CPA-based Assessment

300 Conditioned Play Audiometry *Where developmentally appropriate, Conditioned Play Audiometry (CPA) must be used to obtain behavioural estimates of hearing sensitivity. Wherever feasible, CPA must address frequency-specific and ear-specific thresholds by air conduction, and also by bone conduction where indicated by conventional audiometric criteria.*

305 Candidates for CPA-based Assessment *Candidature for IHP Audiologic Assessment has been extended up to the age of entry into Grade 1 (6 years). Where feasible both developmentally and behaviourally, the oldest children within this candidature age range may be testable by conventional behavioural audiometry. Younger or developmentally delayed children may require CPA, which is typically the procedure of choice for children aged from about 30 to 48 months. Candidates for CPA can arise through: follow-up of children with PCHI identified from prior IHP Assessment by ABR and/or VRA, ongoing surveillance of high-risk children, and referral into IHP of children newly identified as at risk for PCHI.*

340 Protocol Compliance *All CPA testing funded by IHP must be conducted in accordance with the procedures listed in this protocol. Test procedures and results will be subject to IHP random audit, in a similar manner as for ABR-based and VRA-based Assessments.*

345 CPA-Based Assessment Components
All ***Initial CPA-based Assessments*** *shall include:*

> ***Ear-specific AC threshold estimates at 2 kHz and 500 Hz, plus threshold estimates at 4 kHz and 1 kHz, where indicated by rules analogous to those specified previously for ABR-based Assessments;***
>
> ***BC threshold estimates at 2 kHz and 500 Hz, where indicated by conventional audiometric criteria;***
>
> ***DPOAE levels and noise thresholds at nominal frequencies of 1, 2, 3& 4 kHz;***
>
> ***MEA including tympanometry and ipsilateral acoustic reflexes at 1 kHz, with a 226 Hz probe;***

The term 'Initial' refers to the first use of CPA within IHP for a given child. Assessments outside IHP do not qualify as Initial Assessments. Subsequent Assessments within IHP must follow a qualifying IHP Initial Assessment. Mandatory requirements for Initial Assessments do not apply to follow-up IHP Assessments, wherein the choice of tests and test components may be dictated by previous results and specific clinical needs in the individual child.

345 Soundfield Thresholds Soundfield thresholds are not a sufficient basis for optimal intervention and are less than adequate for the purposes of initiating intervention services, establishing a baseline of hearing, or for monitoring hearing changes over time. *Soundfield thresholds are a last resort that are acceptable within the IHP only with clear documentation of a failed, genuine effort to obtain ear-specific thresholds under earphones.* Soundfield measurements are discretional for purposes other than threshold estimation, such as demonstration of non-responsiveness. In some cases, presenting the stimuli in soundfield is helpful in conditioning a child who is initially reluctant to wear insert earphones.

350 Test Personnel *CPA-based Assessments that are billed to the IHP* ***must*** *be conducted directly by an audiologist registered with CASLPO and who is also registered with IHP as having attended VRA training provided through the IHP.* The audiologist may carry out CPA testing alone, acting both as examiner and play partner. If the play partner is someone other than the audiologist examiner, the choice of individual is at the discretion of the IHP audiologist, but their supervision is the responsibility of the audiologist.

355 Test Environment *CPA testing must be done in an audiometric test room satisfying standard criteria (ANSI S3.1-1999) for maximum permissible ambient noise for audiometric test rooms. The room must be of sufficient size to accommodate the parent, child, and audiologist comfortably and shall be adequately ventilated. The room must contain minimal visual distractions to the child.*

The presentation of stimuli may be controlled from an adjacent (observation) room. In this case, the test and observation rooms should be separated by a one-way window so that the child is not distracted by the examiner while the examiner can see the child clearly. Two-way communication should be available between the examiner and the test environment.

360 Test Equipment *CPA testing must be done using a clinical diagnostic audiometer that meets ANSI S3.6-1996 specifications. The audiometer must be capable of presenting pure tone and FM warbled-tone stimuli through insert earphones, supra-aural earphones, and a bone conduction oscillator. Warbled tones are the stimuli of choice for this protocol.*

In the absence of specific contraindications, insert earphones (ER-3A) are the required transducers for air-conduction CPA testing. Supra-aural earphones (TDH/MX41 type) are to be used ***only*** *when insert phones are contra-indicated, such as when the ear canals are very small or stenotic or if the child does not tolerate the insert phones after careful, appropriate and persistent attempts. Careful attention to accurate placement of a TDH earphone is especially important, to ensure appropriate stimulus levels and to minimize collapsing ear canals.*

A bone vibrator as specified by ANSI S3.6-1996 Specification for Audiometers is required. Establishment of bone conduction thresholds requires accurate and stable placement of the bone oscillator. If proper force and stability of the bone conductor cannot be achieved with the standard headband, a band of elastic fabric with Velcro attachments may be used (see the section on Stimulus Transducers in the ABR protocol).

