



Summary: Hearing Screening

Poland

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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	A pre-determined cut-off boundary for when an infant/child should be re-tested or seen for a diagnostic assessment. For example, referral criteria may be “no response” at 35 dB nHL.
Risk babies / Babies at-risk	All infants that are considered to be at-risk or have risk-factors for hearing loss according to the screening programme. 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.
Sensitivity	The percentage of infants/children with hearing loss that are identified via the screening program. 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%.
Specificity	The percentage of infants/children with normal hearing that pass the screening. 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%.
Target condition	The hearing loss condition you are aiming to detect via your screening programme. This includes: <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	Infants who are <i>not</i> admitted into the NICU or born prematurely. Well, healthy babies may or may not have additional risk factors for hearing loss, according to the procedures indicated in the specific screening programme.



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 Poland, newborn hearing screening is organized nationally while preschool hearing screening is organized regionally. The following report contains information with regards to hearing screening in the entire country of Poland.

3.1 General

Poland has a total area of 312 679 km² with a population of 38 424 000.

In Poland, each birth is registered with the Central Statistics Office. The number of births in Poland in 2016 was 382 300 (Statistics Poland, 2017).

The World Bank income classification categorizes Poland as a high-income country (The World Bank, 2018). The gross domestic product (GDP) in 2016 was 48 364 PLN or €11 346 per capita (Statistics Poland, 2017).

From the World Health Organization (WHO) Global Health Expenditure Database, health expenditure in Poland in 2015 was 797 USD or €682 per capita (World Health Organization (WHO), 2018a).

Data from the World Health Organization indicates a child mortality rate (under age 5) in Poland of 4.9 per 1000 in 2015 (World Health Organization (WHO), 2018b). Data acquired from the 2016 United Nations Demographic Yearbook indicates an infant mortality rate of 4.0 per 1000 for the country of Poland in 2015, a rate of 4.0 per 1000 in urban areas and 4.1 per 1000 in rural areas (United Nations Statistical Division, 2016).

3.2 Neonatal hearing screening

In Poland, neonatal hearing screening is conducted universally, with all babies in the country having access to hearing screening. Screening is obligatory for parents, though parents are not rewarded or penalized for participation or refusal to participate. The universal program for well and at-risk babies was first implemented in 2002 and expanded to universally cover all well- and at-risk babies in 2003. Neonatal hearing screening is embedded in the Preventive Child Health Care screening system. The programme for well- and at-risk babies is funded through charity and health insurance.

The Polish Universal Neonatal Hearing Screening Programme (PUNHSP) implements screening procedures which are followed across the country (described in a later section). There are no differences in protocol for well or at-risk infants across regions in Poland. A national registration system for neonatal hearing screening is centralized for data monitoring.

3.3 Preschool hearing screening

In Poland, preschool hearing screening exists only in some regions or local areas. Preschool screening has not been implemented nationally; and therefore, there is no centralized information available for preschool hearing screening that applies to this report.



4. Guidelines & Quality Control

Neonatal hearing screening in Poland follows the national hearing screening guidelines. A protocol exists for both well babies and babies at-risk for hearing loss.

The content of the screening guidelines was developed by the medical coordinator with the cooperation of the Great Orchestra of Christmas Charity Foundation.

Since its initiation in 2002-2003, the guidelines have not been revised, except for modifications on information structure and internet capability. If required in the future, the medical coordinator office would decide on the revisions across all departments. Revisions would be funded through the Great Orchestra of Christmas Charity Foundation.

Quality monitoring of the PUNHSP is performed, as indicated by law, since 2004. Quality is controlled by comparison of data from the PUNHSP central database to two independent databases, the Central Statistical Office and the National Health Fund. Each of the 400 neonatal units in Poland contains a terminal for entering data into the neonatal hearing screening central database, which then become available immediately for central analysis. According to regulation, data should be entered immediately after delivery / screening, but can be entered up to 1 month after birth.

