

# Community Education Series

The Recovery Village and Advanced Recovery Systems





**Presentation Topic:**  
Trans-cranial Magnetic Stimulation (TMS)

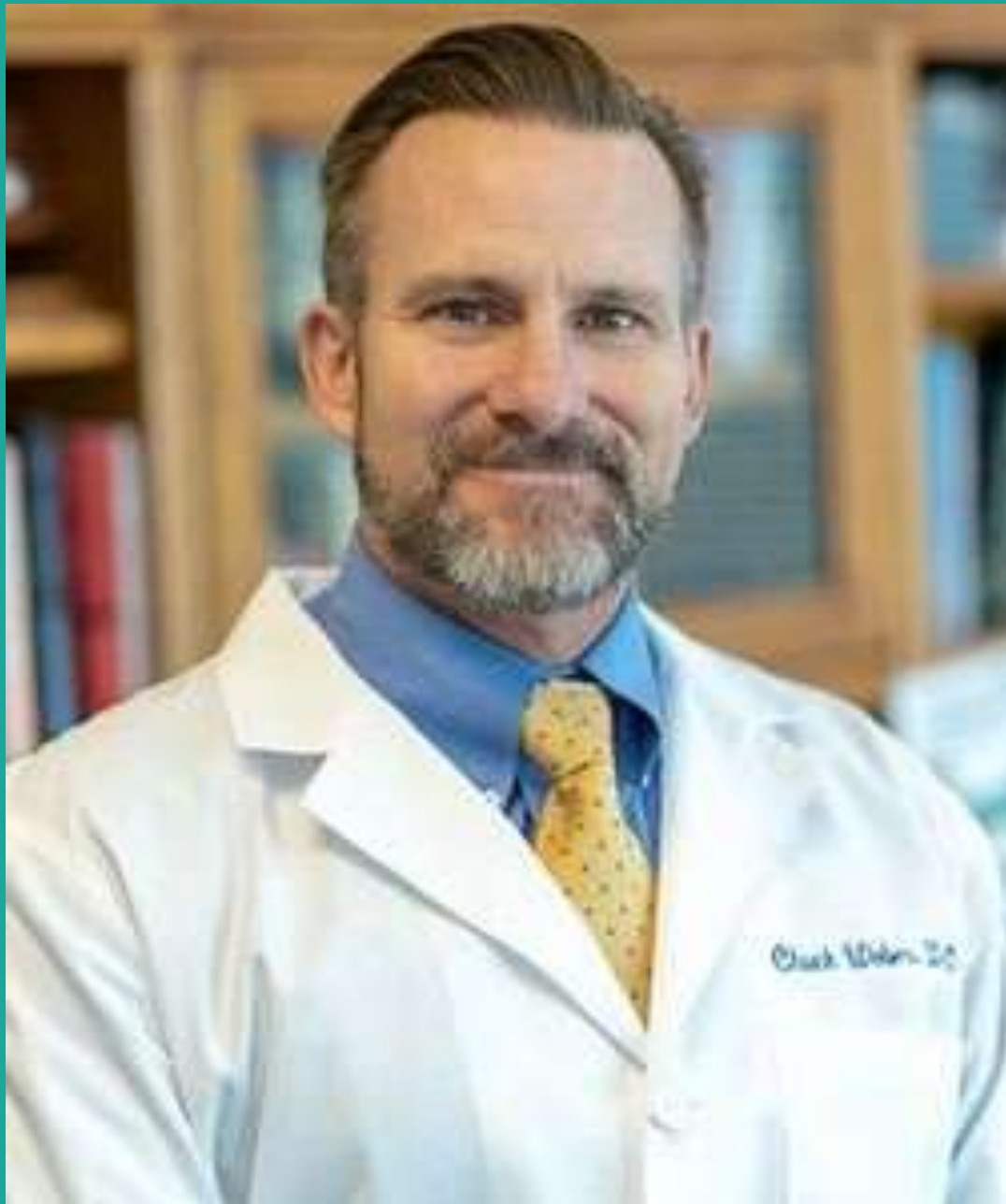


**Speaker:**  
Dr. Charles Weber

# About the Speaker:

Dr. Charles Weber, MD

CEO of the Family Care Center



- Dr. Charles Weber is currently the medical director and CEO of the Family Care Center, a comprehensive outpatient mental health / addiction treatment in Colorado Springs, now with 4 locations. He is married to Dr. Rae Ann Weber, FP, who is a full time opioid addiction treatment provider. He is prior enlisted infantryman and graduated from the United States Military Academy (USMA) at West Point in 1995. He attended Touro University College of Osteopathic Medicine and received a Doctor of Osteopathic Medicine in 2002. His transitional internship was at Walter Reed Army Medical Center, and board certified Psychiatrist. LTC(R) Charles Weber was the Chief of the Department of Behavioral Health at Ft. Carson, CO and retired in 2016 after 27 years in uniform. He is also Addiction Medicine Board certified. Dr. Chuck is extremely passionate about Veteran and DoD mental health and this community.



# Topics

- Mission / Vision
- Background / History
- Major Depressive Disorder
- Electro-convulsive Therapy (ECT) - Brief
- Trans Cranial Magnetic Stimulation (TMS)
- Conclusion



# Mission and Vision

The mission of the Family Care Center of Colorado Springs is to be the premier provider of outpatient behavioral healthcare to military families (DoD), Veterans and our community. We serve those that have first served us.

Our vision is to create a multidisciplinary team of military culturally competent behavioral health providers to reduce suffering through evidence-based treatments, create hope in our patients, and to expand to serve all of the Colorado Springs community.

# Background of Staff

- Focus on the Veteran / DoD family culturally competent providers with experience in outpatient trauma, separation, mood dysregulation, comorbidities with anxiety, addiction and self-harm behavior.
- Dr. Chuck Weber, psychiatrist, prior flight surgeon, prior enlisted, 27 years in service, addiction board certified, and suboxone provider
- Dr. Rae Ann Weber, Family Practice physician, Veteran and focuses on medication assisted treatment (MAT) for opioid dependence





