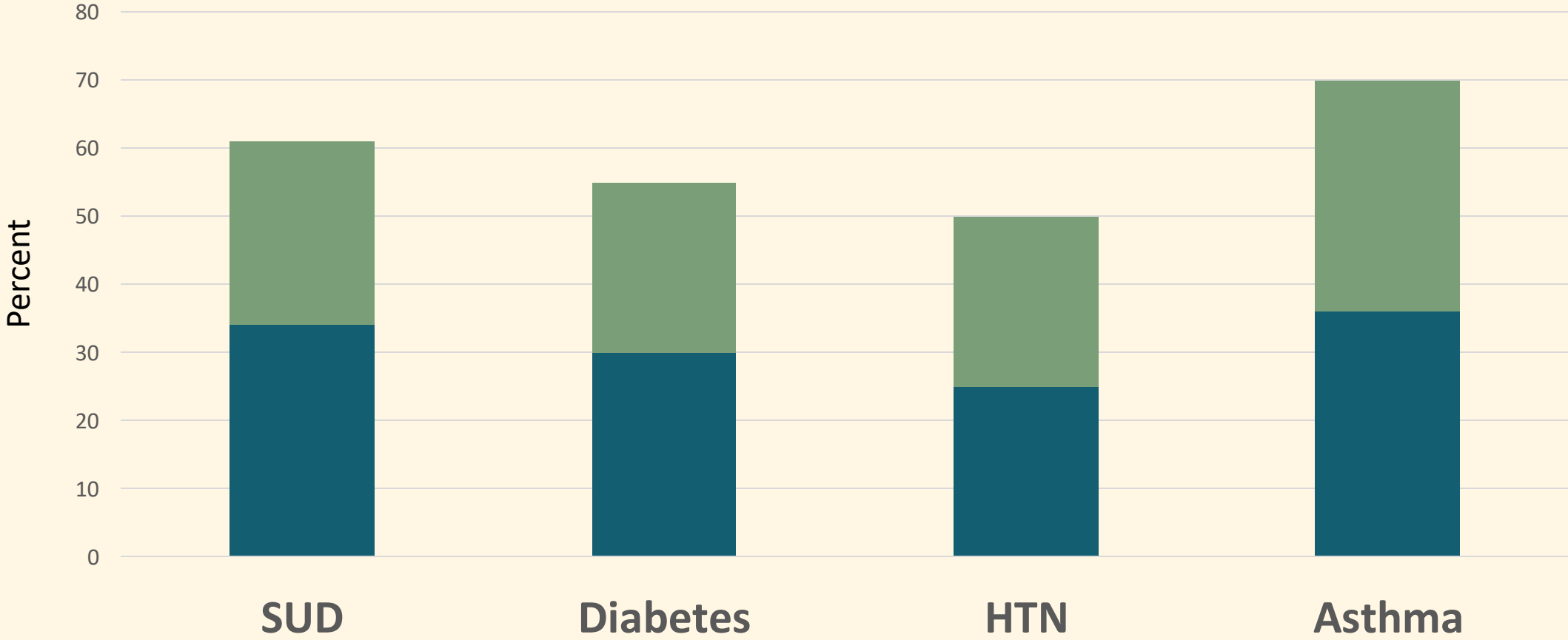
Features of Chronic Illnesses

- ✓ complex causality, with multiple factors leading to their onset
- ✓ a long development period, for which there may be no symptoms
- ✓ a prolonged course of illness, perhaps leading to other health complications
- ✓ associated functional impairment or disability
- ✓ often no cure, prone to relapse long-term care needed





