

CLINICAL

TMS

Transcranial Magnetic Stimulation

SOCIETY

What is TMS?

- TMS is a noninvasive procedure using an electromagnetic coil
- The coils generate repetitive changing magnetic fields which create an electric field. The activity in the neurons modulates brain activity both locally and in connected brain circuits.
- Most indications require a series of treatments on consecutive days (e.g. for depression this number can vary from 36-51+)
- Coils for depression are all designed slightly different, but clinically most FDA Cleared coils are Figure of 8 shaped. One coil is a unique geometry called Hersed-Coil (H1-Coil).

TMS Devices Currently FDA-Cleared For Major Depressive Disorder

Neuronetics



MagVenture



CloudTMS



Mag & More



Brainsway



Magstim



NextStim



TMS is FDA cleared for:

- Treatment resistant MDD in adult patients¹ (7 devices cleared)
 - No satisfactory improvement from (or sensitivity/allergy to) 1, or more, antidepressant medications at or above the minimal effective dose & duration in the current episode of depression. Despite this indication, insurers can require 2-4+ med trials, +/- trial of evidence-based psychotherapy
- Treatment resistant Obsessive Compulsive Disorder (OCD), in adult patients^{2,3} (2 devices cleared)
- Migraines with aura⁴ (single pulse TMS, 1 device cleared)
- Smoking cessation⁵ (1 device cleared)

