



Summary: Hearing Screening

Rwanda

Produced as part of Work Package 4

Date: 2019-06-06

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Disclaimer: This is a summary report representing the responses from a screening expert working within hearing care services of the country or region reported. This report is the product of professional research conducted for the EUSCREEN study and does not represent conclusions made by the authors. It is not meant to represent the position or opinions of the EUSCREEN study or its Partners. Efforts were made to cross-check the information supplied; however, not all information supplied is fully verified by the authors.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 733352

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1. Glossary of Terms: Hearing Screening

Abnormal test result	A test result where a normal “pass” response could not be detected under good conditions. The result on screening equipment may indicate “no response,” “fail,” or “refer.”
Attendance rate	<p>The proportion of all those <u>invited for screening</u> that are <u>tested and receive a result</u>,</p> <ul style="list-style-type: none"> • <u>Invited for screening</u> includes all those that are offered the screening test. • <u>Tested and receive a result</u> could be a “pass” or “fail”. <p>Attendance rate provides information on the willingness of families to participate in screening.</p>
Attendance rate in first year of life	<p>See definition of Attendance rate.</p> <p>The calculation cut-off is after <u>one year of life</u>.</p>
Compliance with referral (percentage)	<p>The percentage of those who are <u>referred from screening</u> to a diagnostic assessment that actually <u>attend</u> the first diagnostic assessment.</p> <p>Percentage of compliance provides information on the willingness of families to attend the diagnostic assessment after referral from screening.</p>
Coverage	<p>The proportion of those <u>eligible for screening</u> that are <u>tested and receive a result</u> within a <u>specific time</u>.</p> <ul style="list-style-type: none"> • <u>Eligible for screening</u> includes those within the population that are covered under the screening or health care program. • <u>Tested and receive a result</u> could be a “pass” or “refer to diagnostic assessment”. • <u>Specific time</u> can be defined, such as 1 month after birth, 3 months after birth, etc. <p>Coverage provides information on the overall effectiveness and timeliness of a complete screening programme.</p> <p>Factors such as being offered screening, willingness to participate, missed screening, ability to complete the screen, and ability to document the screening results will influence the coverage.</p>
Coverage in first year of life	<p>See definition of Coverage.</p> <p>The <u>specific time</u> is pre-defined as within the first year of life.</p> <p>In other words, the coverage is the proportion of those eligible for screening that complete the screening sequence to a final result within the first year of life.</p>
False negatives	The percentage of <u>infants/children with a hearing loss</u> (defined by the target condition) that <u>receive a result of “pass”</u> during screening.



	Example: If 100 infants with hearing loss are screened, and 1 infant passes the screening, the percentage of false negatives is 1%.
False positives	<p>The percentage of <u>infants/children with normal hearing</u> that <u>receive a result of “fail”</u> from the final screening test.</p> <p>Example: If 100 infants with normal hearing are screened, and 3 infants fail the screening and are referred for diagnostic assessment, the percentage of false positives is 3%.</p>
Guidelines	Recommendations or instructions provided by an authoritative body on the practice of screening in the country or region.
Hearing screening professional	A person qualified to perform hearing screening, according to the practice in your country or region.
Inconclusive test result	A test result where a normal “pass” response could not be detected due to poor test conditions.
Invited for screening	Offered screening.
Outcome of hearing screening	An indication of the effectiveness or performance of screening, such as a measurement of coverage rate, referral rate, number of infants detected, etc.
Permanent hearing loss	<p>A hearing impairment that is <i>not</i> due to a temporary or transient condition such as middle ear fluid.</p> <p>Permanent hearing loss can be either sensorineural or permanent conductive.</p>
Positive predictive value	<p>The percentage of infants/children referred from screening who have a confirmed <u>hearing loss</u>, as described by your protocol or guideline and indicated in the Target Condition (see definition).</p> <p>For example, if 100 babies are referred from screening for diagnostic assessment and 90 have normal hearing while 10 have a confirmed hearing loss, the positive predictive value would be 10%.</p>
Preschool or (pre)school children	All children between 3-6 years of age.
Preschool or (pre)school screening	<p>Screening that takes place during the time children are between 3-6 years of age.</p> <p>This refers to <i>any</i> hearing screening during this age. The location of the screening is irrelevant to the definition.</p>



