



Telemedicine and the future for Audiology

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A Sonova brand

PHONAK
life is on

Technology has changed the way we do things



The internet of things

Refers to devices or objects that are connected to the Internet, like your smartwatch, Fitbit, or even your refrigerator. These devices are able to collect and transmit data via the Internet.



Vehicle, Asset, Person & Pet
Monitoring & Controlling



Agricultural
automation



Energy
consumption



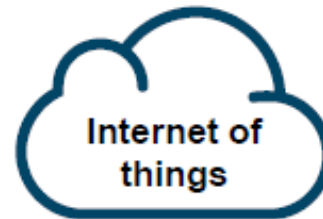
Security



Building
management



Embedded
mobile



Everyday things get
connected for smarter
tomorrow



M2M & wireless
sensor network



Everyday things



Smart homes
and cities



Telemedicine &
Healthcare

Smart
watches



Connected
drones



VR
Glasses



Smart
Homes



Internet of things

- Think of the changes we have experienced in just the past 10 years



Connectivity

- Mobile subscriptions now exceed the global population (**>8 billion**)
- From **< 0.5** billion in 2000 to **> 8** billion in 2015
- More than **90%** of the world's population have access to a mobile signal






2018 Mobile
Industry
Impact Report:
Sustainable
Development
Goals

“Greater access to mobile
technology is associated with
improvements in quality of life”

–GSMA, 2018

A close-up photograph of a person's hand holding a smartphone. The phone's screen is lit up with a blue interface, possibly a calendar or a productivity app. The background is blurred, showing what appears to be a laptop keyboard in the foreground and other people in a dimly lit room. The lighting is soft, highlighting the texture of the hand and the sleek design of the phone.

Today **half** of the adult population has a smartphone – in 2020 **80%** will have a “**super computer in their pocket**”

(The Economist, 2015)

Smartphone Penetration among Older Adults

Cell phone and smartphone adoption among seniors

% of seniors (ages 65 and older) who own a ...

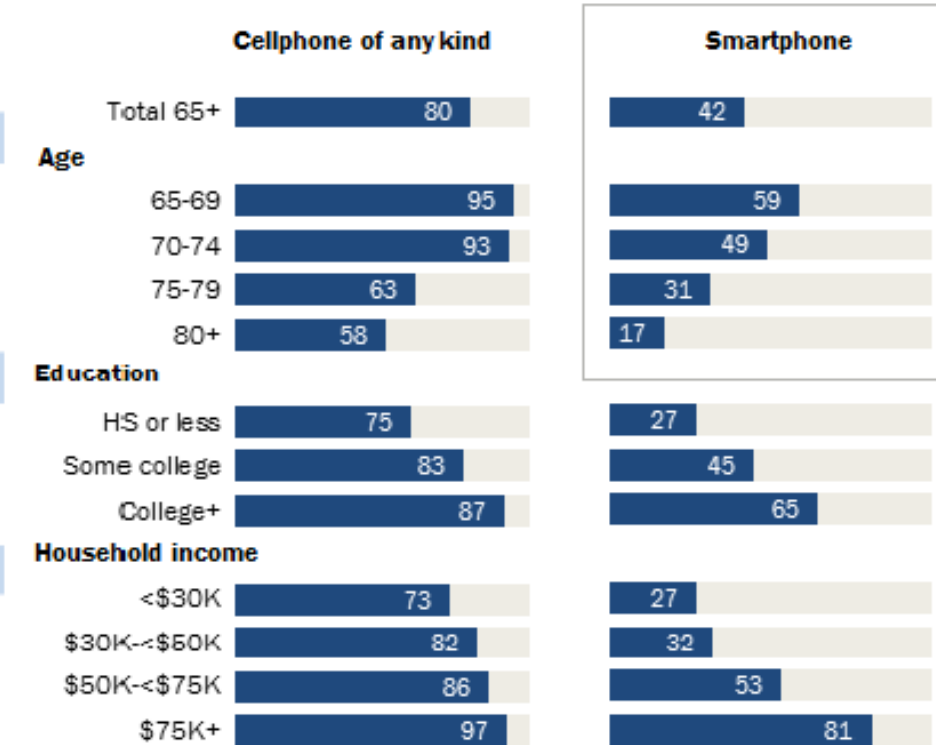
	Cell phone	Smartphone
Total for all 65+	77%	18%
Age		
65-69	84	29
70-74	84	21
75-79	72	10
80+	61	5
Education		
High school grad or less	70	10
Some college	80	19
College graduate	87	35
Household Income		
<\$30,000	67	8
\$30,000-\$49,999	83	15
\$50,000-\$74,999	88	28
\$75,000+	92	42

