

## **SOLOMON ISLANDS INFANT EAR AND HEARING PROGRAM: PROCEDURES AND PROTOCOL MANUAL**

### **INTRODUCTION**

The World Health Organization recommends that Newborn and Infant Hearing Screening should be the goal of all member states (WHO, 2010). Early identification and intervention for infants with hearing loss should reduce the well-known adverse effects of hearing loss on childhood development and social well-being. The Sustainable Development Goal Project offers an opportunity for the implementation of Infant Ear and Hearing Programs in the Pacific Islands.

In 2016-2017, the National Referral Hospital (NRH) Ear Nose and Throat (ENT) Clinic of the Solomon Islands collaborated with the University of Queensland Audiology Division in Australia in a research project to investigate community-based outreach programs for children with ear disease and hearing loss (Kaspar, Kei, Driscoll, Swanepoel, & Goulios, 2016). The first study examined parental knowledge and attitudes to childhood hearing loss and hearing services: the results showed that 94% of parents were aware of ear disease as a major cause of hearing loss in children, and that 96% of parents supported an ear and hearing program for infants (Kaspar et al., 2017). A second study was therefore conducted to investigate the possibility of an Infant Ear and Hearing Program at routine Child Welfare Clinics (CWCs). The NRH ENT Clinic team visited five of the CWCs in Honiara in August 2017, and assessed 288 infants attending the clinic for routine review: results showed that 25.34% of infants presented with ear pathology in at least one ear, and 24.65% of infants presented with at least one risk-factor for sensorineural (permanent) hearing loss (Kaspar et al., In Press).

Based on the evidence of the two studies described above, it is recommended that the NRH ENT Clinic implement an Infant Ear and Hearing Program in Honiara. The program requires at least one staff member of the ENT Clinic to assume the role of Program Manager, and perform regular outreach visits to assess infants attending CWCs in Honiara. The present protocol was written as a preliminary Infant Ear and Hearing Program for the NRH ENT Clinic, and should be considered a first step towards Newborn and Infant Hearing Screening as described by the World Health Organization. The present protocol should provide a good foundation for future program developments as resources permit.

### **AIMS/OBJECTIVES**

The aim of the present document is to provide a guide to the implementation of an Infant Ear and Hearing Program for the NRH ENT Clinic of the Solomon Islands. It is divided into three sections:

- Section 1: Planning and preparation for ENT Clinic outreach visits to Child Welfare Clinics in Honiara
- Section 2: Work Flow and Assessment Procedures for ENT Clinic outreach visits to Child Welfare Clinics in Honiara
- Section 3: Recording and reporting of ENT Clinic outreach visits to Child Welfare clinics in Honiara

The present document may also be adapted by other healthcare services in developing countries wishing to reduce the burden of ear disease and associated hearing loss among infants and young children in their communities. It is suitable for settings where (1) there is a well-supported routine infant healthcare platform, such as Child Welfare Clinics, and (2) formal/sophisticated audiology services are non-existent, limited, or evolving.

## **SECTION 1: PLANNING AND PREPARATION FOR ENT CLINIC OUTREACH VISITS TO CHILD WELFARE CLINICS IN HONIARA**

### **Approval for the Infant Ear and Hearing Program**

The Head of the ENT Clinic will approach the NRH Management Committee for approval to implement the Infant Ear and Hearing Program as part of the routine ENT Clinic outreach service. Further approval for the program may be formally required from the Solomon Islands Ministry of Health and Medical Services, and the Honiara city Council (Public Health Services).

### **Personnel**

#### **(1) Infant Ear and Hearing Program Manager**

It is recommended that one of the senior ENT Clinic Registered Nurses be promoted to the role of Infant Ear and Hearing Program Manager. Their suitability for the role is based on their excellent clinical skills and management experience. Duties will include:

- Responsibility for overall logistics, administration, and management of the Infant Ear and Hearing Program,
- Liaison with the Child Welfare Clinics to arrange ENT Clinic visits,
- Perform clinical assessment of infants during ENT Clinic visits to Child Welfare Clinics, and
- Training other NRH ENT Clinic Registered Nurses for participation in the Infant Ear and Hearing Program.

#### **(2) NRH ENT Clinic Registered Nurses**

At the discretion of the Head of the ENT Clinic, other ENT Clinic staff members may be trained to participate in the outreach visits to the Child Welfare Clinics. Ideally, all ENT Clinic Registered Nurses should be skilled to performed these outreach visits. To ensure feasibility and sustainability of the Infant Ear and Hearing Program, staff participation in the program should

cause minimum disruption to the staffing requirements of the daily operation of the ENT Clinic Outpatient service.

