Main difficulties in establishing a successful EDHI program

(lights and shadows in Hungary)

UNHS in Hungary

Automatic Evaluation of New-Born Baby Hearing Screening Based on Three Criteria Scoring.

Pytel, J.

Pécs, Hungary

The UNHS was started in Hungary in 1997 in Pécs and in Baja

Thank to F. Grandori

2005 - UNHS - HU

	Cities / Hospitals	Live birth	Screened	Referred	Diagnosted HL	Screening method	Device
1	Baja	746	731	14	1	TEOAE	Echoport+
2	Berettyóújfalu	627	621	105	0	TEOAE	Echocheck
3	Bp. MÁV	1111	1102	60	0	DPOAE	ILO292 EP
4	Bp. Nyírõ	990	659	32	0	TEOAE	Echocheck
5	Bp. Péterfy	1784	1661	82	1	TEOAE	Echoscreen
6	Bp. SOTE I.	2822	2814	112	5	TEOAE	Echocheck
7	Bp. SOTE II. -	450		1		AABR	Natus Algo1
8	Bp. Szt.Margit	*				TEOAE	Echoscreen
9	Bp. Újpest	950	850	48	0	TEOAE	Echocheck
10	Cegléd	1201	1189	192	0	TEOAE	Echocheck
11	Debrecen, Hosp.	2791	2382	129	3	TEOAE	Echocheck
12	Debrecen, Univ.	2705	2260	93	0	DPOAE	Capella
13	Györ	2831	2714	125	2	DPOAE	GSI 70 MP
14	Gyula	1186	1180	16	0	TEOAE	Echocheck
15	Jászberény	683	134	11	0	DPOAE	ILO88Dpi
16	Kaposvár	850	690	26	0	DPOAE	Capella
17	Kecskemét	268	246	15	0	TEOAE	Echocheck
18	Kiskunfélegyháza	442	395	35	0	DPOAE	GSI 70 MP
19	Kisvárda	517	367	56	0	DPOAE	GSI 70 MP
20	Miskolc	2810	2750	427	4	DPOAE	DpEchoport+
21	Mosonmagyaróv.	623	593	4	0	TEOAE	Echocheck
22	Nagykanizsa	752	721	24	0	TEOAE	Echocheck
23	Nyíregyháza	2651	2651	1	0	AABR	Natus Algo1
24	Pécs	1455	1289	80	2	TEOAE	ILO288 Echoport
25	Salgótarján	**					
26	Szolnok	1750	1662	60	0	TEOAE	CT/Pytel
27	Tatabánya	1183	1183	1	0	TEOAE	Echoscreen

The UNHS statistic in Hungary 2005

Statistic was made by dr. Zsolt Beke (Baja)

	Number		Percent(%)
Total live birth	97500		100
Total screened	31294		32
Universality	33728	31294	93,58
Refferal rate	31294	1748	5,58

The Problem in Hungary

The neonatal hearing screening is obligatory

but

The method (objective) is not obligatory

The screening is not paid

Motivation is only the whole-hearted enthusiasm

The screening must be

Quick

Simple

Expert opinion on hand not necessary

The screening must have

High accuracy

In the cases of

higher volume of screening (UNHS!)
automated method is needed (A.Davis et al.)

Our automated program and database is an on-line (or off-line) help in screening for trained hearing screener or health visitor

The database is suitable for follow up

Our program is to help interpret the result

Expert opinion on hand not necessary

Double-checking not necessary

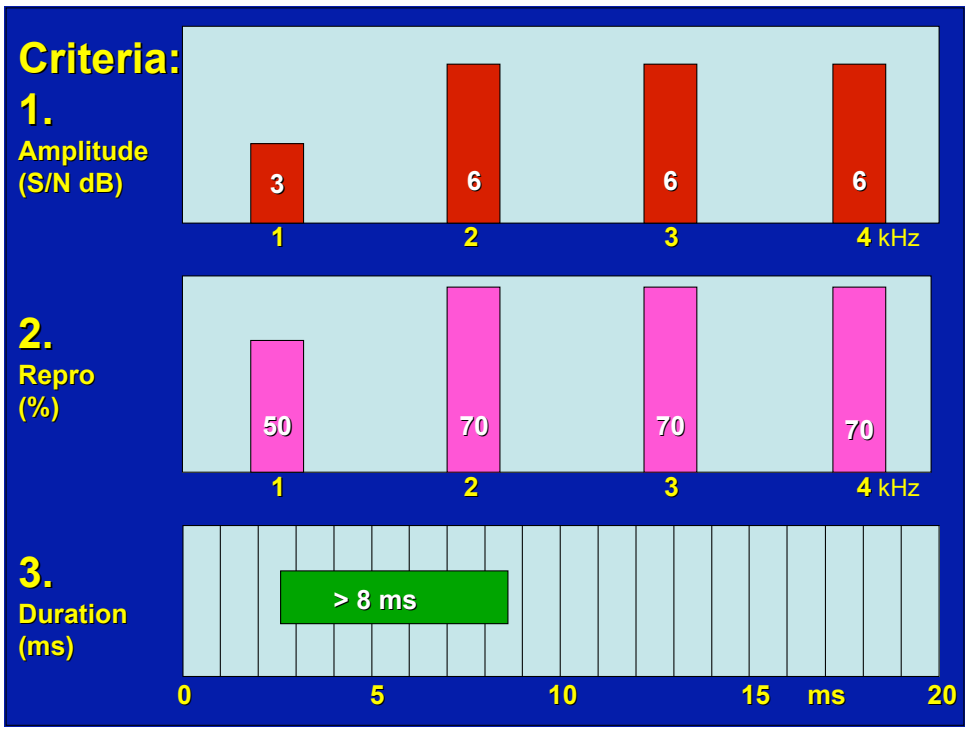
In general two criteria are used for scoring