365 Calibration *Calibration of insert earphones, supra-aural earphones and bone vibrator must be carried out according to ANSI standards (ANSI S3.6-1996). It is required that this calibration be done when the audiometer is installed (or moved) and then annually thereafter.*

365 CPA Threshold Bias As is the case for VRA, there is clear evidence that behavioural Minimum Response Levels (MRLs) for CPA are NOT true perceptual thresholds. CPA MRLs are generally positively biased estimates of the true perceptual threshold; the typical bias is reported to be about 4-9 dB. *Therefore, within IHP, adjustment factors of -5 dB must be applied to all CPA MRLs, to yield more accurate threshold estimates. For any test frequency and stimulus route, the lowest observed MRL required to define normal hearing in the IHP context is 30 dBHL, which yields an estimate of the true threshold of 25 dBHL or better. Any MRL of 35 dBHL or greater will be considered abnormal.*

370 Stimuli *These will have nominal frequencies of 0.5, 1, 2 and 4 kHz. Pulsed FM warbled tones of 1-2 seconds duration must be used. The inter-stimulus interval should be*

varied, and initially lengthened if random responses are frequent. A 10-dB step size is used (20 dB down, 10 dB up), in order to reach the MRL quickly. For MRLs in excess of 70 dBHL, final MRL bracketing with 5 dB steps is recommended, at the discretion of the audiologist.

The order of stimulus frequency and route is also at the discretion of the audiologist, but the emphasis on 2kHz and 0.5 kHz, with 4 kHz and 1 kHz as conditional options, is similar to that for the ABR and VRA protocols. For Initial Assessments, starting with AC thresholds at 2 kHz in each ear is recommended strongly. Strategic considerations for stimulus selection are similar to those for maximizing the efficiency and clinical relevance of ABR threshold measurements, but obviously the ABR concern about waking the child when changing ears no longer applies.

If there is a bilateral air-conduction MRL of >30 dB HL at any frequency, a bone-conduction MRL must be established for at least one such frequency (0.5 or 2 kHz). The bone conductor should be placed on the side that has the lower (better) air-conduction MRL at the test frequency.

375 Speech stimuli An air-conduction MRL for Speech Awareness (SAT) may be established for each ear at the discretion of the audiologist, provided that this does not compromise the achievement of the IHP goal of establishing MRLs for frequency-specific stimuli. Where developmentally feasible, a Speech Recognition Threshold (SRT) may be determined by identifying pictures of spondees or identification of objects or body parts.

380 CPA MRL determination

The procedures recommended by IHP for MRL determination by CPA are closely analogous to those for IHP VRA. Indeed, the VRA worksheet and the methodology of stimulus control and response documentation may be followed closely, at the discretion of the audiologist. For protocol elements related to MRL Search and Control Trials, see sections 300-325: VRA Assessment.

382 CPA Test Procedure

There is no substantive body of evidence that defines optimal CPA procedures. However, there **is** a body of research that provides an evidence-based approach to VRA. Given that both VRA and CPA are based on conditioned response paradigms, it is reasonable to apply the core principles of the IHP VRA protocol to the IHP CPA CPA protocol. In addition to the focus on ear-specific, frequency-specific testing and on strategic efficiency, the key principles relate to successful conditioning, keen awareness of false positive responses, and appropriate documentation of stimulus-response relationships. The use of a worksheet approach, analogous to the mandatory IHP VRA worksheet, is encouraged but, given the absence of a clear evidence base, a CPA worksheet is not mandatory.

The audiologist controls the presentation of stimuli and the nature and pace of the play activity. S/he observes the child's behaviour, judges if the child has responded or not, and records these judgments on the Worksheet. S/he may also guide the assistant in task management or in modeling of the required response for the child.

In order for CPA to be successful, the child must be attentive to the stimuli. The role of the assistant is to keep the infant in an appropriate state of listening for the sound stimulus, while preparing the child to perform the play activity.

The procedure begins with description and modeling of the desired response play-activity, and then the child is conditioned to perform the activity. Before determining the MRL, it is important to establish that the child will respond independently with the appropriate response. Two consecutive, reinforced responses to a stimulus of a supra-threshold level are required to establish that the child has been conditioned. This response should occur within four seconds of the stimulus presentation to be accepted.

385 AD Inference from CPA In the event of clear and normal DPOAE records in the presence of reliable CPA thresholds with an MRL at 2 kHz of greater than 60 dBHL, AD is a strong possibility. A confirmatory ABR test with the IHP click protocol for AD should be considered, if there is any question about the reliability of the CPA thresholds. Such a test is likely to require sedation.