### (3) NRH Health Promotion Officer

Collaboration with the NRH Health Promotion Officer is highly encouraged. Ideally, the NRH Health Promotion Officer will accompany the Infant Ear and Hearing Program Manager on outreach visits, and provide ear and hearing health education to caregivers attending the clinic. The NRH Health Promotion Officer may also be involved in developing appropriate ear and hearing health promotion materials (i.e., pamphlets for parents).

### **Written Protocol and Procedures Manual**

A written protocol and procedures manual for the Infant Ear and Hearing Program should be included among the documents submitted to the NRH Management Committee for approval for the program. The present document was written to satisfy this requirement.

### **Logistics and Administration**

The Infant Ear and Hearing Program Manager is responsible for the overall logistics and administration of the program. The present document states the duties required.

### **Training of personnel**

For the Infant Ear and Hearing Program Manager, training may be required on (1) theory and administration of the Joint Committee on Infant Hearing Risk-Factor Questionnaire, and (2) management of the Infant Ear and Hearing Program. The training may be provided by the Solomon Islander ENT Registered Nurse who participated in the Infant Ear and Hearing Program research study, and/or the Australian audiologist who facilitated the research study.

Should resources permit other ENT Clinic staff members to participate in the outreach visits, the Program Manager will provide training to ensure competence in the required clinical assessments and administrative procedures. Ideally, a certificate to recognize additional skills should be awarded to staff members who successfully complete training.

The NRH Health Promotion Officer has previously collaborated with the NRH ENT Clinic for World Hearing Day health education activities. Training may be provided by the Program Manager to the Health Promotion Officer on the key ear and hearing health messages that are specifically required for caregivers of newborns and infants.

### **Equipment and consumables**

The Program Manager will require use of the NRH Outpatient (OPD) ENT Clinic staff computer for the planning, preparation, record-keeping and reporting stages of the program. Suitable arrangements should be negotiated with the Head of the ENT Clinic.

Equipment and consumables that are required on the day of outreach visits to Child Welfare Clinics are:

- Vorotek. All ear examinations are to be performed using Vorotek equipment, as it is non-invasive and well-accepted by both parents and infants. The NRH ENT Clinic currently allocates one Vorotek to each ENT Registered Nurse, and the Program Manager and/or other staff member would use their allocated Vorotek equipment for CWC outreach visits. The use of Vorotek equipment for outreach visits should not impact the daily NRH ENT Clinic service, as sufficient numbers of Vorotek equipment remain at the NRH ENT Clinic for use by staff members.
- Medication Kit. Medications that are routinely administered to infants in the NRH ENT Clinic should be included in the Medication Kit that is brought to CWC outreach visits.
- Attendance Record Book. A dedicated Attendance Record Book for CWC outreach visits is required. Each visit should record the location of the CWC and the date. Record-keeping should follow current NRH ENT clinic protocol: patient name, age, sex, address, contact number of caregiver, diagnosis, and management plan.
- Laminated JCIH Risk-Factor Questionnaire
- Laminated Work-flow Chart
- Pens

Please note that there are minimal consumables required, which should positively impact on budget considerations. Regular care and maintenance of Vorotek equipment is already included in the ENT Clinic budget.

### **Quality Control**

The Infant Ear and Hearing Program Manager is responsible for quality control of the program.

This includes, but is not limited to:

- Regular review of the present protocol and procedures manual, and implementing modifications as required,
- Regular performance review of other ENT Clinic staff members participating in CWC outreach visits, to ensure on-going skill and competence of all tasks, and to provide additional training and support if required,
- Regular meetings with CWC Nurse Managers to address any issues arising from the Infant Ear and Hearing Program, and to discuss areas for improvement, and
- Regular meetings with NRH Management Committee, to provide updates on the progress of the program.

### **Budget**

Staff salaries should reflect additional responsibility and skills of ENT Clinic Registered Nurses.

Travel allowance should be included as part of the outreach service. For ENT Clinic staff members with own transport, an appropriate travel allowance may be negotiated.

There are no additional equipment or consumables costs beyond routine NRH ENT Clinic service.