Indications with Promising Data: Level A/B evidence⁷

- Neuropathic Pain⁶
- Post-Stroke⁷
- PTSD⁷
- Fibromyalgia⁷

¹McIntyre R et al. J Clinical Psychiatry, 2017

² Press Release from FDA August 17, 2018

³Press Release from FDA August 11, 2020

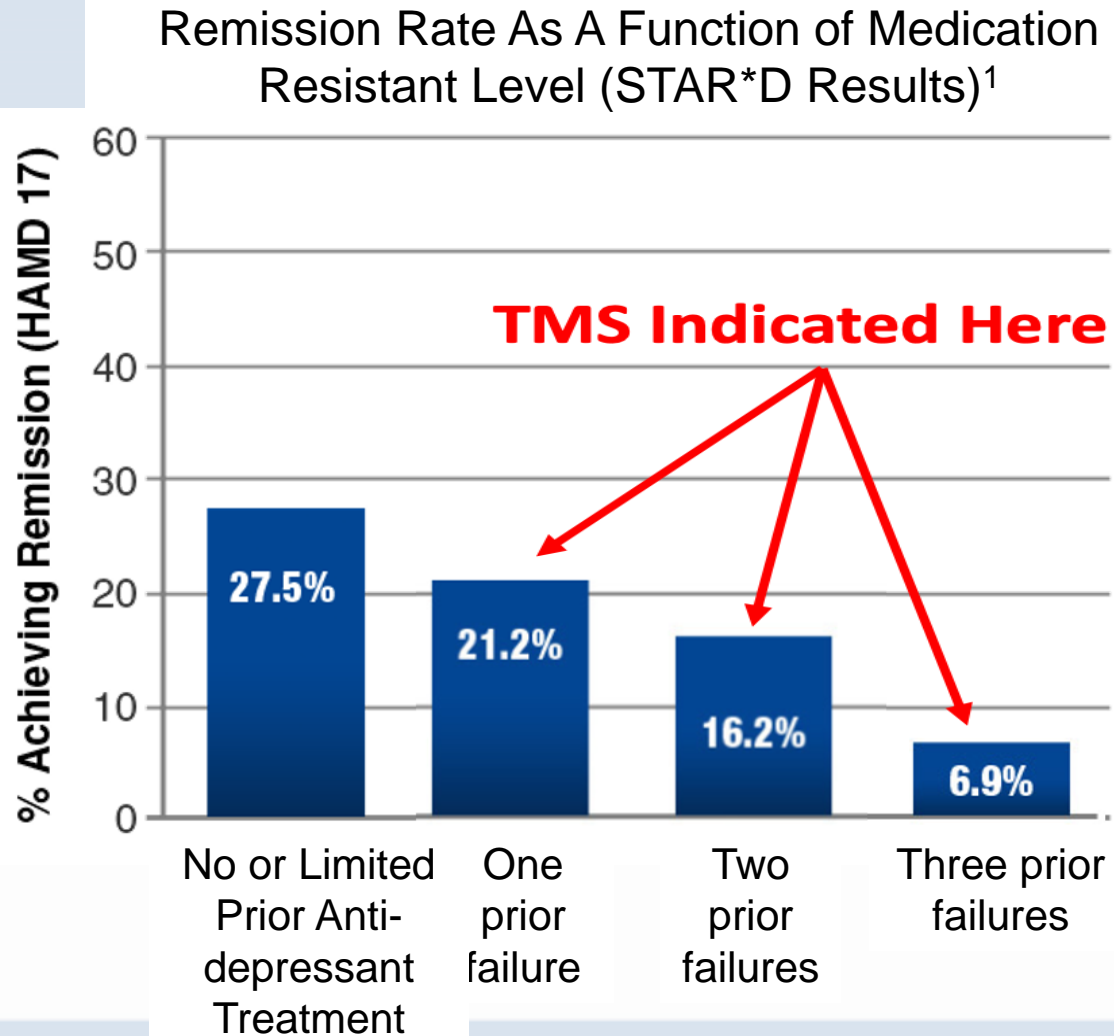
⁴Lan et al. J Headache Pain, 2017

⁵Press Release from FDA August 24, 2020

⁶Hamid P, et al. 2019

⁷Lefaucheur, JP et al. 2020

TMS vs. Antidepressant Medication



- No systemic side effects - insomnia, fatigue, blurred vision, GI distress, sexual dysfunction, dry mouth, tremor, autonomic instability, etc. (as with medications)
- No known cognitive side effects
- Noninvasive - No need for sedation, anesthesia, hospitalization, or recovery time (as with ECT, DBS, VNS)
- Effective in treatment resistant depression (TRD) where medications can have diminishing returns^{1,2,3,4}