Annual reports of neonatal hearing screening results are available in Poland and published regularly (Greczka, Zych, Szyfter, & Wróbel, 2018; Szyfter, Greczka, Dąbrowski, & Wróbel, 2016; Zych et al., 2018). Additional research has also been completed on the PUNHSP (Greczka et al., 2017; Greczka, Wróbel, Dąbrowski, Mikołajczak, & Szyfter, 2015; Greczka, Wróbel, Dąbrowski, Szyfter-Harris, & Szyfter, 2016; Szyfter et al., 2016; Szyfter, Wróbel, Radziszewska-Konopka, Szyfter-Harris, & Karlik, 2008; Szyfter, Wróbel, Szyfter-Harris, & Greczka, 2013; Szyfter, Wróbel, Karlik, & Greczka, 2013; Wróbel, Greczka, & Szyfter, 2014; K. E. Wroblewska-Seniuk, Dabrowski, Szyfter, & Mazela, 2017; K. Wroblewska-Seniuk, Greczka, Dabrowski, Szyfter-Harris, & Mazela, 2017; K. Wroblewska-Seniuk, Greczka, Dabrowski, Szyfter, & Mazela, 2017).



5. Process: Screening, Diagnosis, Intervention

5.1 Neonatal hearing screening

In Poland, hearing screening occurs in the in the hospital (or NICU) for both well babies and babies at risk for hearing loss. Parents are contacted directly while in the hospital or NICU. According to the Central Statistical Office in Poland, 99.8% of children were born in a hospital or maternity clinic and 0.2% births took place at home in 2016 (Statistics Poland, 2017). The average stay in the maternity hospital after birth is estimated to be 2-3 days.

Well-baby screening should be completed before discharge from the hospital. For infants at risk, screening should be completed as soon as possible, but some follow-up screening (e.g., if on ototoxic medications) continues until 3 years of age.

The target condition for screening (both well babies and at-risk babies) is a unilateral or bilateral hearing loss of greater than 20 dB HL.

Well babies and at-risk babies are screened with the same protocol, with the exception that at-risk babies are referred directly to diagnostic assessment irrespective of screening result.

At-risk babies are defined as those with a family history of hearing loss (including parents, siblings, grandparents, aunts/uncles, and/or cousins), congenital abnormalities of the head or neck¹, a congenital syndrome associated with hearing loss², prematurity, use of ototoxic medications³, TORCH infection or other serious infection⁴, low birth weight (<1500 g), APGAR score of <4 in 1 minute, APGAR score of <6 in 5 minutes, jaundice requiring exchange transfusion, intensive therapy > 7 days, or artificial ventilation > 5 days.

Data is unavailable regarding the number of infants admitted into a NICU, but 11.3% of babies screened are identified as being at-risk for hearing loss according to Poland's hearing screening protocol (K. Wroblewska-Seniuk, Greczka, Dabrowski, Szyfter, et al., 2017).

The prevalence of cytomegalovirus (CMV) infections or meningitis is not known.

5.2 Neonatal diagnostic assessment

The diagnostic assessment tests performed are OAEs, tympanometry / impedance measures, and ABR.

The diagnostic assessment of well-babies and at-risk babies should be performed before 3 months of age and a final diagnosis of hearing loss should be made before 6 months of age.

5.3 Preschool hearing screening

Not applicable.

¹ Deformation of the pinna, underdevelopment of the pinna, lack of auricular ear, narrowing of the external auditory canal, underdevelopment of the external auditory canal, absence of external auditory canal, fistula ear, cove, fistula or cyst of gill gap, bay and pre-cyst cyst, or cleft lip, ridge, hard palate or soft palate

² Alberts-Schonberg, Alstrom-Hallgren, Cogan, Crouzon, Down's, Escher-Hirt, Feinmesser-Zelig, Franceschetti, Goldenhar, Gregg, Hallgren, Klippel-Feil, Leopard, Pendred, Pierre-Robin, Treacher-Collins, Turner, Usher, Vourmann-Vourmann, Waardenburg, Wildervank, or other.