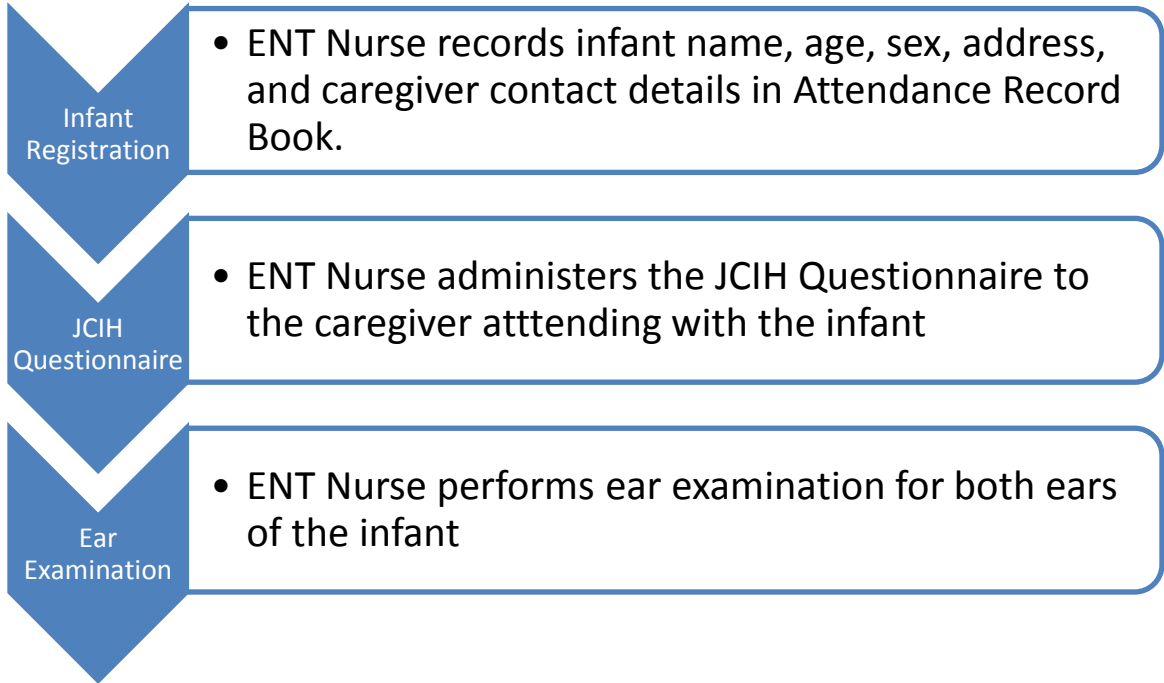
**SECTION 2: WORK FLOW AND ASSESSMENT PROCEDURES FOR ENT CLINIC OUTREACH VISITS TO CHILD WELFARE CLINICS IN HONIARA**

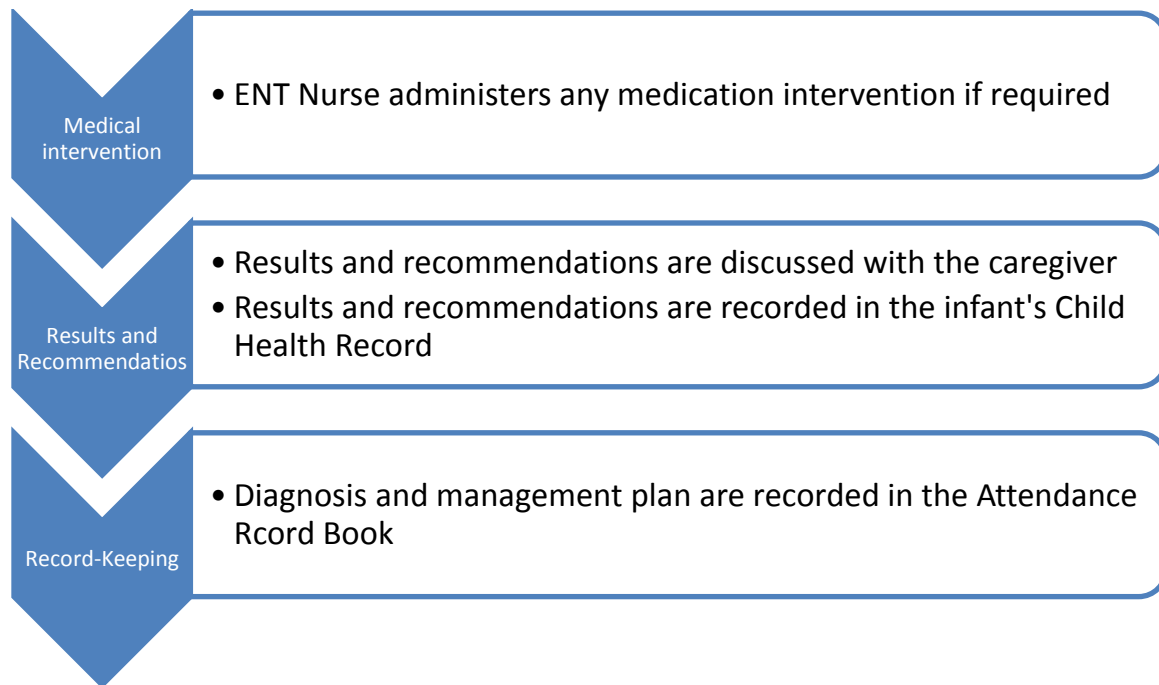
**Arrangements to be made prior to outreach visit**