Pew Research Center's Internet Project July 18-September 30, 2013 tracking survey.

PEW RESEARCH CENTER

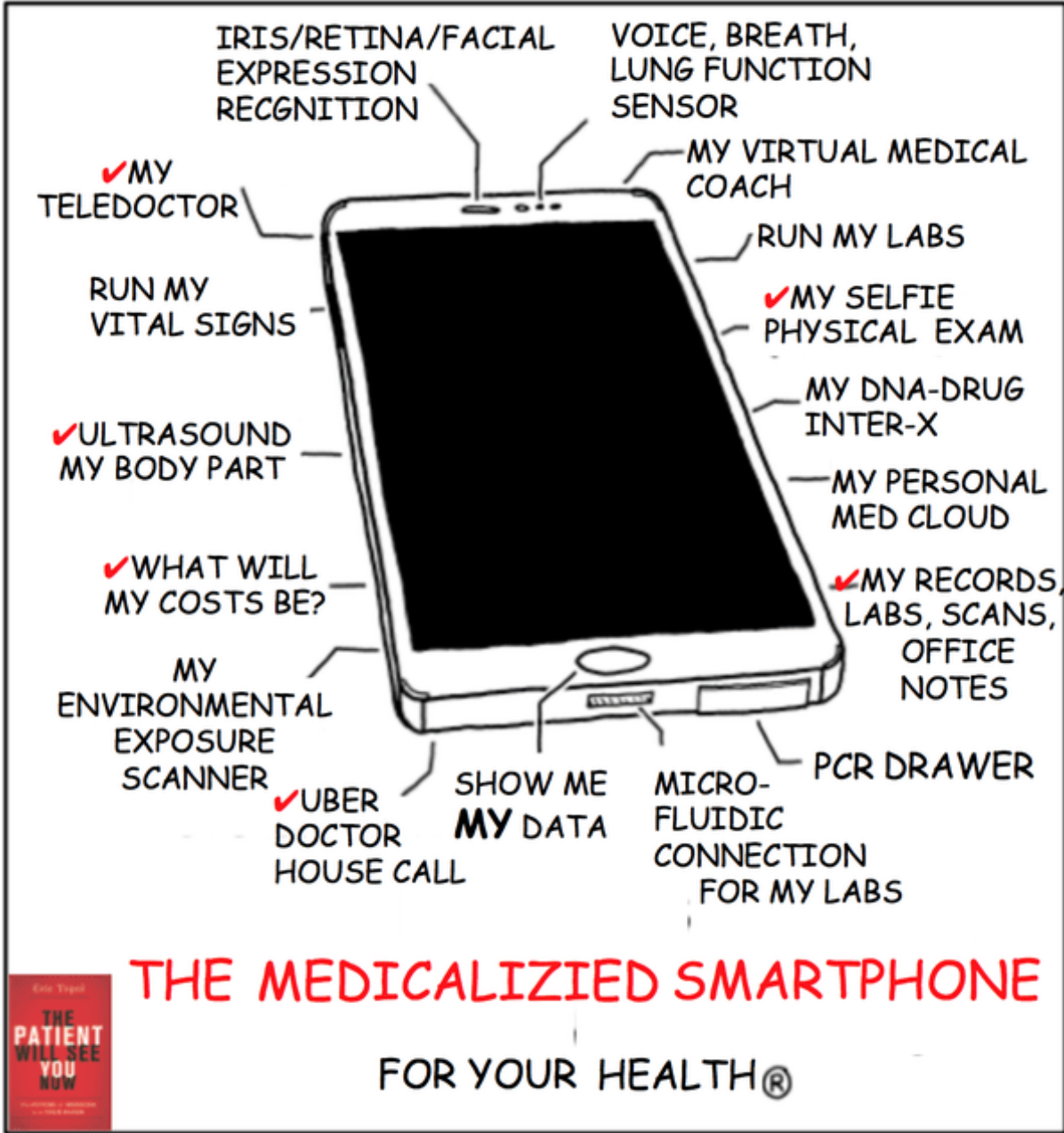
Roughly four-in-ten seniors are smartphone owners