¹Avery et al. (2008) *J Clin Psych*

²Carpenter et al. (2012) *Depress Anxiety*

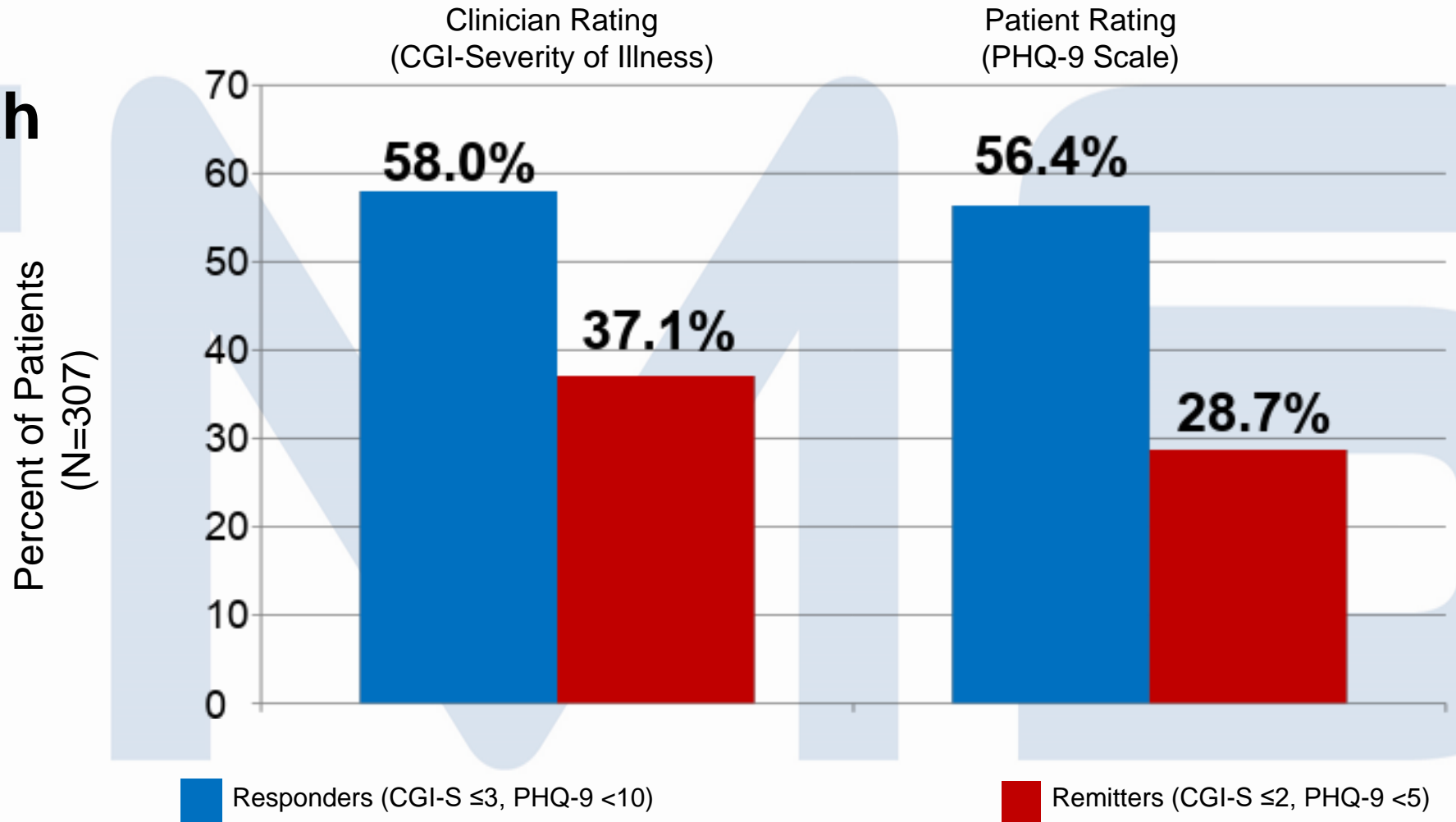
³Connolly et al. (2012) *J Clin Psych*

⁴Fava et al. (2006) *Am J Psychiatry*

⁵Trivedi et al. (2006) *Am J Psychiatry*

Remission from Depression is possible with TMS Therapy:

- **1 in 2 Patients Respond**
- **1 in 3 Patients Achieve Remission**

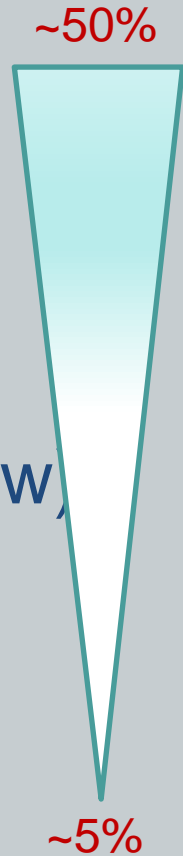


LOCF Analysis of intent-to-treat population

TMS Therapy is Well-Tolerated and Safe for Most Patients

Side Effects¹

- Application site discomfort/pain
- Headache
- Referred (eye, tooth, jaw) discomfort/pain
- Insomnia
- Anxiety



Contraindications:

- Non-removable metal objects in or around head

Not Contraindicated:

- Tattoos
- Dental metal (braces, bridges, implants, or fillings)

Conclusion

TMS is...

- a focal, non-invasive form of brain stimulation
- in clinical use for nearly 20 years
- safe for almost all patients
- very well-tolerated
- FDA cleared for patients with MDD and OCD who do not benefit sufficiently from, or tolerate, pharmacotherapy
- FDA cleared for smoking cessation and migraine with aura