The Infant Ear and Hearing Program Manager will contact the Director of the Child Welfare Clinic (CWC) that is scheduled for an outreach visit. A face-to-face meeting may be beneficial prior to the first outreach visit to a CWC, in order to clarify and discuss optimal arrangements for the visit (ie., table/space allocation, order of ear/hearing check in routine CWC work flow, etc...). A date will be confirmed with the Director of the CWC for the ENT Clinic outreach visit.

**Work Flow Chart**

The following Work Flow Chart describes the procedures to be performed by the ENT Clinic staff member on the day of the outreach visit. The staff member is an ENT Clinic Registered Nurse, and may also be the Infant Ear and Hearing Program Manager in the initial stages of the program.





## **Assessment Procedure**

### ***Infant Registration***

The ENT Clinic Nurse will call infants in the order that their Child Health Record book is placed for review. After welcoming the caregiver and explaining the ear/hearing assessment, the ENT Clinic Nurse will record the infant name, age, sex, address, and caregiver contact details in the Attendance Record Book.

### ***JCIH Risk-factor Questionnaire for Hearing Loss***

The JCIH Risk-Factor Questionnaire for Hearing Loss will be administered. The ENT Clinic Nurse will ask all items on the questionnaire, commencing at Question 1 and ending at Question 14. The caregiver will be asked to respond with “Yes”, “No”, or “Unsure”. The Child Health Record book should provide information relating to cranio-facial anomalies, syndromes associated with hearing loss, prematurity/low birthweight, birth asphyxia and/or Apgar score 0-6 at 5 minutes,

mechanical ventilation lasting 5 days or more, ototoxic medication, bacterial meningitis, hyperbilirubinemia, and undernutrition. All other items required parental report.

Even though information is available in the Child Health Record book, it is recommended that parents be asked each question to verify that parental report and recorded information is consistent.

### ***Ear Examination***

The ENT Registered Nurse will perform an ear examination of both ears of the infant, including inspection of the auricle, external ear canal, and tympanic membrane.

An overall diagnosis for each ear is made as per routine ENT Clinic protocols:

- No abnormalities detected: NAD
- Acute Otitis Media: AOM
- Chronic Suppurative Otitis Media: CSOM
- Dry Tympanic Membrane Perforation: Dry TM Perf
- Otitis Media with Effusion: OME
- Eustachian Tube Dysfunction: ETD
- Impacted Cerumen
- Could not assess

### ***Medical Intervention***

For infants requiring medical intervention, the ENT Clinic Nurse will administer medication as per ENT Clinic protocols:

- AOM: Amoxicillin antibiotics
- CSOM: dry mopping and topical ciprofloxacin eardrops

Other common infant ear pathologies do not generally require drug therapy, however, ENT Clinic review may be recommended if necessary.

### ***Results and Recommendations***

The results and recommendations will be communicated to the caregiver, and recorded in the infant's Child Health Record book.

- For infants with no risk-factors for sensorineural (permanent) hearing loss and no abnormalities on ear examination, routine CWC review is recommended.
- For infants with one or more risk-factors for sensorineural (permanent) hearing loss, monitoring of speech and language milestones is recommended. Referral to Community-Based Rehabilitation Worker may be recommended if the caregiver already expresses concerns regarding the infant's hearing.
- For infants diagnosed with ear pathology, review and recommendations follow routine ENT Clinic protocols.

Examples for recording result in Child Health Record Book:

Example 1:

#### Infant Ear and Hearing Program

Normal ear examination for both ears, and no risk-factors for permanent hearing loss identified.

Plan: Routine CWC.

Example 2:

#### Infant Ear and Hearing Program

Risk-factor for permanent hearing loss: family history

Normal ear examination for both ears.

Plan: Monitor speech and language milestones by CWC.

