



## Addiction and the Brain

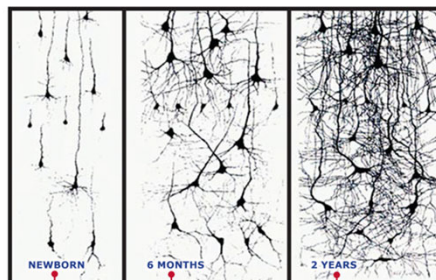
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### BUILDING CONNECTIONS

More Than **ONE MILLION**  
New Neural Connections Per Second  
During the first few years of life

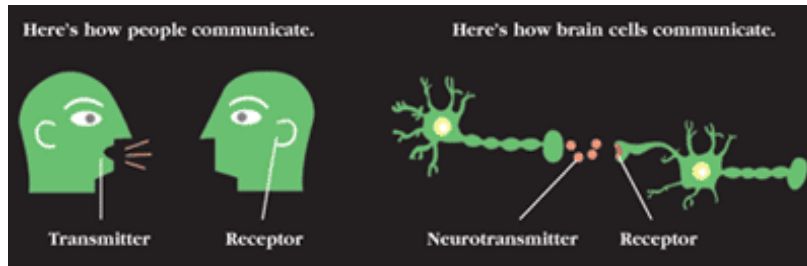
Source:  
Harvard Center for the Developing Child

Brains are not fully  
developed until at least  
age 25



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## Brain Functioning and Mental Illness Neurotransmitters



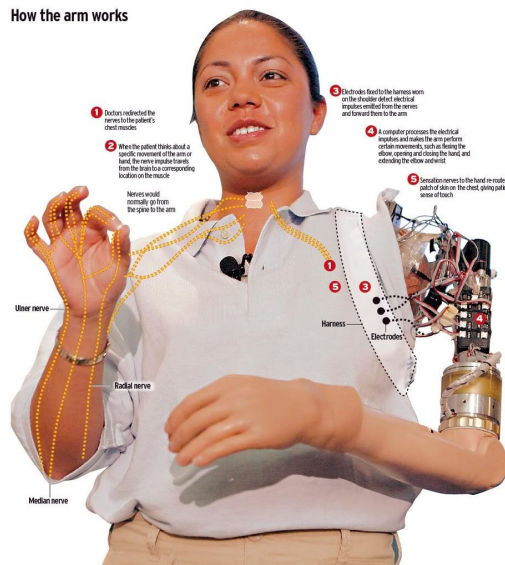
Concept courtesy: B.K. Madres



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## The Brain and Nueropathways

How the arm works



- Transmit signals, information
  - Electric signals
  - Chemical signals
- Signals are transported by chemicals in body
- Signals move your muscles
- Signals transfer thoughts



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## Watering the garden



What path will the water take the first time the garden is watered?

What path will the water take the second time?



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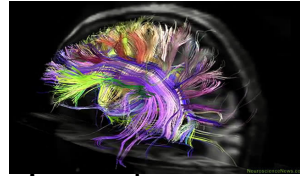
## Pathways

- Experiences organizes the pathways in your brain.
- Brain organization is based on repetition.
- The more you experience a thought or feeling the more likely it is to be repeated by you as a response
- If trauma is pervasive at a systemic level, brain chemistry is altered to include protective factors such as hypervigilance and distrust



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## Brain Structure



- The Chemical pathways in the brain can be changed by adding or deleting substances
- The structure of the Brain itself is not altered when these pathways are affected – there are many more synapses in our brain than we can ever use
- Brain functions can be altered by using new pathways or using existing neuropathways differently
- Melatonin, Dopamine and Serotonin are neurotransmitters



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## Survival Center Brain

Primitive/Survival center is more than just fight or flight

- Eating (sucking, rooting)
- Breathing
- Elimination
- Procreation (sex)
- Crying



Pain is a survival center function

- Pain tells you to get help
- Managing pain becomes a survival issue - whether physical pain or emotional pain
- Flight or Flight – if you think you die



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## Addiction

When we eat great lasagna, get a warm hug or compliment, use a drug or addictive behavior, or even anticipate one of these; our brain lights up (serotonin)!