% of U.S. adults ages 65 and older who say they own the following ...



Source: Survey conducted Sept. 29-Nov. 6, 2016.
"Tech Adoption Climbs Among Older Adults"

PEW RESEARCH CENTER





Welcome

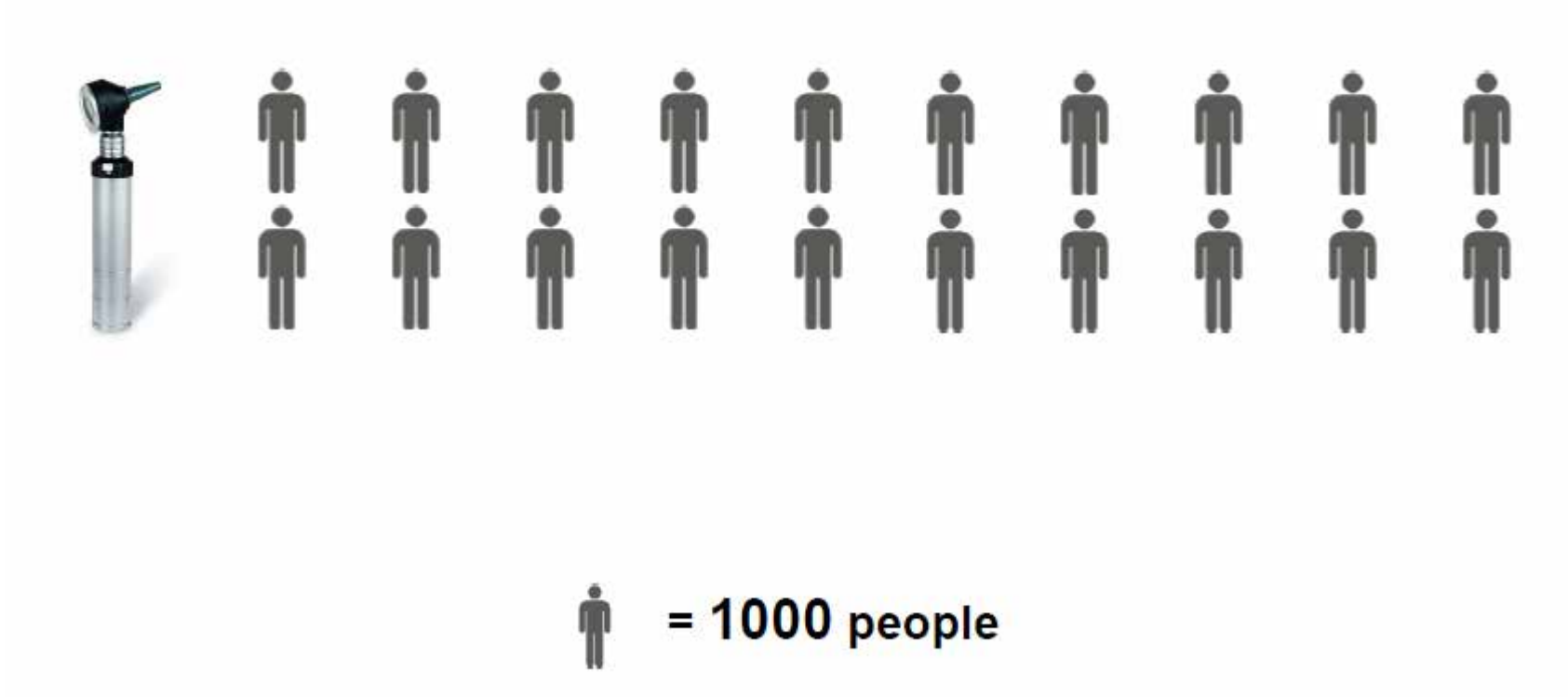
THE FUTURE
IS NOW

Audiology Headline

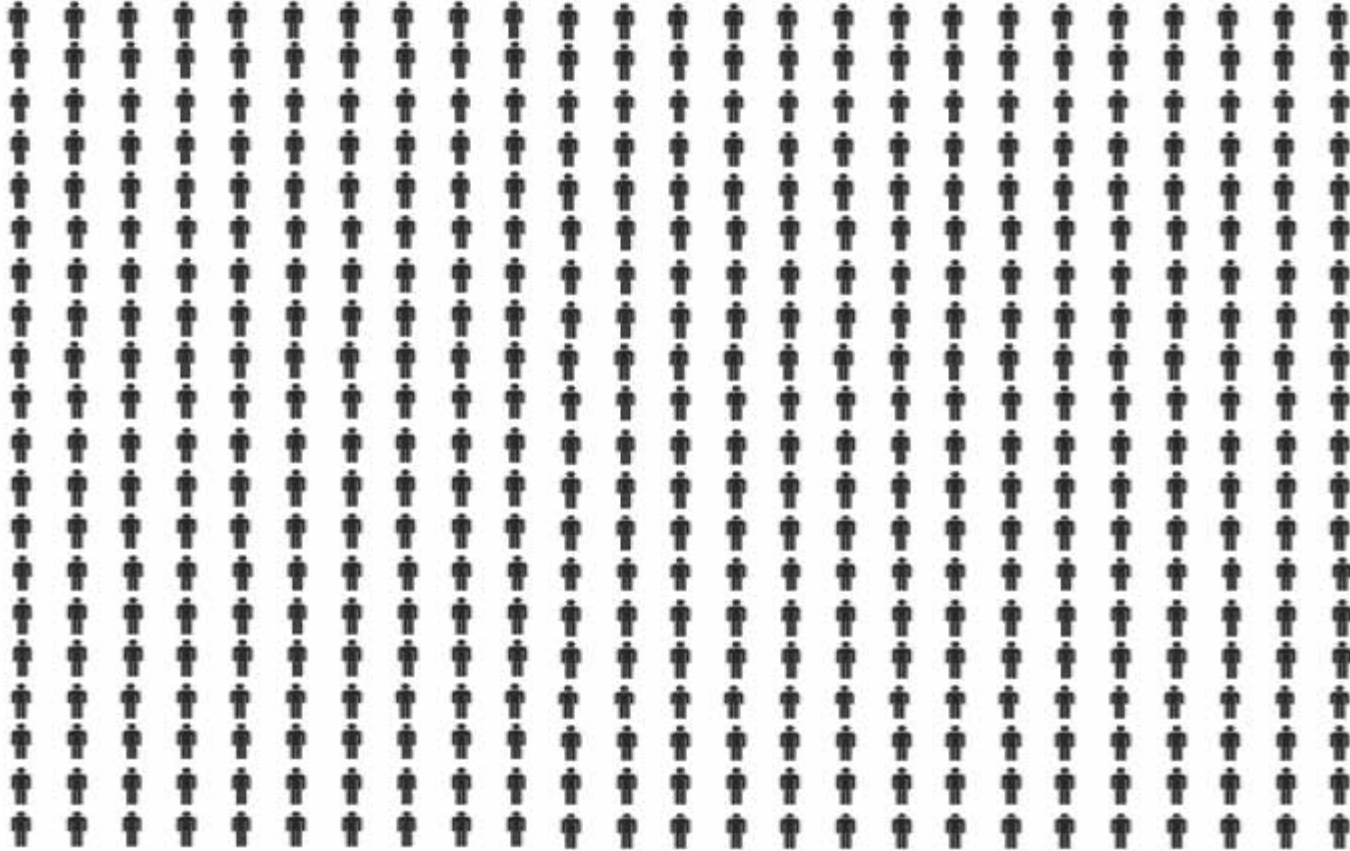


Why study eAudiology?