Example 3:

Infant Ear and Hearing Program

No risk-factors for permanent hearing loss identified.

Ear examination: R-CSOM, L-NAD. Dry mopping and Cipro ear drops for R ear.

Plan: Review at NRH OPD ENT Clinic 5/1/2017

Example 4:

Infant Ear and Hearing Program

Risk-factors for permanent hearing loss: in-utero infection, maternal hypertension

Ear examination: OME both ears

Plan: Advised to keep nose clean and dry; monitor speech and language milestones by CWC.

***Record-keeping***

Infant final diagnosis and management plan entered into the Attendance Record Book. Routine abbreviations may be used.

**Health Promotion**

Should the NRH Health Promotion Officer be available to attend during the ENT Clinic outreach visit, ear and hearing health education may be provided to caregivers as they are awaiting their CWC appointments.

**SECTION 3: RECORDING AND REPORTING OF ENT CLINIC OUTREACH VISIT TO CHILD WELFARE CLINICS IN HONIARA**

**Data entry**

Following the CWC outreach visit, the Program Manager will transcribe information from the Attendance Record Book to an Excel spreadsheet. A separate spreadsheet for each visit is recommended: spreadsheets may then be combined, depending on reporting requirements (i.e., monthly/quarterly/annual, overall CWCs/specific CWC, etc...).

Additional columns are recommended for the Excel spreadsheet to facilitate ease of data analysis for demographic information, JCIH risk-factors, and ear examination results for each ear. A suggested coding strategy is given in Table 1.

**Table 1. Coding Strategy for Infant Ear and Hearing Program**

<b>Description</b>	<b>Code</b>
Sex-Male	1
Sex-Female	2
Age Category – 0-6 months	1
Age Category- 6-12 months	2
Age Category – 12 months +	3
Family history	RF1
Cranio-facial anomalies	RF2
Syndromes associated with hearing loss	RF3
In-utero infection (Rubella, CMV, syphilis, toxoplasmosis, herpes)	RF4
Prematurity (<34 weeks) / low birthweight (1500g)	RF5
Birth asphyxia and/or Apgar score 0-6 at 5 minutes	RF6
Mechanical ventilation lasting 5 days or more	RF7
Ototoxic medication	RF8
Bacterial meningitis	RF9
Hyperbilirubinemia requiring exchange blood transfusion	RF10
Maternal hypertensive disorders in pregnancy	RF11
Non-elective caesarean delivery	RF12
Unskilled attendant at delivery	RF13
Undernutrition	RF14
Questionnaire Response-Yes	1

Questionnaire Response -No	2
Questionnaire Response -Unknown	3
Ear Examination- NAD	1
Ear Examination – AOM	2
Ear examination – CSOM	3
Ear examination – Dry TM Perforation	4
Ear examination – OME	5
Ear examination – ETD	6
Ear examination – Impacted cerumen	7
Ear examination – could not assess	8

## Reporting

The Infant Ear and Hearing Program Manager should discuss reporting requirements with the NRH Management Committee. A possible reporting schedule may include monthly/quarterly/annual reports of overall program.

An individual report for each Child Welfare Clinic (CWC) included in the program is also recommended, and should be sent to both the NRH Management Committee, and the Director of the participating CWC.

The minimum information that should be included in each report is:

- Number of infants assessed
- Number of male/female infants
- Number of infants with normal ear examinations for both ears and no risk-factors for sensorineural (permanent) hearing loss
- Number of infants with ear pathology in at least one ear
- Number of infants with at least one risk-factor for sensorineural (permanent) hearing loss
- Number of infants referred to the ENT Clinic for further review

## Health Promotion

The Infant Ear and Hearing Program Manager should collaborate with the NRH Health Promotion Officer to draft press releases regarding the program. Press releases should highlight key messages regarding prevention, early detection, and early treatment for ear disease among infants and children.

## REFERENCES

- Kaspar, A., Kei, J., Driscoll, C., Swanepoel, D. W., & Goulios, H. (2016). Overview of a public health approach to pediatric hearing impairment in the Pacific Islands. *International Journal of Pediatric Otorhinolaryngology, 86*, 43-52.
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- WHO. (2010). Newborn and infant hearing screening. Current issues and guiding principles for action. Retrieved from [http://www.who.int/blindness/publications/Newborn\\_and\\_Infant\\_Hearing\\_Screening\\_Report.pdf](http://www.who.int/blindness/publications/Newborn_and_Infant_Hearing_Screening_Report.pdf)