³ Gentamicin, amikacin, netilmicin, vancomycin-erythromycin, azithromycin, furosemide, biodacin, or other.

⁴ Cytomegalovirus (CMV), rubella, mumps, toxoplasmosis, herpes, meningitis, or other

5.4 Intervention approach

In Poland, treatment options available include hearing aids, bone conductive devices, and cochlear implants. Infants are fitted with hearing aids from less than 6 months to 1-2 years age. Infants are fitted with cochlear implants from 1 year of age and older.

The hearing aid fitting criterion is a hearing loss of > 30 dB HL bilaterally. Unilateral hearing losses are also considered for amplification, though hearing aids are fit on a child-by-child basis, depending on the results of the overall assessment and with close parental support and involvement (Skarżyński et al., 2011).



6. Protocols

Hearing screening protocols are described for neonatal hearing screening (well 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)

The neonatal hearing screening programme in Poland for well babies without risk factors includes one or two OAE tests before the infant is discharged from the hospital. The screening process for well babies is indicated in Table 1. No screening is performed after the infant is discharged. Infants that are not screened before discharge from the hospital are provided a referral to the second level of the programme, which is the diagnostic assessment.

Table 1: Neonatal hearing screening process for well babies in Poland.

Test	Age	Referral criteria	Device	Unilateral Referrals?	Location
OAE1	24-72 hours	4 dB SNR for 3/6 freq	OtoRead	Yes	Maternity ward
OAE2	Before discharge	(Interacoustics, 2017)	TEOAE	Yes	Maternity ward

6.2 Neonatal hearing screening (at-risk)

The screening process of infants at-risk is very similar to the process for well babies. However, all babies at risk for hearing loss are automatically referred to the second phase of hearing screening in the audiology centre, regardless of the OAE result at the screen. Risk factor information is collected in the maternity ward or NICU.

6.3 Preschool hearing screening

Not applicable.



7. Professionals

7.1 Neonatal hearing screening (well)

Screening for well babies is performed by nurses or midwives in the hospitals.

Nurses and midwives undergo 1-day training, which is provided as part of the contract in the purchasing of hearing screening equipment. After training, nurses and midwives who participated receive a certificate, which is a mandatory requirement to perform hearing screening. Internal training by an experienced nurse or midwife is also considered on an individual basis if a new staff member requires training.

Before each training session, the material of the 1-day course is re-assessed by considering the questions, concerns and comments raised previously.

7.2 Neonatal hearing screening (at-risk)

Screening for at-risk infants is also performed by nurses or midwives in the hospital. See section 5.1 for training details.

7.3 Preschool hearing screening

Not applicable.



8. Results: Neonatal Hearing Screening

8.1 Coverage and attendance rates

In Poland, all babies are theoretically offered either hearing screening or a direct referral to diagnostics. Infants who are born outside the hospital should be directed to a diagnostic assessment via their family doctor.

Neonatal hearing screening regulation indicates that infants should be registered in the database directly after delivery in the hospital. In 2016, 96.3% of neonates born in Poland were registered in the neonatal hearing screening database (Zych et al., 2018). This includes both well-babies and at-risk babies. For home births, these infants would not be registered but should be directly referred for a diagnostic assessment by their family doctor. As described earlier, home births account for 0.2% of births in Poland.

Coverage rate is defined as the percentage of infants who have a screening result out of all those eligible for screening. Infants may therefore be registered in the database but not receive OAE screening. In 2016, 94.7% of infants born in Poland had a hearing screening test at discharge (Zych et al., 2018).

In Poland, the screening phase ends once the infant is discharged from the hospital. As part of the discharge process, parents are provided a coloured card indicating the results of the screening test. At this point, infants are referred for a diagnostic assessment upon discharge if they failed both OAE screens. If the second-step OAE could not be completed or if the infant was not screened at all, this would also warrant referral to a diagnostic assessment. Therefore, the precise coverage rate in Poland is difficult to determine, as infants without an initial hearing screening test may still attend the second level of the programme (diagnostic assessment). Considering this variation, the coverage rate in Poland can be calculated to be *at least* 94.7% and up to 96.3% in 2016 (Zych et al., 2018).

