

# Theta Burst Stimulation for Hemiplegic Upper Extremity After Stroke: A Meta-analytic Review

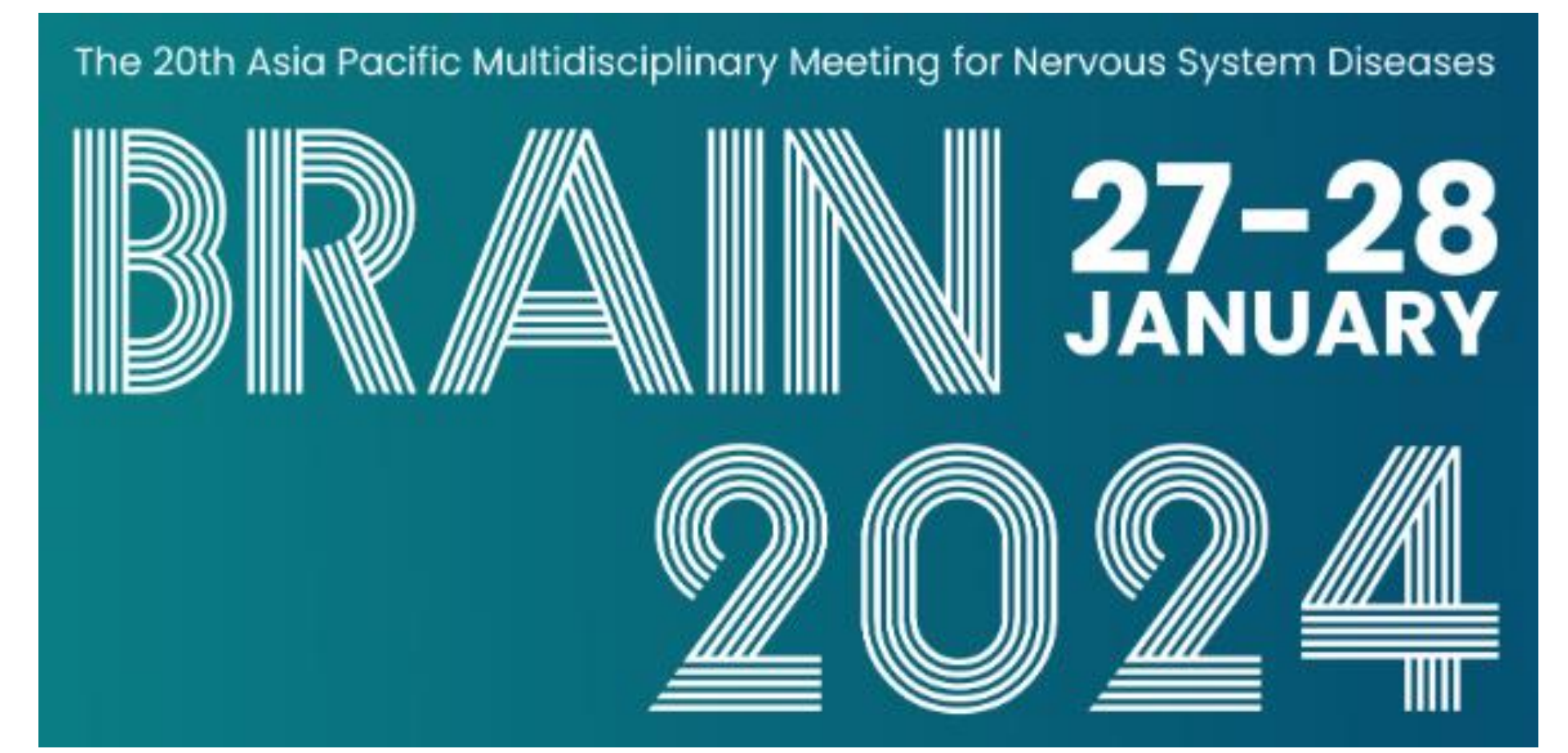
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