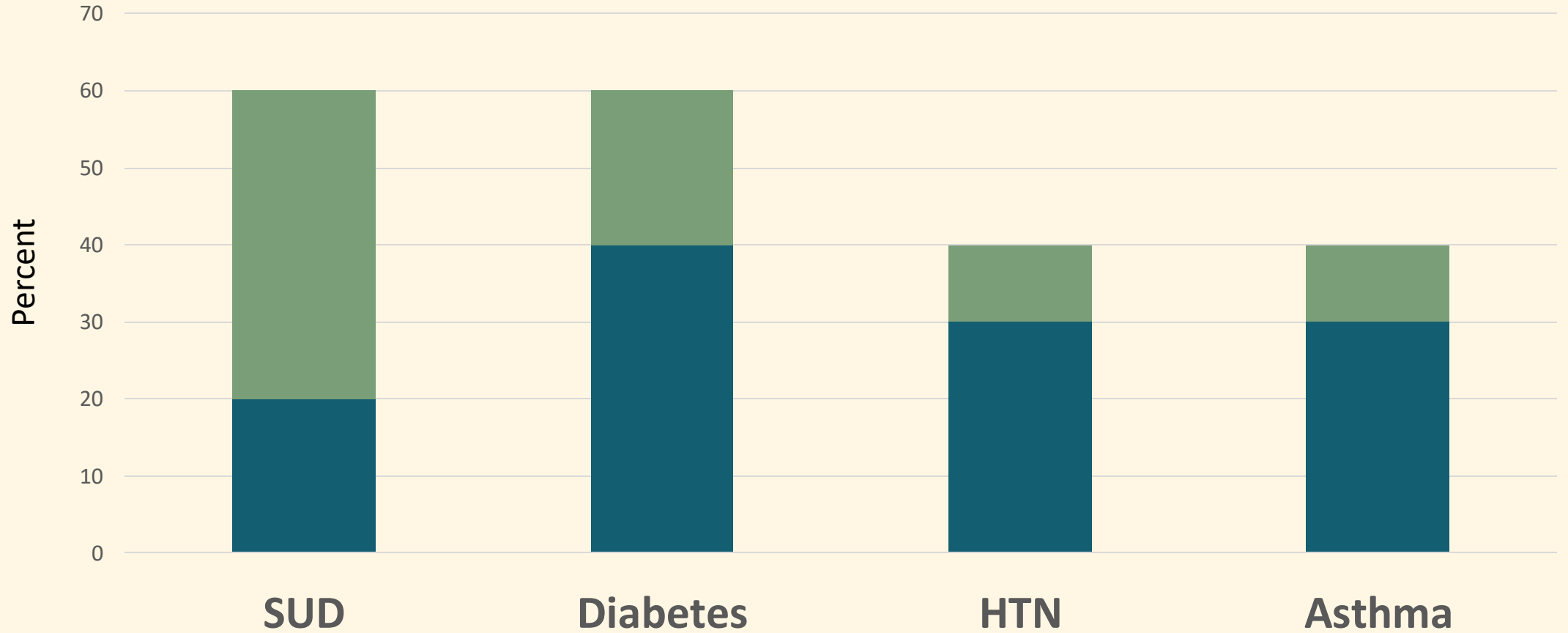
Heritability of Chronic Illnesses



Powering recovery, no matter the path



Adherence Rates for Chronic Illnesses

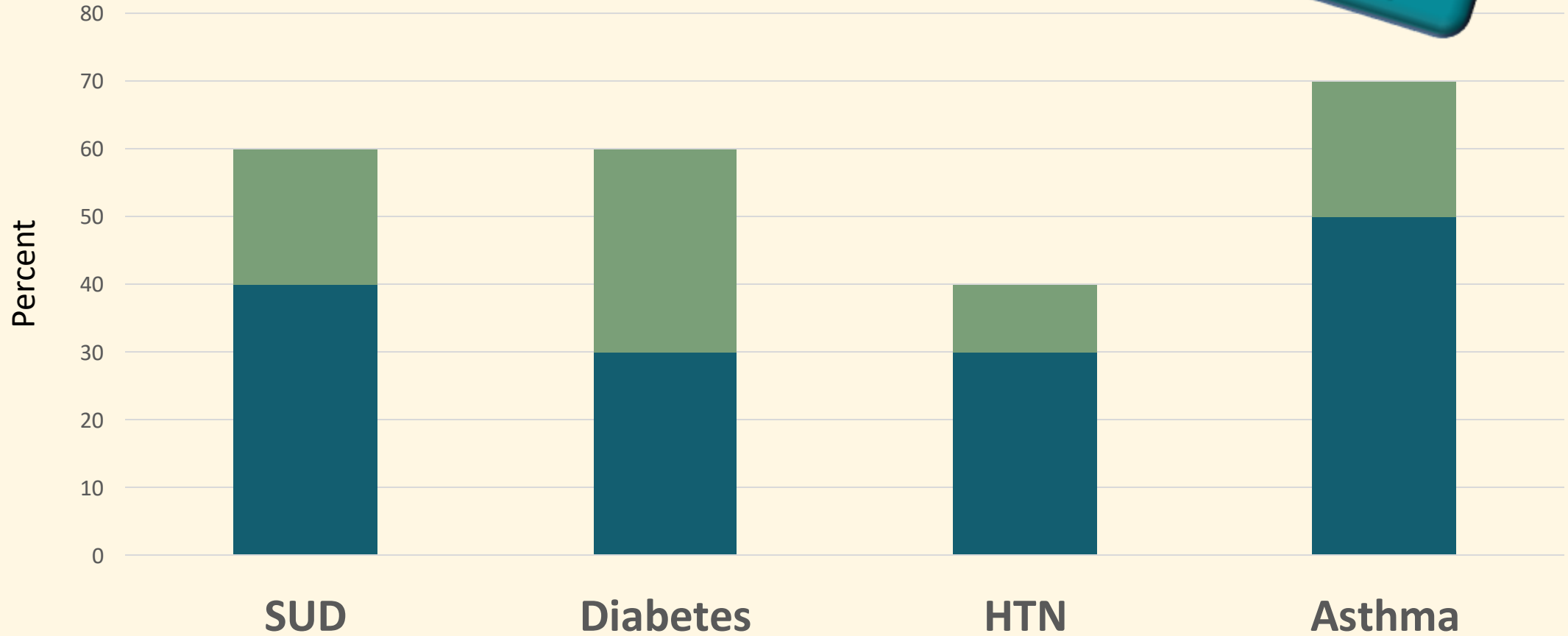


Powering recovery, no matter the path



Comparison of Recurrence Rates

But only a fraction of those with a SUD receive treatment



Powering recovery, no matter the path



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Initial Reinforcements

Powering recovery, no matter the path

Euphoria

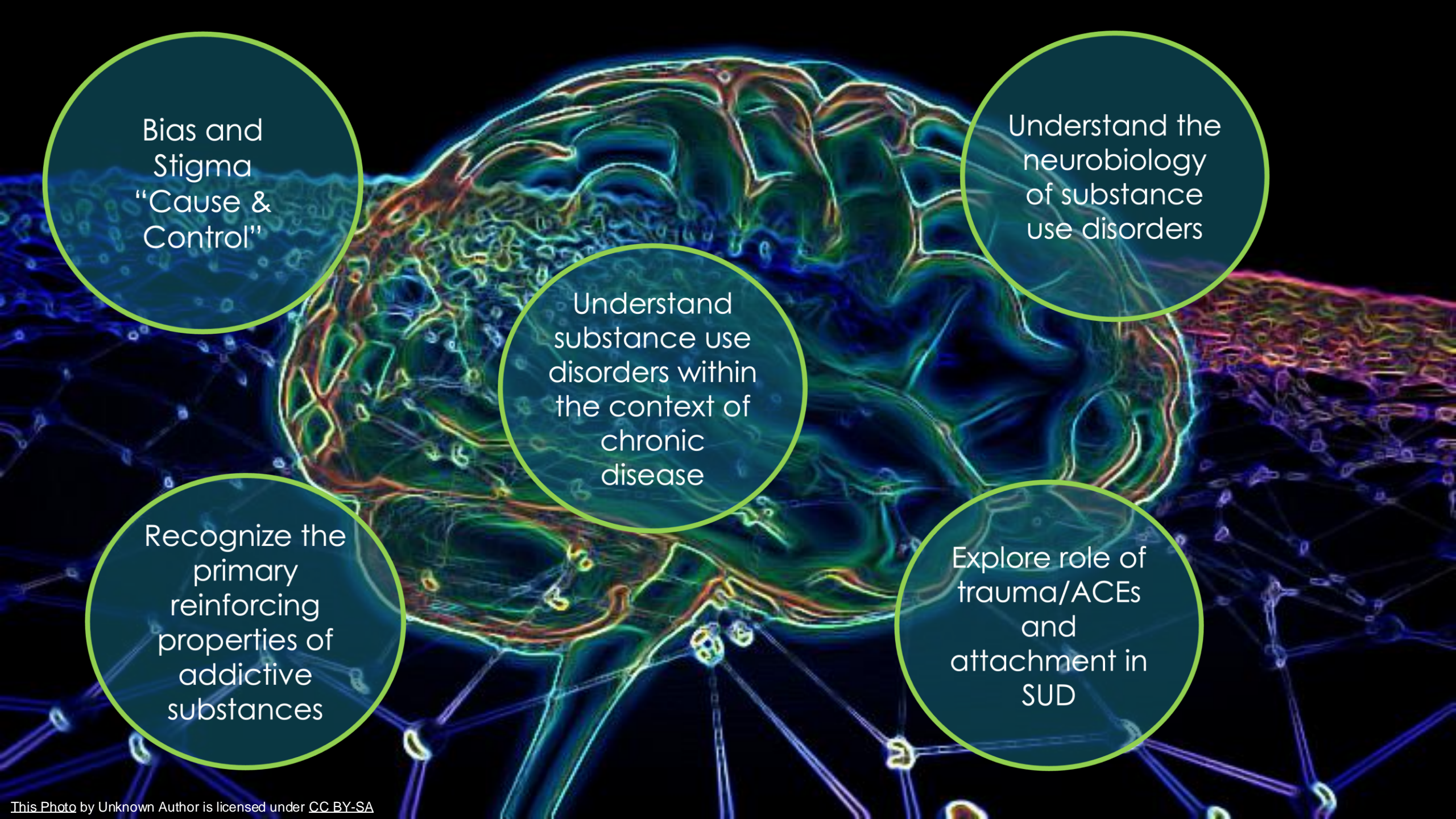


Attachment



Pain



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Neurobiology of Substance Use Disorders



Case Vignette

Riley is a 24-year-old who identifies as a woman who struggles with alcohol and methamphetamine use disorders. She was living with their 7-year-old son Chris until a recent DUI.

Riley came to the attention of a Drug Court following her third DUI and a possession charge.

Riley has been a single parent for the past three years after kicking Chris's father out due to physical and emotional abuse.

Riley has been drinking alcohol since age 13 and using meth near daily since age 19. There have been several inpatient withdrawal management admissions and some IOP treatment.

Riley occasionally attends AA meetings but did not follow up with outpatient individual counseling in the past.



Sorry, this question doesn't belong to this Menti

Reload



Pathophysiology

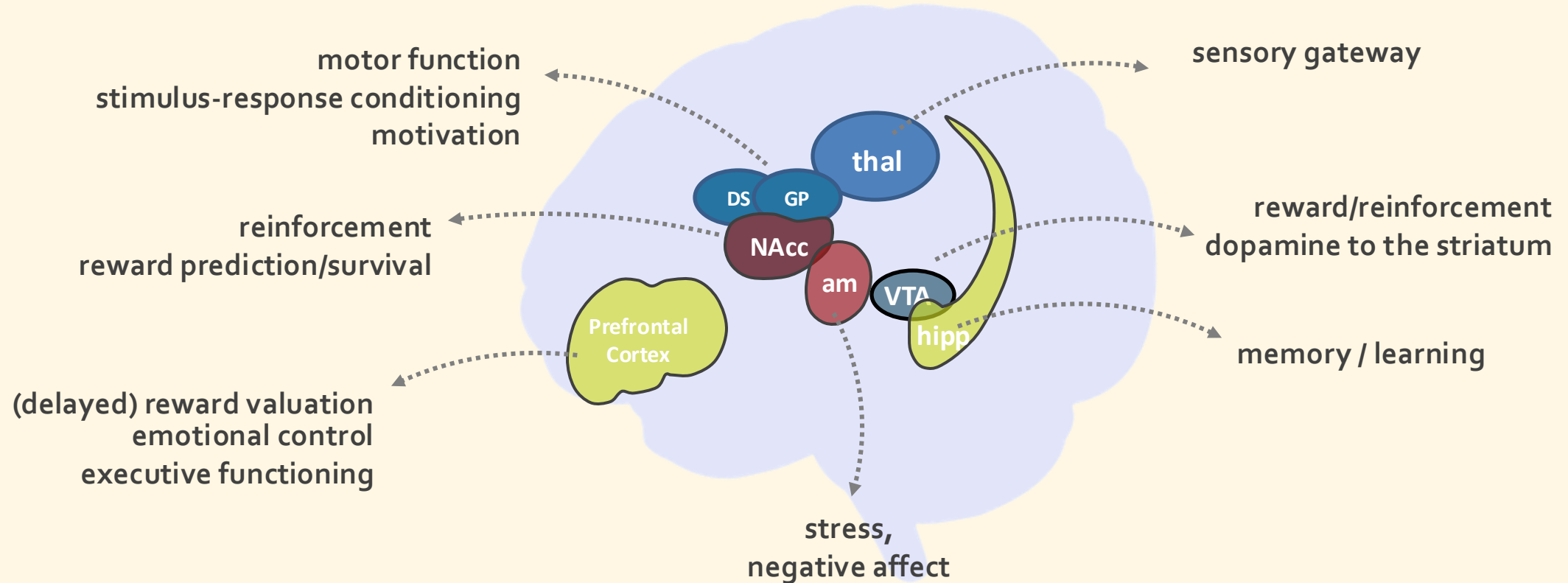
While there are some unique features at the molecular, cellular, and behavioral levels,

all substance use disorders share aberrations in the same CNS pathways

So, the Golden Rule is that multiple substance use disorders at the same time is the NORM, not the exception