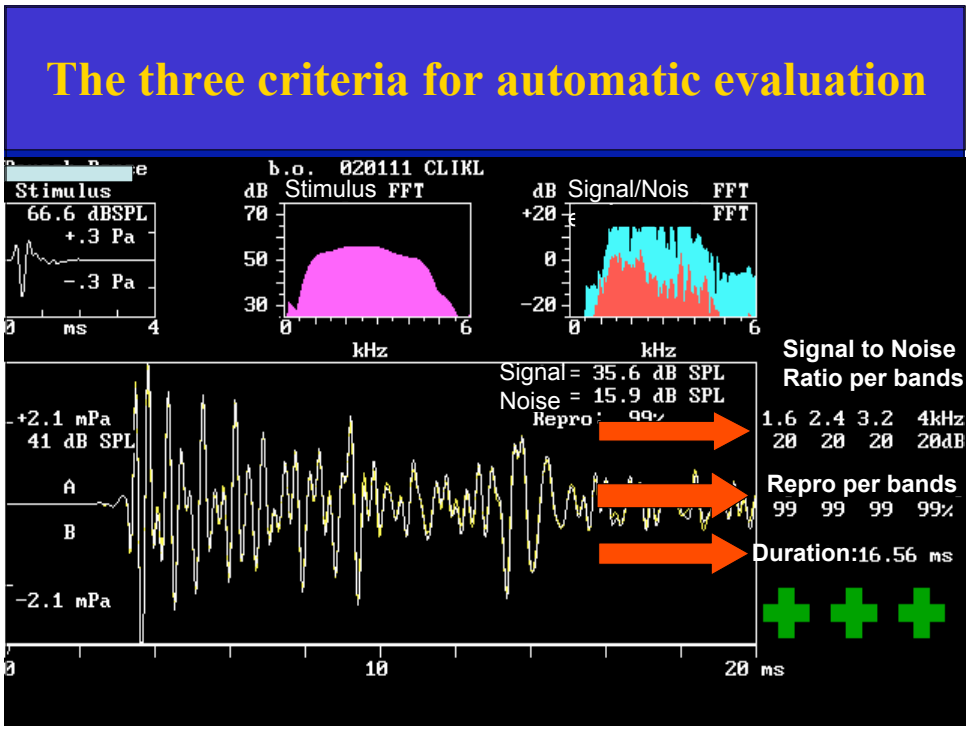
Response to noise ratio in four frequency bands

1	2	3	4 kHz
3	6	6	6 dB

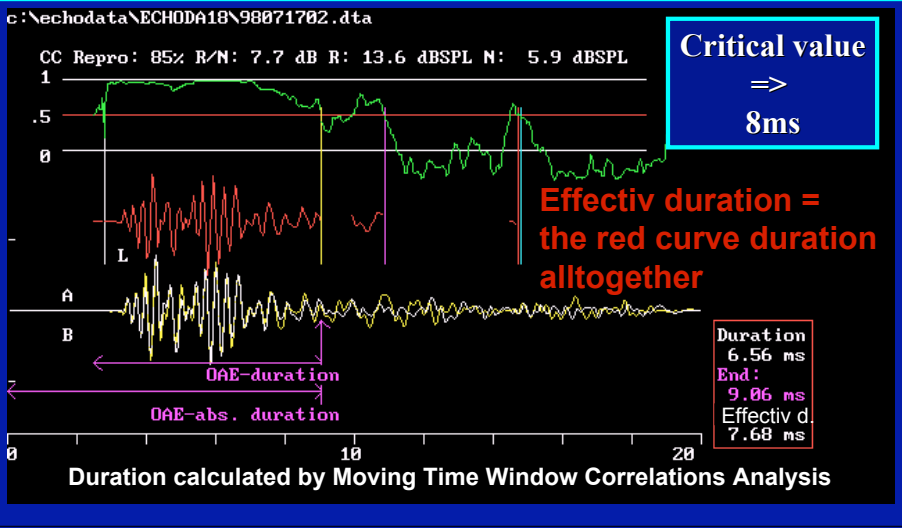
Correlation in four frequency bands

1	2	3	4 kHz
50	70	70	70%


Criteria:
1.
Amplitude
(S/N dB)
3
6
6
6
1
2
3
4 kHz
2.
Repro
(%)
50
70
70
70
1
2
3
4 kHz
3.
Duration
(ms)
> 8 ms
0
5
10
15
ms
20