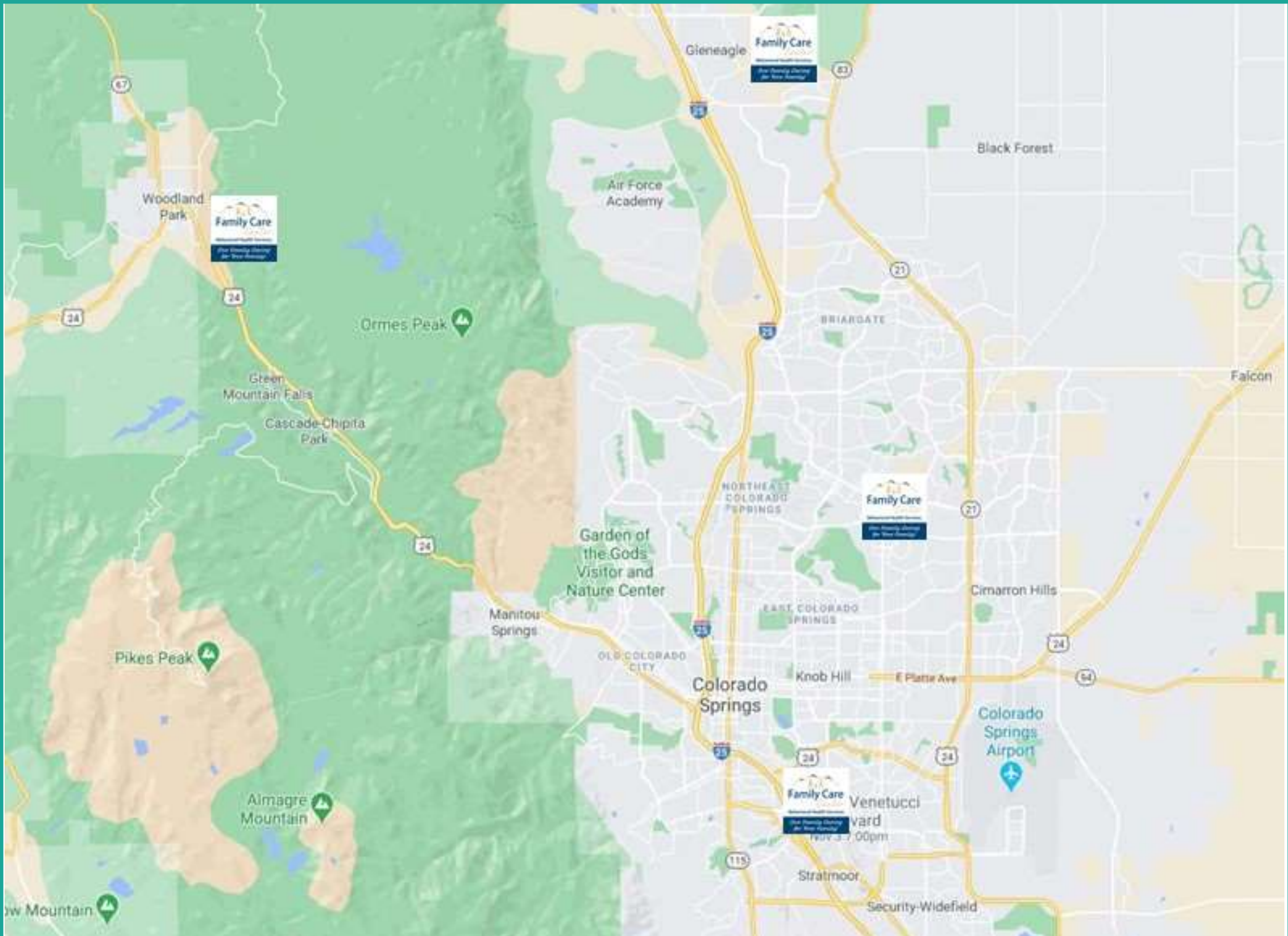
# Family Care Center Staff

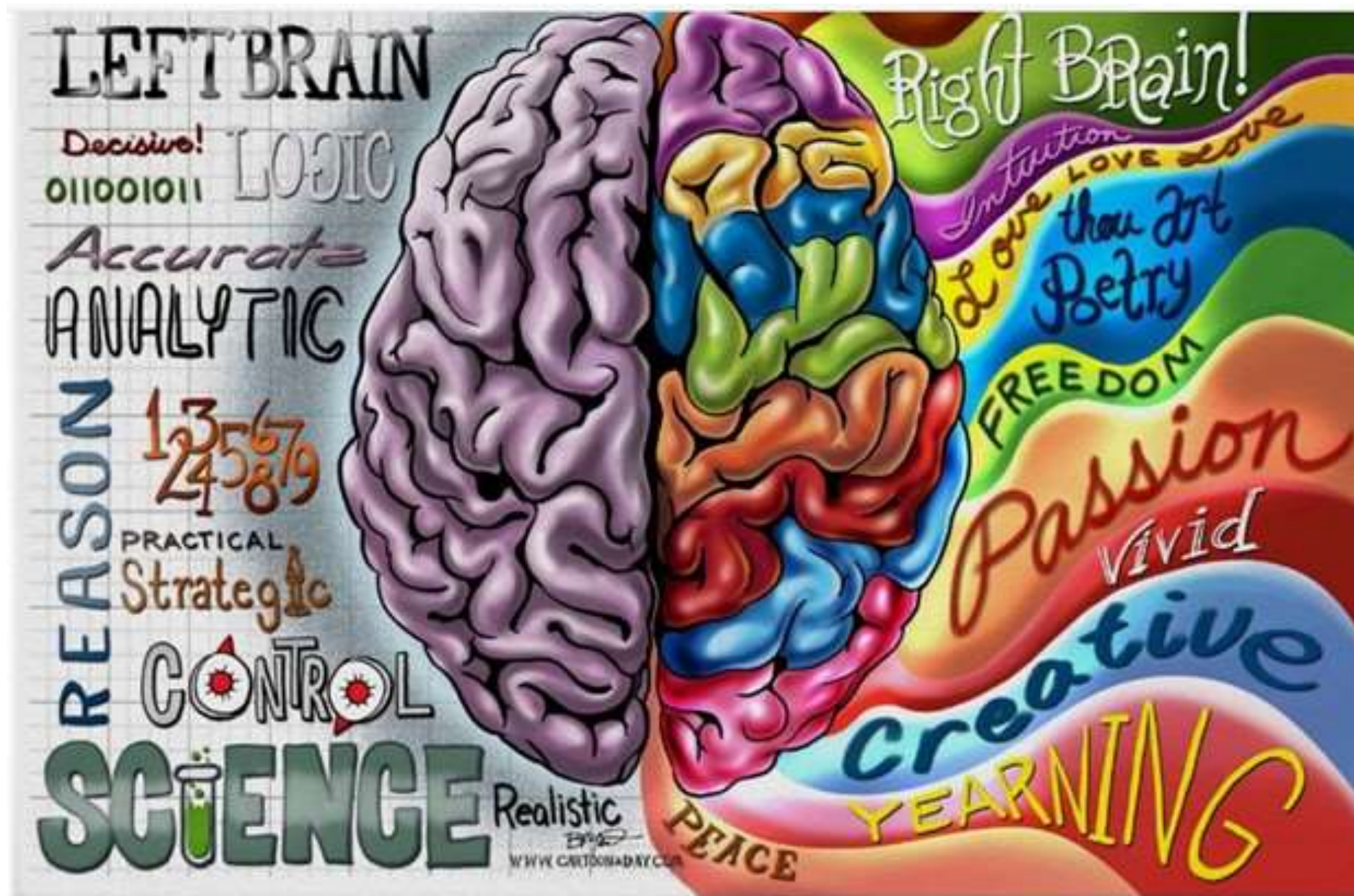
- 5 psychiatrists, 1 subspecialty in addiction, 1 in child psychiatry, 1 FP physician for opioid dependence treatment (1 psychiatrist starting in Oct 2020)
- 8 psych NP (Psychiatric Nurse Practitioners), 1 psych physician assist 2 Family Practice NP (working under MD/DO)
- 1 Doctoral level Certified Nurse Anesthetist for our ketamine infusions
- 4 PhDs (Psychologists)
- 3 LMFT (Licensed Marriage and Family Therapists)
- 4 LCSW (Licensed Clinical Social Workers)
- 19 LPC (Licensed Professional Counselors)
- 5 Child Play Therapists (2 also see adults)
- 13 trained in EMDR (Eye Movement Desensitization & Reprocessing)
- 4 formally trained in DBT (Dialectal), moving toward adherent DBT
- Total 98 staff as Oct 2020



# Excelling in Colorado Springs

- Largest private outpatient behavioral health clinic / group in the Springs
- Largest collection of Veteran / Military Culturally Competent Providers in the Springs and #1 BH Veteran Choice / MISSION ACT / Community Care Network
- Leader of Psychiatric Medication management
- 5 TMS machines, CEO is part of the Clinical TMS Society
  - Highest number of TMS patients per day in Colorado (at this time)
- Highest google and facebook rating for any BH group in Colorado
- Top rated local rated FCC #1 Psychiatry / Mental Health Clinic in the state
- 2017 and 2019 Best Mental Health Clinic Colorado Springs



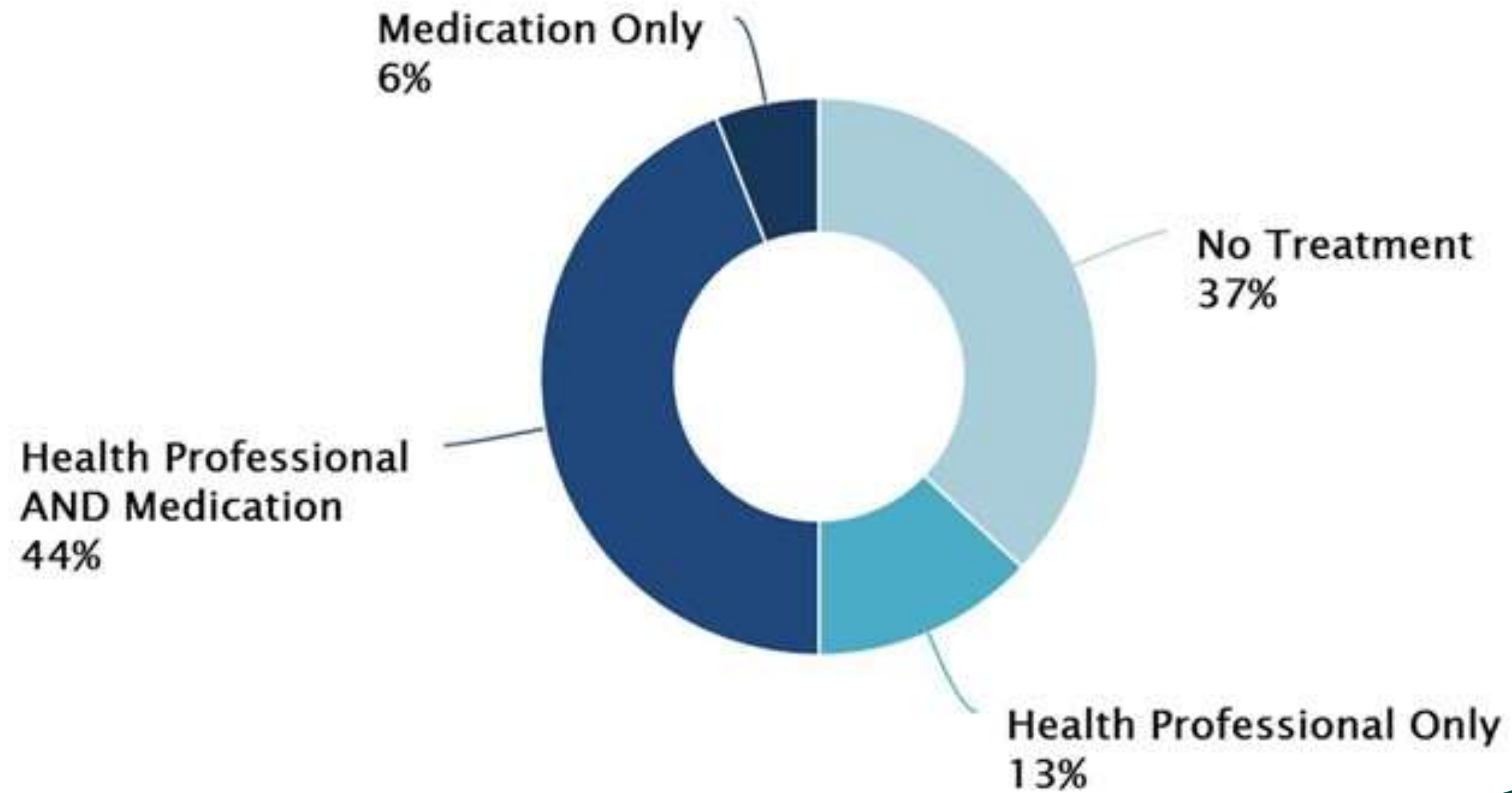


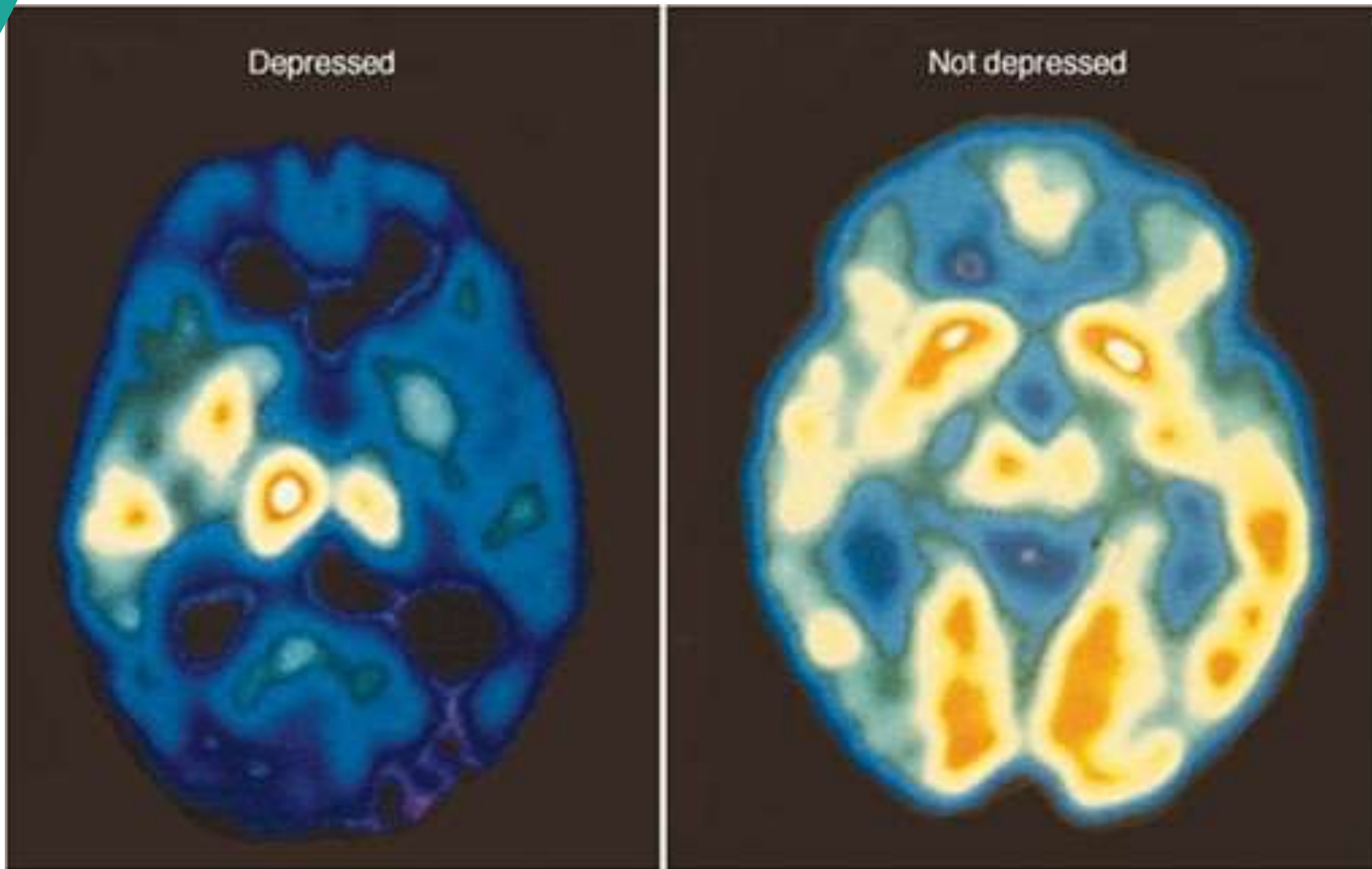
# Major Depressive Disorder (MDD)