Neurobiology of Substance Use Disorders

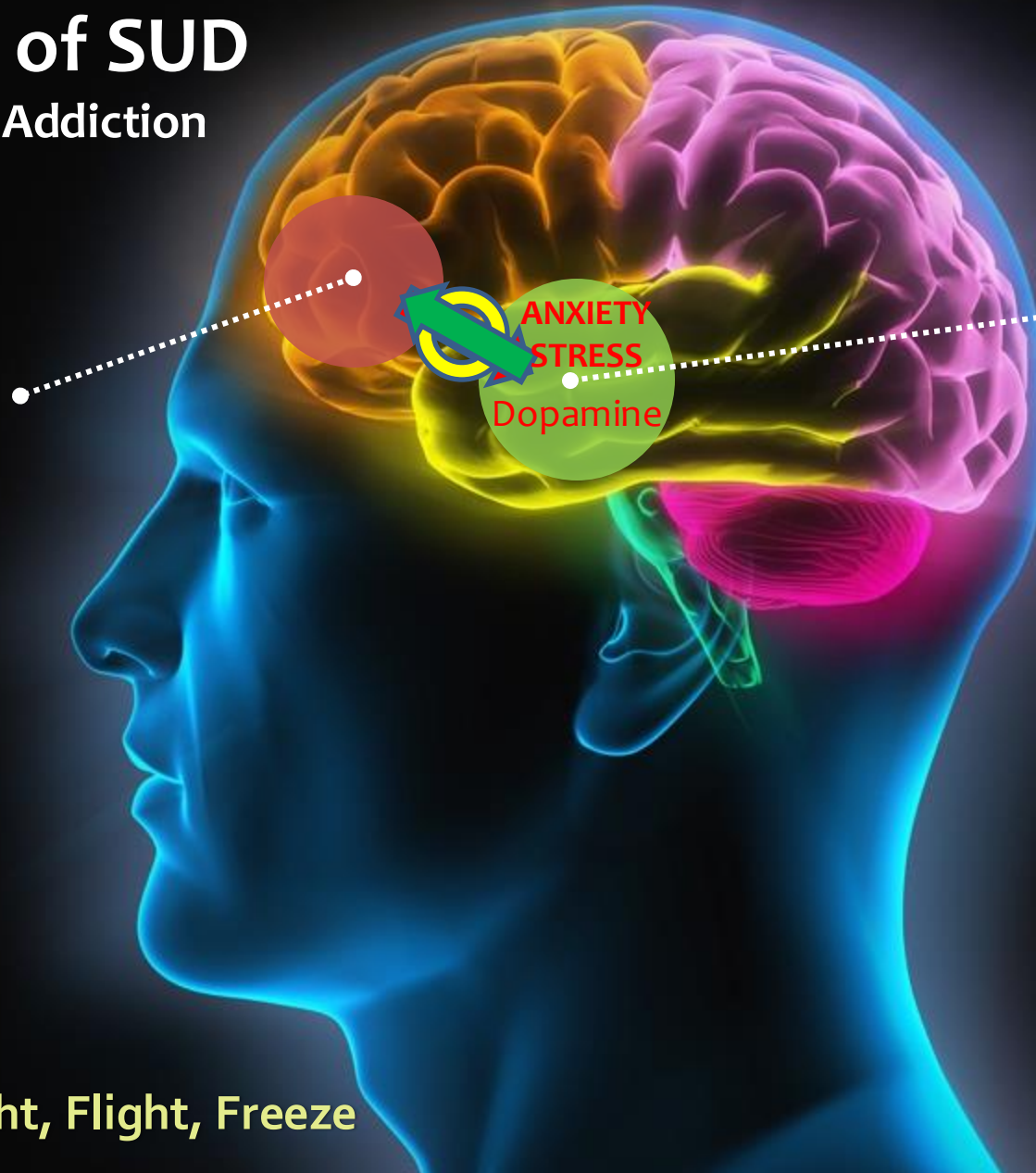


Neurobiology of SUD

and Overlap Between Addiction and Trauma/ACEs

Prefrontal Cortex

Emotional control, delayed reward valuation, executive functioning, judgement, perspective

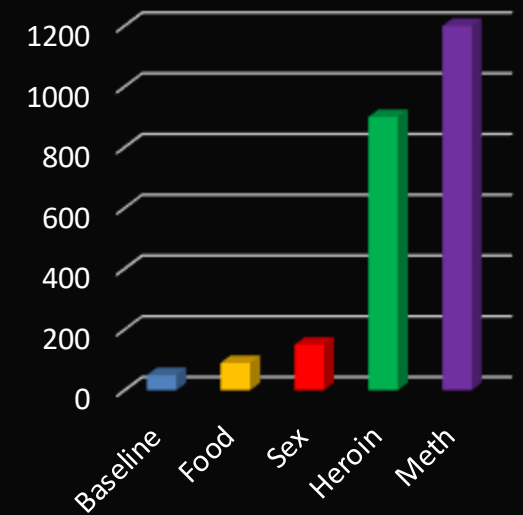


Fight, Flight, Freeze

Limbic System

Dopamine related reward and motivation, memory, stress response, emotions

Relative DA release



Source: Excerpt of a 2015 presentation for CHCF by addiction specialist R. Corey Waller, MD, medical director of the Center for Integrative Medicine at Spectrum Health Medical Group in Michigan. National Institute on Drug Abuse



Assess for Stage and Capacity for Change

- Certainly, we need to assess Stage of Change
- But, equally important (at times more important) is assessing capacity for change
- As part of an initial SUD evaluation, we need to recognize Executive Functioning deficits





Signs of prefrontal cortex deficits

NON-CLINICAL TERMS

(what we all see lived out, stigmatizing):

Inability to objectively assess oneself

Poor judgment

Inability to learn from experience

Decreased attention span

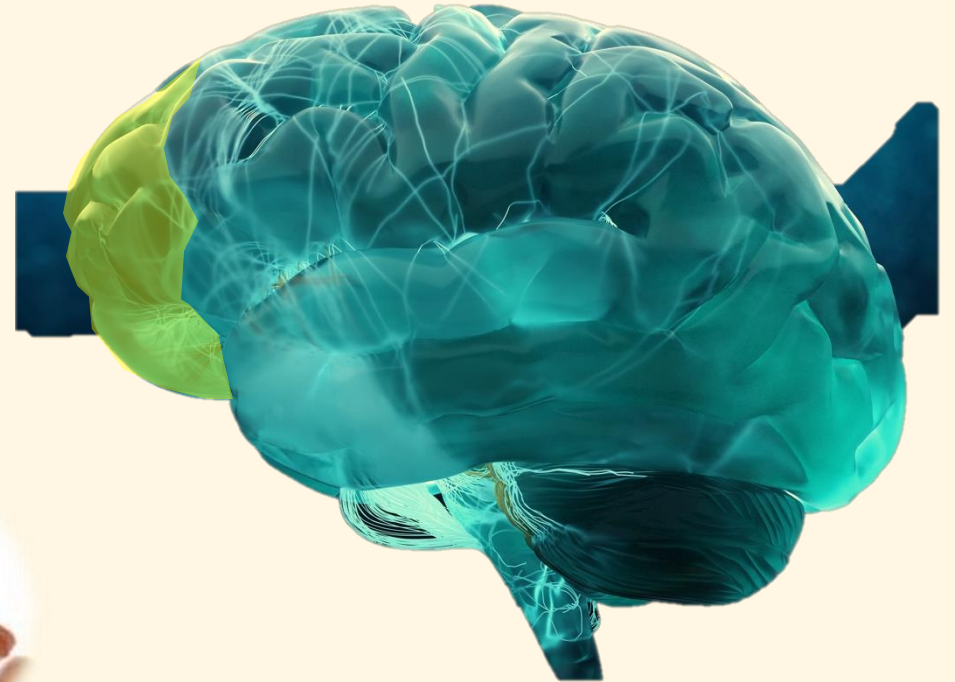
Becoming easily bored

Argumentative

Thin skinned

Self-centered

Disorganized



(We need to check our own reactions)

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Intersection of ACEs/Trauma and SUD



Case Vignette

Prior to Riley's DUI and possession charge, Child Welfare had become involved when a teacher reported that Chris had come to school with poor hygiene and clothes that did not fit for about a week.