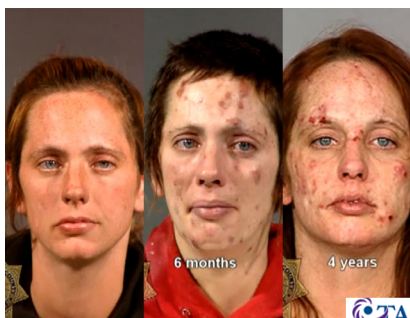
Ordinarily, the prefrontal cortex keeps the midbrain in check. However, with addiction, the midbrain becomes more powerful than the prefrontal cortex at guiding behaviors. Addictive chemicals or behaviors stimulate the unconscious survival centers in the midbrain and tells the brain that it needs more and more to survive.



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## Addiction is a Disease

Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to an individual pathologically pursuing reward and/or relief by substance use and other behaviors.



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Addiction Disrupts the survival center in the brain so it disrupts self preservation

**SELF-PRESERVATION IS THE FIRST LAW OF NATURE.**

Samuel Butler

Addiction disrupts awareness



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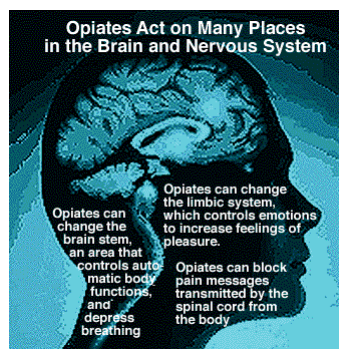
## Addiction Treatment

The same way that chemical imbalances can cause mental illness – the chemicals that one ingests (alcohol, prescriptions, tobacco, opioids, METH, marijuana, etc.) – can alter brain chemistry. Brain Chemistry is altered not just when using the substance but for long periods afterwards.

Many substances such as opiates – can change parts of the brain chemistry.

Opiates in particular destroy the pleasure cells which leads to an increasing need for more substance to feel anything or to recreate the 'high' that first occurred. Because these cells are destroyed the user will keep trying even though the 'high' is never recreated.

It can take at least a year of abstinence for a person's brain to recover enough to be at baseline – essentially fully functioning, able to feel emotions and sensations again.



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## Types of Addiction Treatment

### Brain Recovery – A Chance to Heal

Traditional treatment has been abstinence based and long term (when possible)

Brain heals with treatment (retraining the brain) and removal of triggers, focused participation; Return to the community often means a sober living environment.

Current Treatment modalities also include Medication Assisted Treatment (MAT)



Brain heals with treatment (retraining the brain) and medication that blocks receptors in the brain so that the person can be in the community while in treatment; titrated off medication as the brain heals

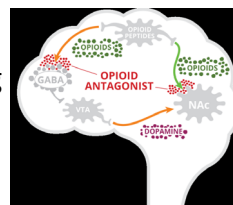


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## Brain Recovery – a Chance to Heal

Traditional treatment

Detox, residential treatment and sober living  
Takes opportunity and triggers to use away



MAT

Methadone

Subutex - Buprenorphine

Partial Antagonist – blocker that replaces opioid on receptors; doesn't allow opioid to have an effect

Taper protocol for up to 2 years typically

Not as addictive as other opiates, methadone

Vivitrol – Naltrexone (opioid and alcohol addiction)