- The most common cause of worldwide impaired / loss days
  - Depressed mood / loss of interest or pleasure for 2 weeks
  - Impairing in Academic, Social, Occupational realms
  - 5 or more symptoms that include problems with sleep, interests, guilt, energy, concentration, appetite, motivation and suicidality
- 
- 16.2 million adults, 6.7% of all US, double the rate in females
  - Highest in 18-24 year olds, and > 65
  - American Indian > White > Hispanic > Black > Asian > other
  - T >> LBG > heter for sexual orientation risk factors (42 / 27 / 4 per 100K)

# Past Year Treatment Received Among Adults with Major Depressive Episode (2016)

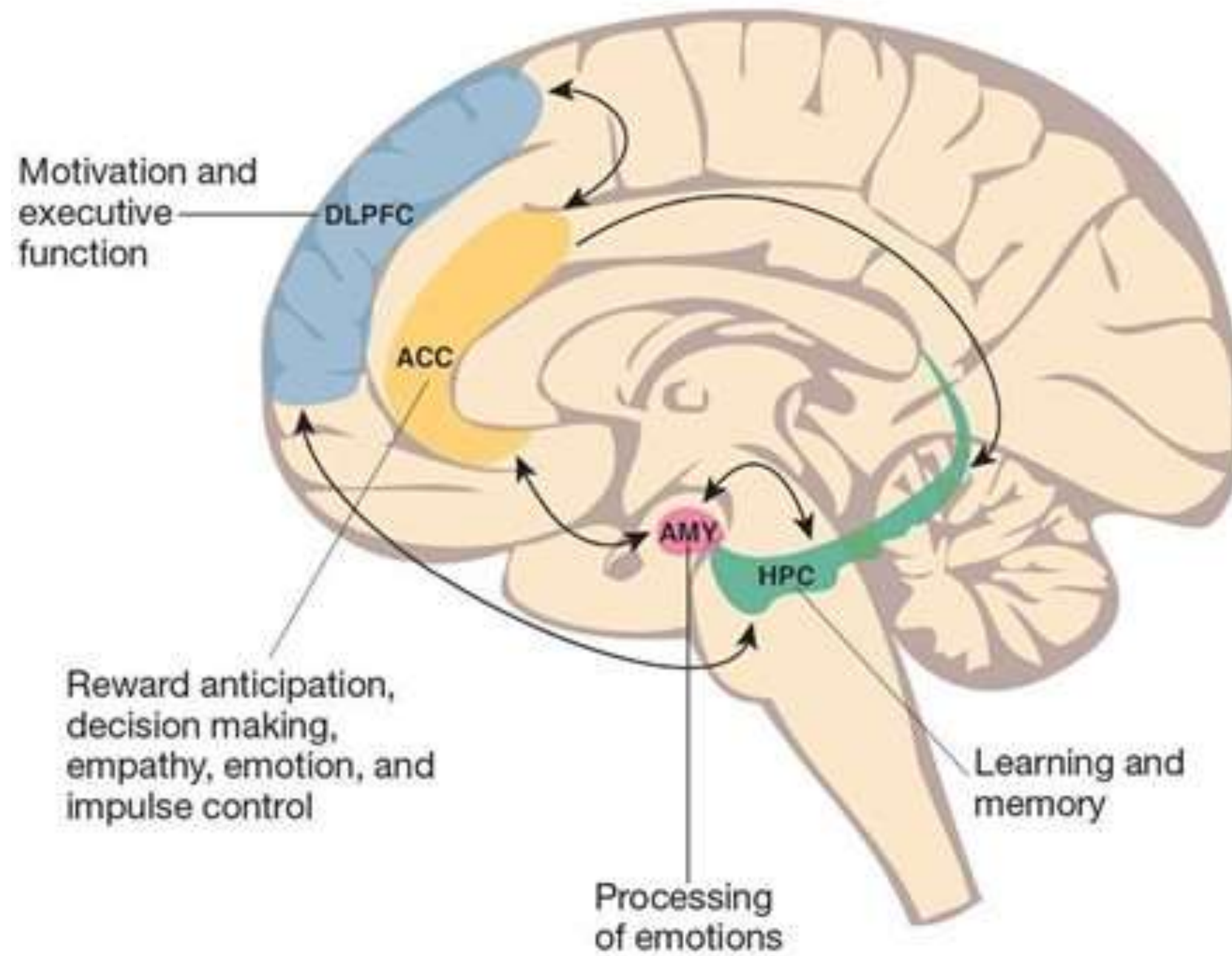
Data Courtesy of SAMHSA





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Figure 1. Corticolimbic system

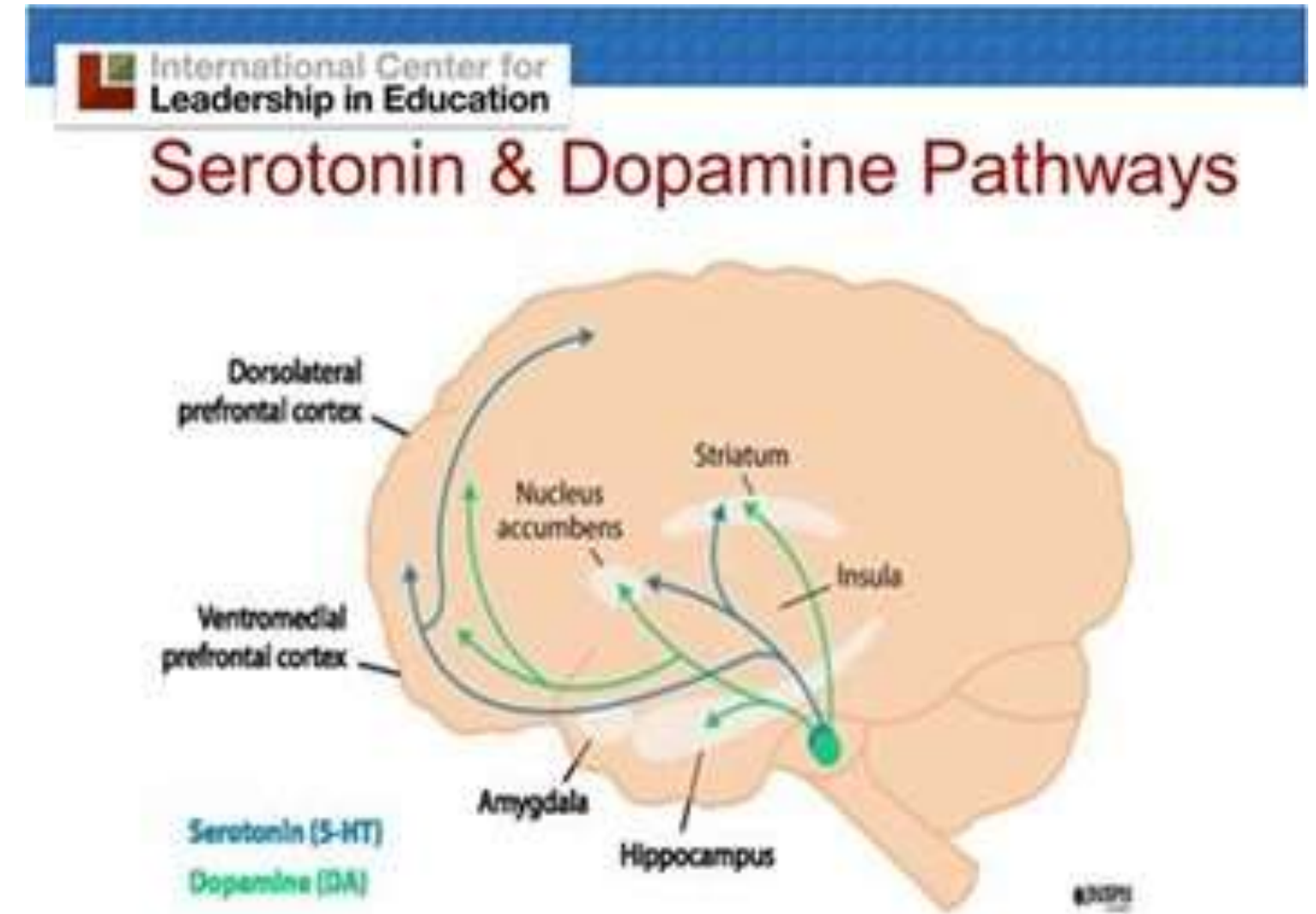


DLPFC, dorsolateral prefrontal cortex; ACC, anterior cingulate cortex; AMY, amygdala; HPC, hippocampus.