The teacher also reported that Chris was showing symptoms of anxiety and some possible tics.

Chris also had some bruises on his wrists and upper arms.

When Riley was growing up, both of Riley's parents routinely used alcohol, cannabis, and meth in the home.

Riley describes her father as physically abusive towards Riley's mother and was often emotionally (and occasionally physically) abusive towards Riley.



Case Vignette

When Riley was 13, her mother died after an overdose (? Suicide) after many years of severe bipolar disorder.

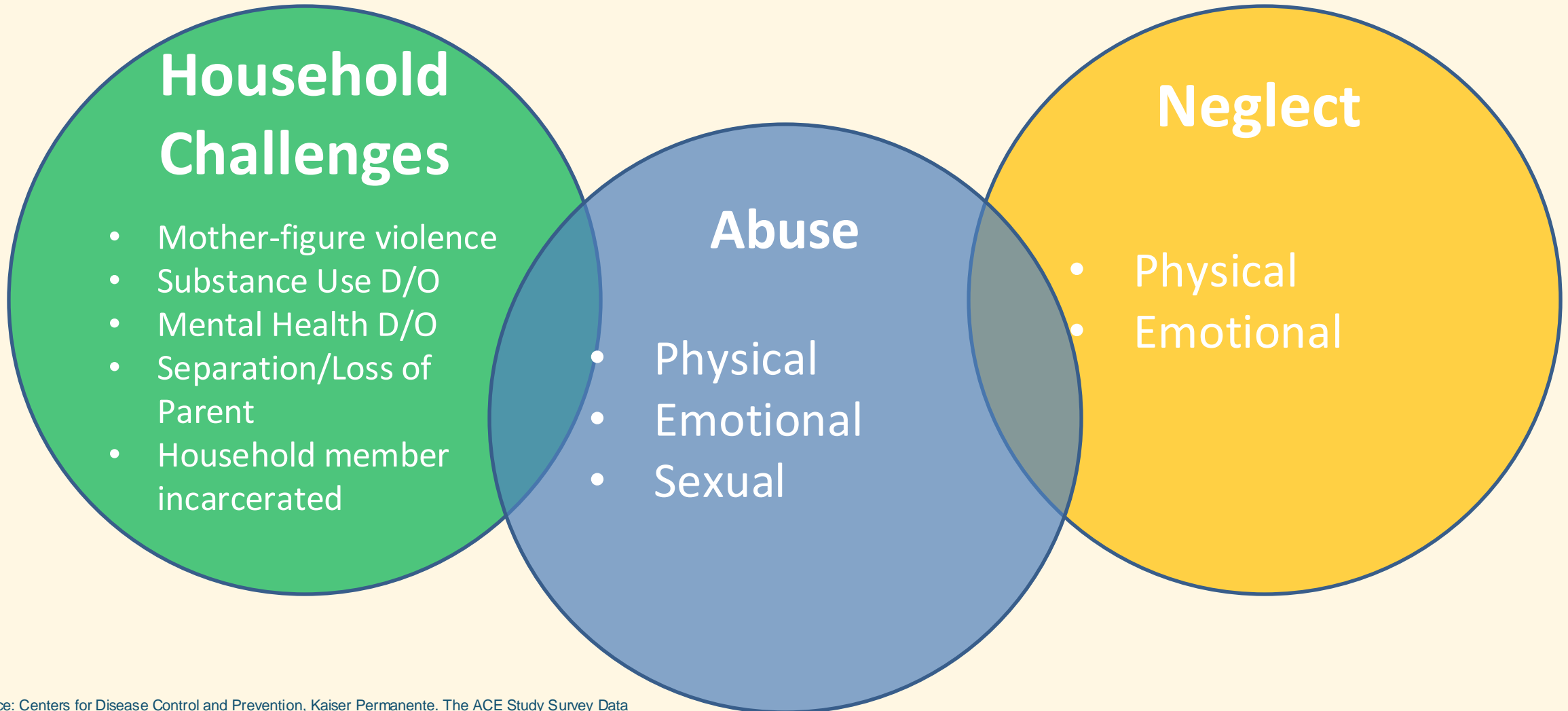
After her mother died, Riley's father struggled to support the family and was often both physically and emotionally distant.

Riley recalls many times where they had to move because of finances and food was always scarce. Riley said that she "never had the right clothes to wear" and was frequently bullied by kids at school.

Riley reported being sexually abused by one of Riley's father's "friends" and her father did not believe her.

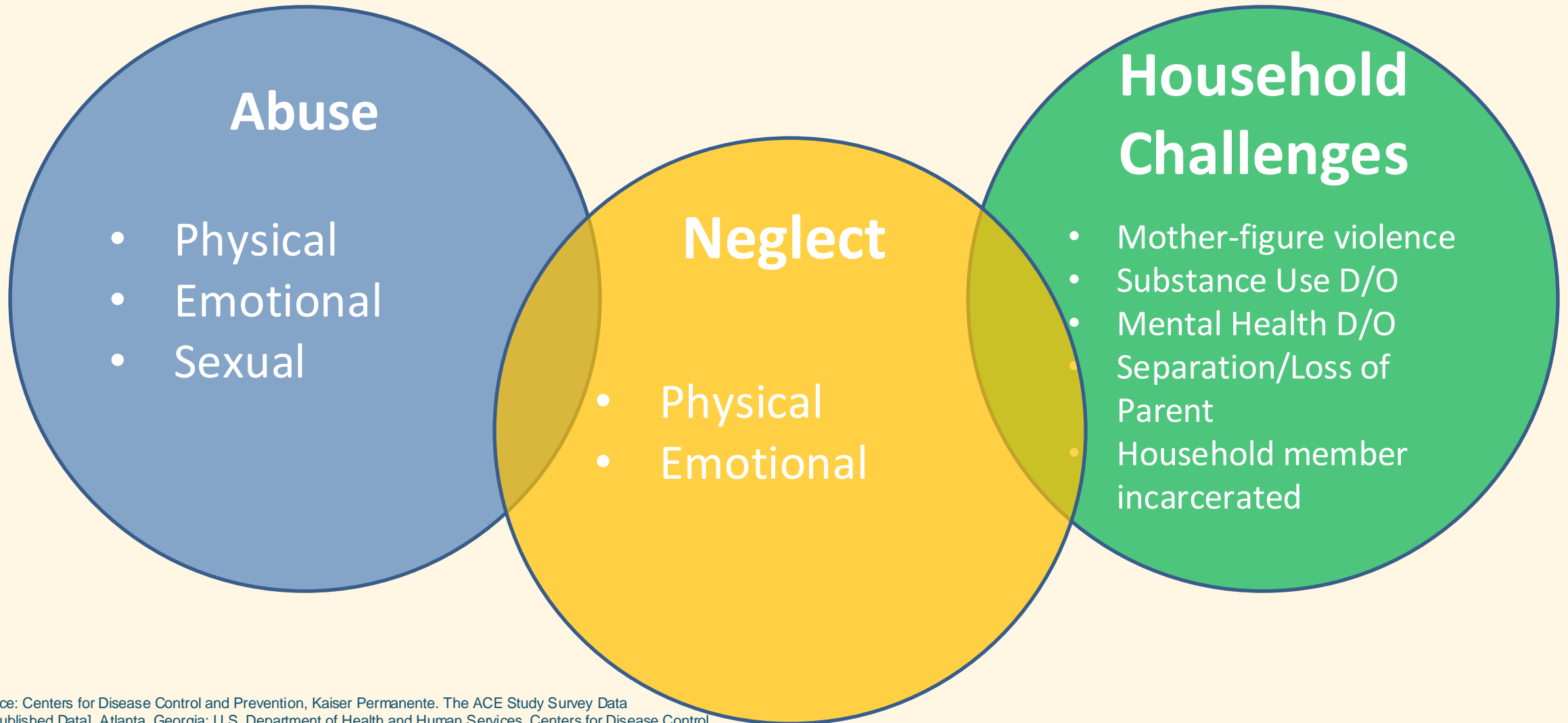


Adverse Childhood Experiences (ACEs)



