

INTERGROWTH-21st

International Fetal and Newborn Growth Standards for the 21st Century

The International Fetal and Newborn Growth Consortium



NEURODEVELOPMENT ASSESSMENT SUMMARY OF MANUALS

December 2013



Please read this summary carefully and refer to it throughout the study if any clarification is needed

This Summary of Manuals was produced by the INTERGROWTH-21st Infant Development Group, based on the 1st Meeting of the Group, Oxford, March 2012. This document reflects the consensus reached by members of the group regarding the selection of tests to be included in the INTERGROWTH-21st Neurodevelopment Package to be implemented by all centers taking part in the INTERGROWTH-21st follow-up study.

INTERGROWTH-21st is a large project involving health institutions from eight geographically diverse countries. It is therefore essential that all participating institutions follow a standardized neurodevelopment protocol.

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Credits

This summary was prepared by members of the INTERGROWTH-21st Infant Development Group and reflects the general consensus reached during the Infant Development Group Meeting, Oxford, 23 March 2012 regarding the selection of tests to be included in the INTERGROWTH-21st Neurodevelopment Package.

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Vision Assessment

Location: Neurodevelopment assessment room

Working distance: 50 cm

Duration: 2.5 mins/test

Procedure for Cardiff Acuity and Contrast Sensitivity Test

1. Explain procedure to mother
2. Position child (50 cms away, seated alone or on mother's lap)
3. Position yourself (50 cms away, straight in front of child – check eye level)
4. Present card D to child by holding it up next to the side of your face.
 - a. Important I: Perform this action
 - b. Important II: Do not look at the card before presenting it to the child. Encourage the child to identify the picture on the card by saying its name or pointing.
5. Note the child's immediate response. From the child's eye movements/position, estimate the position (top/bottom) of the target
6. Present the next card in the same set & note position of child's eyes.
7. Check to corroborate.
8. If 2/2 correct move to next level. If 1/2 correct, repeat level. If 0/2 correct, move to level below.
9. Assess lower levels, using same method as before moving lower & lower until 2/2 are correct.
10. Note logmar (or CS) for highest level of visual acuity obtained i.e. the highest card for which 2/2 are correct

Post-test tasks

1. Shuffle cards in each set
2. Ensure the CS and CA cards are in the CS and CA boxes respectively – don't ever mix the cards
3. Wipe clean with disinfectant wipe if necessary

Points to note

1. Use the correct cards for each test
2. Ensure your eyes are at the child's eye level
3. Present each card quickly
4. Assess response quickly – look for an immediate 'clear' look
5. Report VA in logMar and CS in Contrast %

Cortical Auditory ERPs

Location: Neurodevelopment assessment room

Duration: 13-15 mins/test

Procedure for Auditory Novelty Odd Ball Paradigm Test

Pre-test protocol

1. Ensure battery of NECBOX charged
2. Install front-ends and back-ends into cap according to pre-defined format.
3. Attach stick on electrodes to DRL & CMS cables
4. Ensure headphones & antenna are fixed on channel 1
5. Ensure computer volume is set on level 1 or 30
6. Ensure the computer is connected to the internet either via a broadband cable or Wifi.

Test protocol

1. Explain procedure to mother. Give her & child cap to touch & play (mother may wear grey cap).
2. Position child (either seated alone or on mother's lap) in front of laptop.
3. Place cap with the electrodes on the child's head & fasten.
4. Attach NECBOX at the rear of the cap.
5. Connect device cable to the NECBOX.
6. Switch NECBOX on & attach cover to conceal wires.
7. Place stick-on electrode CMS to child's right mastoid and the electrode DRL as close to CMS as possible. It is important that CMS is on the child's right mastoid.
8. Launch NIC software from desktop Icon. Click 'Settings' tab & select device.
9. Click 'ERP Protocol' tab and enter data. Once data is entered, click 'Start Experiment'.
10. Minimize the cartoon video as soon as the experiment begins by pressing Esc. Click EEG tab, and check the signals for 5 seconds to ensure that all channels are recording.
11. If a channel is not recording, pull off the cap's cover and reposition the electrode that is not recording taking care to not upset the child. Check the EEG signals again to confirm that this electrode is now recording.
12. In any case, pull off the cover of the cap preferably within 10 seconds of starting the experiment taking care to not upset the child.
13. The experiment will run automatically. EEG will be recorded and saved automatically. To see the wave forms press 'Esc'. To return to video, press 'F11'. To pause the experiment click 'Pause'.
14. After the experiment, enter any further information about the child or the testing conditions in the text box (e.g. assessment terminated due to lack of co-operation; child was eating during the experiment; child pulled cap off after 4 minutes). If you have no comments to enter, please enter 'NONE'.