# How Do We Treat MDD?

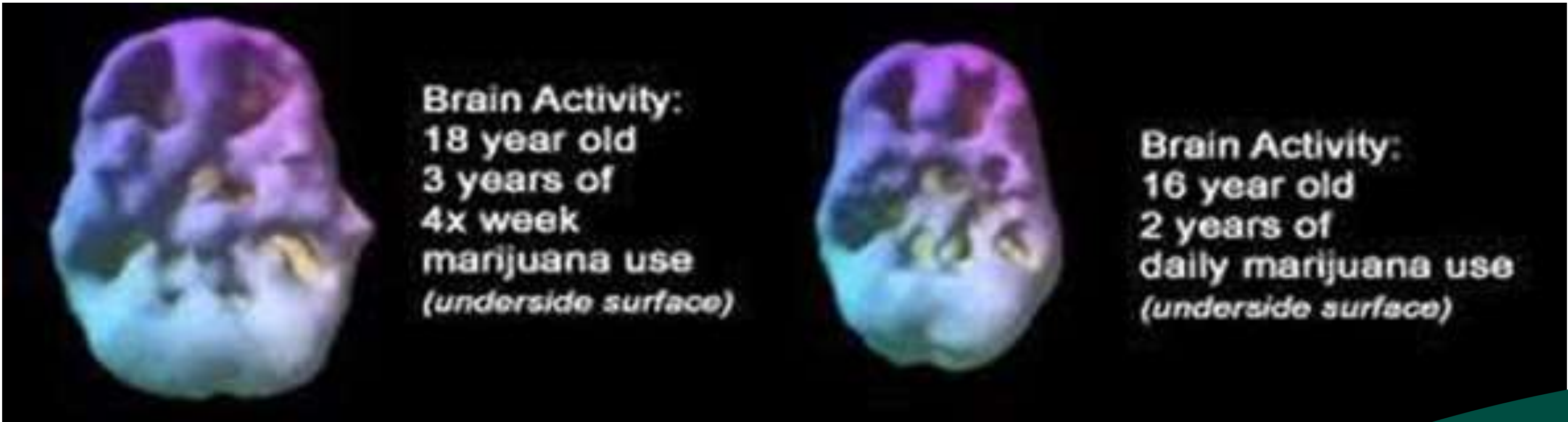
- Medication
- Talk therapy
- Combination
- ECT
- TMS
  
- Various homeopathic / alternative / natural currently lacking double blind placebo controlled trials (not scientific evidence based)







**Brain Activity:**  
**Normal, Healthy Brain**  
*(Underside surface)*



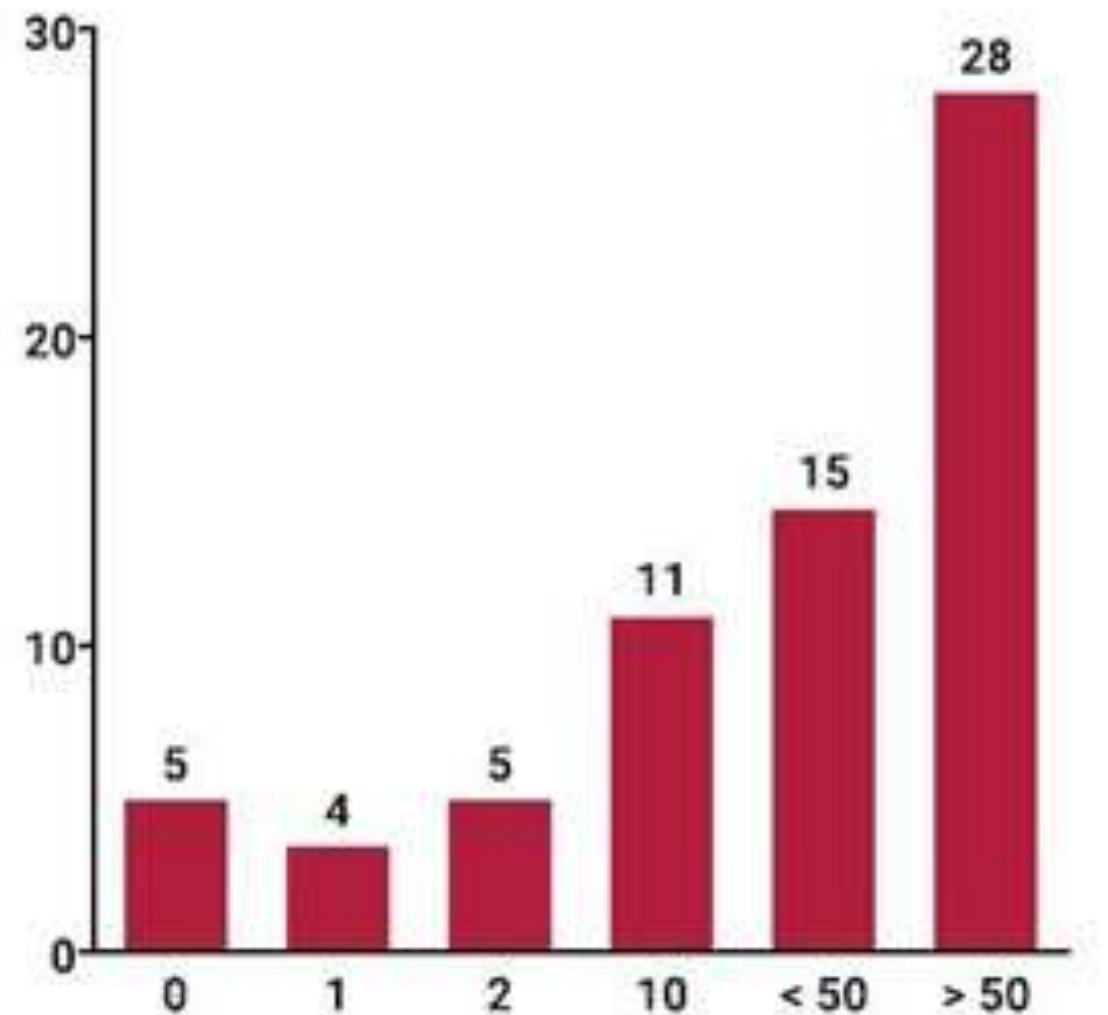
**Brain Activity:**  
**18 year old**  
**3 years of**  
**4x week**  
**marijuana use**  
*(underside surface)*

**Brain Activity:**  
**16 year old**  
**2 years of**  
**daily marijuana use**  
*(underside surface)*

# Pot use is strongly correlated with psychosis

## MORE MARIJUANA USE CORRELATES WITH HIGHER RATES OF SCHIZOPHRENIA

Cases of schizophrenia per 1,000 people

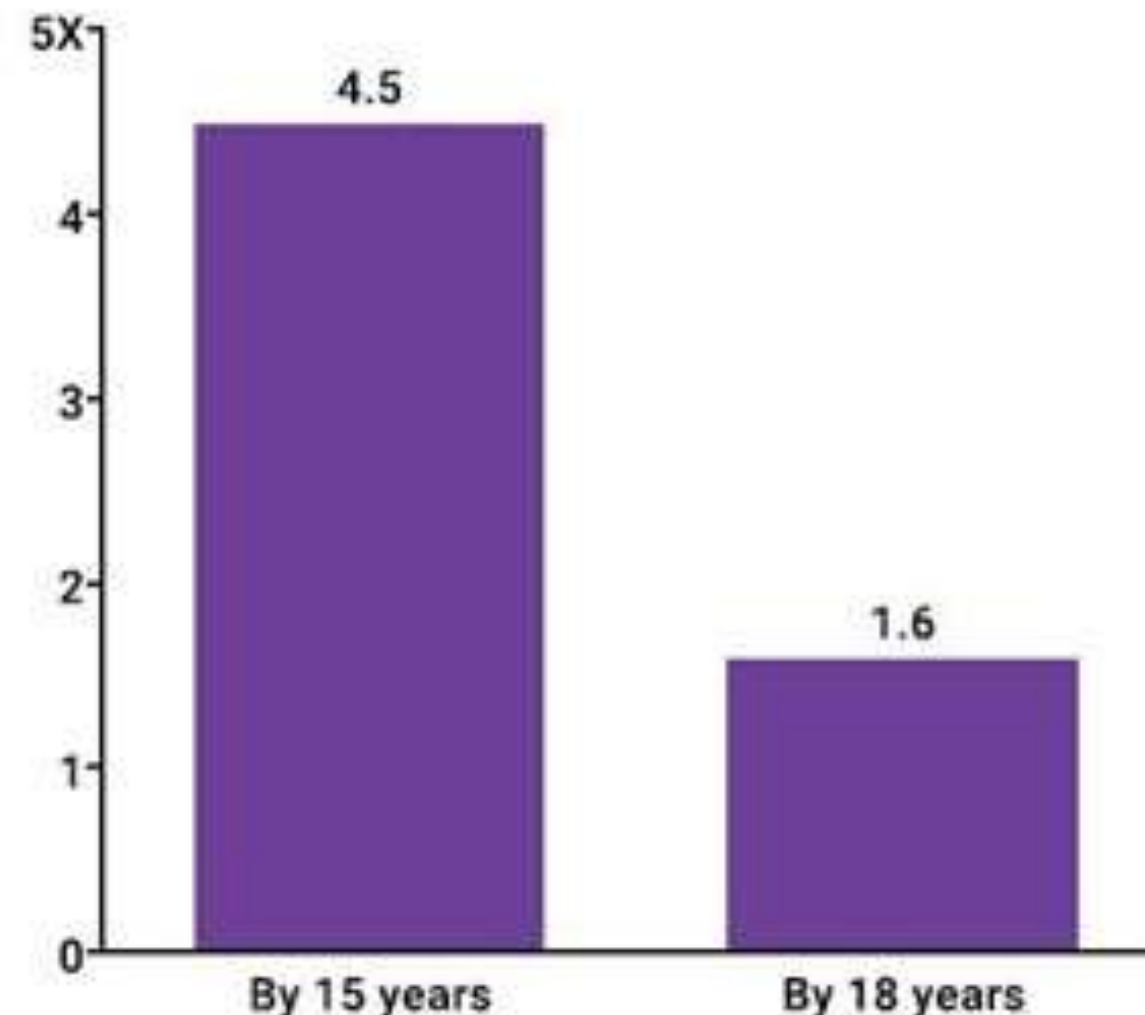


Number of times cannabis used (lifetime)

*Study of Swedish Conscripts (n=45570)*

## EARLIER AGE OF USE CORRELATES WITH INCREASED SCHIZOPHRENIA RISK

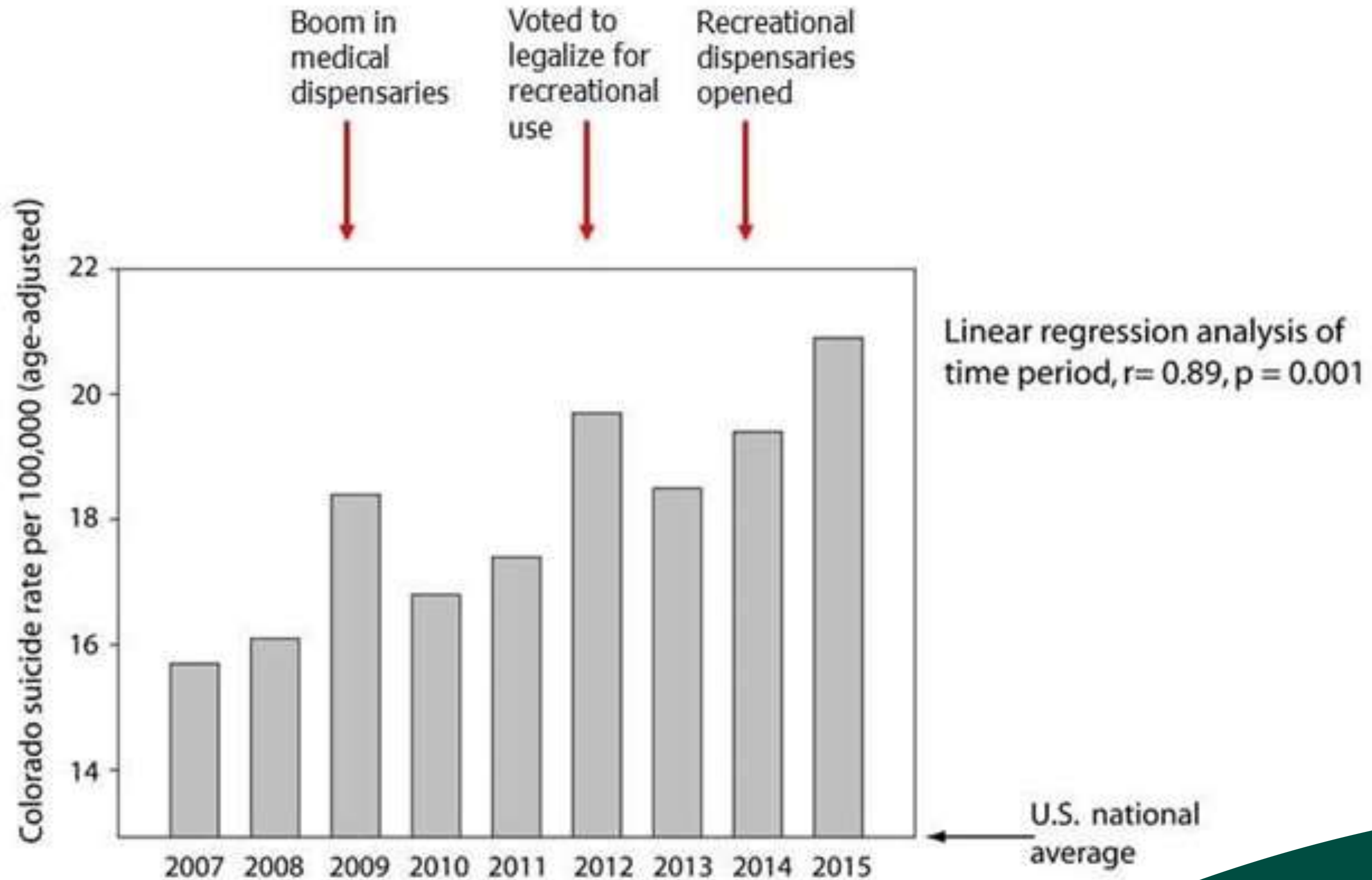
Risk multiple for schizophrenia-like psychosis at age 26