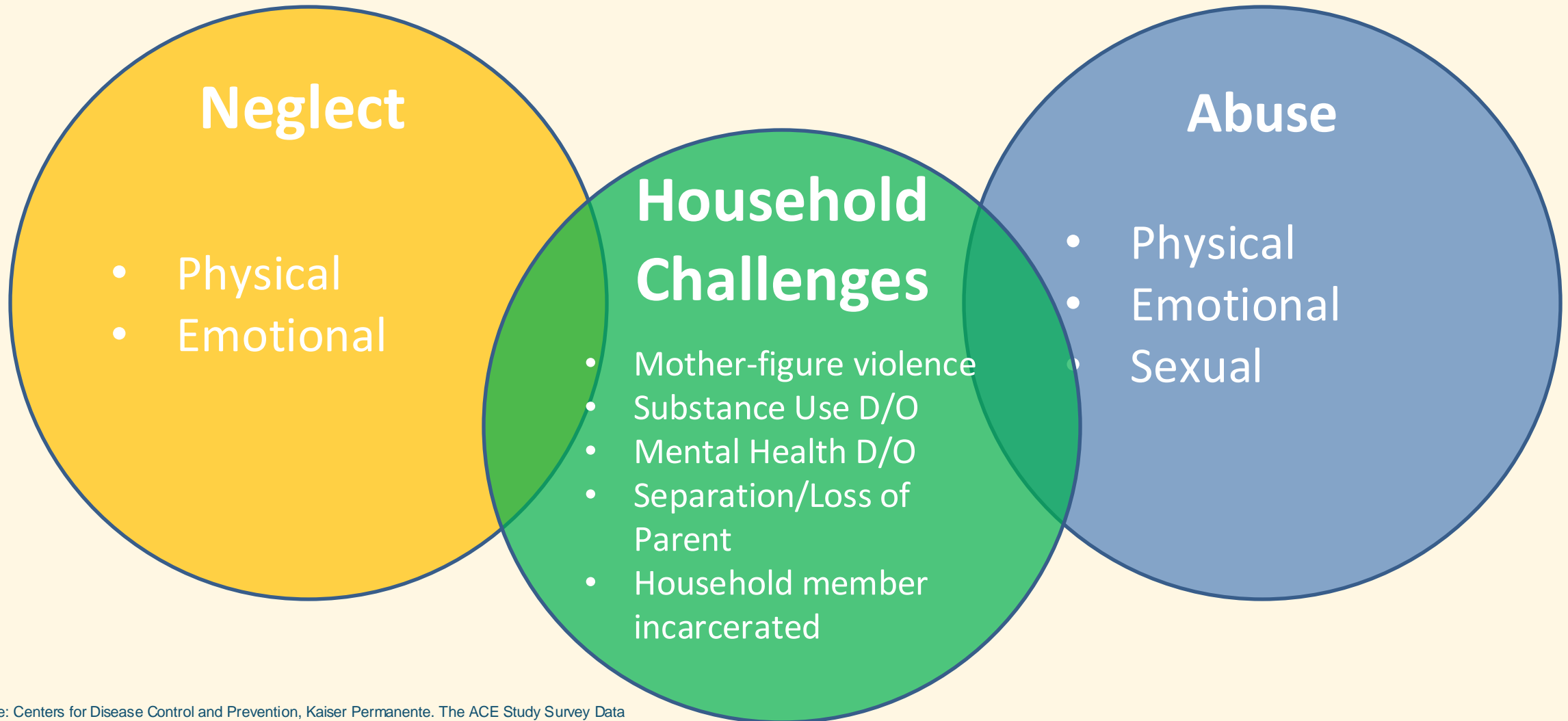


Adverse Childhood Experiences (ACEs)





Adverse Childhood Experiences (ACEs)





Three Realms of Adverse Childhood Experiences



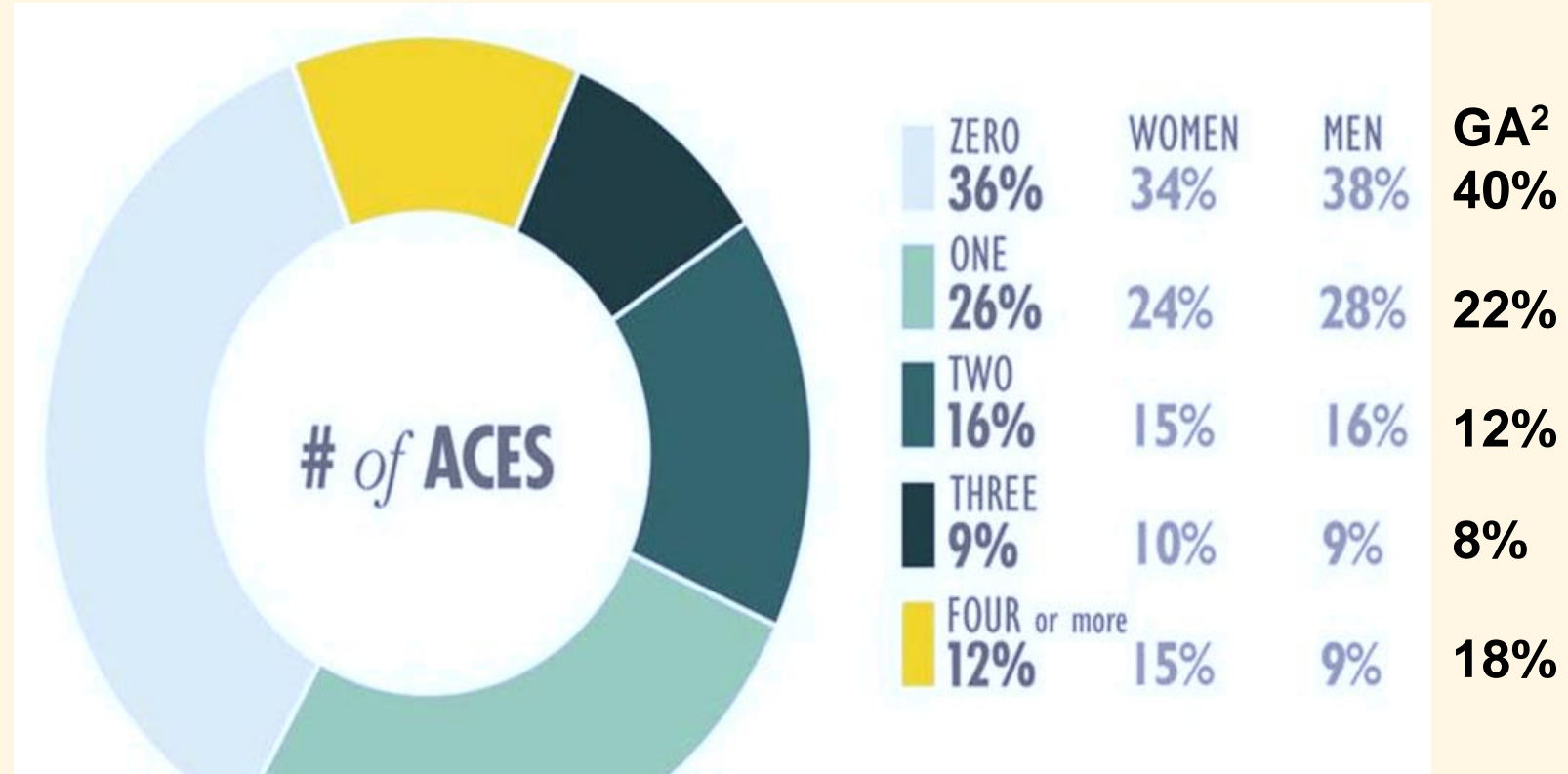
Thanks to Building Community Resilience Collaborative and Networks and the International Transformational Resilience Coalition for inspiration and guidance. Please visit [ACESConnection.com](https://www.acesconnection.com) to learn more about the science of ACEs and join the movement to prevent ACEs, heal trauma and build resilience.



How common are the ACEs?

More than 4X higher 4+ ACEs in Justice-involved populations

- Nearly 2/3 of people had at least 1 ACE
- Over 1/5 had 3 or more ACEs
- ACEs don't occur alone....
- if you have one, there's an 87% chance that you have two or more.¹



VERY COMMON!!!