not addictive and not an opioid

Given shot 1x month; blocks receptors

Not for pregnant women

Equally effective

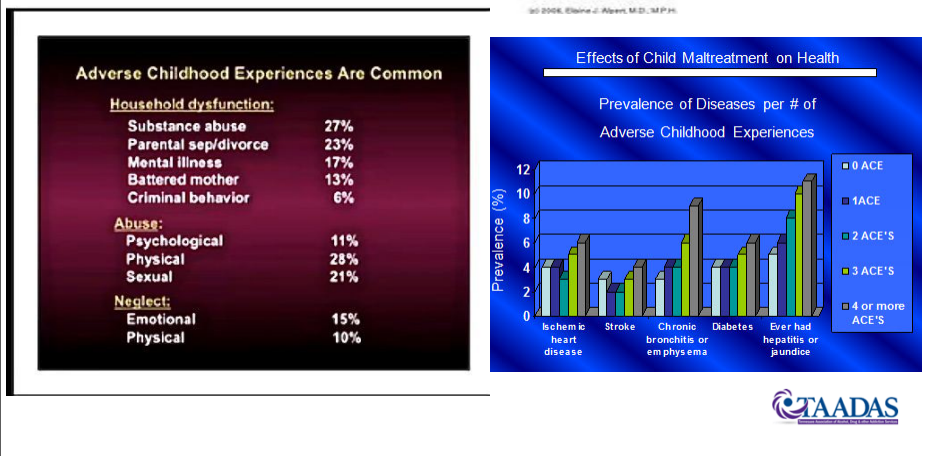


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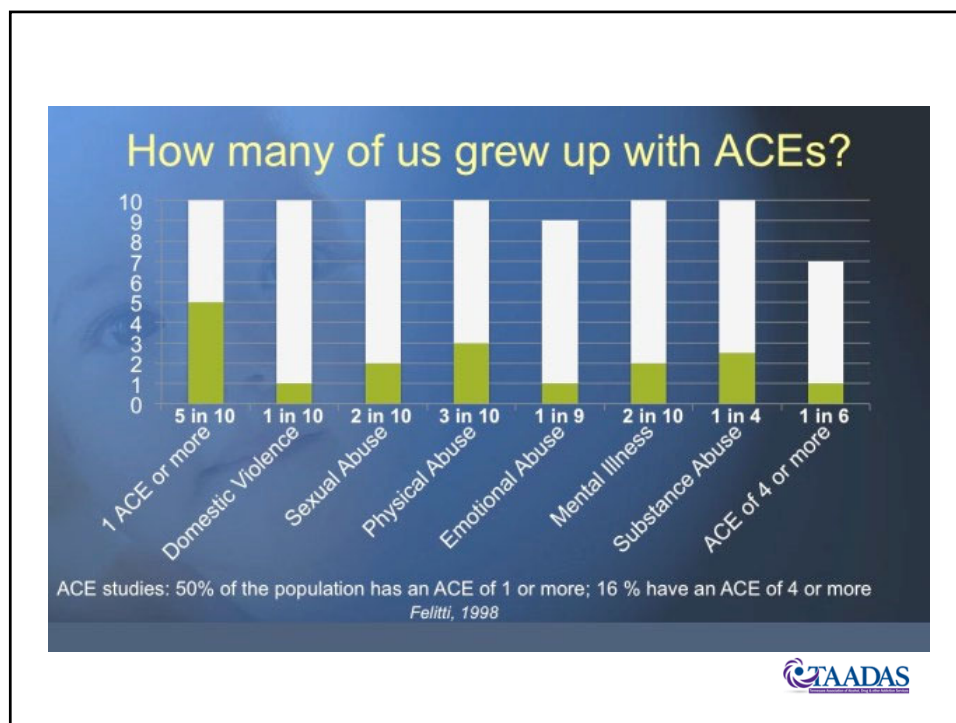


