**PREP2 Transcranial Magnetic Stimulation (TMS) Operator – Supervisor Key Competency**

This document is designed for clinicians who will be training others (acting as the “Trainer” or “Supervisor”) in the practical and clinical skills required to achieve ‘PREP2 – TMS Operator’ Competency. For the purposes of this document they will be referred to as the “training supervisor”. The “trainees” will be physiotherapists and occupational therapists using the PREP 2 algorithm & Transcranial Magnetic Stimulation (TMS) for prediction of upper limb motor recovery after stroke. It provides information and training to perform a TMS assessment, and determine MEP status as part of PREP2. Clinicians training to act as supervisors should have successfully completed PREP2 Basic, PREP2 Advanced and PREP2 TMS Operator competency package, as well as successfully completing the PREP2 Basic and PREP2 Advanced Trainer Key Competency documents before starting this competency document.

Training Supervisor Competency Process: Agreed competencies are to be signed off by your allocated assessor. Bring your competency document to any training sessions. Following this, you will need to complete the log of supervised training sessions with a trainee, including at least 3 that are deemed successful.

**On completion of competencies:**

Copy to be retained by employee and healthcare organisation. Once signed off, it is the responsibility of the training supervisor to ensure that skills are kept up to date, and opportunities to refresh skills and knowledge are sought on a regular basis.

**PREP2 Competency Documents PREP2 Basic, PREP2 Advanced, PREP2 TMS Operator, PREP2 Basic Trainer and PREP2 Advanced Trainer completed (prerequisite)**

*Training Supervisor*: “I acknowledge that I have successfully completed the above PREP2 training modules and competencies”

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

Date of competency sign off: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**REP2 TMS Operator Trainer Key Competencies:**

*Organisation representative/ allocated assessor: “*I acknowledge that the training supervisor has demonstrated required skills and knowledge for becoming a PREP2 TMS Operator supervisor”

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

*Training Supervisor*: “I acknowledge that I have completed and understood all required training for becoming a PREP2 TMS Operator supervisor.”

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

**Readings & Resources**

In addition to the listed readings and resources you are expected to look for some up to date literature and record this as you go.

**Useful Readings & Resources**

Stinear C (2010) Prediction of motor recovery after stroke *Lancet Neurology* 9(12): 1228-32

Stinear C (2017) PREP 2: A biomarker-based algorithm for predicting upper limb function after stroke. *Annals of Clinical and translational Neurology. 4(11): 811-820.*

Stinear C. (2017) [Prediction of motor recovery after stroke: advances in biomarkers](https://www.sciencedirect.com/science/article/pii/S1474442217302831). *Lancet Neurology* 16(10): 826-36.

Smith, M. C., Ackerley, S. J., Barber, P. A., Byblow, W. D., & Stinear, C. M. (2019). PREP2 Algorithm Predictions Are Correct at 2 Years Poststroke for Most Patients. *Neurorehabilitation and neural repair*, *33*(8), 635-642.

Hallett M (2007) Transcranial magnetic stimulation: a primer *Neuron* 55(2):187-99

Rothwell J (2007) Techniques and mechanisms of action of transcranial stimulation of the human motor cortex *Journal of Neuroscience Methods* 74:113-22

Rossi S (2009) Safety, ethical considerations, and application guidelines for the use of transcranial magnetic stimulation in clinical practice and research *Clinical Neurophysiology* 122 (8), 1686

Lerner A (2019) Seizures from transcranial magnetic stimulation 2012–2016: Results of a survey of active laboratories and clinics *Clinical Neurophysiology (*https://doi.org/10.1016/j.clinph.2019.03.016*)*

[www.presto.auckland.ac.nz](http://scanmail.trustwave.com/?c=7264&d=zPXa2UJ9CgRjx5a7lqxPr_-xi9YtRpZU3HcO3CiImw&u=http%3a%2f%2fwww%2epresto%2eauckland%2eac%2enz)