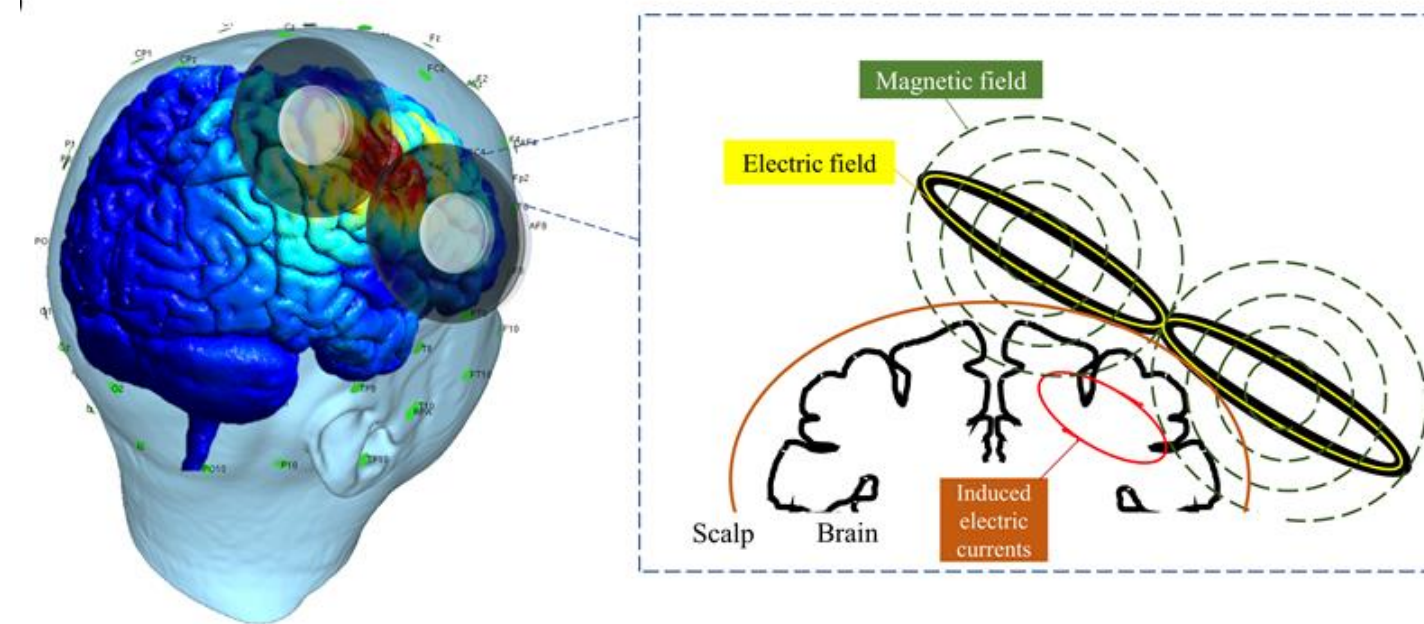
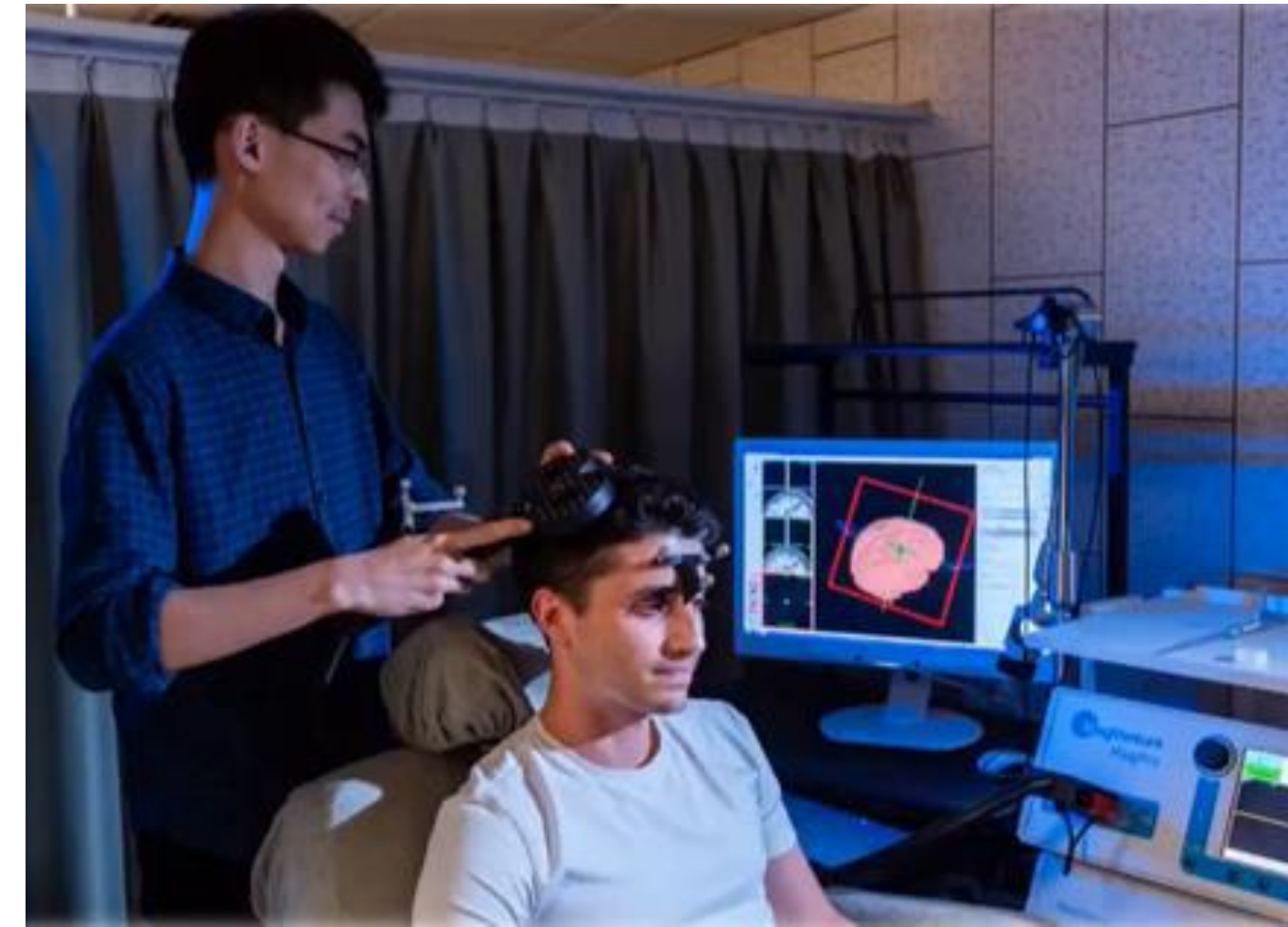