Post-test protocol

1. Remove cap
2. Add any notes in 'annotations' and close software
3. Disconnect back ends, device cable and NECBOX immediately & place in envelopes
4. Remove front ends immediately and place inside envelope. Place envelope inside dark box.
5. Clean and dry the electrodes immediately after assessment by
 - (i) Wiping with a clean paper towel dipped in distilled water
 - (ii) Drying immediately with a soft paper towel.
6. Wipe cap & cover clean using disinfectant wipe.

Points to note

1. The electrodes are very delicate – they corrode in contact with metal, air, water, light and solvents. They are also very expensive. Ensure that they are stored in their own envelope and placed in the black box.
2. Charge the NECBOX via the microUSB connector located at the rear part of the NECBOX.
3. Ensure the NECBOX is ON while recording.
4. If you do not switch the NECBOX on before starting the NIC software, the NIC software will hang and you will have to re-start the software.

Test duration details

Set-up: 1-3 minutes

Test duration: 10 minutes

Termination: <1 minute

Total duration: 12-14 minutes

The INTER-NDA

Cognition, Language, Motor Skills & Behaviour Assessment

Location: Neurodevelopment assessment room

Duration: 20-25 mins/test

Pre-test protocol

1. Ensure battery of the iPad is adequately charged
2. Ensure the iPad is connected to the internet

Protocol for the cognition, language, motor Skills& behaviour assessment

1. Explain procedure to the mother & obtain consent
2. Load the NeuroApp on the iPad and enter the child's FGLS number, date of birth and the researcher code. Access 'neurodevelopment' home screen.
3. Administer and score Part A of the INTER-NDA. Help on the administration of certain items can be access by clicking on the tags, 'Picture', 'Examples' and 'Other options'. Ensure that every item has an outcome selected. Only one outcome may be selected per item.
4. Enter additional information about the child in to the text box, if necessary.
5. If any items are incomplete, complete them before accessing part B.
6. Click 'finish'.
7. Access Part B. Score items based on concurrent observation of the child during Part A. Help on the administration of certain items can be access by clicking 'Examples'. Ensure that every item has an outcome selected. Only one outcome may be selected per item.
8. Click 'finish'
9. Go back to the 'Neurodevelopment Home Page' of the child. If the sleep and vision tabs are incomplete, complete them by clicking on them and selecting the relevant outcomes. Once the sleep, vision and neurodevelopment windows are completed, click 'Send'

Post-test protocol

1. Wipe all toys down with a disinfectant wipe.
2. Replace all kit items into appropriate boxes.
3. Check expiry date on the raisins and replace as necessary.
4. Charge the iPad.

Attention Assessment

Location: Neurodevelopment assessment room

Duration: 3-5 mins/questionnaire

Procedure for Filling in of Assessment Questionnaire

Pre-check

1. Record the child's FGLS number and date of birth on the header of the form
2. Record the date of assessment and researcher code at the bottom of the form.

Procedure

1. Explain the purpose of the questionnaire to the mother/caregiver.
2. Request him/her to complete the questionnaire by circling the option most true of his/her child

Post-test tasks

1. Place completed forms in designated folder tray.
2. Upload data using CBQ app or directly onto the online form in the database.

Test Duration Details

Set-up: 1 minute

Test duration: 3-5 minutes

Assessment of Sleep-Wake Cycle & Daytime Physical Activity

Location: Neurodevelopment assessment room

Duration: 5-10 mins/test

Experimental Protocol

Pre-test protocol

1. Ensure battery of watch is adequately charged i.e. >20%
2. Insert new watch strap.
3. Keep envelope with instructions ready for postal return if need be.

Test protocol

1. Explain procedure (consent + watch) to mother.
2. Complete the 5 sleep questions on the iPad's NeuroApp
3. If mother consents to the watch, calibrate watch with FGLS number, DOB & child's sex.
4. Explain the process to the child, highlight that the watch must be worn all the time for five full days.
5. Place watch on the non-dominant hand of the child.
6. Offer mother the option of couriering watch back (give pre-paid envelope) or dropping it off to the team after 5 days (i.e. on day 6 after starting the test).
7. Give the mother the following instructions on the use and return of the watch:
 - i. Encourage the child to keep the watch for 5 days (do not remove even while bathing the child).
 - ii. Try to not cover the watch with a heavy sleeve.
 - iii. Press the event marker before starting and after finishing the following activities:
 - a. Feeding the child
 - b. Changing nappies
 - c. Bathing the child
 - iv. Return the watch – Post (pre-paid envelope) / drop off; on D6 after starting test

Post-test protocol

1. Remove strap & discard.
2. Upload data.
3. Check battery – if <20% change.
4. Clean outside of device with antibacterial wipes.

Test Duration Details:

Set-up: 2-4 minutes

Test duration: 5 days

Termination: Day 6