

## NEW STRATEGY FOR EARLY DETECTION OF HEARING IMPAIRMENTS IN YOUNG CHILDREN BY PARENTS AT HOME OR STAFF AT CHILD CARE CENTRES.

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So far we don't have a universal hearing screening system for all children from birth up to the primary school. At the beginning, the development of screening methods was undertaken for two groups of children quite separated by their age:

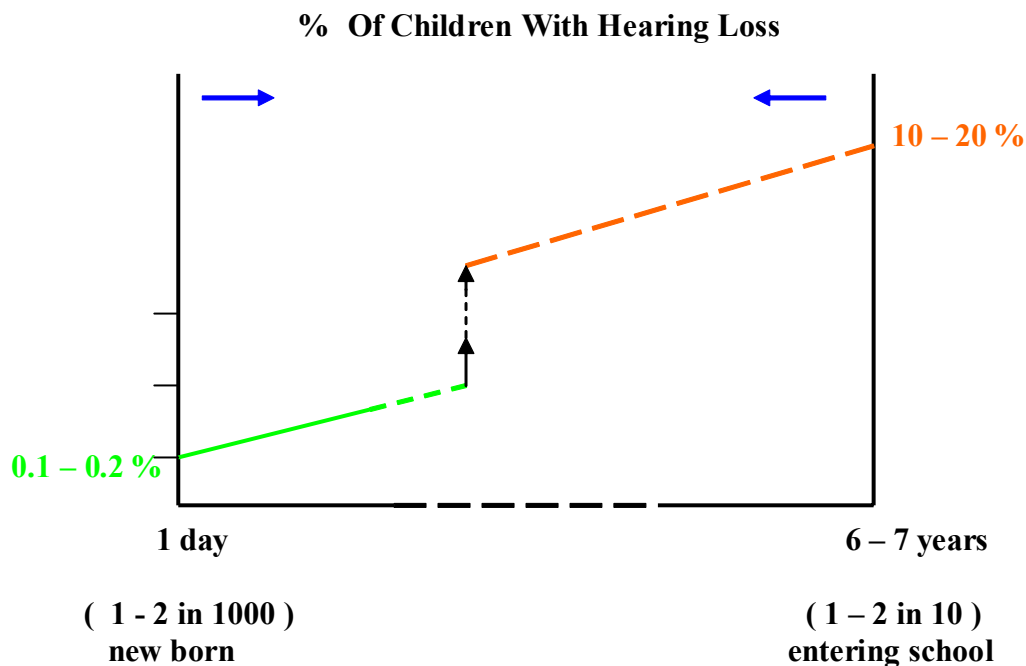
- newborn and
- school age children

Children from these two groups belong to so called "easy to test patients".

Newborn children sleep most of the time and they do not interfere with the test procedure, while the school age children can very well cooperate with the tester or they can even use the self testing methods from the Internet if this is available and affordable to them.

The general percentage data of children with hearing problems in these two groups is presented on the following graph:

[ 1 Slide – percentage graph ]



The data presented may vary slightly for different countries but the tendency of

**a significant increase in the number of children with hearing problems as they grow older, up to school age, is very alarming.**

**In newborn babies, 1 or 2 children have a hearing problem which is max. 0.2%, while in school age even 20% of children have this problem. Such a dramatic increase of hearing problems in children as they grow older, indicates the necessity to improve the effectiveness of early detection of these problems in the group of children from a few months old up to the school age.**

**However there are a number of problems making such improvement difficult to achieve on a mass scale:**

- **The number of specialized paediatric centres with Audiology facilities is limited and providing regular screening for every child is practically impossible. There are also limitations in the number of specialists and equipment available.**
- **The children in this age group are rather more difficult to test, more than 40% of children do not want to cooperate during the test with an unfamiliar person and environment and they have return again to complete one test.**
- **There is also the economical question of how to run such centres effectively if the test cannot be completed during one visit and how such centres can be financed.**

**But we know from experience that only 1 months delay in detection and correction of the hearing problem in such a young child may results in a 1 year delay in the child's general development.**

**Therefore it is extremely important to create the methods and facilities for early detection of hearing problems for every child in every family, in a regular, easy, cost effective and repetitive way.**