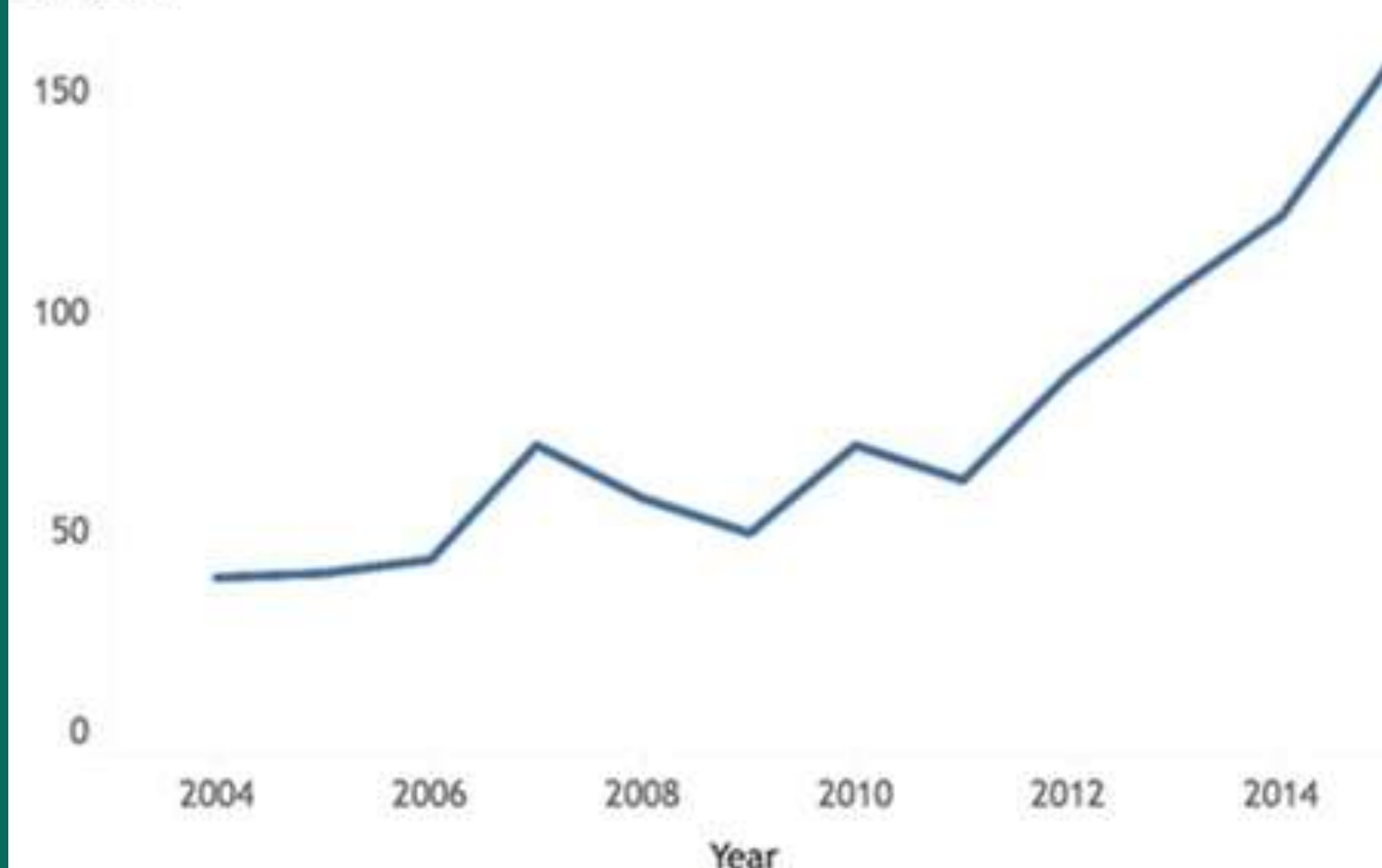
Year of first use

*Longitudinal prospective Dunedin study (n=1037)*

# Colorado Suicide Rates in Relation to Marijuana Commercialization



Number of suicides for which *Marijuana present* was indicated by year



# Electro Convulsive Therapy (ECT)



# TMS Intro

- Dr. Anthony Barker, 1984, showed a magnetic increased cortical activity
- Depression, trials started in 1996
- FDA approved since 2008 for treatment resistant depression
  - Ideal Candidate:
    - At least one failed med
    - Most insurances ask for 2-4 failures
    - Patients that have problems with side effects
    - Can't tolerate therapy until symptoms under control
  - Recently indication for OCD





# Trans Cranial Magnetic Stimulation (TMS)

- Maxwell Equation / Farady's Law (Magnetic Current creates an electric charge)-measured in Teslas
- Figure 8 or H-Coil reduces time to approx 20 min
- Theta bursts can augment / assist (higher frequency)

Maxwell's Equations of the Electromagnetic Field Theory

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$

Gauss's Law - charge makes an electric field

$$\nabla \cdot \mathbf{B} = 0$$

The magnetic field is solenoidal (no monopole sources).

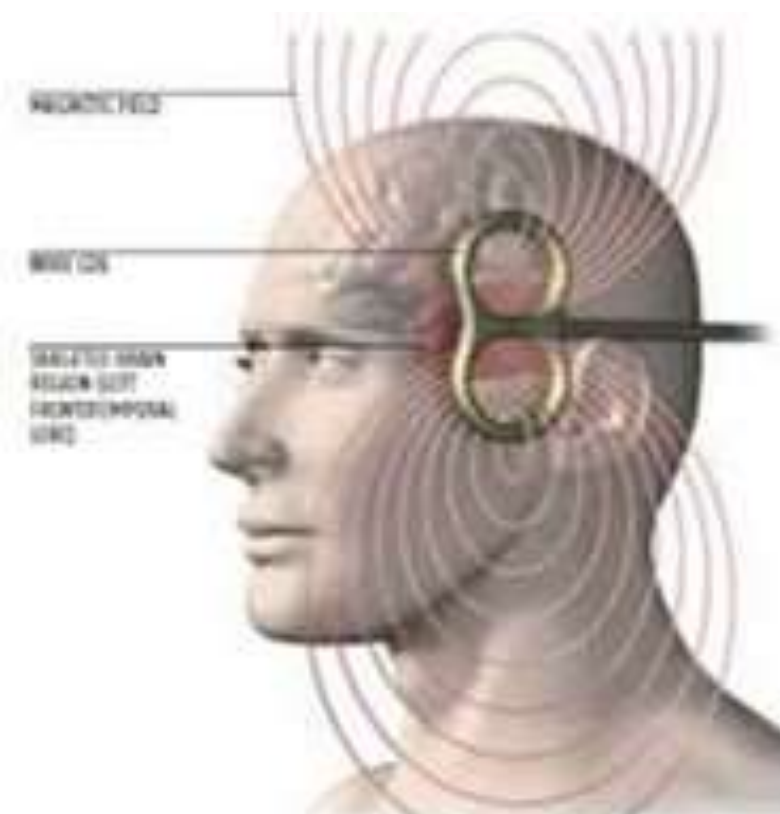
$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

Faraday's Law of electromagnetic induction -- E curls around a changing B.

