



Artificial Intelligence-Assisted Cochlear Implant Mapping: Implications for Clinic Efficiency and Future Directions

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Disclosures

- Financial:
 - University of Michigan, Employer
 - Consultant, Cochlear Americas
- Nonfinancial:
 - Executive Board Member, Michigan Audiology Coalition
 - Volunteer, American Academy of Audiology PAC



Introduction

- Differences in MAPping across clinicians & clinics may impact recipient outcomes and clinic efficiency
 - Programming procedures, use of default MAP parameters, and frequency and length of post-operative programming sessions
- Standardization of post-operative management procedures may improve or equalize patient outcomes across clinicians/clinics while promoting efficient clinical service delivery



Demographics & Methods

- 8 newly implanted adult unilateral CI recipients
 - Enrolled in study *Clinical Investigation of New CI Delivery Models in an Adult Nucleus CI Population*
- Post-operative programming used the FOX clinical support tool and a streamlined visit schedule
- Performance was evaluated pre-operatively and at 3 & 6 months post-activation in the soundfield using CNC monosyllabic words presented at 60 dB SPL in quiet.

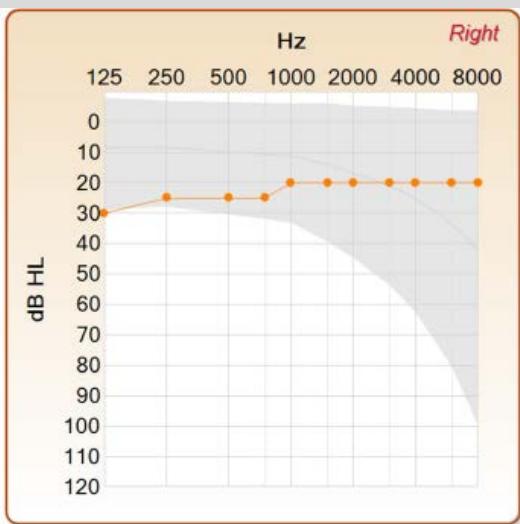
Subject Demographics (N=8)	
Age	68;8 (48;11-87;1)
Male/Female	3/5
Duration of Hearing Loss	20;7



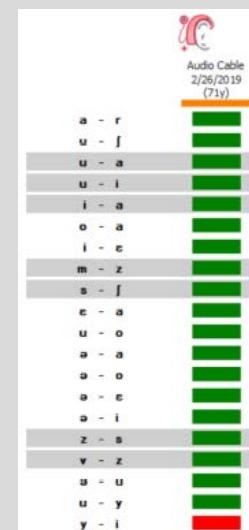
FOX – Fitting to Outcomes Expert

- Artificial Intelligence (AI) based clinical support tool
- Assists the audiologist with making MAP changes based on the recipient's performance on direct-connect tests performed outside the sound booth

