

## Association of Neurophysiology Scientists of Australia Inc.

(also known as ANSA, formerly ANTA)

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### Competency statements- Nerve Conduction Studies (NCS)

These competency statements assume a University education including a bachelor of biomedical science or similar including major components of human anatomy and physiology.

### Underpinning Knowledge

The following areas of knowledge are topics that relate to the competency statements required to perform NCS. These areas of knowledge are not included in the statements as topics that require competence in performance but would assist in a better understanding of the competencies required.

- Anatomical structures and function of the central nervous system
- Maturation and development of the central nervous system
- Electrophysiology of the peripheral nervous system
- Dermatomes
- The neurological examination
- Neuro-imaging techniques
- Diseases of the nervous system including but not limited to
  - neuropathies
  - neuro-degenerative disorders
  - Metabolic disorders
  - Drug effects
- Medications used for treatment of diseases of the nervous system
- Verbal and written communication skills
- Health and ethical principles

### **To perform NCS**

1. Core Knowledge
2. Preparation
3. Patient Care
4. Equipment
5. Electrode application
6. Recording
7. Interpreting the data
8. Completing the test
9. Presenting the data for reporting
10. Managing the recorded data

### **Appendix**

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## 1. Core knowledge

The Neurophysiology Health Worker must be able to demonstrate an understanding of specialised knowledge in the following areas:

- Define anatomical structures and function of the
  - sensory nerve pathways
  - motor nerve pathways
- Describe the effects of diseases of the nervous system on the nerve conduction including but not limited to
  - neuropathies
  - neuro-degenerative disorders
  - metabolic disorders
  - drug effects
- Identify the use of NCS during surgical procedures
- Describe analogue to digital conversion recording techniques
- Identify bandwidth and frequency response characteristics
- Identify and explain the implication and use of frequency filters
- Explain the function and purpose of differential amplifiers
- Define common mode rejection ratio and understand its function and purpose
- Identify the recording parameters and how they differ from display parameters including sensitivity and filters
- Identify advantages and disadvantages of different types of electrodes
- Discuss sterilising procedures including high risk infectious diseases according to current Workplace Health and Safety (WH&S) and Infection Control (IC) regulations
- Identify the need to chloride and re-chloride silver electrodes
- Discuss the chemical and electrolytic process to chloride and de-chloride silver electrodes
- Explain the measurement of impedance
- Identify the importance of equal and low impedances in electrode application
- Explain the importance of normative data
- Verbal and written communication skills
- Health and ethical principles

## 2. Preparation

The Neurophysiology Health Worker must be competent in the following areas of NCS preparation:

- Identify the process for patients to attend and leave the clinic
- Prepare consumables appropriately
- Perform routine maintenance of equipment
- Prepare and check equipment is working according to manufacturer's specifications
- Identify and correct minor equipment faults
- Identify the process for repair of more complex faults
- Prepare the environment according to WH&S regulations
- Identify and remove equipment likely to cause electrical interference.
- Register correct data for patient

- Identify sufficient recording space for the recording
- Identify ethical issues that may occur during the recording
- Obtain appropriate patient consent

### 3. Patient Care

The Neurophysiology Health Worker must be competent in the following areas of NCS patient care:

- Introduce self and others present
- Identify correct patient, correct procedure
- Evaluate clinical and patient information on the request form noting
  - age of the patient
  - special care requirements
  - obtain relevant clinical history including
    - personal medical history,
    - description of symptoms
    - medications
    - family History
  - indication for the test
  - contraindications for the test or part thereof
- Demonstrate appropriate patient interaction
  - according to age, cultural differences and clinical state
  - provide sufficient pre-test information
  - gain sufficient pre-test information
    - height of the patient
  - explaining the procedure including answering questions
- identify the need to adapt the NCS procedure according to the information provided
- position the patient for adequate accessibility, and patient comfort
- identify, evaluate and register appropriate limb temperature for recording within departmental normative data
  - identify the need to warm sites to be tested
  - prepare the skin for best practice recording
  - recognise and respond when assistance is required
  - demonstrate patient confidentiality