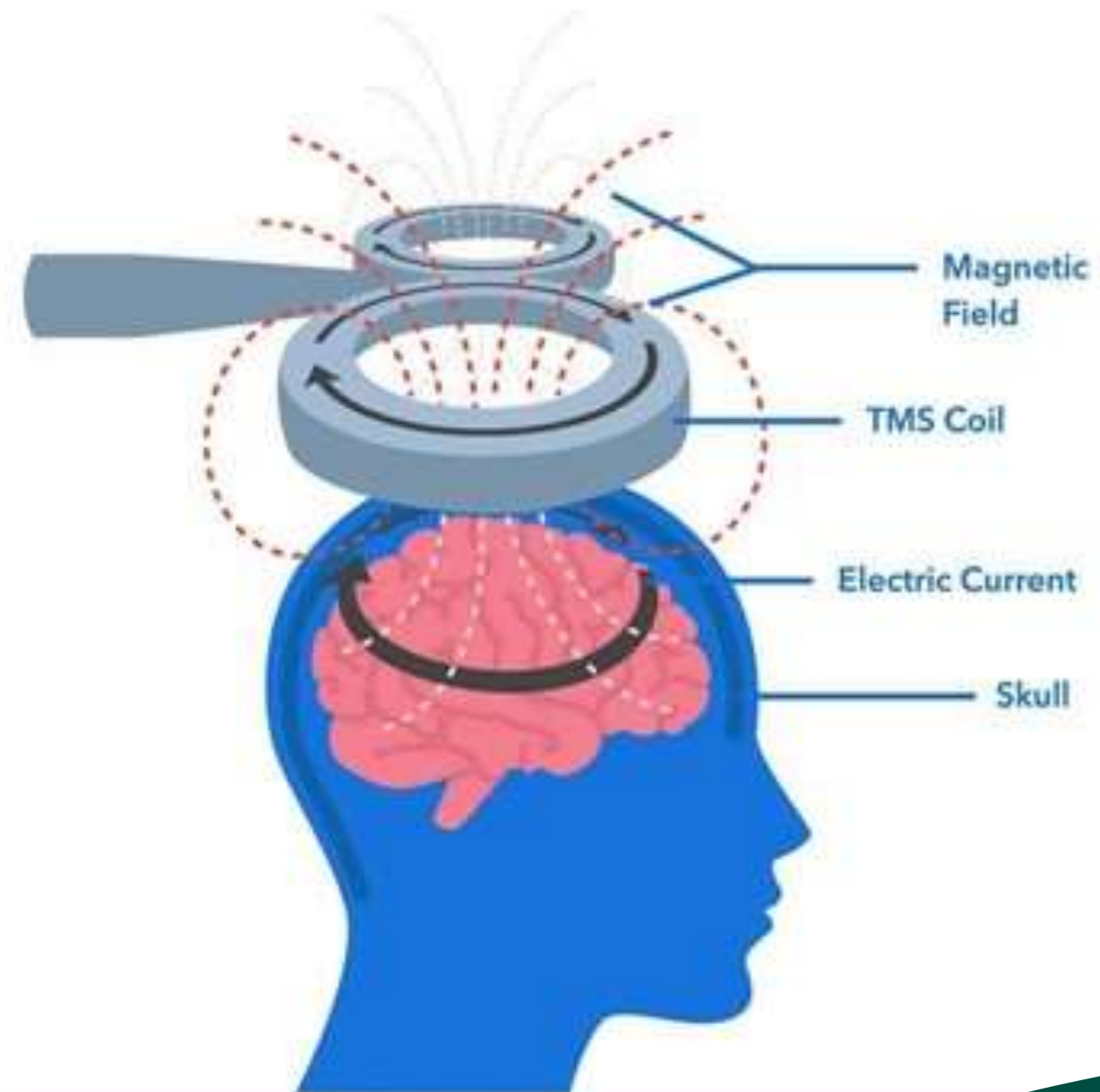
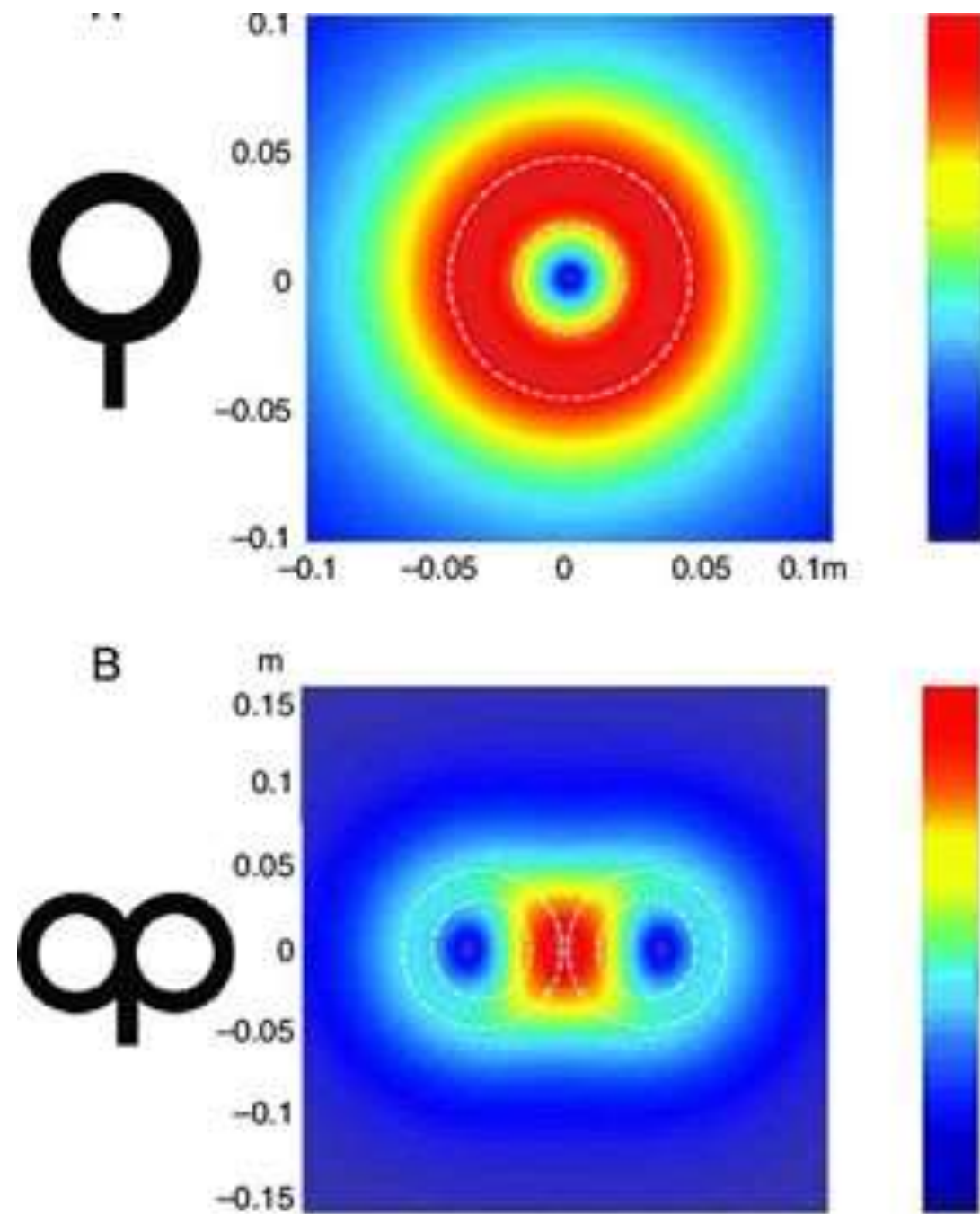
$$\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \mu_0 \epsilon_0 \frac{\partial \mathbf{E}}{\partial t}$$

Ampère's Law - current makes a magnetic field

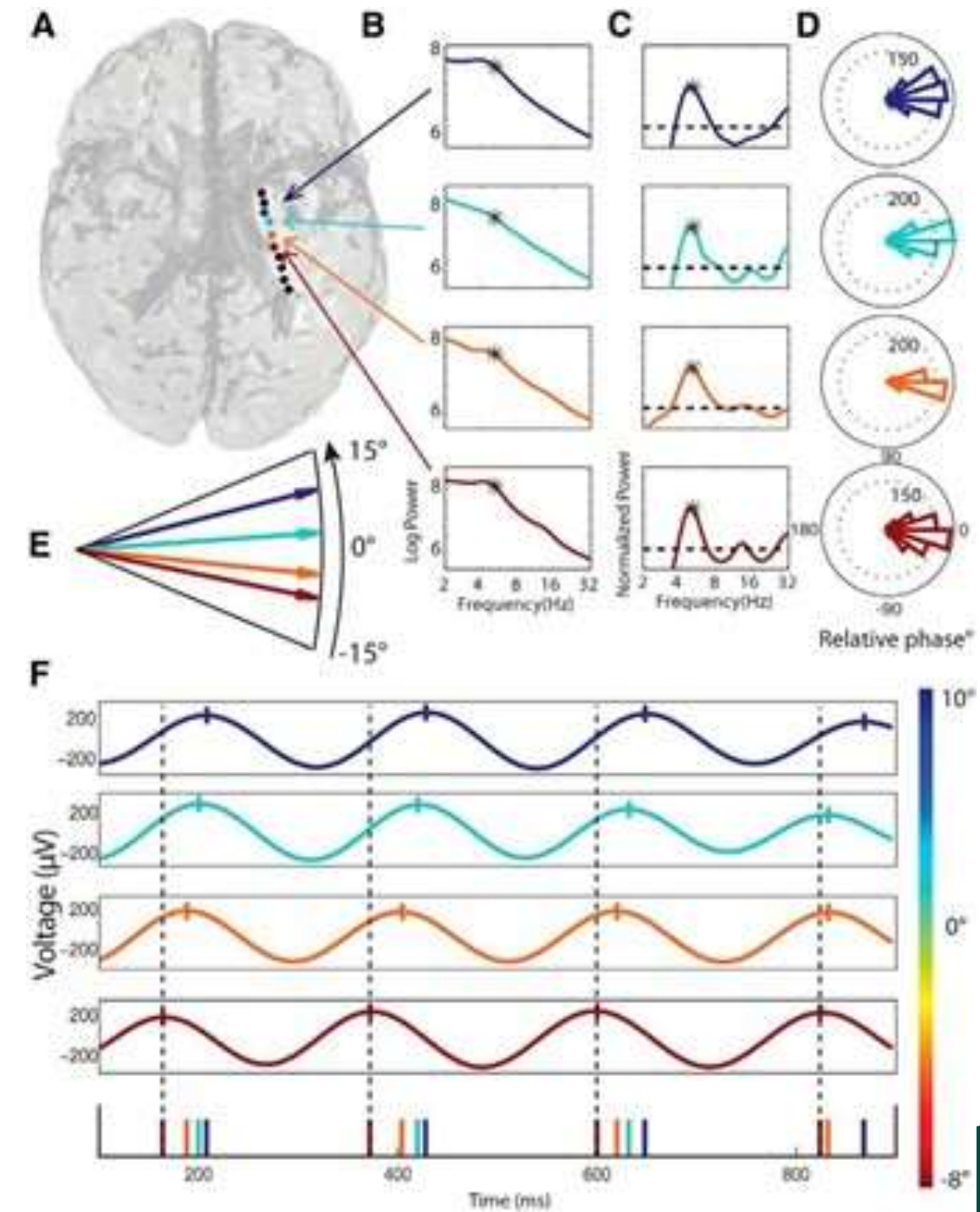
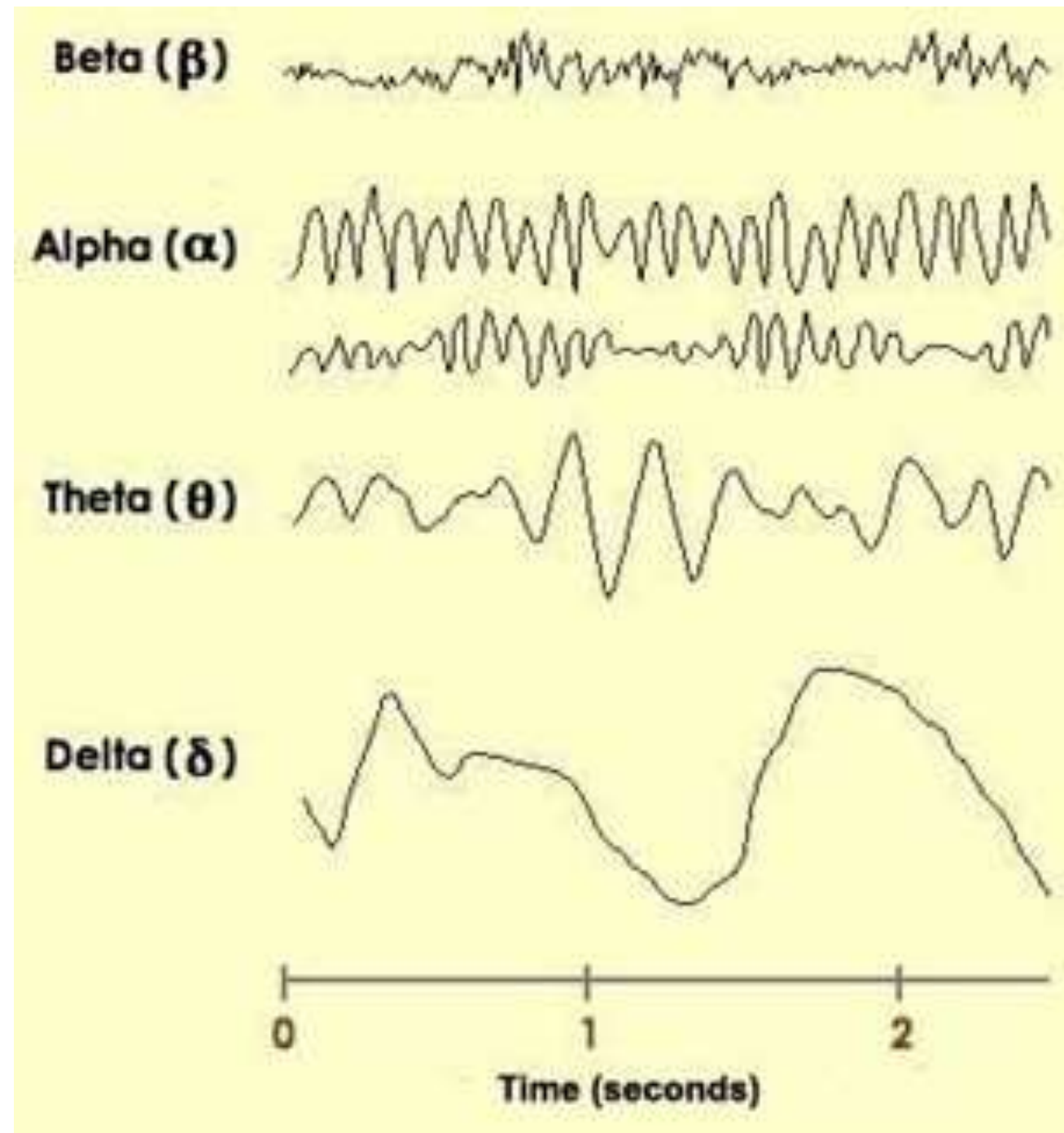
Maxwell's "Displacement Current"



