
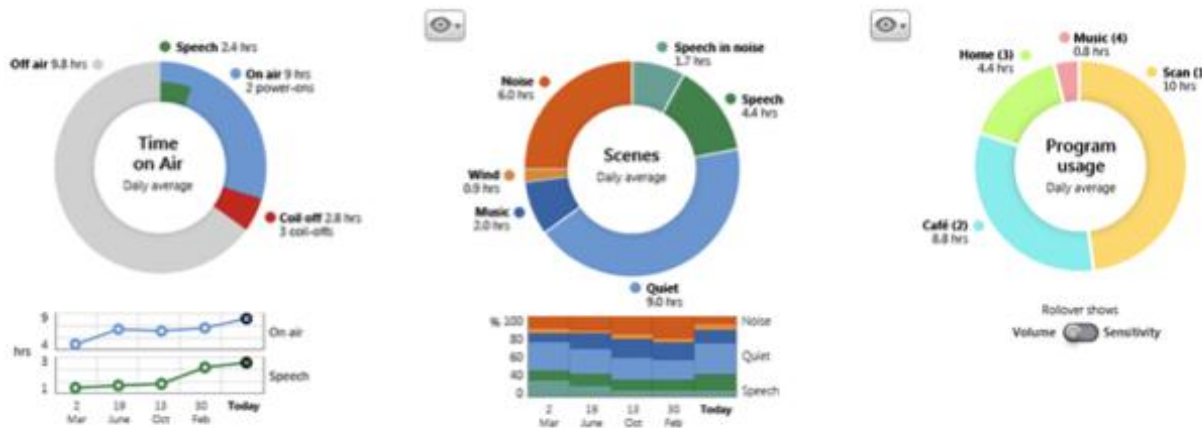
 <p>Project Title: Supported Hearing in Elderly Citizens</p> <p>Project acronym: SHiEC</p> <p>Contract No: AAL-2013-6-065</p>	<p>Deliverable Reference: D.1.2 System established to obtain and analyse datalogs and provide feedback</p>	<p>Date: 23.02.2015</p>
	<p>Title:</p> <h1 style="text-align: center;">Data Logging</h1> <p style="text-align: center;">May 2014 – February 2015</p>	
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1 Introduction

1.1 What is data logging?

Data logging is a feature in the Cochlear™ Nucleus® 6 System that provides you with valuable, evidence-based feedback about your patient's listening environment and device usage. Data logging has been developed in accordance with privacy acts and only records information about device usage, such as time on air, listening environments, and accessory and program usage.



1.2 How does data logging work?

Whenever a cochlear implant (CI) recipient's sound processor is switched on, information is stored related to device use, sound environment, exposure to speech and accessory use. When the CI recipient returns to the clinic, this information is uploaded from the sound processor by Custom Sound Software® and displayed as 24 hour averages since the last time the data was analyzed. Time and event based data is recorded every five minutes while the coil is off the implant, every 30 minutes while the coil is on and at automatic or manual shut down of the sound processor.

2 SHiEC activities

2.1 Norms for usage data

One limitation of the commercial system is the limited access to the data logs of a CI user. The data logs are stored in the memory of the implant. It is only when a CI user is visiting the clinic and the sound processor is connected to the programming software (Custom Sound), that the usage data is stored in the database on the clinician's computer. The data is then visualized with the graphics shown above. The clinician can then provide counseling and recommendations.

To formulate recommendations in terms of using the sound processor, it is necessary that the clinician has insight in the average usage data of a typical CI user. Therefore normative data should be available. Different user groups will have different usage patterns. E.g. age and lifestyle will be important factors. To collect normative data, an extraction tool was developed at Cochlear Technology Center (CTC) that can read out all the usage data of all CI users that are stored in the data base [1]. Through the standard Custom Sound software, the clinician can only see the usage data of one single CI user. An effort was done to collect data from multiple CI centers. Data of 640 Cochlear™ Nucleus® 6 users were used (of

which 131 bilateral CI users). Time stimulated was 566 279 / 1 742 953 hours logged. Hence normative data on loudness categories, SCAN classifier selections, programs used, volume and sensitivity is available. Also event counters (for example, number of power-on, number of programs, accessory usage, alarms, low batteries, ...) were taken into account [2].

Results indicated that older CI recipients spend more time in a quieter environment compared to younger CI recipients. Also, it was found that older CI recipients are less exposed to speech and music.

This extraction tool has also been provided to two SHiEC partners, VU Medical Center (VUA) and Otoconsult (OTO). Case studies were presented on Cochlear Audiology Days in Brussels and Utrecht [3].

2.2 Access to data logs from home

Access to the data logs could also be improved if a CI user would not have to travel to the clinic in order to read out the data logs. Ideally a CI user should be able to do this from home. By doing so, the time resolution will be much more precise, and more meaningful data will be available for counselling.

Therefore a special research version of the data logging software has been created. If the sound processor is programmed with this software, it will automatically send the data logs to the remote assistant. A tool on the home computer can then store the data logs in the cloud. The software is now available [4].

Since this process requires a change to the commercial software, setting up an evaluation is complex, as it must comply with clinical trial regulations. A study is now being organized in which data logs of consenting individuals will be analyzed for speech, noise levels and settings used. The users will be from the audiological centers and from the end user group. The study will compare these metrics to speech understanding scores and hearing benefits from the use of the device. It will also evaluate whether the availability of data logs is beneficial for the recipient to take more ownership over and adhering to his hearing therapy.

References

- [1] Cochlear data mining tool 1.0, Stefan Lievens
- [2] 'CP900 Data logs: Normative data', Stefan Lievens, presentation
'Assessing and optimizing the speech environment of younger children with CI', Tobias Busch, presentation
Both presentations were given on the 'Coaching and Guidance with Datalogging and Rehabilitation' Days, 06.11.2014, Mechelen, Belgium
- [3] 'Datalogging CP900', David Pascoal, Otoconsult, presentation, 26.11.2014, Brussels
'Datalogging CP900', Cas Smits and Feike de Graaff, VUmc, 27.11.2014, Utrecht
Both presentations were given on the Cochlear Benelux Workshops 'Details Do Matter'
- [4] Custom Sound 4.2 software (Build 4.2.00.0371)