Sources: ¹Centers for Disease Control and Prevention, Kaiser Permanente. The ACE Study Survey Data [Unpublished Data]. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2016. ²Davis, V.N., Bayakly, A.R., Chosewood, D., Drenzek, C. 2018 Data Summary: Adverse Childhood Experiences. Georgia Department of Public Health, Epidemiology Section, Chronic Disease, Healthy Behaviors, and Injury Epidemiology Unit



Case Vignette

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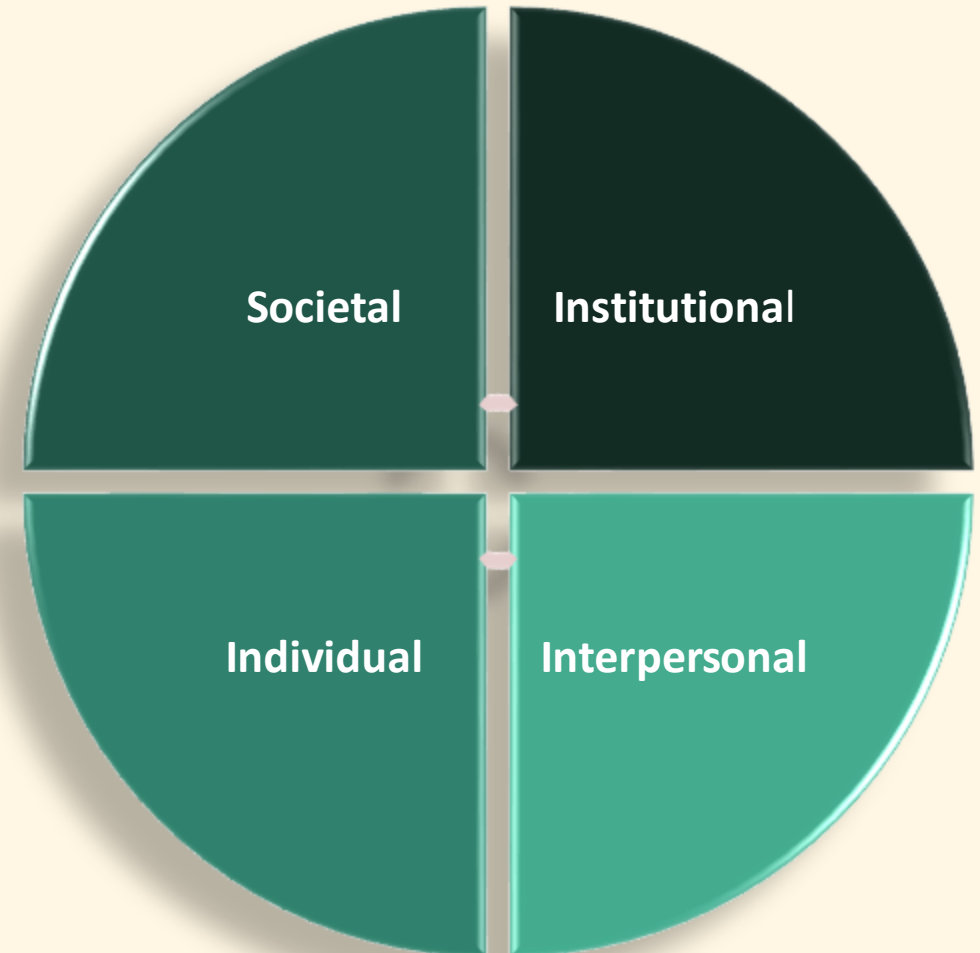
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Types of Trauma (not an exhaustive list)

- Discrimination (all the ism's)
- Race Based Trauma
- Gender/Sexuality Based Trauma
- Attachment Trauma
- Medical Trauma
- Natural Disasters
- Social determinants of health
- Historical trauma
- Violence and abuse
- Neglect
- Physical trauma
- Intergenerational Trauma
- Vicarious Trauma

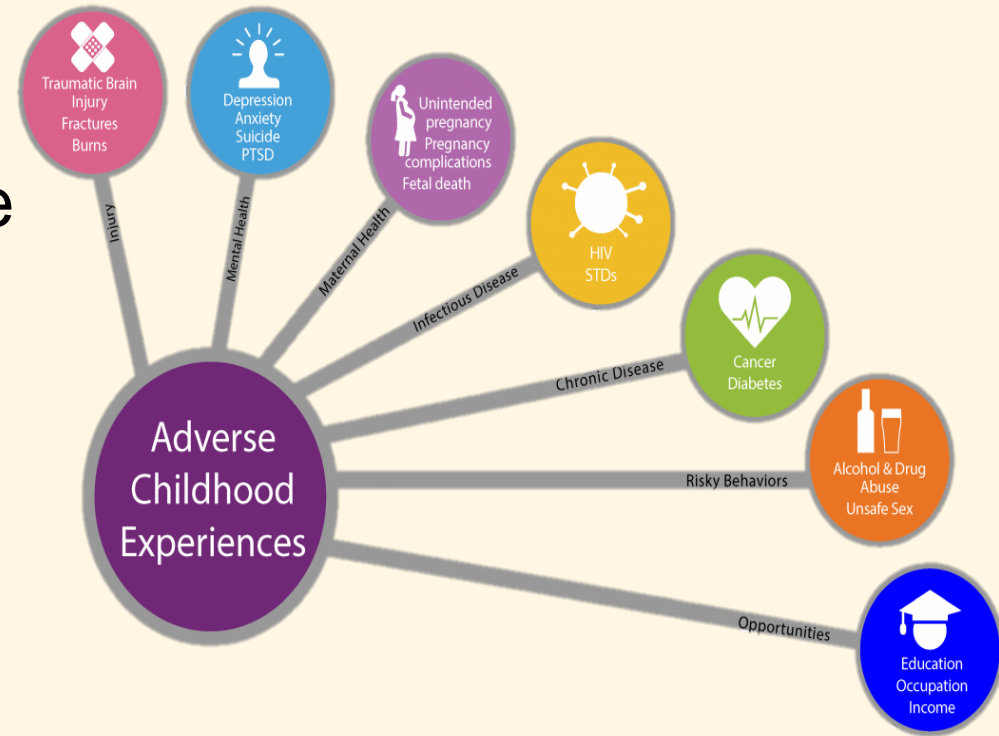




How do ACEs affect Health?

Increased Risk of Illness with 4+ ACEs

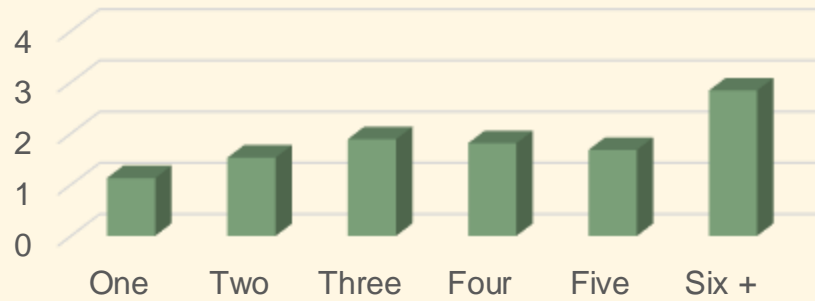
- 4.5x risk for depression
- 2-4x risk for AUD, and 7x risk for drug use
- 12x risk for suicide
- 2.5x risk for COPD
- 2.5x risk for Hepatitis
- Increased risk of illness with 7+ ACEs
- 3x risk for lung cancer
- 3.5x risk for ischemic heart disease
- 6+ACEs associated with **20-year reduction** in Life Expectancy