# Repetitive TMS

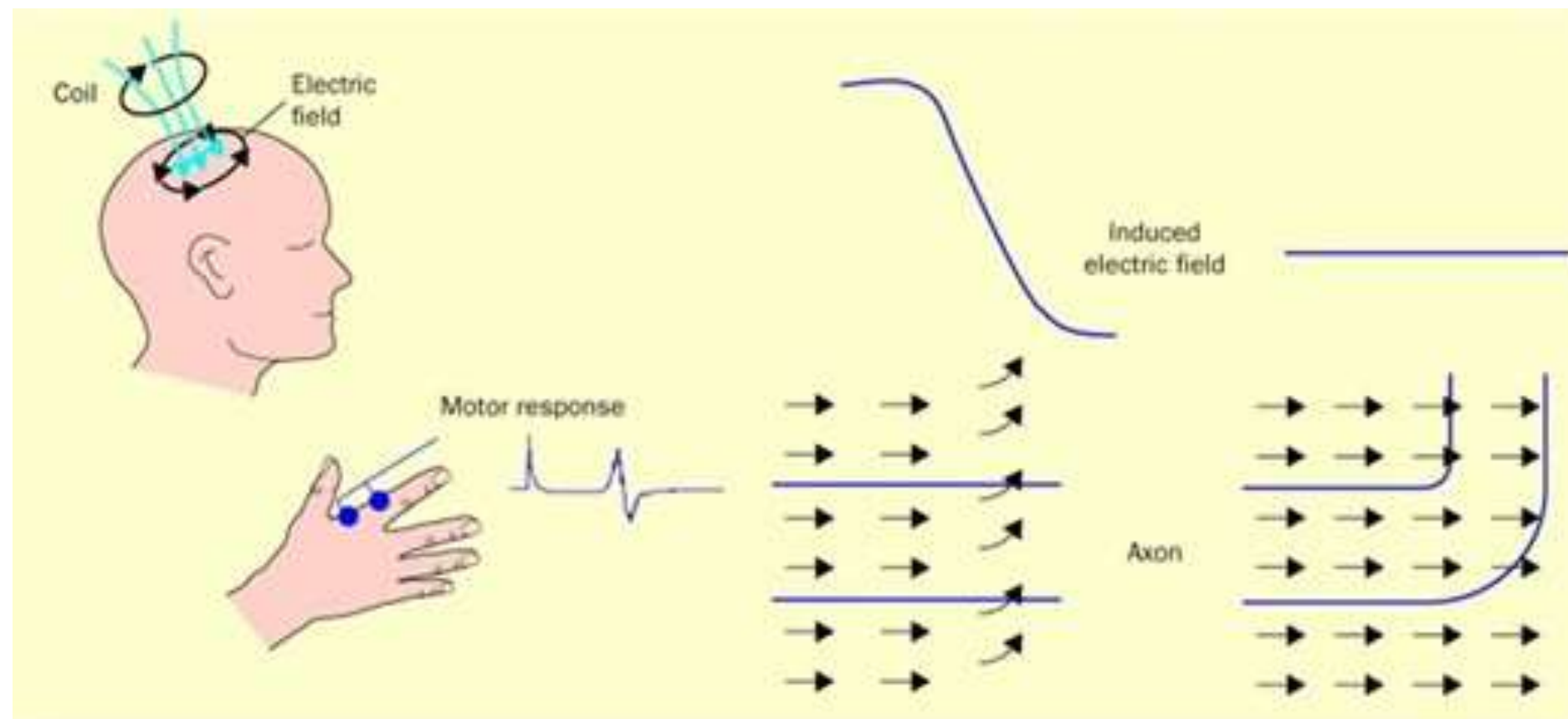
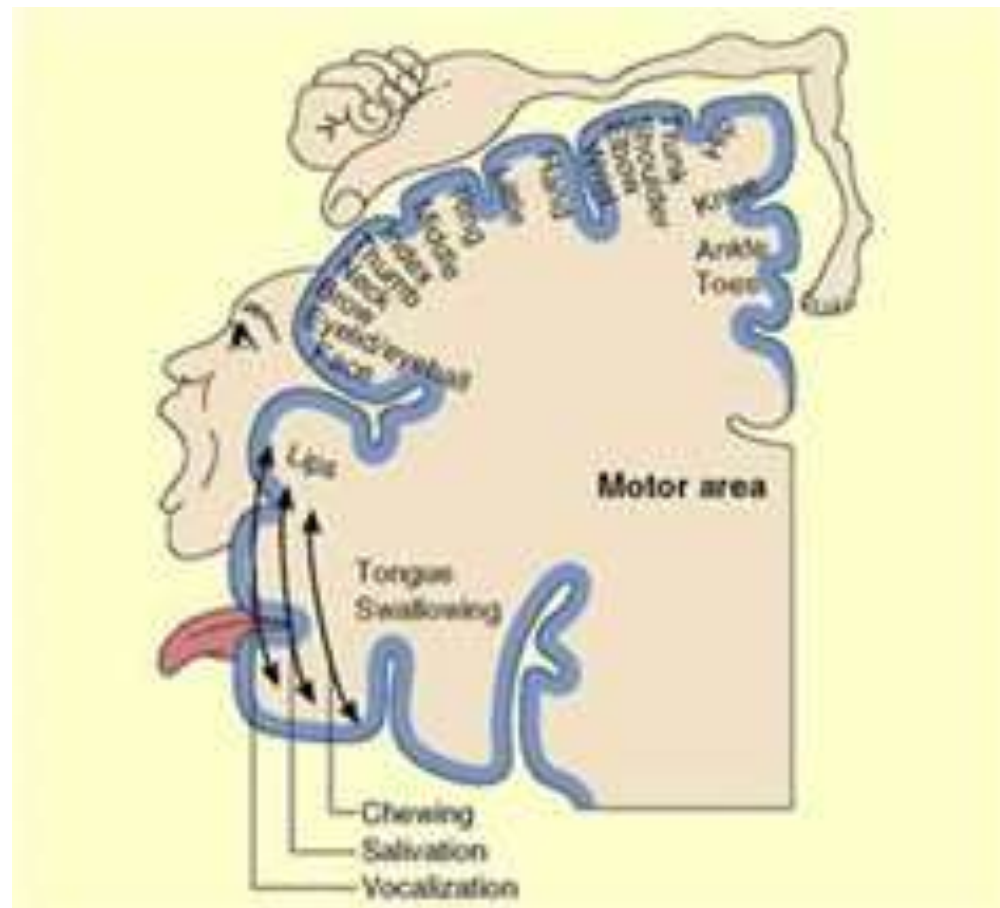