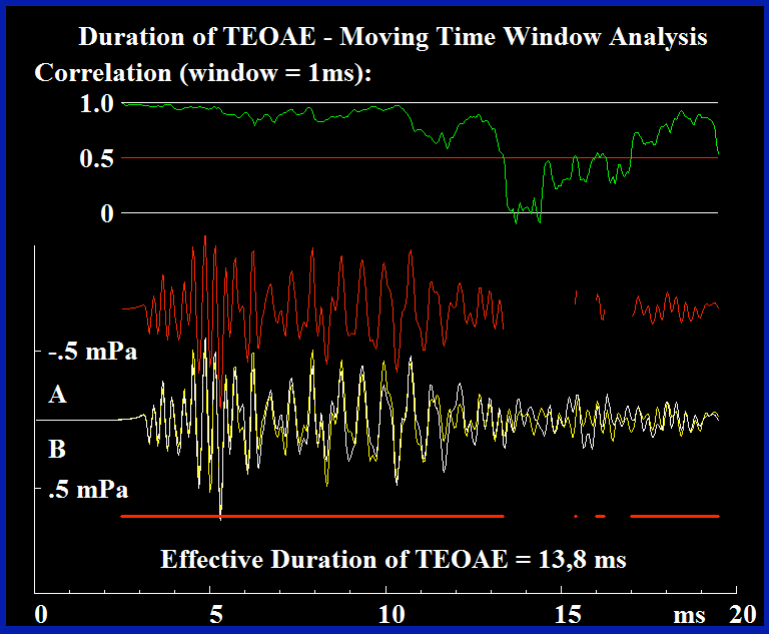

The three criteria for automatic evaluation
Stimulus
66.6 dBSPL
+.3 Pa
-.3 Pa
0
ms
4
b.o. 020111 CLIKL
dB Stimulus FFT
70
50
30
0
6
kHz
dB Signal/Nois FFT
+20
0
-20
FFT
0
6
kHz
Signal = 35.6 dB SPL
Noise = 15.9 dB SPL
Repro : 99%
+2.1 mPa
41 dB SPL
A
B
-2.1 mPa
0
10
20 ms
Signal to Noise
Ratio per bands
1.6 2.4 3.2 4kHz
20 20 20 20dB
Repro per bands
99 99 99 99%
Duration:16.56 ms

The third criterion of scoring the effectiv duration of emission

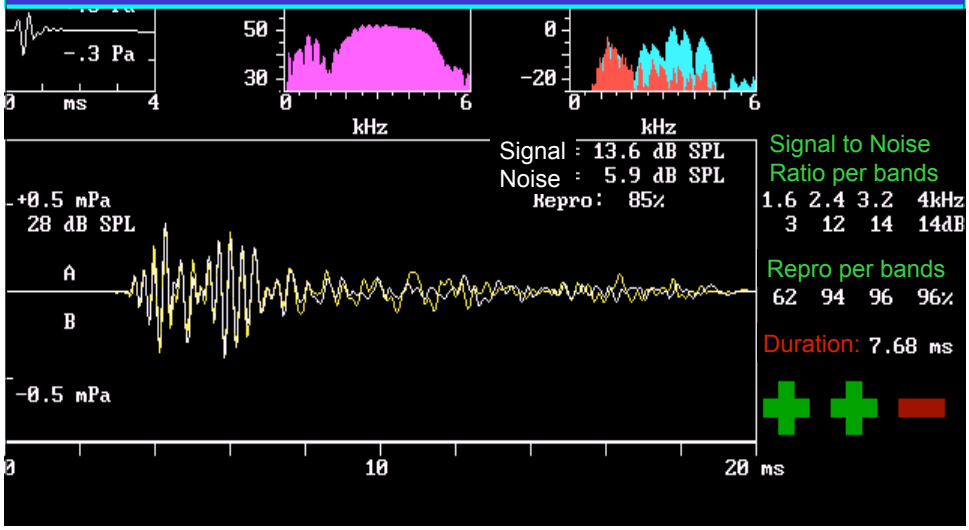


Critical value
=>
8ms

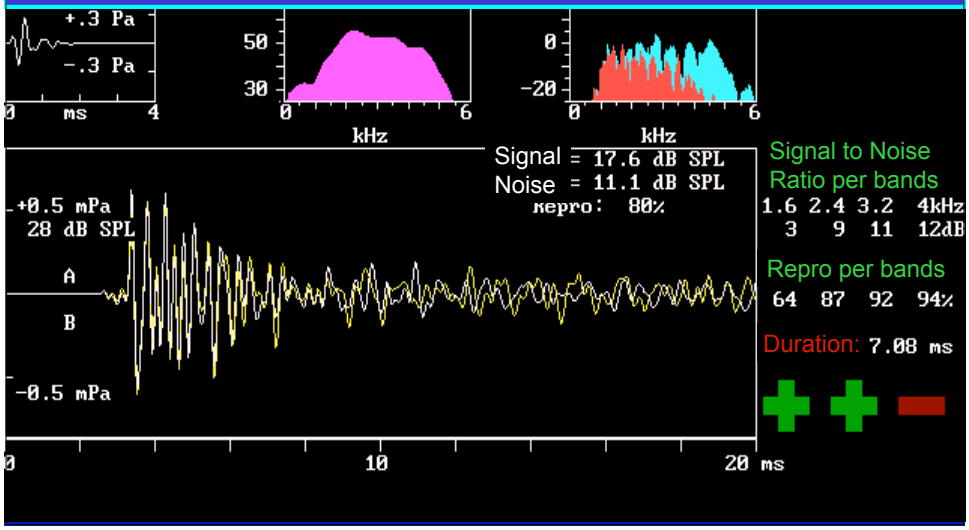
Effectiv duration =
the red curve duration
alltogether