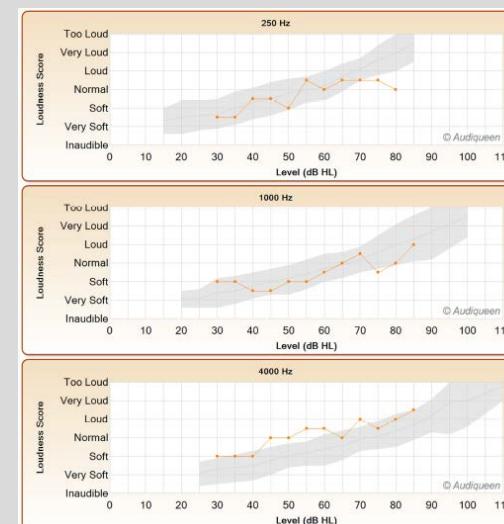
Audiometry



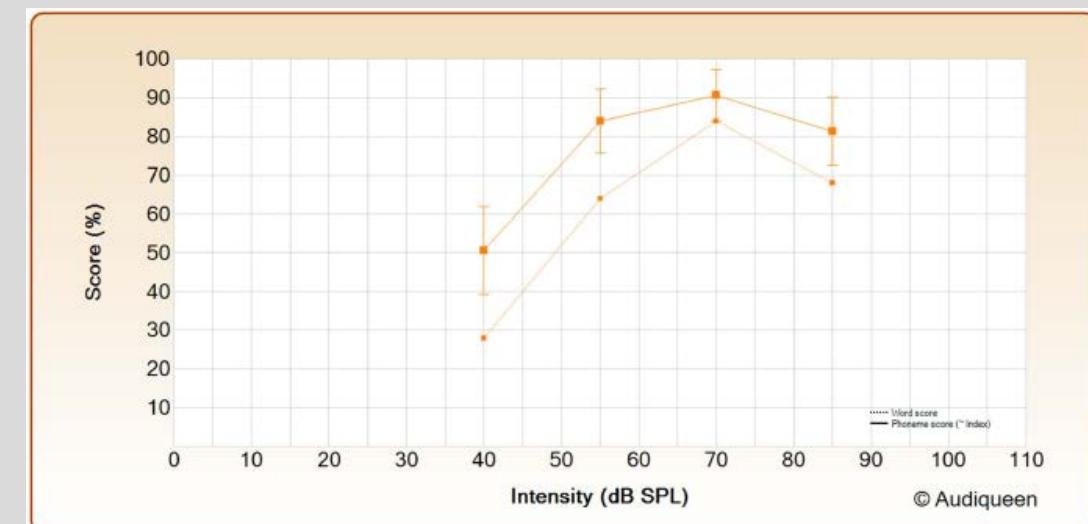
Phoneme Discrimination



Loudness Scaling
250, 1000, 4000 Hz



CNC Word Recognition
40, 55, 70, 85 dB SPL



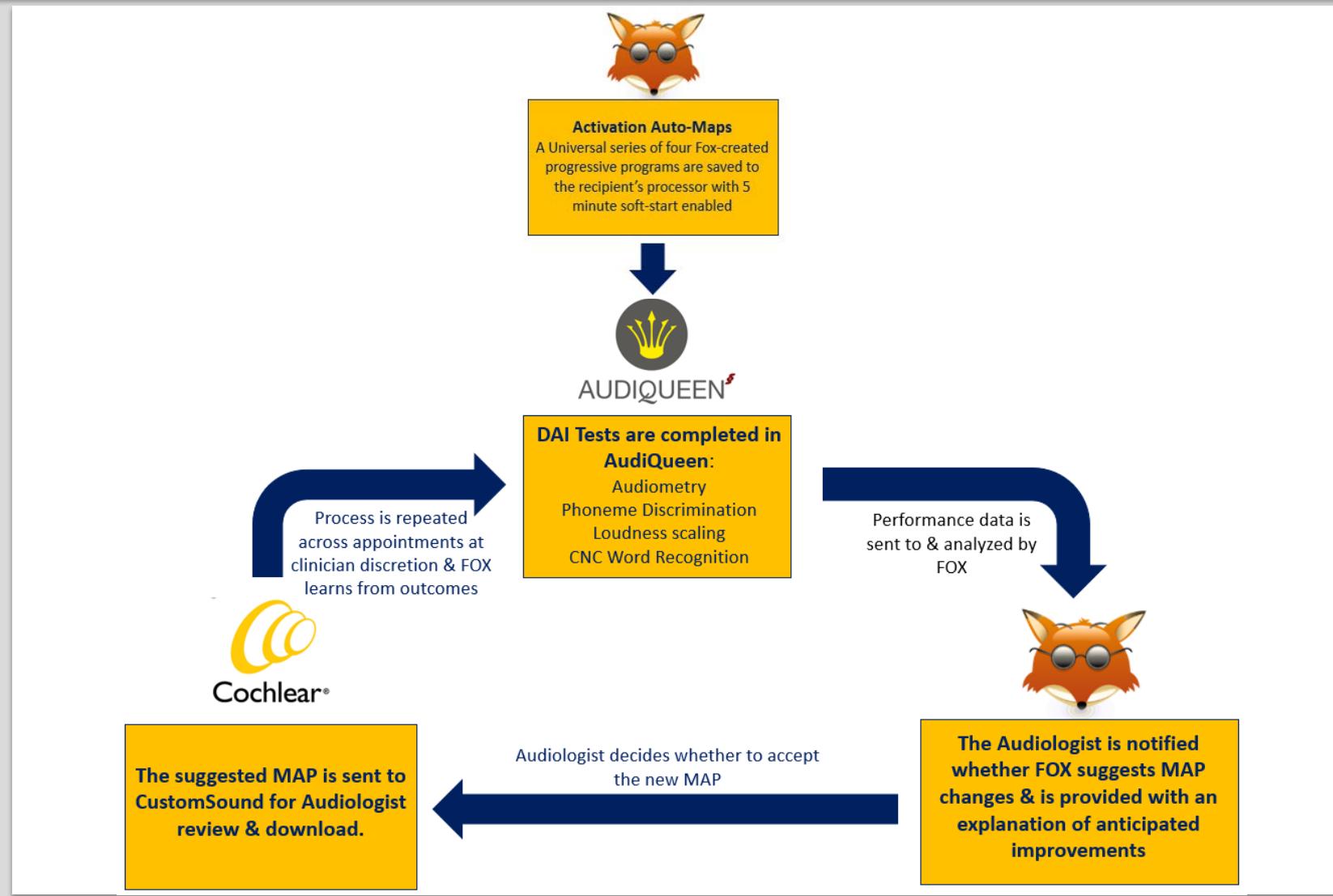
*This software is not FDA approved



