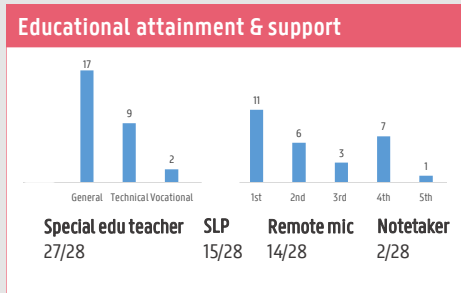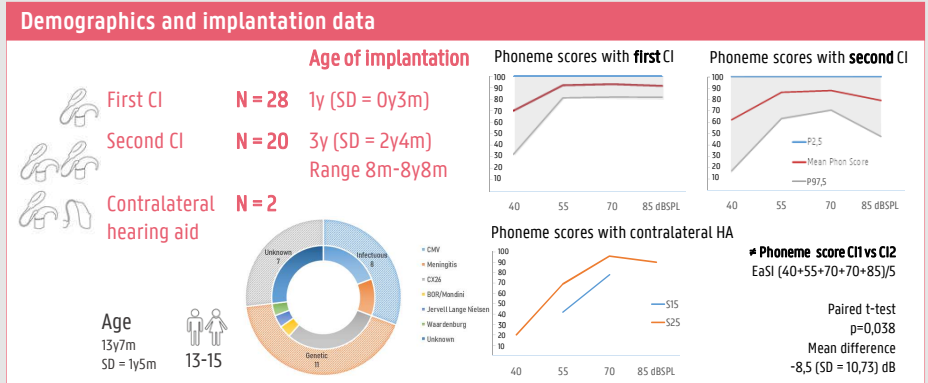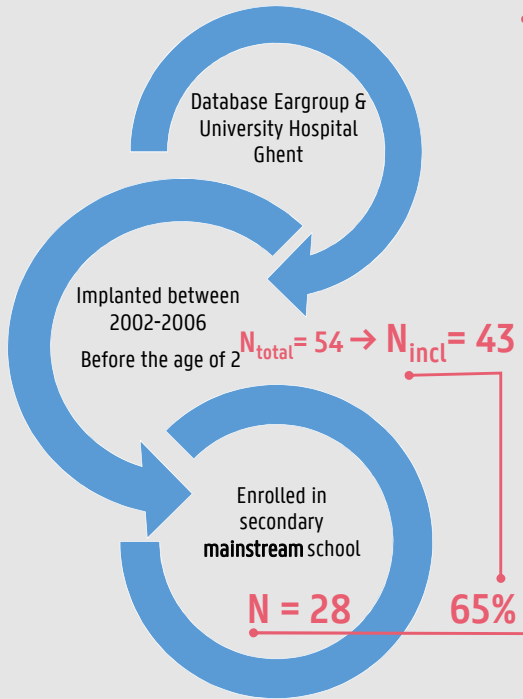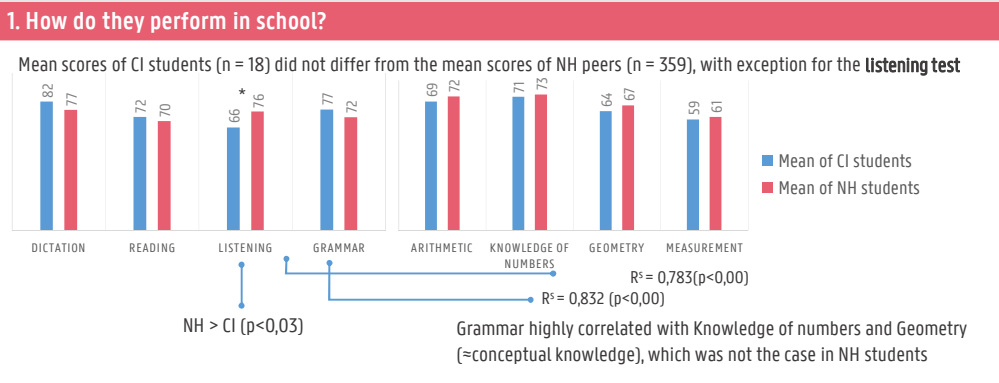**Stefanie Krijger[1], Martine Coene[2], Paul Govaerts[3], Ingeborg Dhooge[1,4]**
1 Department of Otorhinolaryngology, Ghent University, Belgium
2 Applied Linguistics, VU, Amsterdam, The Netherlands
3 The Eargroup, Deurne-Antwerp, Belgium
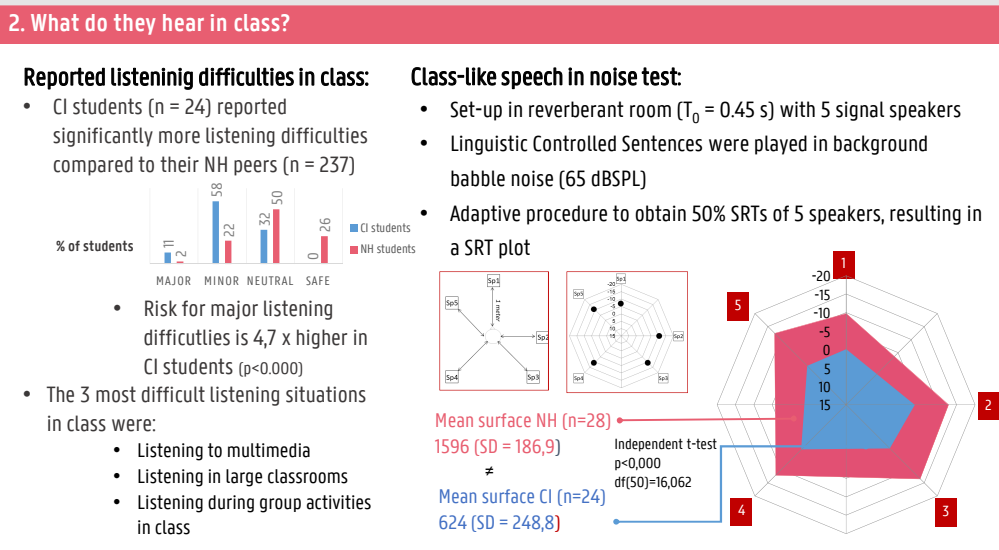4 Ghent University Hospital, Ghent, Belgium