Prevalence	The number or percentage of individuals with a specific disease or condition. Prevalence can either be expressed as a percentage, proportion, or as the value per 1000 individuals within the same demographic.
Programme	An organized system for screening, which could be based nationally, regionally or locally.
Protocol	Documented procedure or sequence for screening, which could include which tests are performed, when tests are performed, procedures for passing and referring, and so forth.
Quality assurance	A method for checking and ensuring that screening is functioning adequately and meeting set goals and benchmarks.
Referral criteria	<p>A pre-determined cut-off boundary for when an infant/child should be re-tested or seen for a diagnostic assessment.</p> <p>For example, referral criteria may be “no response” at 35 dB nHL.</p>
Risk babies / Babies at-risk	<p>All infants that are considered to be at-risk or have risk-factors for hearing loss according to the screening programme.</p> <p>Two common risk factors are admission to the neonatal-intensive care unit (NICU) or born prematurely. However, other risk factors for hearing loss may also be indicated in the screening programme.</p>
Sensitivity	<p>The percentage of infants/children with hearing loss that are identified via the screening program.</p> <p>For example, if 100 babies with hearing loss are tested, and 98 of these babies are referred for diagnostic assessment while 2 pass the screening, the sensitivity is 98%.</p>
Specificity	<p>The percentage of infants/children with normal hearing that pass the screening.</p> <p>For example, if 100 babies with normal hearing are tested, and 10 of these babies are referred for diagnostic assessment and 90 pass the screening, the specificity is 90%.</p>
Target condition	<p>The hearing loss condition you are aiming to detect via your screening programme. This includes:</p> <ul style="list-style-type: none"> • The <u>laterality of the condition</u>, whether the program aims to detect both unilateral and bilateral hearing loss or just bilateral hearing loss. • The <u>severity of the condition</u>, whether the program aims to detect hearing loss ≥ 30 dB HL, ≥ 35 dB HL, ≥ 40 dB HL or ≥ 45 dB HL
Well, healthy babies	<p>Infants who are <i>not</i> admitted into the NICU or born prematurely.</p> <p>Well, healthy babies may or may not have additional risk factors for hearing loss, according to the procedures indicated in the specific screening programme.</p>



2. Abbreviations

ABR – auditory brainstem response

aABR – automatic auditory brainstem response

ANSD – auditory neuropathy spectrum disorder

ASSR – auditory steady-state response

CI – cochlear implant

CMV – cytomegalovirus

dB HL – decibel hearing level

dB nHL – decibel normalized hearing level

dB SNR – decibel signal-to-noise ratio

DPOAE – distortion product otoacoustic emissions

HA – hearing aid

NICU – neonatal intensive care unit

OAE – otoacoustic emissions

TEOAE – transient-evoked otoacoustic emissions



3. Background

In Rwanda, childhood hearing screening does not exist. The following report contains information with regards to childhood hearing screening across Rwanda.

3.1. General

The country of Rwanda has an area of 26 338 km² and with an estimated population of 11 839 420 in 2017 (National Institute of Statistics Rwanda, 2019).

In Rwanda, most children are registered to their parents' ID at birth; however, some are registered later when applying for health insurance. According to a published report, 51% of births are registered in Rwanda (National Institute of Statistics of Rwanda, 2016). The number of live births in Rwanda, by projection is an estimated 352 052 in 2017 (National Institute of Statistics Rwanda, 2019).

The World Bank income classification categorizes Rwanda as a low-income country (The World Bank, 2018). The gross domestic product (GDP) was €678 per capita in 2017 (National Institute of Statistics Rwanda, 2018).

From the World Health Organization (WHO) Global Health Expenditure Database, health expenditure for Rwanda in 2015 was 46 USD or €40 per capita (World Health Organization (WHO), 2018).

An infant mortality rate of 31.4 per 1000 was reported in 2015 by the World Health Organization (World Health Organization, 2018).