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FOX Mapping Process

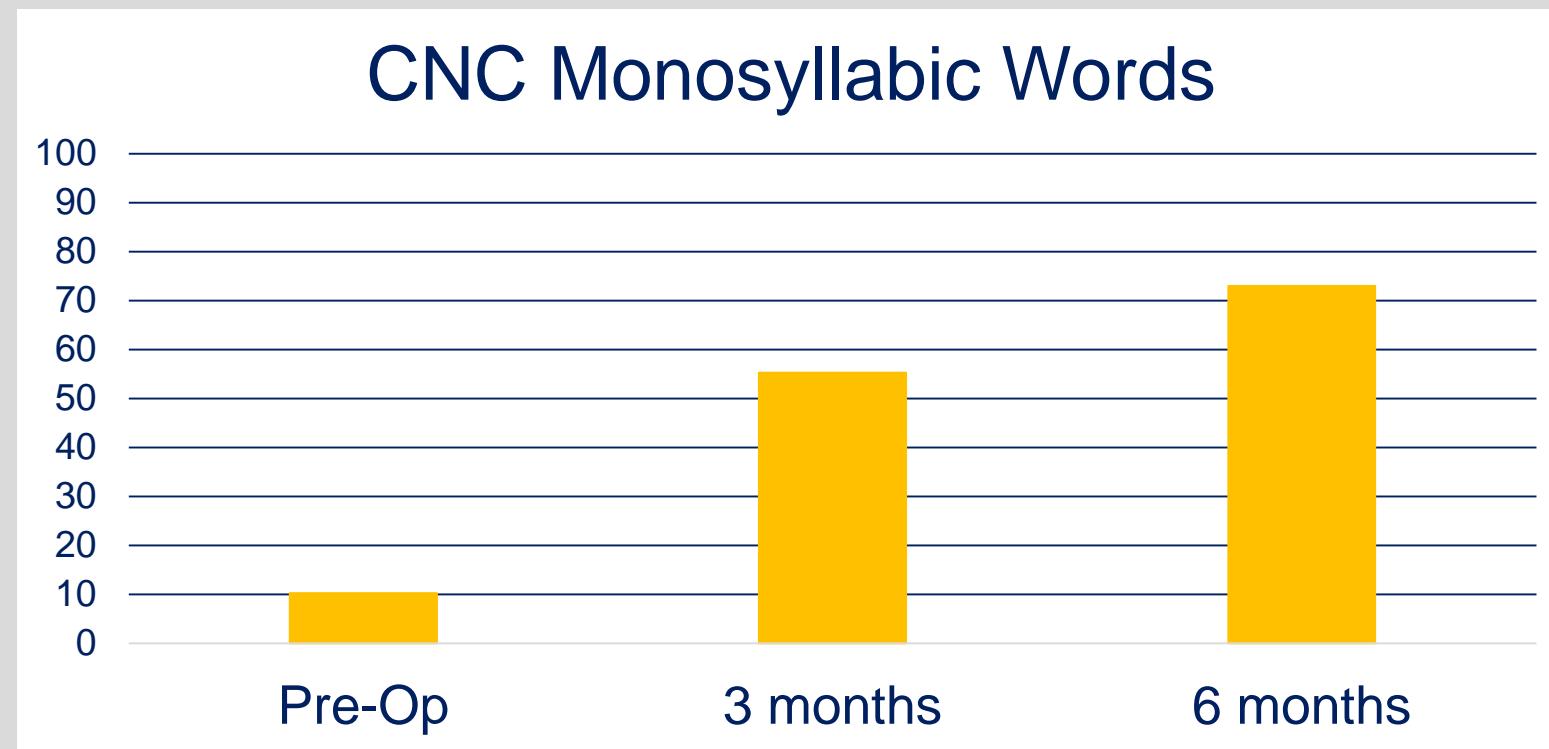


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Results

- Improvement in CNC monosyllabic word scores was observed for all subjects at 3 and 6 months post-activation