<https://preptraining.auckland.ac.nz/>

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| **Article Reference:** | **Key points:** |
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| **Required?**  **Y or N/A** | **Competency** | **Measurement** | **Self-sign off & date** | **Assessor**  **Sign off & date** |
| --- | --- | --- | --- | --- |
| *If refresher required following PREP2 Basic Training* | Demonstrates an understanding of PREP2 development and validation | * Discuss the development of PREP2, from biomarkers identified in chronic stroke patients, to the development and validation of PREP2 with sub-acute stroke patients. * Demonstrate a clear understanding of the evidence for PREP2, being able to identify the strengths and limitations of previous work. |  |  |
|  | Demonstrate effective and accurate presentation skills | * Demonstrate the ability to deliver clear and accurate presentations to trainees, outlining the use of PREP2. |  |  |
|  | Demonstrate understanding of learner needs | * Describe an approach to training that considers the current knowledge and experience of the trainees and effective means of communication * Demonstrate an understanding of critical knowledge and skills to be acquired by trainees and the ability to discern whether these have been successfully acquired. |  |  |
|  | Demonstrate approach to meeting learner needs | * Describe an approach to training and coaching individual trainees that considers supported self-directed learning and problem solving, appropriate and timely feedback, and facilitates high levels of engagement by trainees. |  |  |
|  | Demonstrates awareness of likely concerns and queries related to PREP2 | * Describe concerns and queries that trainees are likely to raise during their training, and appropriate responses to these |  |  |
|  | Demonstrates advanced knowledge of motor system anatomy | * Discuss the components of the nervous system that control voluntary movement * Demonstrate how to assess and support this knowledge in trainees |  |  |
|  | Demonstrates ability to teach basic concepts of transcranial magnetic stimulation (TMS) | * Describes the mechanism of action of TMS * Describes the relative and absolute contraindications to TMS * Identifies and names parts of TMS and EMG equipment and their function. * Demonstrates the ability to correctly educate trainees in basic skin preparation for EMG electrode placement, and how to trouble shoot for impedance issues. * Demonstrates the ability to correctly educate trainees on the roles of the “TMS assistant” and “TMS operator” within TMS assessment sessions. * Demonstrates the ability to correctly educate trainees on the components of the motor evoked potential (MEP) and their interpretation. * Demonstrates the ability to coach trainees to engage in conversations with clients (patients and whanau) around TMS use in practice. |  |  |
|  | Demonstrates ability to assess knowledge and skill in relating to clinical use of transcranial magnetic stimulation (TMS) | * Demonstrate the ability to accurately assess trainees’ knowledge of basic concepts of TMS outlined in PREP2 TMS Operator Competency document. * Demonstrate the ability to accurately assess trainees’ ability to perform basic skin preparation and troubleshooting of impedance issues. * Demonstrate the ability to accurately assess trainees’ ability to accurately identify and interpret EMG readings to ascertain patient MEP status. * Demonstrates the ability assess trainees’ competence to engage in conversations with clients around TMS use in practice. * Demonstrate the ability to provide timely feedback and coaching on the above skills. |  |  |
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|  | Demonstrates ability to teach basic concepts of screening patients for TMS | * Can describe and demonstrate the screening process for TMS * Can identify the main relative and absolute contraindications to TMS * Demonstrates ability to accurately assess trainee’s competence with completing a TMS checklist, as outlined in PREP2 TMS Operator Competency document * Demonstrate the ability to provide timely feedback and coaching on the above skills. |  |  |
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|  | Demonstrates ability to assess trainee’s ability to document and communicate PREP2 predictions following TMS assessment | * Demonstrate the ability to accurately assess trainees’ skills as outlined in PREP2 TMS Operator document, and provide appropriate feedback and coaching as needed. |  |  |
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**Practical assessment - TMS Operator role –** Assessor to complete

Trainee to be assessed by training supervisor in session with qualified ‘PREP2 advanced” practitioner present. Training supervisor to be observed by allocated assessor.

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| **Patient:** |  | **Diagnosis:** |  | **Position:** Chair / Bed |
| **Date:** |  | **Age:** |  | **Tested:** One side / Both |
| **Ward:**  **Training Supervisor:**  **Trainee:**  **Assessor:** |  | **Gender:**  **Day 3 SAFE:** /10 |  | **Outcome:** MEP+ / MEP- |
| **Prediction: Good / Limited / Poor** |
| **Present:** | **NIHSS:** | **Prediction given:** YES / NO - Plan? |
| **Day post stroke:** |  |

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| **Competency** | **Supervisor**  **Identifies**  **Yes/No** | **Comments** |
| **Can screen patient for contraindications to TMS**   * Trainee accurately completes the TMS Safety Checklist, in consultation with the patient, their family, and the patient’s clinical notes * Trainee presents the completed checklist to the patient’s physician for consideration * Trainee records the outcome of the TMS safety screening in the patient’s clinical notes, and conveys the outcome to the patient and their family * Trainee provides the patient and their family with an accurate and concise explanation of the TMS procedure |  |  |
| **Can record surface EMG**   * Trainee prepares the skin appropriately * Trainee accurately positions EMG electrodes over the target muscle(s) and reference site * Trainee correctly connects the EMG electrodes to the EMG recording system * Trainee correctly uses EMG system software to observe EMG activity * Trainee can discern between acceptable and unacceptable EMG signals, and between biological and environmental sources of noise in the signal * Trainee can trouble-shoot to improve the quality of the EMG signal as required |  |  |
| **Can participate in TMS delivery session**   * Trainee communicates effectively with the patient before and during the testing procedure * Trainee safely turns on, arms and tests the TMS unit * Trainee appropriately positions the TMS coil over the patient’s scalp * Trainee uses an appropriate initial stimulus intensity * Trainee appropriately re-positions the TMS coil in order to locate the optimal stimulation site * Trainee increases the stimulus intensity as required in appropriate increments and with communication to the patient * Trainee uses facilitation techniques where appropriate * Trainee accurately evaluates whether motor evoked potentials can be elicited in the target muscle(s) * Trainee monitors the patient throughout the TMS session and responds appropriately * Trainee removes EMG electrodes and cleans patient’s skin * Trainee disconnects, turns off and stores equipment correctly |  |  |

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| **Post-session reflection – Trainee/Supervisor:** | **Action plan:** |
| **Post Session Reflection – Supervisor / Assessor:**  **Action Plan:** | |

Observed training sessions (Training Supervisor with TMS Operator Trainee, observed by assessor) without patient (3 minimum)

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| **Number** | **Date** | **Trainee** | **Assessor** | **Comments** |
| **1** |  |  |  |  |
| **2** |  |  |  |  |
| **3** |  |  |  |  |
| **4** |  |  |  |  |
| **5** |  |  |  |  |

Supported training sessions (Training Supervisor with TMS Operator Trainee, observed by assessor) (3 minimum)

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| **Number** | **Date** | **Trainee** | **Assessor** | **Comments** |
| **1** |  |  |  |  |
| **2** |  |  |  |  |
| **3** |  |  |  |  |
| **4** |  |  |  |  |
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Independent Management observed by allocated assessor (Training supervisor observes sessions led by TMS Operator Trainee, and deems whether “sign ‘off” appropriate) (3 minimum)

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| **Number** | **Date** | **Trainee** | **Assessor** | **Comments** |
| **1** |  |  |  |  |
| **2** |  |  |  |  |
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