Attendance rate for neonatal hearing screening is defined as the percentage of babies who completed the screening out of all babies offered screening. The number of infants that missed being *offered* screening is not specified, and therefore, attendance rate of screening cannot be determined.

8.2 Referral rates

Referral rates for the two-step OAE screening for well babies are indicated in Table 3.

Table 2: Referral rates for neonatal hearing screening among well babies in Poland.

Test	Referral Rate
OAE1/2	3.4% in 2017 (Greczka, 2018), 4.5% in 2014 (Greczka et al., 2017)

OAE1 and OAE2 results not separated. Percentages indicate total referral rate at discharge (i.e., after one or both tests), assuming an attendance rate of 100%.

From January 2003 until November 2013, 2.9% of well infants without risk factors had an abnormal OAE result during the first stage of screening (Greczka et al., 2015). From June to November 2014, 3.0% of well-babies screened were referred from the OAE screening (Greczka et al., 2017). Similarly, the 96.6% passing rate for well babies in 2017 would suggest a 3.4% rate of abnormal OAE results

(Greczka, 2018). Therefore, the percentage of well babies *who are screened and subsequently referred* to diagnostic evaluation is approximately 3% in Poland.

However, the referrals in Poland also include the infants who were not screened in the maternity hospital. As indicated, infants not screened in the hospital are automatically referred to the second (diagnostic) stage of the programme in the audiology centre. Therefore, actual referral rates of well babies are estimated to be up to 5% (Greczka et al., 2015).

As indicated, all at-risk babies should be referred to the audiology centres, regardless of a passing or referring OAE result, therefore actual referral rates for at-risk babies are around 90-100%. However, given that OAEs are still performed on at-risk infants, it can be calculated that 10.2% of infants who were screened with risk factors failed the initial OAE screening from June to November 2014 (Greczka et al., 2017).

In total, a yearly average of 8.5% (ranging from 8 to 10%) of well and at-risk infants are referred for diagnostic assessment from the screening programme.

8.3 Diagnostic assessment attendance

The compliance rate for diagnostic assessment after screening referral is unclear.

According to the neonatal hearing screening database from 2003 to 2013, the compliance rate for all infants (including well-babies with a failed OAE screen, infants with risk factors (pass or fail OAE), and infants without an OAE screen) was 55.8%. Through a telephone survey, Greczka et al. (2017) estimated that approximately 27.7% of these infants, who should have been referred for diagnostic assessment according to the database, actually passed the OAE screen according to their parents. Therefore, based on these phone interviews, it was estimated that the compliance rate is likely notably higher, around 83%. According to Greczka et al. (2017), the estimated compliance rates for infants that failed the initial OAE screen were 82.4% and 81.3% for well-babies and at-risk babies, respectively.

However, in contrast, recent evidence from 2016 showed that 66.9% of well and at-risk infants who were referred to a diagnostic assessment attended their diagnostic appointment (Zych et al., 2018, data according to Central Data Base, not validated by use of telephone survey).

8.4 Prevalence / Diagnosis

The calculated prevalence of hearing loss among neonates in Poland is presented in Table 3. According to the source used, values were determined from years 2003 to 2011, after the implementation of neonatal hearing screening (Szyfter, Wróbel, Szyfter-Harris, et al., 2013). Data presented were not separated by permanent or transient, rather by type of hearing loss. Note that sensorineural, mixed and conductive hearing losses are included in the total prevalence values.

Table 3: Prevalence of hearing loss among neonates in Poland (Szyfter, Wróbel, Szyfter-Harris, et al., 2013).

	Bilateral		Unilateral	
	≥ 40 dB	≥ 95 dB	≥ 40 dB	≥ 95 dB
Total (per 1000 neonates)	1.47	0.39	0.52	0.09
Sensorineural & mixed (per 1000 neonates)	1.29	0.39	0.41	0.09



Because prevalence was calculated after neonatal hearing screening implementation, the percentage of neonates diagnosed with hearing loss after neonatal hearing screening are identical to the figures presented in Table 3.