## Introduction

- **Theta burst stimulation (TBS)** is a patterned form of repetitive transcranial magnetic stimulation (rTMS).
- In clinical trials, TBS is now frequently used for **stimulation-based brain priming** before rehabilitation intervention to **improve the readiness of the brain to re-learn motor skills during behavioral motor practice**, thereby facilitating therapeutic benefits from upper extremity rehabilitation training for patients after stroke.

This meta-analytic review aimed:

- 1) To evaluate the effects of different TBS protocols on **improving upper extremity motor impairment and functional activities** in patients with stroke using meta-analyses.
- 2) To identify any significant associations between **various TBS parameters, patient demographics, clinical profiles, and effect sizes** using subgroup analyses and meta-regression.



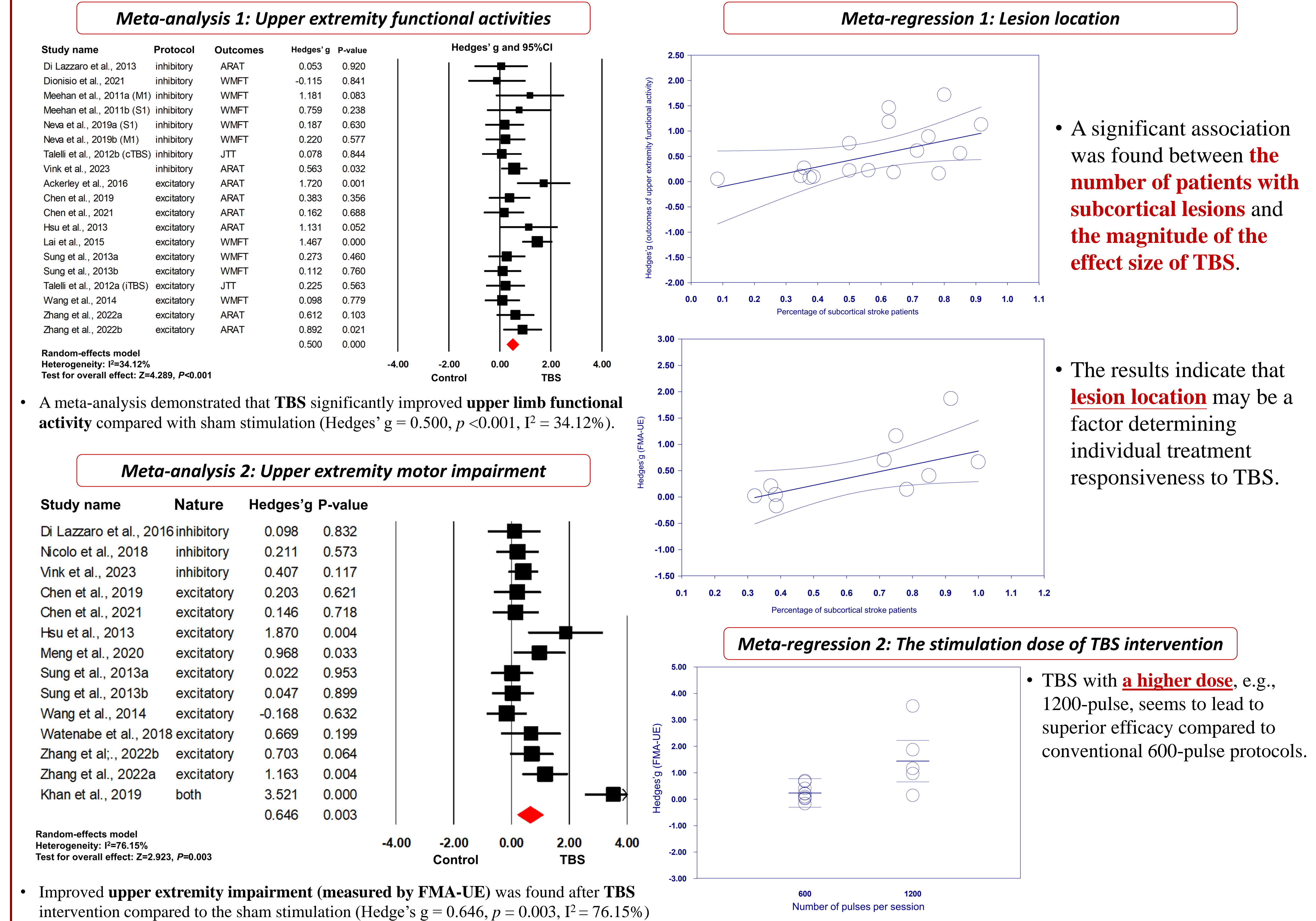
## Methods

- A literature search was conducted for studies published between January 1, 2000, to August 29, 2023, which were indexed in four databases: PubMed, EMBASE, Web of Science, and Medline.

We followed the PICOS framework for **the inclusion of studies**:

- Population (P): Studies that included **adult participants diagnosed with stroke**.
- Intervention (I): **Interventions that used TBS applied to the primary motor cortex (M1) cortical representations of the proximal or distal upper extremity**.
- Comparison (C): Sham TBS or no stimulation control.
- Outcomes (O): Studies that provided at least one outcome assessing upper limb motor impairment, functional activity, or neural functions (neurophysiological or neuroimaging outcomes).
- Study design (S): Randomized or pseudorandomized controlled trials with either a parallel or crossover design.
- **Meta-analysis**: Hedges' g and 95% confidence interval (CI) were computed for all meta-analyses.
- **Meta-regression**: Univariate meta-regression was performed with various patients' demographics, clinical information, as well as TBS parameters.

## Results



## Conclusion

- **TBS** is an efficacious brain stimulation therapy that **enhances the therapeutic benefits of poststroke upper extremity rehabilitation training**. Stroke patients with **a preserved cortex** show better responsiveness to TBS. TBS protocols using **a higher dose** may have superior efficacy.