3.2. Neonatal hearing screening

In Rwanda, neonatal hearing screening is not conducted. It is not offered in any hospitals in Rwanda.

3.3. Preschool hearing screening

There is no preschool hearing screening in Rwanda.



4. Guidelines & Quality Control

Not applicable. Hearing screening is not performed in Rwanda.



5. Process: Screening, Diagnosis, Intervention

5.1. Neonatal hearing screening

Not applicable. Hearing screening is not performed.

5.2. Neonatal diagnostic assessment

Not applicable.

5.3. Preschool hearing screening

Not applicable.

5.4. Intervention approach

In Rwanda, treatment options available include hearing aids. It is unknown at what age hearing aids are fitted on children

The hearing aid fitting recommendations are unknown.



6. Protocols

Hearing screening protocols are described for neonatal hearing screening (well-baby and at-risk) as well as for preschool hearing screening when applicable.

- The Test performed is the screening technique used
- The Age of the child is indicated in hours, days, months or years
- Referral criteria may be the lack of an OAE response at specified frequencies, a response-waveform repeatability constant, the absence of an aABR response at a specified intensity, or an absent behavioural response at a specified intensity. Referral criteria may be defined within a protocol or limited based on the device used.
- The Device is the screening device used.
- Unilateral Referrals indicates whether children are referred if only one ear fails screening.
- The Location is where the screening takes place

6.1. Neonatal hearing screening (well)

Not applicable.

6.2. Neonatal hearing screening (at-risk)

Not applicable.

6.3. Preschool hearing screening

Not applicable.



7. Professionals

7.1. Neonatal hearing screening (well)

Not applicable. Hearing screening is not performed in Rwanda.

7.2. Neonatal hearing screening (at-risk)

Not applicable. Hearing screening is not performed in Rwanda.

7.3. Preschool hearing screening

Not applicable. Hearing screening is not performed in Rwanda.



8. Results: Neonatal Hearing Screening

8.1. Coverage and attendance rates

Not applicable. Hearing screening is not performed in Rwanda.

8.2. Referral rates

Not applicable. Hearing screening is not performed in Rwanda.

8.3. Diagnostic assessment attendance

Not applicable. Hearing screening is not performed in Rwanda.

8.4. Prevalence / Diagnosis

The prevalence of hearing loss in Rwanda is unknown.

8.5. Treatment success

Information on the number of children fitted with hearing aids in Rwanda is unknown.

8.6. Screening evaluation

Not applicable. Hearing screening is not performed in Rwanda.



9. Results: Preschool Hearing Screening

9.1. Coverage and attendance rates

Not applicable. Hearing screening is not performed in Rwanda.

9.2. Referral rates

Not applicable. Hearing screening is not performed in Rwanda.

9.3. Diagnostic assessment attendance

Not applicable. Hearing screening is not performed in Rwanda.

9.4. Screening evaluation

Not applicable. Hearing screening is not performed in Rwanda.



10. Costs: Neonatal Hearing Screening

In Rwanda, hearing screening is not performed. There has not been a cost-effectiveness analysis performed on neonatal hearing screening.

10.1. Screening costs

Not applicable. Hearing screening is not performed in Rwanda.

10.2. Equipment costs

Not applicable. Hearing screening is not performed in Rwanda.

10.3. Staff costs

There are 0 professionals that perform hearing screening in Rwanda. Health workers at the clinics would be suitable professionals to perform screening if trained.

10.4. Diagnostic costs

The total cost of diagnostic confirmation is not indicated.

10.5. Amplification costs

In Rwanda, not all children are provided intervention due to capacity and payment problems. The costs for amplification are not known.

10.6. Social costs

It is unknown whether special schools exist in Rwanda for children who are deaf or hard of hearing. It is unknown how many children attend a special school, if they do exist. It is unknown whether special support exists in mainstream schools for hearing impaired students.

All costs associated with schooling or special support are unknown.



11. Costs: Preschool Hearing Screening

11.1. Screening costs

Not applicable.

11.2. Equipment costs

Not applicable.

11.3. Staff costs

Not applicable.



12. References

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