# Wave Forms



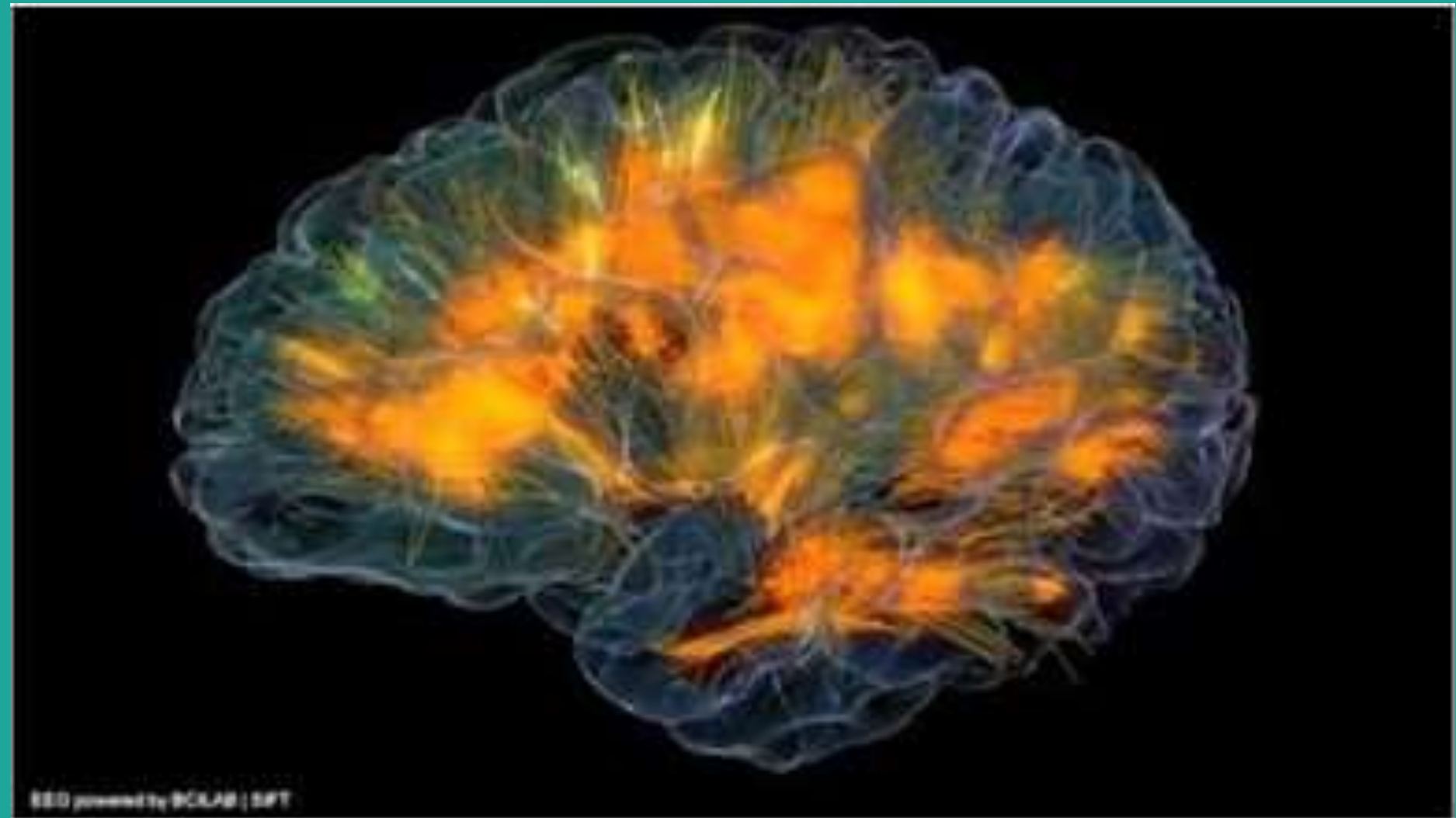
# Individualized Treatment

- Reduce Seizure Risk by determining Motor Threshold (MT)
- Cortical excitability theory
- Alcohol use, benzodiazepines and other drugs can alter cortical excitability



# Neural Networks

- Neurons / Circuits
- Specific region
- Changing Networks
  - Excite or Inhibit
- Neuronal Activity
  
- REBALANCED



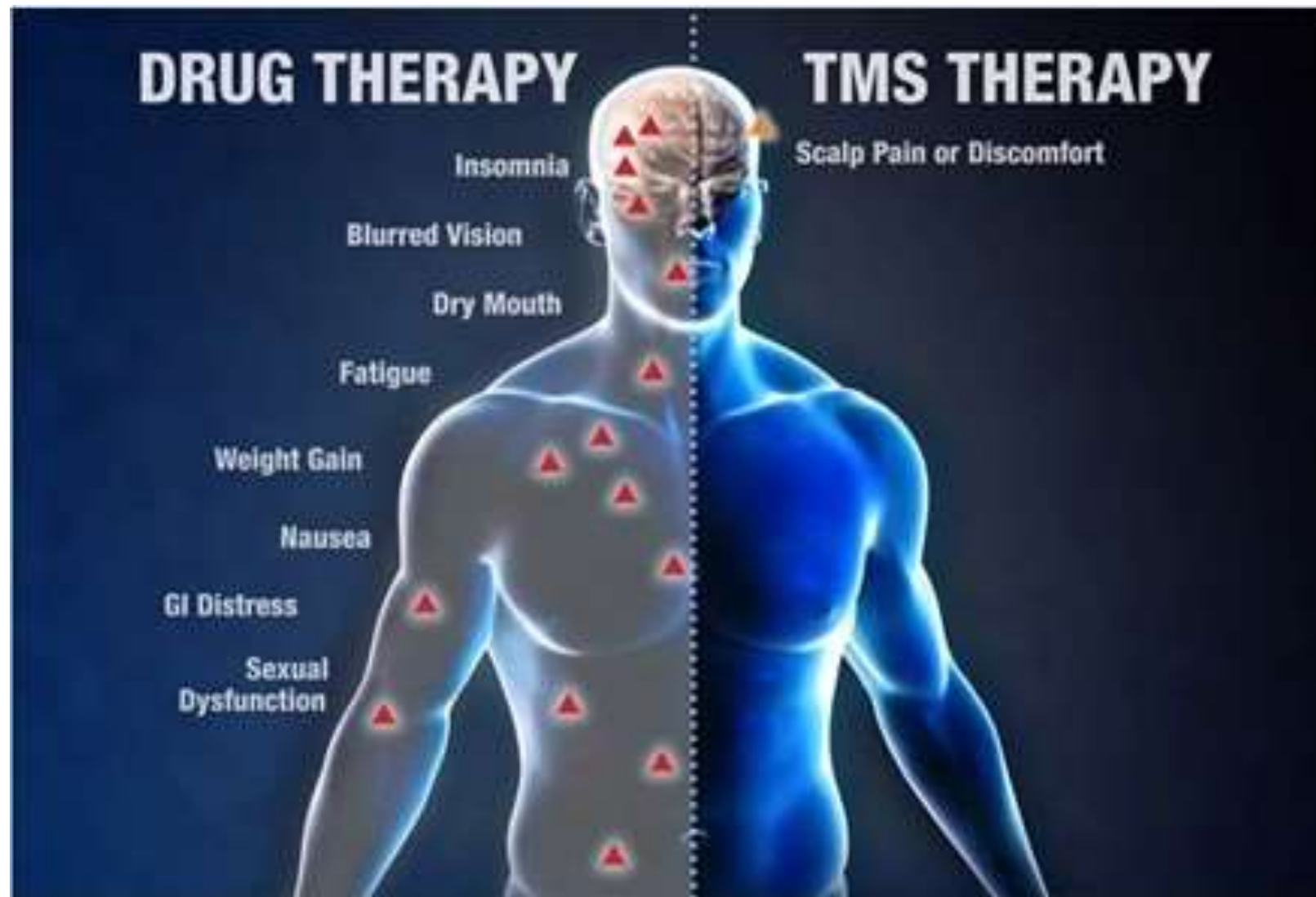
# Logistics

- Awake, non-invasive
- Initial treatment is 5 days a week for 6 weeks
- No restrictions on activity
- Daily duration is 20-26 min (30)
- Tapping sensation, no real force “clicks”
- Some wear ear plugs



# Transcranial Magnetic Stimulation (TMS)

- Safer, more effective and higher remission rates than medication alone



#### TMS Side effects:

Headache (not migraine)

Syncope RARE

Seizure RARE

#### Contraindications:

Deep Brain Stimulator

Shrapnel in head

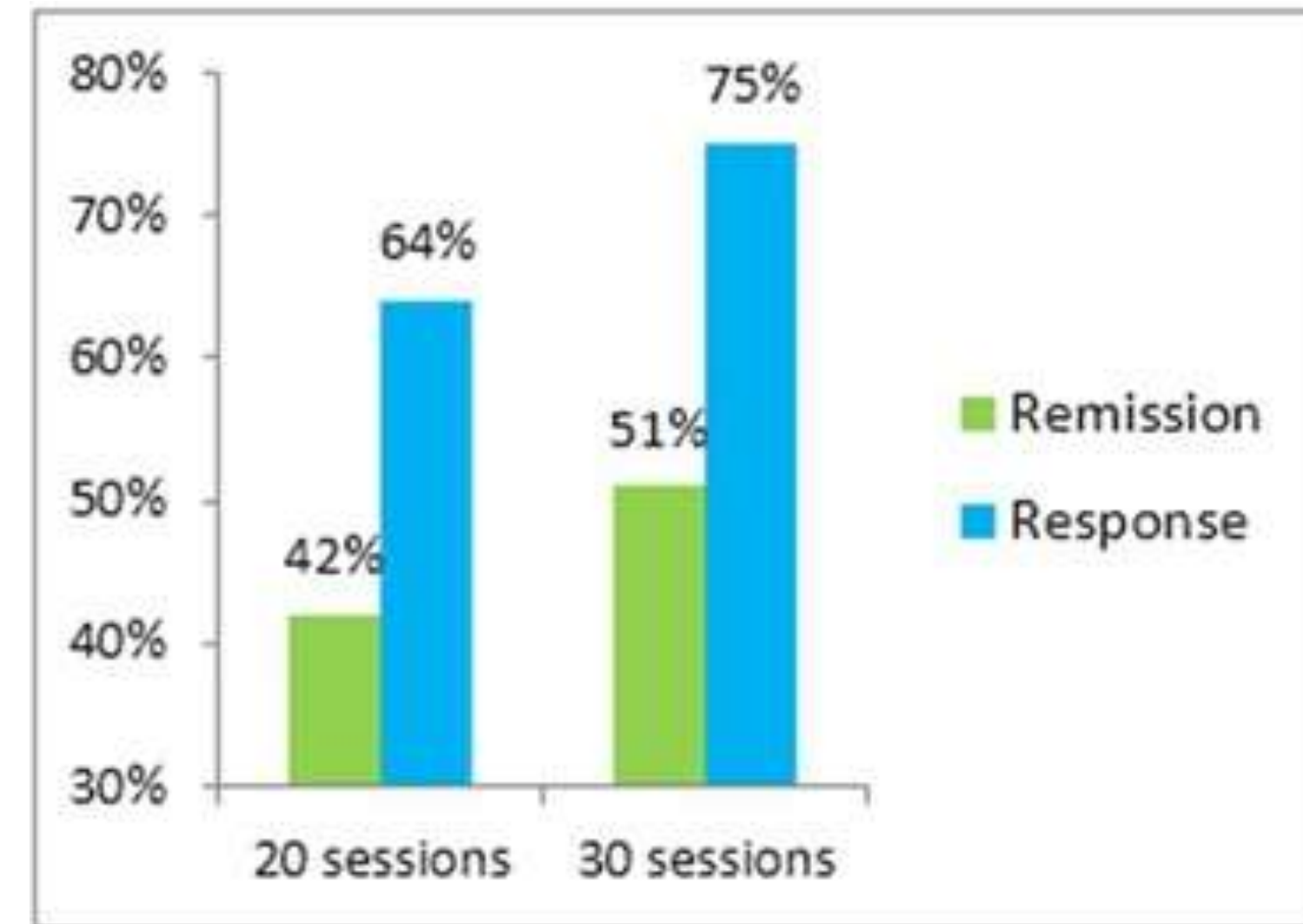
Relative: SZ,  
pacemaker

# Transcranial Magnetic Stimulation (TMS)

What it is NOT:  
“Shocking”



What it IS:  
“Researched”







# NOTE TO SELF

Take meds

# Conclusion

- Increased your knowledge of TMS as related to MDD
  - Well tolerated, non-invasive therapy
- Reinforce your drive to care for your patients in new and innovative ways
- FCC is steeped in the military culture, but dedicated providers for all
  - Questions?



# SLEEPING DISORDER

I'VE GOT THIS TERRIBLE SLEEPING DISORDER  
WHERE I HAVE TO WAKE UP EVERY MORNING & DO WORK

[motifake.com](http://motifake.com)

# QUESTIONS



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  - [Dr Alvaro Pascual-Leone](#)
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**THANK YOU**