**The project undertaken shifts the concept of early detection of hearing problems from a limited number of medical centres into individual family homes, Kindergartens and preschool classes.**

**This new strategy is designed to help early detection of hearing problems in young children, but not to make the diagnosis.**

**It should alert the Parents as early as possible about the necessity to bring their child to the medical specialists. It also should cut down the average elapse of time of the child's referral by Parents, which still in some countries is very high – even a few years.**

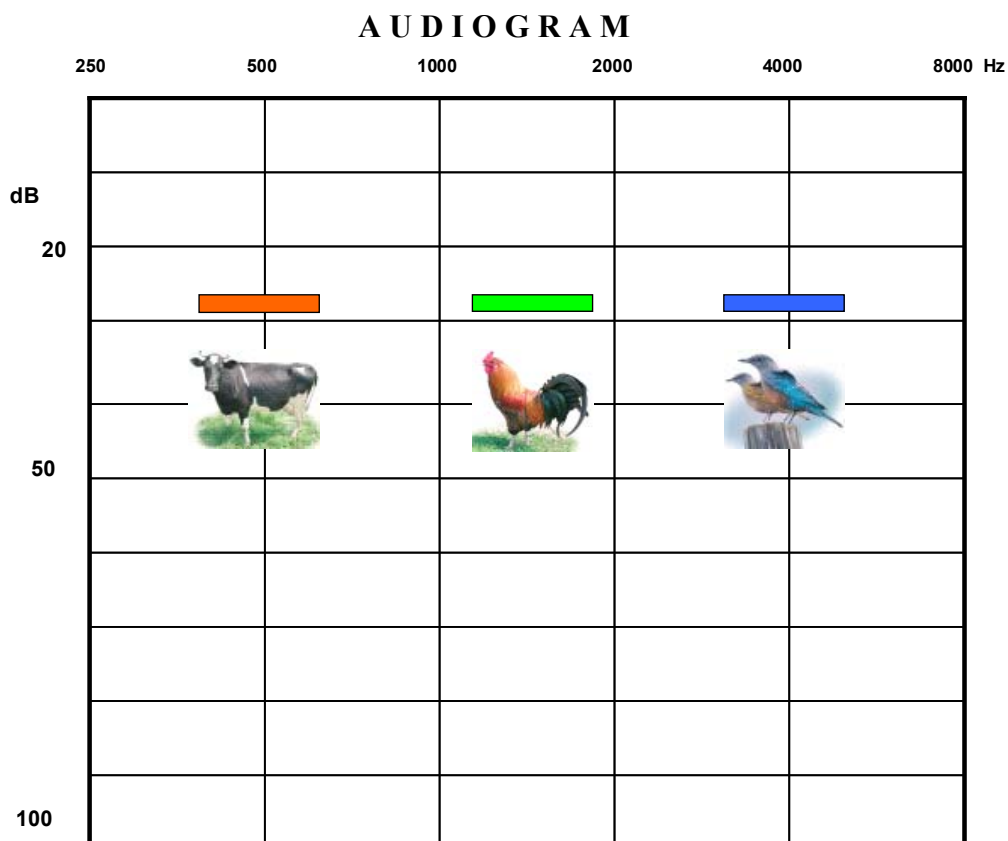
**The new strategy is supported by the following rationales:**

- 1. Parents are the people who are the most interested in their children's well being**
- 2. Parents are the most friendly people towards their children**

3. Parents are the best observers of their children’s behavioural patterns and reactions to the sound
4. The best contact with children when performing a hearing test can be achieved in a friendly environment at the family home and with well known friendly people i.e. with Parents
5. There is no time limit to complete the test during one session
6. The test can be completed in small steps over a few days when the child is relaxed and willing to cooperate.
7. There is no need to arrange and wait for a special appointment at the medical centre and to transport the child, who at that particular date may be not feeling well.
8. About half of all children cases with hearing problems are already reported by the Parents. The Parents need extra support to improve effectiveness of early detection of hearing problems in children.
9. There is no need to use additional equipment like PC Computers, CD Players, Amplifiers, Speakers etc.