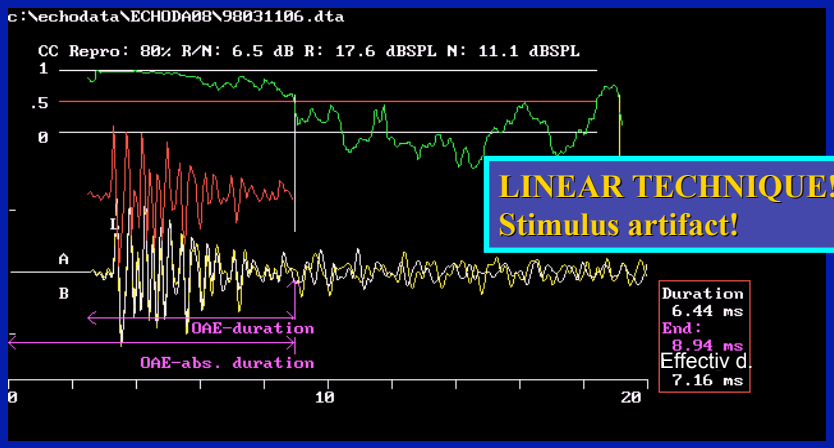
The third criterion for automatic evaluation: Duration



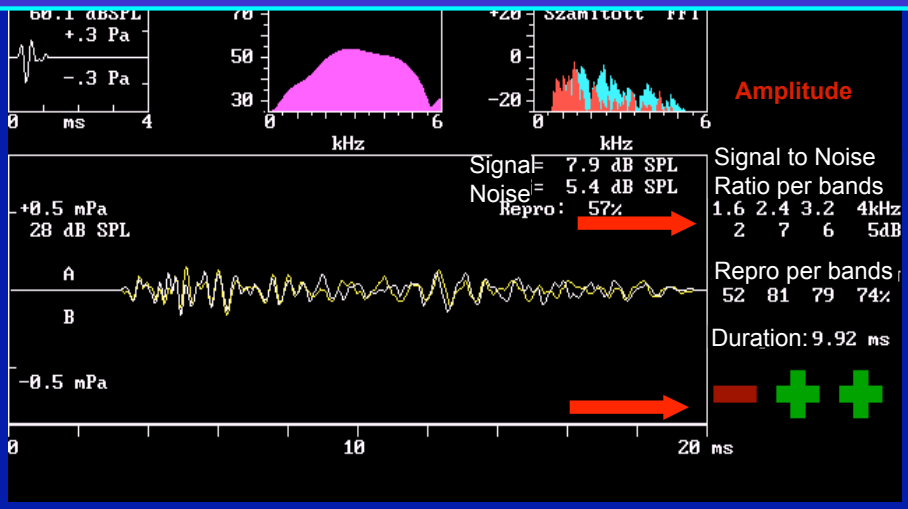
The third criterion for automatic evaluation: Duration



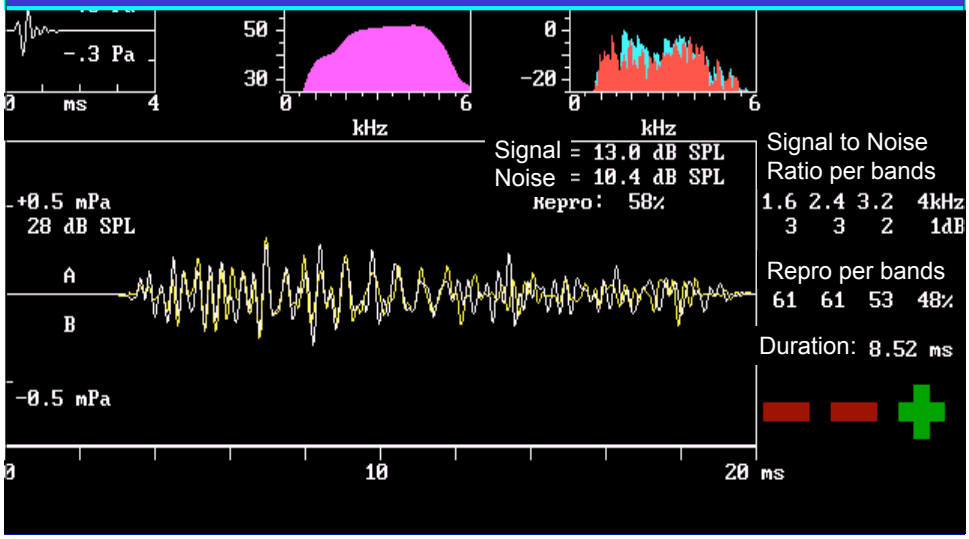
The third criterion for automatic evaluation: Duration