#### 4. Equipment

The Neurophysiology Health Worker must be competent in the following areas of NCS equipment:

- Electrodes
  - prepare and clean electrodes for use according to WH&S and IC regulations
  - store electrodes appropriately
- Amplifiers
  - identify and explain the implication and use of frequency filters on the NCS
  - identify the routine acquisition parameters for NCS
  - identify the routine stimulation parameters
  - identify appropriate sampling rates for NCS

#### 5. Electrode Application

The Neurophysiology Health Worker must be competent in the following areas of NCS electrode application:

- define the anode and cathode
- apply recording electrodes in accordance to nerve(s) to be studied
- apply ground electrode to appropriate position for best recording practice
- identify and implement infection control procedures
- observe and apply standard precautions for contact, droplet and airborne infection risks when applying, removing and cleaning electrodes

#### 6. Recording

The Neurophysiology Health Worker must be competent in the following areas of NCS recording:

- Connect electrodes correctly to pre-amplifiers and stimulator.
- Machine settings
  - define the machine settings including sensitivity, filters, sweep time
  - explain the relevance of the machine settings to the recording
  - use machine settings according to the nerve to be studied and departmental protocols
  - alter machine control settings when appropriate
- Stimulation
  - stimulate appropriate site in accordance to nerve(s) to be studied
  - define supra and sub maximal stimulation
  - determine stimulation intensity to produce best practice recording.
- Recording techniques
  - explain antidromic and orthodromic recording techniques including their best use
  - identify when trace averaging is required

- identify anomalies of waveforms recorded
- annotate difficulties encountered during the recording
- identify artefacts and their source
  - instrumental and or environmental artefacts
  - physiological artefacts
- determine appropriate nerve studies to provide clarification of disease and or clinical correlation

#### 7. Interpret the data

The Neurophysiology Health Worker must be competent in the following areas of NCS interpretation:

- Measurement
  - measure, calculate and register latencies, amplitudes and conduction velocities using appropriate scientific unit measurement scales
- Normative values and data variation
  - compare data to departmental normative values
  - define cause for variance ie artefact, disease, anomaly
  - identify the affect height may have on studies
  - identify abnormalities as associated with clinical symptoms
  - compare data to previous results where appropriate
  - identify critical test results for interpreting physician

#### 8. Completing the NCS

The Neurophysiology Health Worker must be competent in the following areas of completing the NCS:

- Remove electrodes according to different applications according to WH&S and IC regulations and patient comfort.
- Assist patient as required
- Inform patient of the process for obtaining results
- Dispose of materials according to waste management, WH&S and IC regulations
- Clean recording electrodes in accordance with WH&S and IC regulations
- Ensure patient knows how to access test results

9. Presenting the data for reporting

The Neurophysiology Health Worker must be competent in the following areas of presenting the NCS data for reporting:

- Present data in tabulated format for interpretation

10. Managing the recorded data

- Archive recording
- Maintain database of recording

## Appendix – Stakeholders

### Stakeholders

- ANTA Inc. Members
- Document Development Committee
- Document Development Committee Advisory Group
- Other interested parties

### Document Development Committee (2014-2015)

Joanne Wex, Angela Borbelj, Anna Exley, Holly Campbell, Mary Lynch, , Santhi Chigurupati, Malcolm Corkhill, Amy Lofts, Vicky Grant, Samantha Soe.

### Advisory Committee

The document development committee identified a group of key stakeholders to view the draft documents for feedback. The advisory group was made up of technologists, scientists and neurologists working in the neurophysiology industry around Australia. The comments from this group were considered, compared against the reference material and included where appropriate.

### Members Feedback

On completion of the final draft the document was put out to all members of ANTA Inc. for feedback. The comments from members were considered, compared against the reference material and included where appropriate.

### Amendment

2023 July      Rebranded to ANSA Inc



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