Taking into account these reasons and available technical support a special simple game called “Educational Hearing Game” has been developed to play by Parents or Kindergarten Staff with the child. In this game the child has to point to the picture of the animal or birds who’s voice is played from the special electronic Sound Module. These sounds are calibrated in intensity and filtered in frequency bands to correlate them with the audiogram intensity and frequency scale.

[ 2 Slide – Audiogram ]



**When designing this project special attention has been given to make this tool simple and easy to use by the average Parent, but still being effective in detection of the hearing problems. That is why only 3 frequency bands centred around 500 Hz, 1500 Hz and 4000 Hz have been chosen to cover the range of frequencies needed the most by the child to develop the speech.**

**Selection of these frequency bands has the following clinical application**

**Low frequency 500 Hz**

**Helps detect hearing problems with a conductive component often seen in children with recurrent ear infections.**

**Middle frequency 1500 Hz**

**Helps detect the sensori-neural or mixed hearing loss in the middle frequency range.**

**High frequency 4000Hz**

**Helps to detect the sensori-neural hearing loss.**

**Before commencing the Game it is extremely important to do an initial training with the child by presenting the sounds at higher intensity levels - closer to the child's ear - to be sure that the child can recognize the sounds of cow, rooster and birds and correlate them with the right pictures. After that, the Game can be commenced at lower intensity levels, at the distances specified in the Instruction.**

**This new tool has already been tested in Poland and received a positive opinion from the Research Institute of Mother and Child in Warsaw – Poland.**

**[ 3 Slide - testing the child in Poland ]**



**The Sound Module is activated by the Parent and the child has to point to the correct picture. More than 3 pictures can be used in this game and the picture placement can be rearranged from time to time to make the guessing more difficult for the child.**

**Older children, who can read, may prefer the word cards (on reverse side of picture cards) or they can tell the animal name as long as no guessing is involved.**

**This Game also helps to develop and to observe the child's listening, correlation and coordination skills.**

**The Sound Module is built as a small hand held and battery operated electronic device.**

**[ 4 Slide - Sound Module ]**



**It has been registered with the Australian Communication Authority and also received the certificate CE in Europe.**

**This new strategy is also intensively tested in the Philippines.**

**[ 5 Slide – testing in the Philippines ]**



**Here the tester stays behind the child.**

**In the Philippines, the people involved in testing, introduced a very interesting group training for larger numbers of children.**

**[ 6 Slide – group training ]**



**This Slide shows the initial training when the Sound Module is connected to the amplifier and speakers to make the sounds loud and the children very much enjoy competition in guessing what animal or birds sounds has been presented. They are very much excited during this initial training and the training results are very positive and obtained much quicker than for the individual child. After such training the child is taken to the quiet room for individual testing.**

**The results of the test are recorded by the Parents or Kindergarten staff on a simple record form.**

**[ 7 Slide – record form ]**

**RECORD FORM..... EAR**










**HOW TO RECORD THE RESULTS:**

1. top line – record ” Left or Right “
2. in large blocks of the table record the date of the test
3. in small blocks record positive or negative responses  
( make sure to collect 3 responses for each sound )
4. positive response mark with V
5. negative response mark with X

A child with normal hearing should be able to hear and recognize all sounds presented at the recommended distances. He/she must get at least 2 correct out of 3 responses for each sound and for each ear.

If the child, after successful training, fails to recognize even one type of sound for the left or right ear at the correct distance, it is strongly recommended that medical advice be obtained.

As a further development of this new strategy the headset, normally used to attenuate and protect the ear against loud noises, was introduced with built-in Sound Module to make possible testing in more noisy conditions often present in Kindergartens, preschools and some individual houses.

[ 8 Slide – headset with built-in Sound Module ]





**Finally – it should be noted that the aim of the Educational Hearing Game with the Sound Module is to alert and identify areas of concern, not to diagnose in detail the cause of the problem.**

**The introduction of this new strategy will first involve Kindergarten, preschool and school children. Involvement of the individual Parents will require some special training to make them aware of the necessity to check more regularly the hearing status of their children.**

**It is anticipated that special classes similar to “cooking, sewing, etc.” will be organized for Parents and supported by the home Video and DVD cassettes helping them to understand the problems related to their child’s hearing and the methodology of the home testing.**