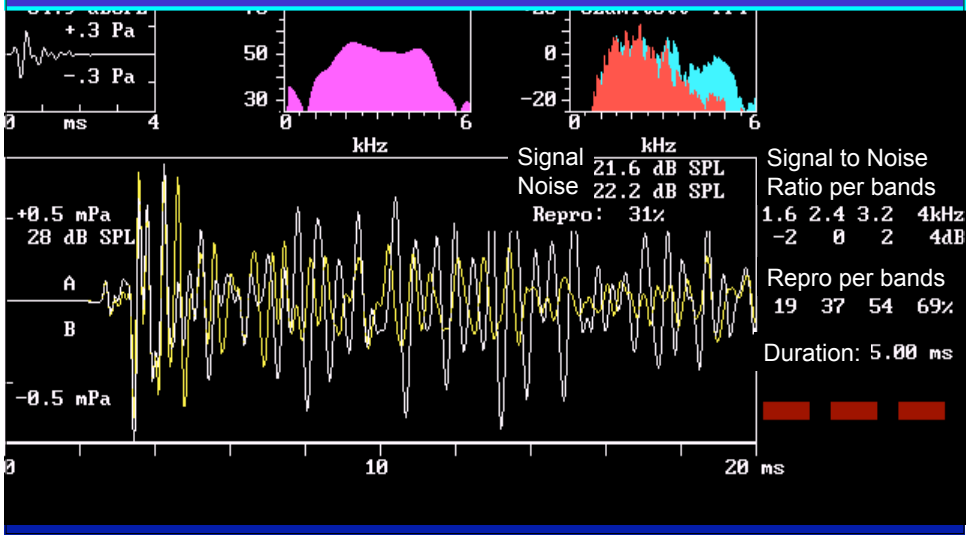
The three criteria for automatic evaluation