Data regarding hearing loss diagnosed among infants who were not screened via neonatal hearing screening is not available.

8.5 Treatment success

After neonatal hearing screening in Poland, 59% of children with hearing loss are fitted with hearing aids per year, and 30% of children with hearing loss are fitted with cochlear implants (Greczka et al., 2015).

8.6 Screening evaluation

Data is unavailable with regards to the false positive or negatives associated with neonatal hearing screening for well babies or at-risk babies. The positive predictive value of a referral to diagnostic assessment in all infants is 5% according to data collected from 2003 to 2013 (Greczka et al., 2015).

The sensitivity and specificity of neonatal hearing screening is unavailable for well-babies and at-risk babies.



9. Results: Preschool Hearing Screening

9.1 Coverage and attendance rates

Not applicable.

9.2 Referral rates

Not applicable.

9.3 Diagnostic assessment attendance

Not applicable.

9.4 Screening evaluation

Not applicable.

10. Costs: Neonatal Hearing Screening

Neonatal hearing screening in Poland is free of charge for parents, while preschool hearing screening is funded by parents. There is no financial reward when parents attend hearing screening, and there is no penalty for those who do not attend hearing screening.

There has not been a cost effectiveness analysis completed in Poland.

10.1 Screening costs

The total screening annual costs for all neonatal hearing screening in Poland is around 2 000 000 PLN. In 2016, the exact expenditure was 1 129 410 PLN (€263 672), which applies to costs of printing screening cards, certificates, bulletins, leaflets, renting the office of the medical coordinator, and operating an IT company (Great Orchestra of Christmas Charity, 2016). Hospital costs and screening staff salaries are not included in this figure, and these data are not available (see below). Equipment costs are also not included, nor are costs for diagnostic assessments.

The total screening cost per baby is unavailable.

Screening costs for at-risk babies is not a separate figure and included in the total costs.

10.2 Equipment costs

(Information extracted to protect commercially sensitive data)

The maintenance costs and disposable costs are unknown. Screening devices are scheduled to be replaced every 7 years (Great Orchestra of Christmas Charity, 2016).

10.3 Staff costs

Data is unavailable regarding how many screening professionals exist in Poland currently.

In Poland, the yearly salary for a nurse is 40 803.72 PLN and for a midwife is 40 466.64 PLN. The cost for the education to become a nurse or midwife ranges from 19 000 to 60 000 PLN (Ministry of Health). Education standards of nurses and midwives meet regulations set by the European Union. Standards in Poland for nursing and midwifery education are that first-cycle studies are at least 6 semesters (3 years) and second-cycle studies are at least 4 semesters.

As indicated previously, nurses and midwives are trained to become hearing screeners via a 1-day training course. The cost of this training course is included in the contract for the OAE device (OtoRead, Interacoustics). As indicated previously, each device costs approximately 4000€ and Poland has currently 1339 devices in the program.

10.4 Diagnostic costs

The cost for a diagnostic assessment is not provided.

10.5 Amplification costs

In Poland, all children with hearing loss are treated; however, children may not be fitted with cochlear implants if deaf parents refuse this type of intervention.

The costs for hearing aids and services are reimbursable. Reimbursement includes 2 000 PLN for hearing aids and 60 PLN for ear molds.

For implants, bone conduction devices are refunded 1800 PLN and CI processors are refunded 2 750 PLD. The implant and costs associated with the operation are fully financed, including the preparation of the patient for the procedure and the subsequent rehabilitation. The user, however, is responsible for covering costs of batteries or additional accessories. The speech processor is eligible for replacement once every 5 years.

10.6 Social costs

There are 32 special institutions for the deaf and hard of hearing at various levels of education (Butkiewicz et al., 2014). Costs for special school or additional support is not available.



11. Costs: Preschool Hearing Screening

11.1 Screening costs

Not applicable.

11.2 Equipment costs

Not applicable.

11.3 Staff costs

Not applicable.

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