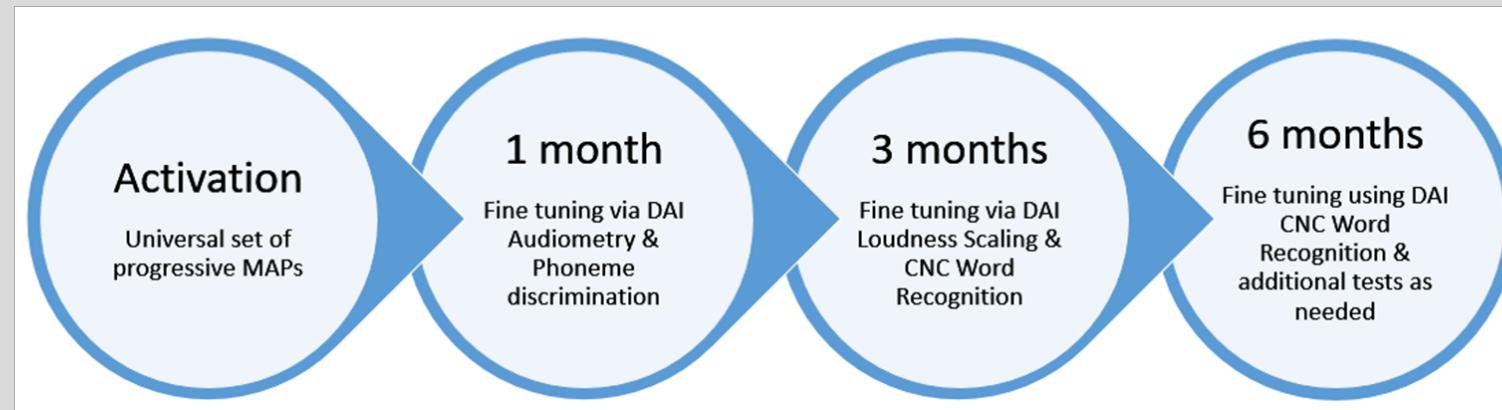
*This software is not FDA approved



Subjective Experience

- Clinician-patient relationships were not subjectively compromised
- Appointment lengths were similar to traditional programming