The three criteria for automatic evaluation



The three criteria for automatic evaluation



Only the +++ is accepted

++−

+−−

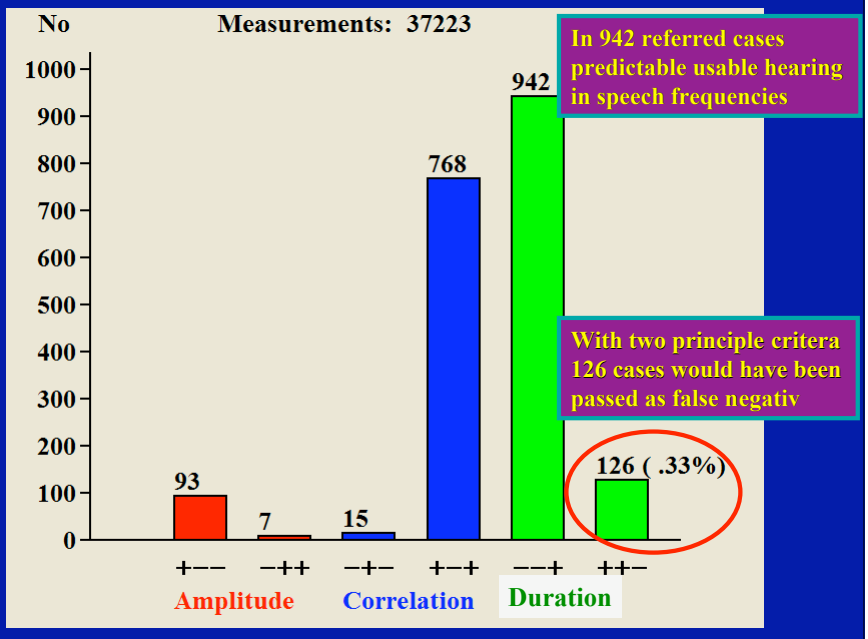
+−+

−++

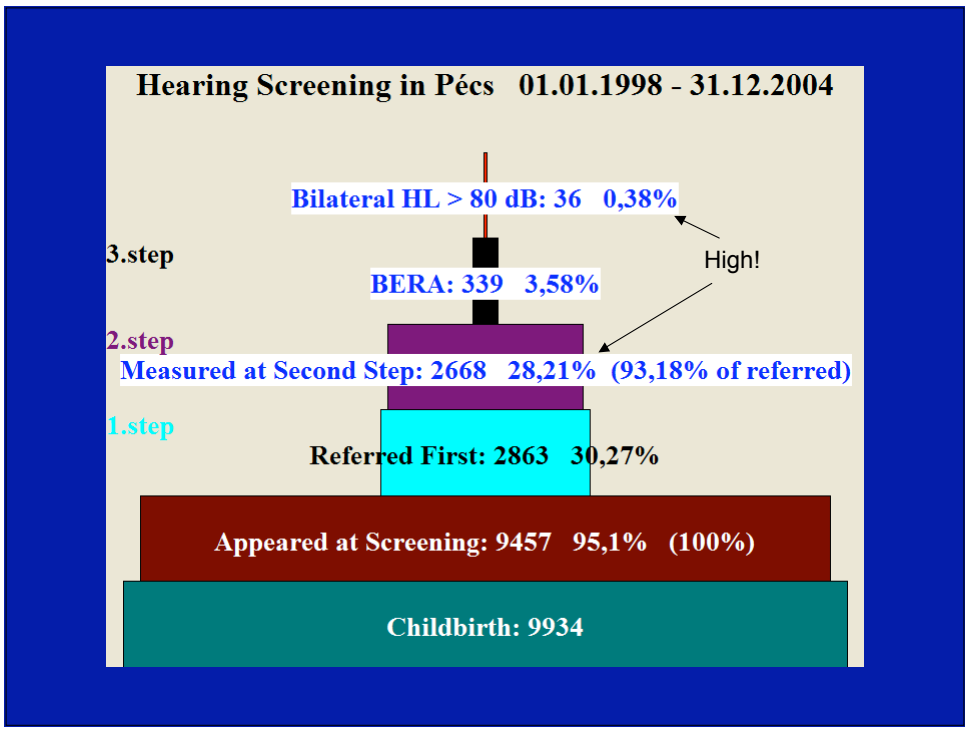
−−+

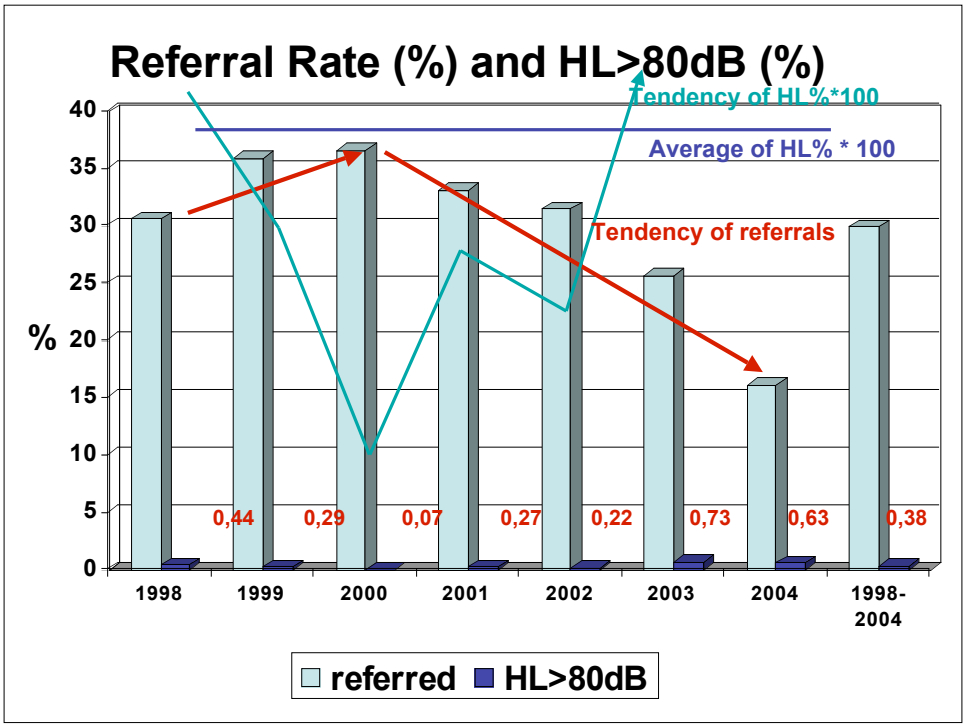
−−−

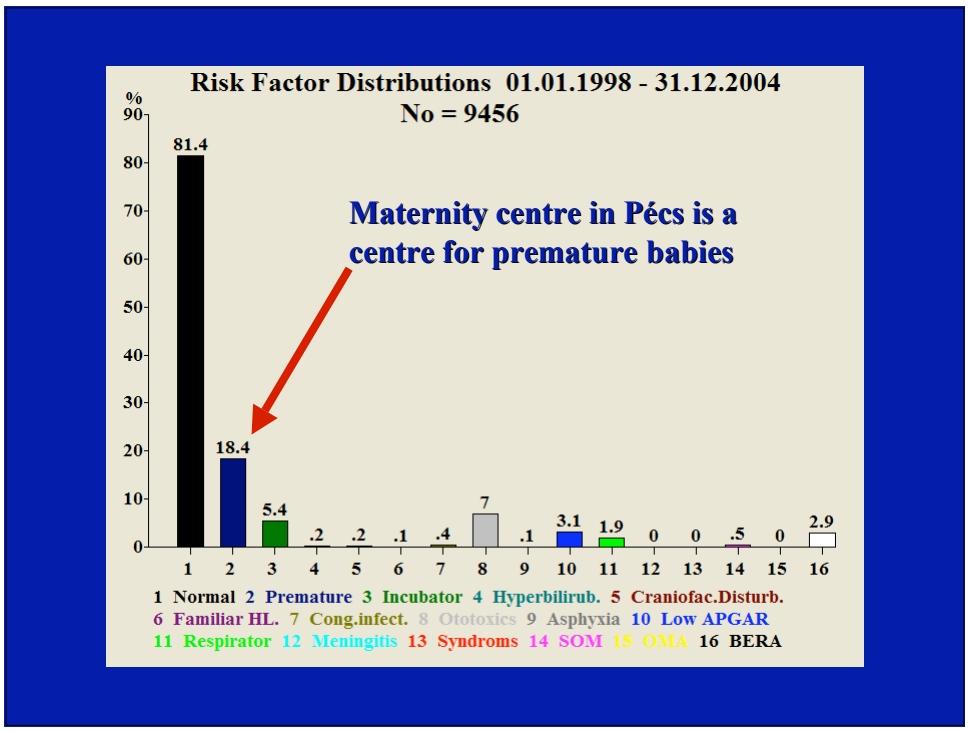
NOT ACCEPTED !