EARLY COCHLEAR IMPLANTATION: A SUCCESS STORY?

Database Eargroup & University Hospital Ghent

Implanted between 2002-2006
Before the age of 2

N_{total} = 54 → N_{incl} = 43

Enrolled in secondary **mainstream** school

N = 28   65%

Demographics and implantation data

Age of implantation

First CI	N = 28	1y (SD = 0y3m)	
Second CI	N = 20	3y (SD = 2y4m) Range 8m-8y8m	
Contralateral hearing aid	N = 2		

Age 13y7m SD = 1y5m   13-15

CMV, Meningitis, CX26, BOR/Mondini, Jervell Lange Nielsen, Waardenburg, Unknown — Unknown 7, Infectious 8, Genetic 11

Phoneme scores with **first** CI
Phoneme scores with **second** CI
Phoneme scores with contralateral HA

P2,5 / Mean Phon Score / P97,5
S1S / S2S

≠ Phoneme score CI1 vs CI2
EaSI (40+55+70+70+85)/5
Paired t-test
p=0,038
Mean difference
-8,5 (SD = 10,73) dB

Educational attainment & support

General 17, Technical 9, Vocational 2
1st 11, 2nd 6, 3rd 3, 4th 7, 5th 1

Special edu teacher 27/28   **SLP** 15/28   **Remote mic** 14/28   **Notetaker** 2/28

Aim

1. To investigate how they perform in school
   - by obtaining school results (6th grade) of Dutch & Mathematics
2. To investigate what they hear in class
   - by administrating the Listen Inventory For Secondary Edcuation (LIFE2-NL)
   - by administrating a class-like speech in noise test

1. How do they perform in school?

Mean scores of CI students (n = 18) did not differ from the mean scores of NH peers (n = 359), with exception for the **listening test**

DICTATION 82/77, READING 72/70, LISTENING *66/76, GRAMMAR 77/72, ARITHMETIC 69/72, KNOWLEDGE OF NUMBERS 71/73, GEOMETRY 64/67, MEASUREMENT 59/61

■ Mean of CI students   ■ Mean of NH students

R^S = 0,783(p<0,00)
R^S = 0,832 (p<0,00)

NH > CI (p<0,03)

Grammar highly correlated with Knowledge of numbers and Geometry (≈conceptual knowledge), which was not the case in NH students

2. What do they hear in class?

Reported listeninig difficulties in class:
- CI students (n = 24) reported significantly more listening difficulties compared to their NH peers (n = 237)

% of students — MAJOR 11/2, MINOR 58/22, NEUTRAL 32/50, SAFE 0/26
■ CI students ■ NH students

- Risk for major listening difficulties is 4,7 x higher in CI students (p<0.000)
- The 3 most difficult listening situations in class were:
  - Listening to multimedia
  - Listening in large classrooms
  - Listening during group activities in class

Class-like speech in noise test:
- Set-up in reverberant room (T_0 = 0.45 s) with 5 signal speakers
- Linguistic Controlled Sentences were played in background babble noise (65 dBSPL)
- Adaptive procedure to obtain 50% SRTs of 5 speakers, resulting in a SRT plot

Mean surface NH (n=28)
1596 (SD = 186,9)
≠
Mean surface CI (n=24)
624 (SD = 248,8)

Independent t-test
p<0,000
df(50)=16,062

CONCLUSION

- 65% of the early implanted CI students were enrolled in mainstream schools
- They achieved school results **comparable** to their NH peers.
- Low scores on grammar might result in low scores on **mathematics**, which needs further attention.
- CI children seem to fail on listeninig tests, which are often performed by means of **multimedia.** This was also reported as a common listening difficulty in class.
- **Noise and reverberation** diminish speech perception in CI students and should be monitored closely to minize the listening difficulties.
- Overall, CI students seem to overcome these issues quite well with the right **support** and the right attitude.

Stefanie Krijger

Audiologist and FWO researcher
Department of Otorhinolaryngology
University Hospital Ghent
Stefanie.Krijger@UGent.Be