## The Adverse Childhood Experiences (ACE) Study

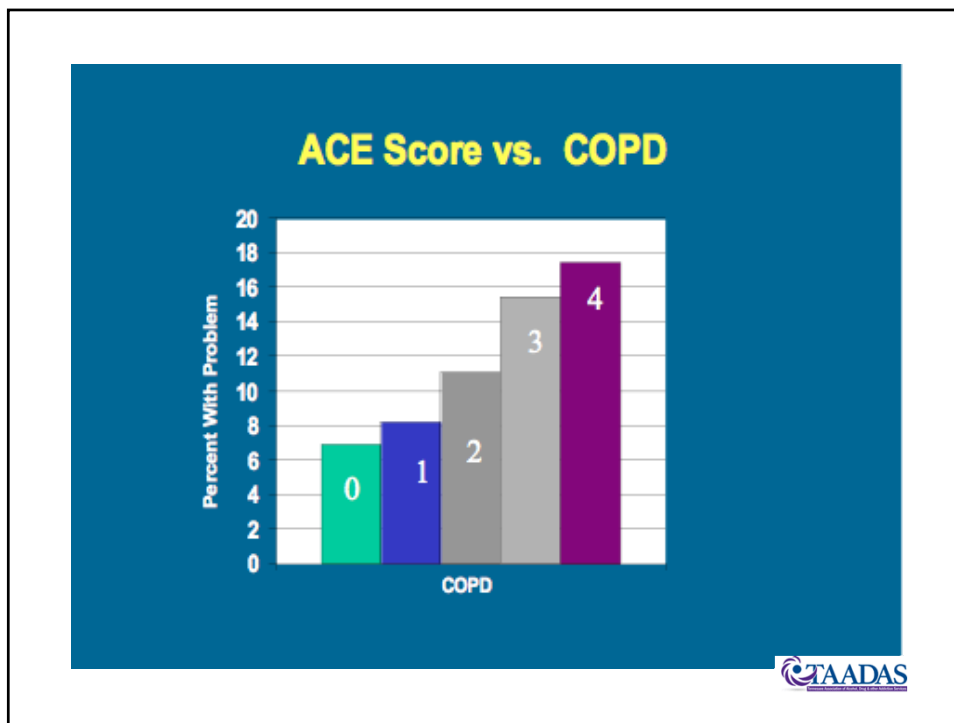
<http://www.cdc.gov/violenceprevention/acestudy/>



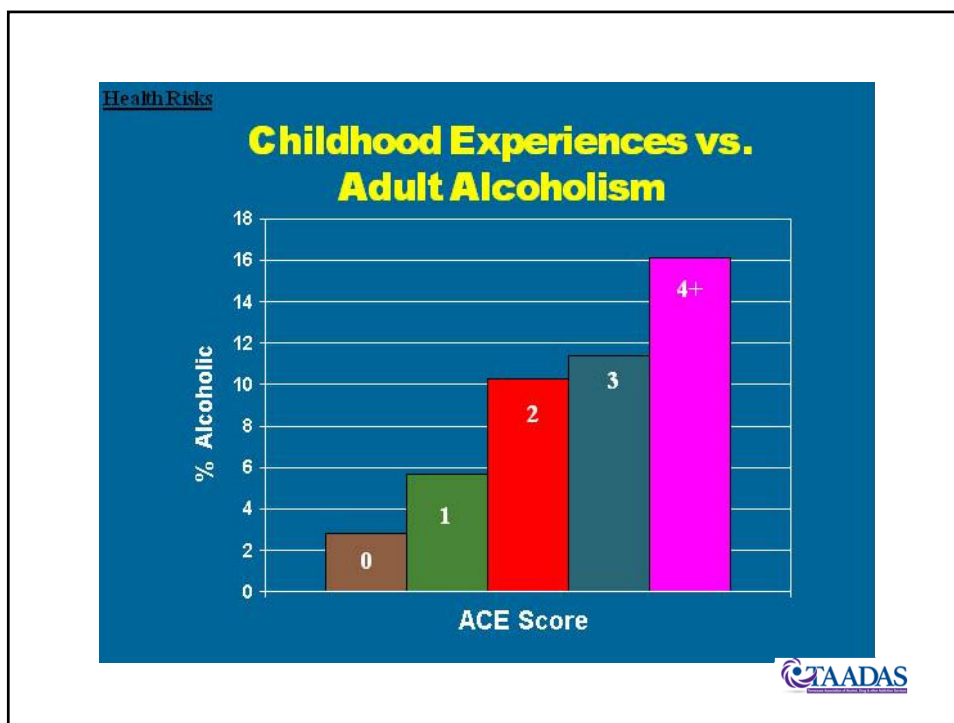
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## Trauma

Trauma is not an event, but a person's response to an event.