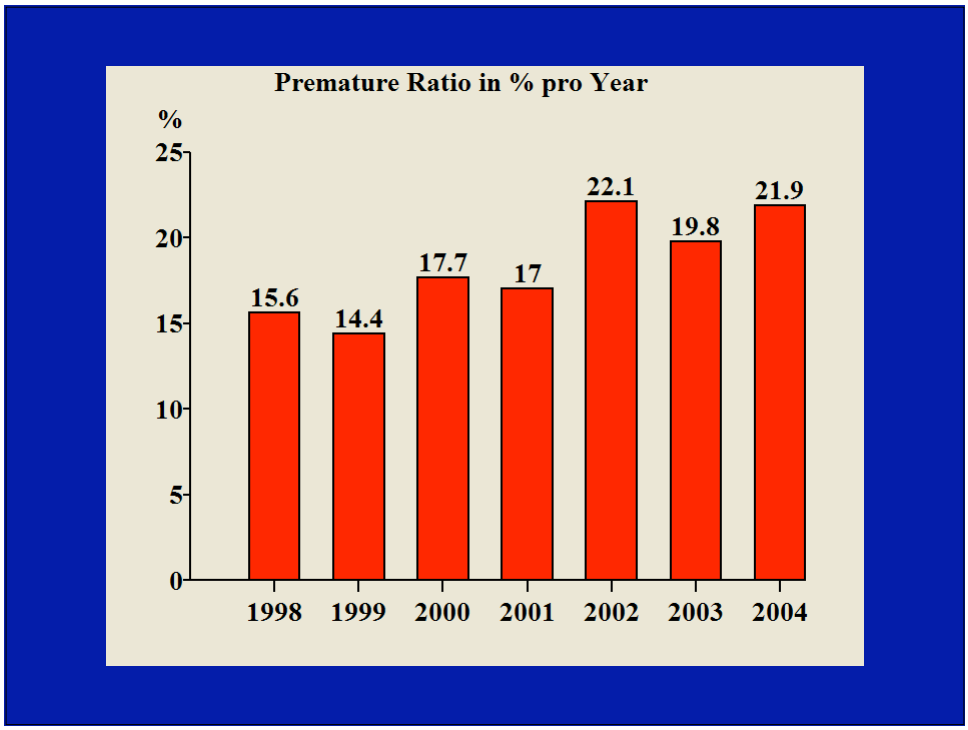


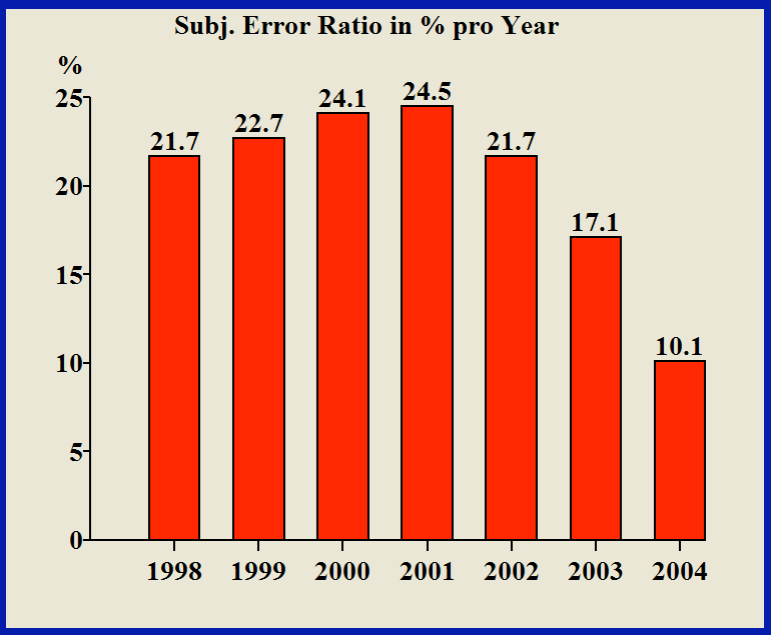
Special scoring variations

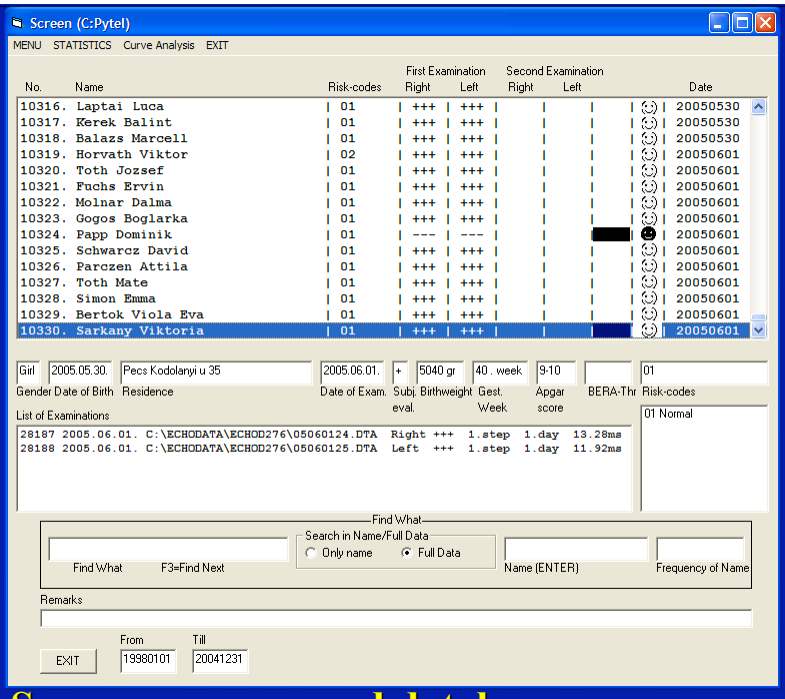

Hearing Screening in Pécs 01.01.1998 - 31.12.2004
Bilateral HL > 80 dB: 36 0,38%
3.step
High!
BERA: 339 3,58%
2.step
Measured at Second Step: 2668 28,21% (93,18% of referred)
1.step
Referred First: 2863 30,27%
Appeared at Screening: 9457 95,1% (100%)
Childbirth: 9934


Referral Rate (%) and HL>80dB (%)
Tendency of HL%*100
Average of HL% * 100
Tendency of referrals
%
40
35
30
25
20
15
10
5
0
0,44
0,29
0,07
0,27
0,22
0,73
0,63
0,38
1998
1999
2000
2001
2002
2003
2004
1998-2004
referred
HL>80dB