Study Streamlined Visit Protocol



Clinic Protocol



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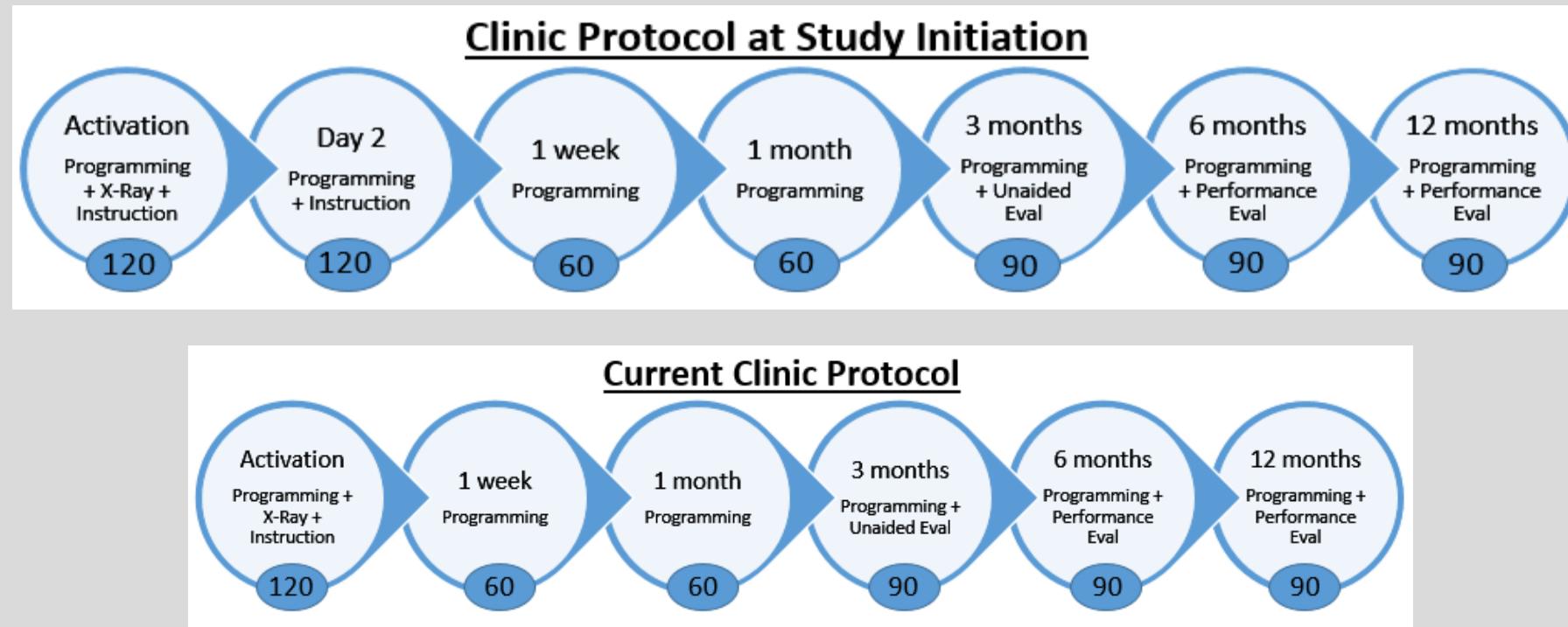


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Clinical Relevance

- Day 2 Activation appointment was eliminated for all recipients as a result of our experience in this study



Opened approximately 340 clinic hours per year



Conclusions

- Recipients can have their performance optimized with fewer programming sessions
- It is possible to efficiently utilize an AI-assisted clinical support tool during mapping sessions



Limitations & Future Directions

- Limitations
 - Statistical analysis was not possible due to the low number of subjects
 - Subjects were selected from individuals presenting for traditional CI evaluation, however selection bias may have been a factor
- Further research is necessary to identify appropriate clinical populations for use of AI-assisted clinical support tools.



Acknowledgements

- Michigan Medicine Cochlear Implant Team
- Cochlear Americas
- Otoconsult
- Questions?
 - Heidi Slager
 - hkslager@med.umich.edu
 - Poster #107