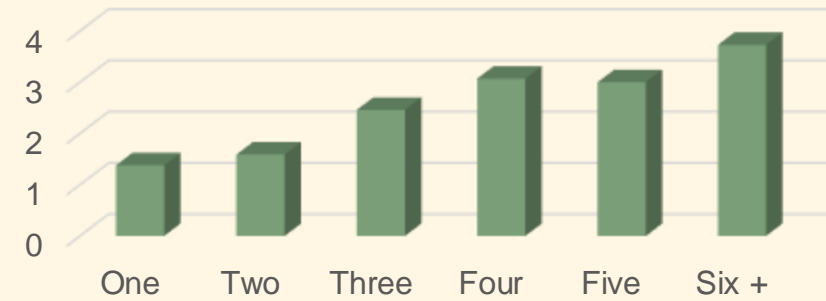


“Dose-responses” with Mental Health/SUD and ACEs

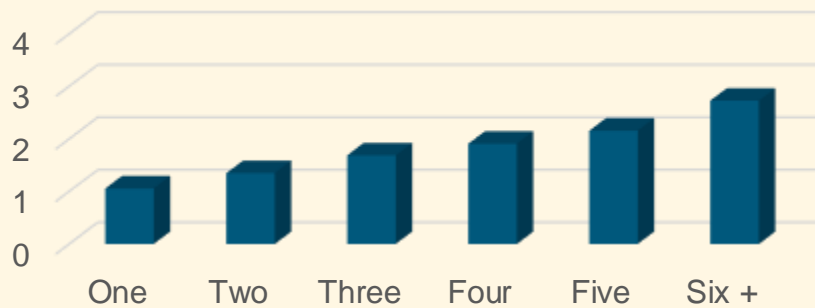
Moderate to Heavy Alcohol Use



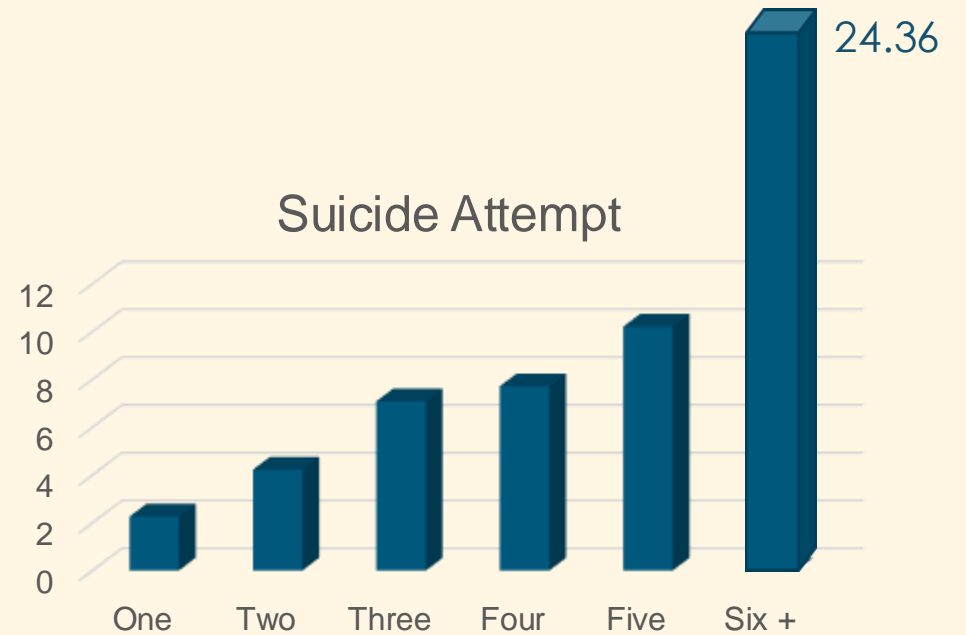
Illicit Drug Use



Depressed Affect



Suicide Attempt

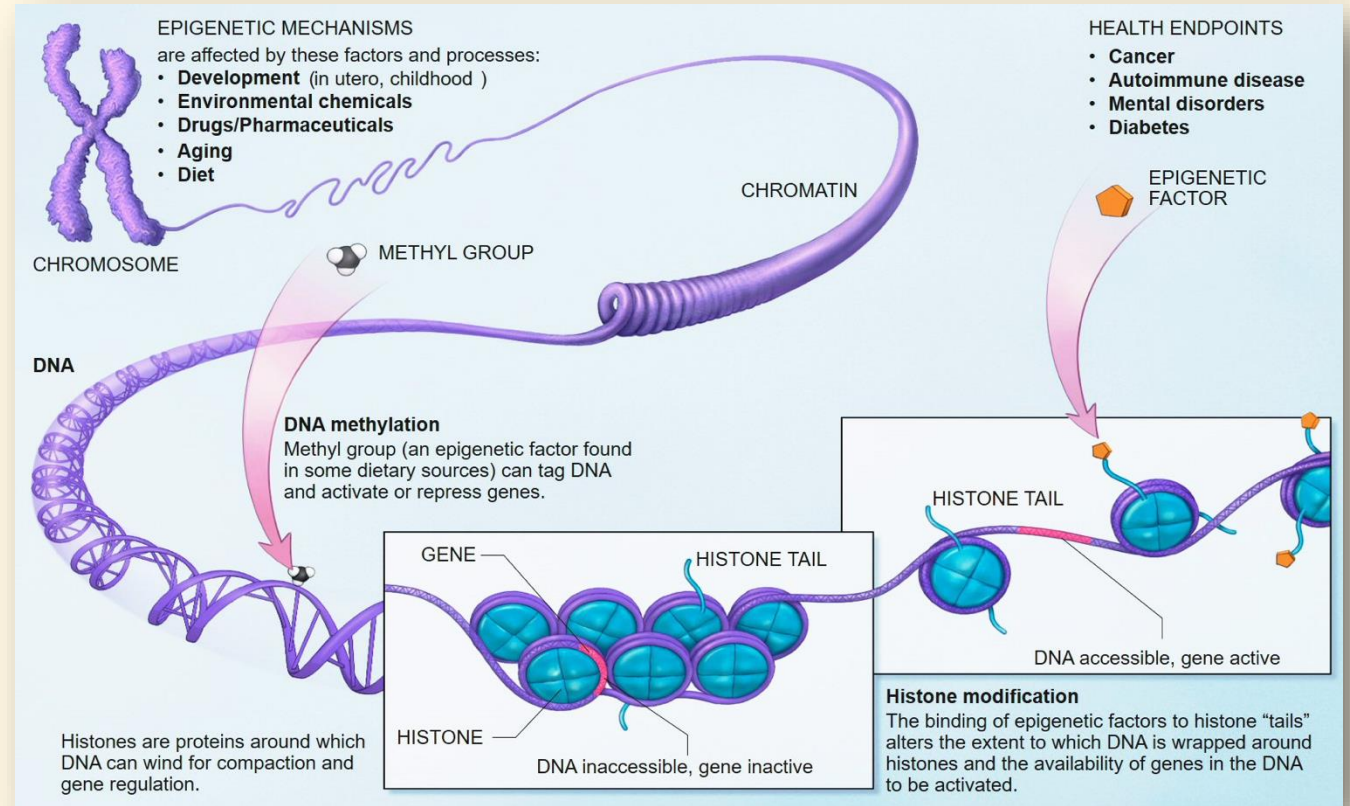




Epigenetic Effects = Genetics + Experiences

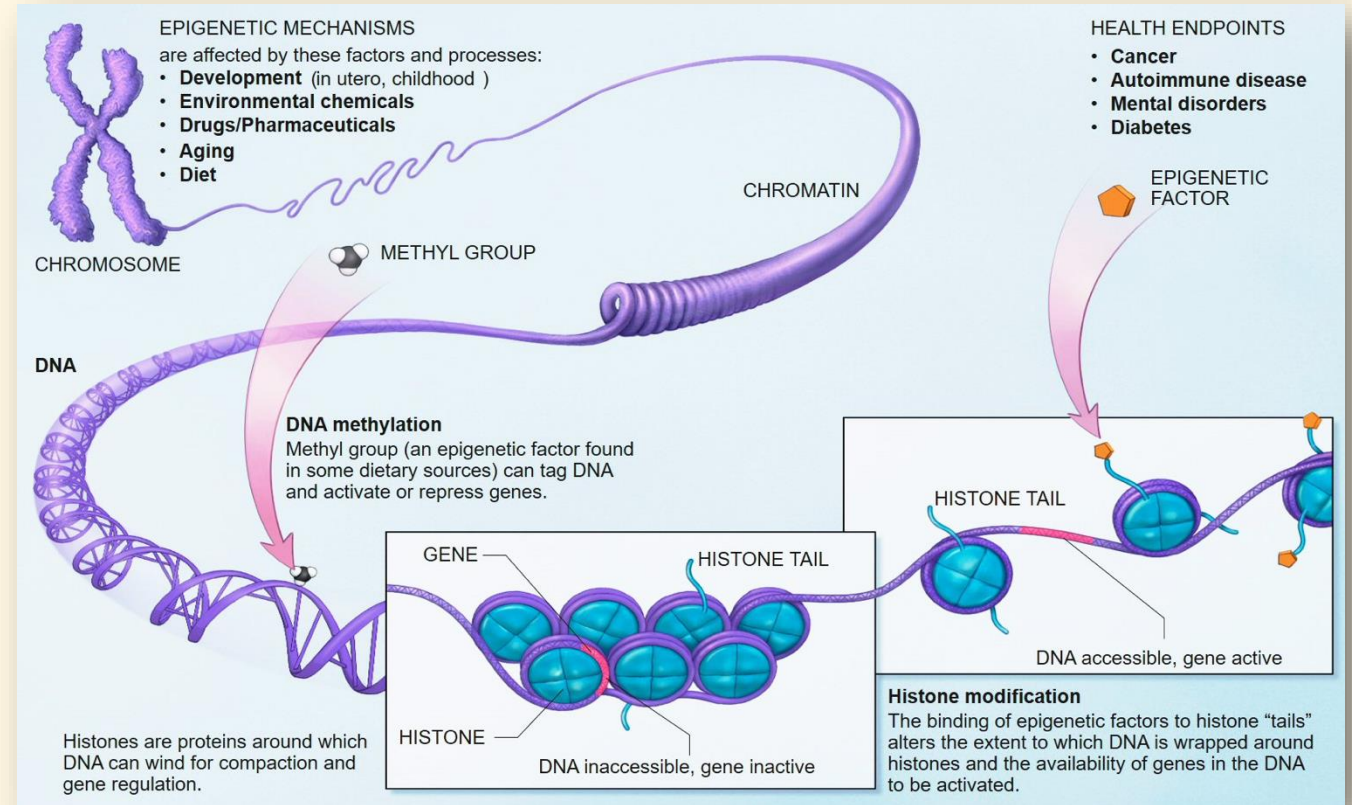
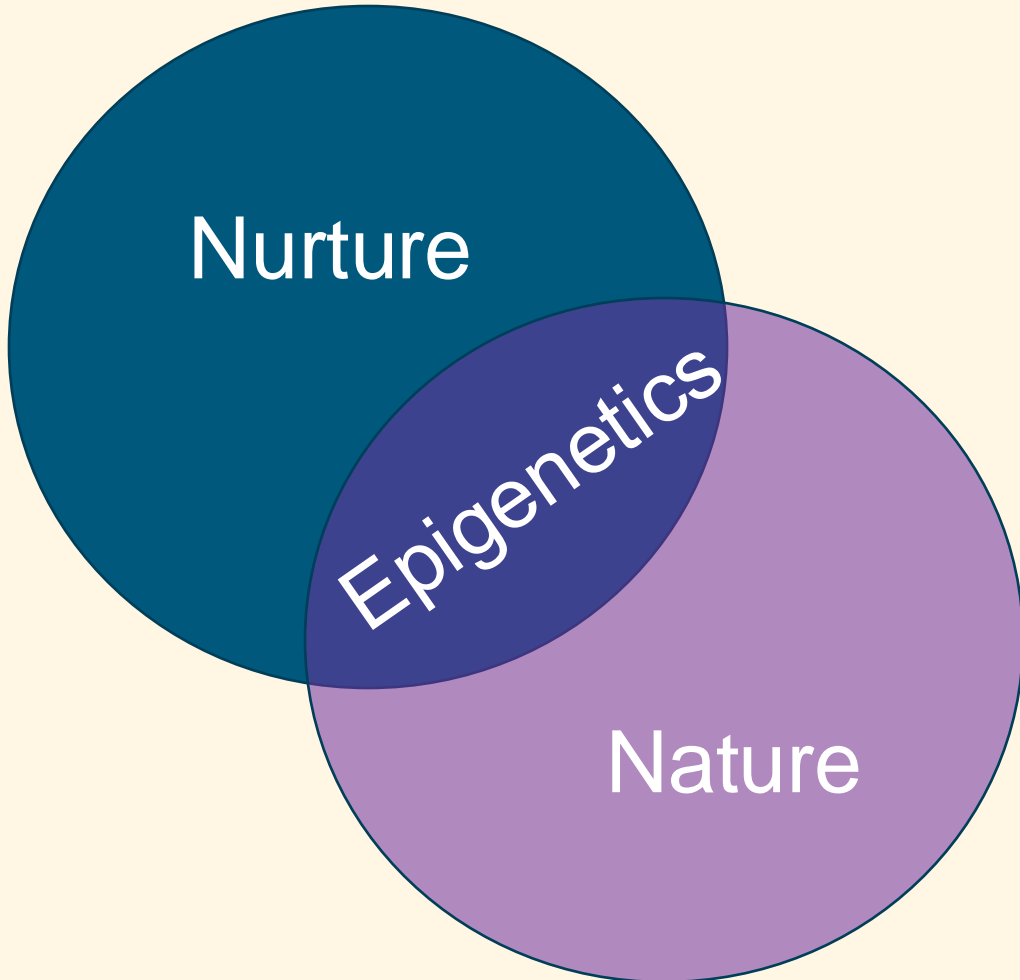
Nurture

Nature





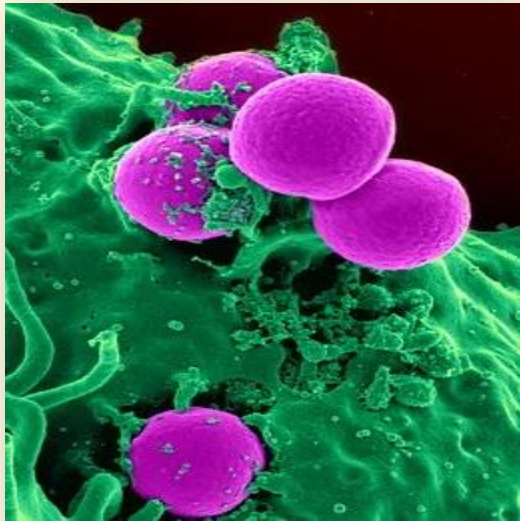
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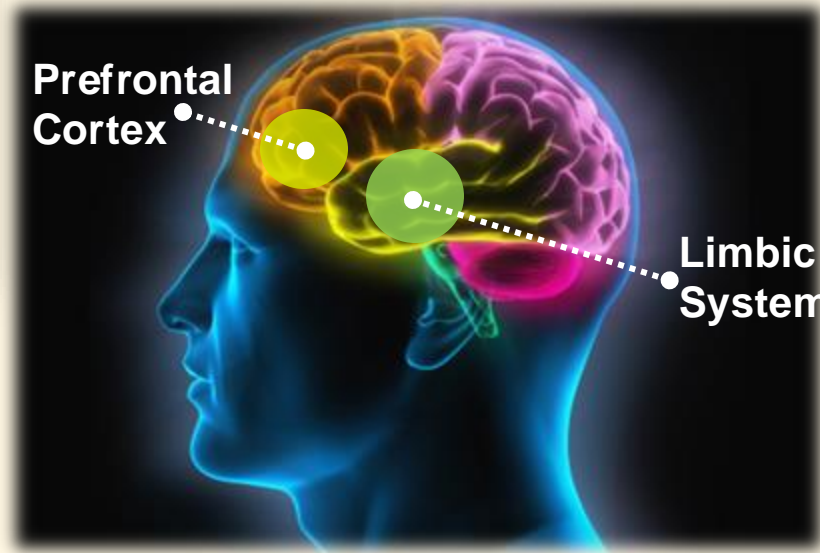
Effects of ACEs and trauma (focus on SUD/MH)

Inflammation



Depression

Brain Changes



Addiction



Chronic

Pain



Stress

Fight



Freeze

Flight

Herzog JI, Schmahl C. Adverse Childhood Experiences and the Consequences on Neurobiological, Psychosocial, and Somatic Conditions Across the Lifespan. *Front Psychiatry*. 2018;9:420. Published 2018 Sep 4. doi:10.3389/fpsy.2018.00420, and Volkow et al. *NEJM Neurobiologic Advances from the Brain Disease Model of Addiction* 2016.



But...Humans are resilient!

- Individual strengths
- Family Support
- Friendship
- Community Support
- Cultural Support





Four “R”s in a Trauma-Informed Approach

Realizes

- The widespread prevalence of trauma individually and collectively and the presence of strength and resilience.

Recognizes

- How trauma affects, client’s, families, staff and others involved in the system.

Responds

- By putting knowledge into practice individually and organizationally by learning from community, promoting safety and wellness.

Resists

- Re-traumatizing by re-evaluating procedures or policies that have been activating or traumatizing in the past and seek to eliminate them.



What can all members of the team do?

- **Recognize** the childhood traumas experienced by individuals like Riley
- Strive to **understand** WHY Riley began using substances
- **Understand** that there were likely prefrontal deficits and overactive Fight, Flight, Freeze systems before and then worse after substance use
- Recognize that with continued use, further brain changes have occurred
- **Reflect** upon our own reactions to Riley's behaviors and, using the neurobiological information we learned, acknowledge that Riley might not immediately be able to self-manage and that their substance use is a symptom of their illness.

Return to use = reemerging symptoms, not “failure”

- **Ensure** that all team members (not just clinicians) utilize motivational engagement skills to support Riley in connecting with all services

Thank you!



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“Regardless of the pain, challenges or wounds that we carry, there is always potential for healing and transformation.”

-Gabor Mate