Risk Factor Distributions 01.01.1998 - 31.12.2004
No = 9456
%
90
80
70
60
50
40
30
20
10
0
81.4
18.4
5.4
.2
.2
.1
.4
7
.1
3.1
1.9
0
0
.5
0
2.9
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Maternity centre in Pécs is a centre for premature babies
1 Normal 2 Premature 3 Incubator 4 Hyperbilirub. 5 Craniofac.Disturb.
6 Familiar HL. 7 Cong.infect. 8 Ototoxics 9 Asphyxia 10 Low APGAR
11 Respirator 12 Meningitis 13 Syndroms 14 SOM 15 OMA 16 BERA

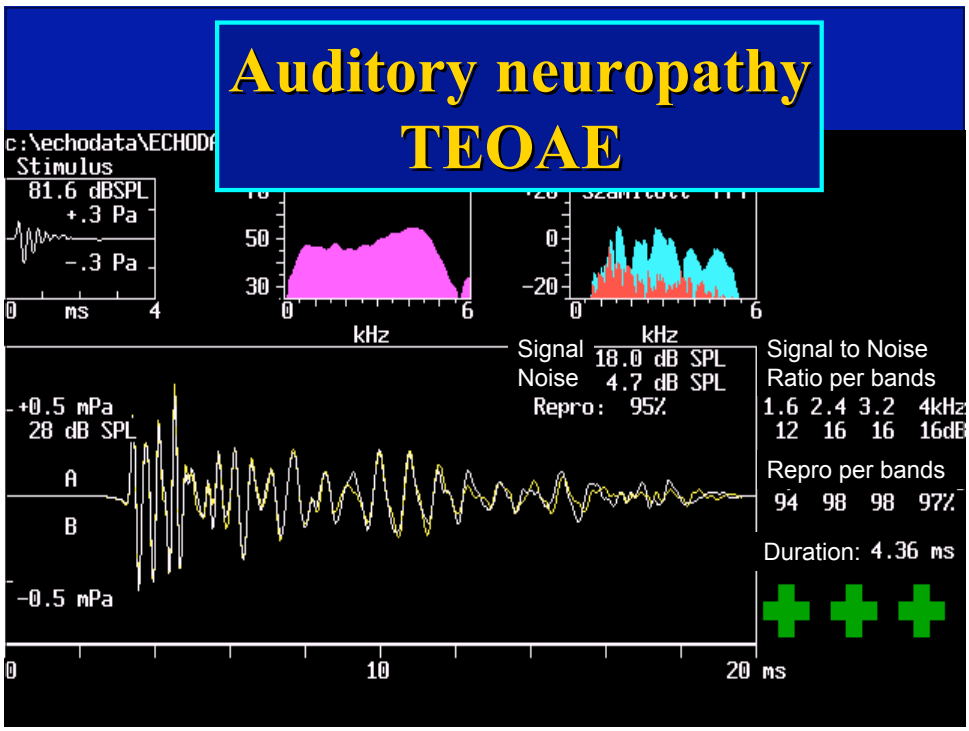

Premature Ratio in % pro Year
%
25
20
15
10
5
0
15.6
14.4
17.7
17
22.1
19.8
21.9
1998 1999 2000 2001 2002 2003 2004





Screen program and database

Auditory neuropathy
TEOAE



Auditory neuropathy
BERA