Traumatic experiences can trigger 'fight or flight' responses – trigger the survival center of the brain.

Self preservation demands immediate reaction– no time to think.



When repeated trauma is hardwired in the brain – reactions toward what the person perceives as self preservation come automatically.

The person may not even realize why they are reacting.



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## Trauma and Survival Functions

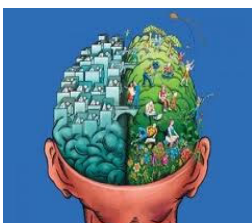
Survival center brain reacts to keep you safe  
If you take the time to think – you die



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## Trauma's Influence on Brain Development

- Access to adequate stimulation at key times that organizes brain structure and function
- Elevated stress hormone levels (particularly adrenaline and cortisol) may impact brain structural development
- Sustained stress hormones correlated with reductions in brain development and function such as:



- Memory, emotional regulation, and stress regulation
- Verbal skills, memory, and problem solving



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## Trauma and Addiction

- Same area of brain that regulates nervous system response (pain, flight and fight) also regulates sleep cycle, and food and water intake.
- These chemical changes that come with the brains response to trauma can lead to behaviors to self sooth – eating, drinking, and sex.



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## Repetition is Key

- No new skill is learned quickly – you must repeat a new behavior as long as it took to learn the old behavior
- Once you have a skill it will not automatically translate to new environments or be instantly accessible



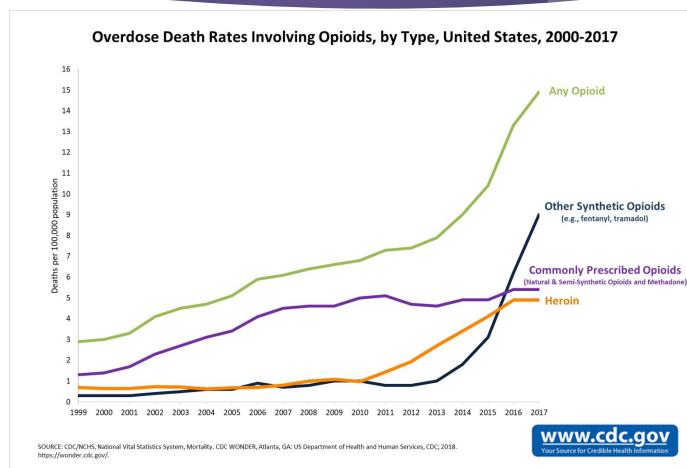
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## Tennessee's Opioid Crisis

- ▶ There are more opioid prescriptions than people in Tennessee.
- ▶ This total places Tennessee second in the nation, behind only Alabama in prescriptions of the drugs, according to IMS Health data. Even though the number of scripts has fallen by 724,070 since 2013 when there were over 8.5 million total prescriptions, the state remains ensconced as a leader in prescribing oxycodone, hydrocodone and Percocet.
- ▶ Currently Tennessee is the nation's leader in Suboxone prescriptions and that is the number one most prescribed medication in the state.

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## Tennessee's Opioid Crisis



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## Addiction Crisis

An estimated 88,000 people (approximately 62,000 men and 26,000 women) die from alcohol-related causes annually, making alcohol the third leading preventable cause of death in the United States.

Overdose is now the #1 cause of accidental death in the United States, recently surpassing car accidents. Every four minutes a parent loses a child to addiction, and the rising cost of addiction now exceeds \$400 billion a year.



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**Tennessee REDLINE**

- ▶ Provider Referrals statewide
- ▶ Toll free
- ▶ 24/7
- ▶ Anonymous

**TN  
REDLINE**   
**1.800.889.9789**




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**Contact  
Information**

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