Ratio of Audiologist to General Population



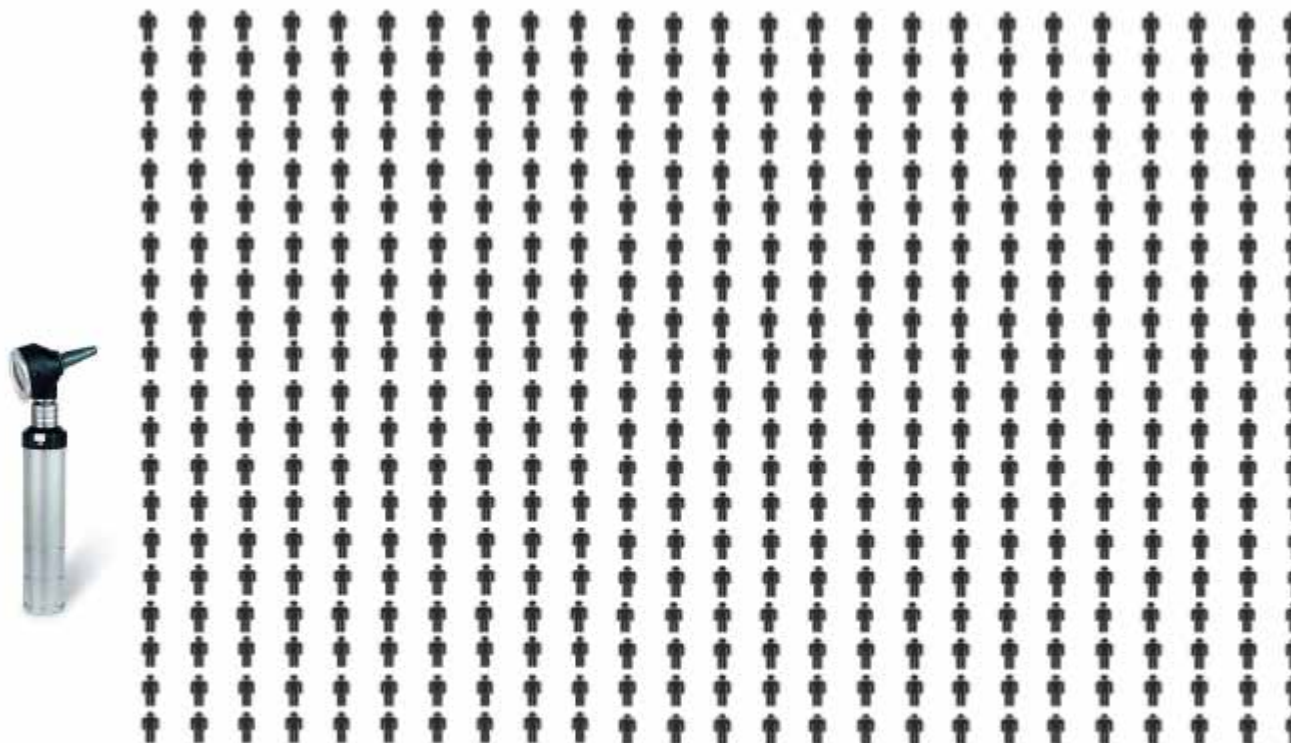
Ratio of Audiologists to General Population



 = 1000 people

Ratio of Audiologists to General Population

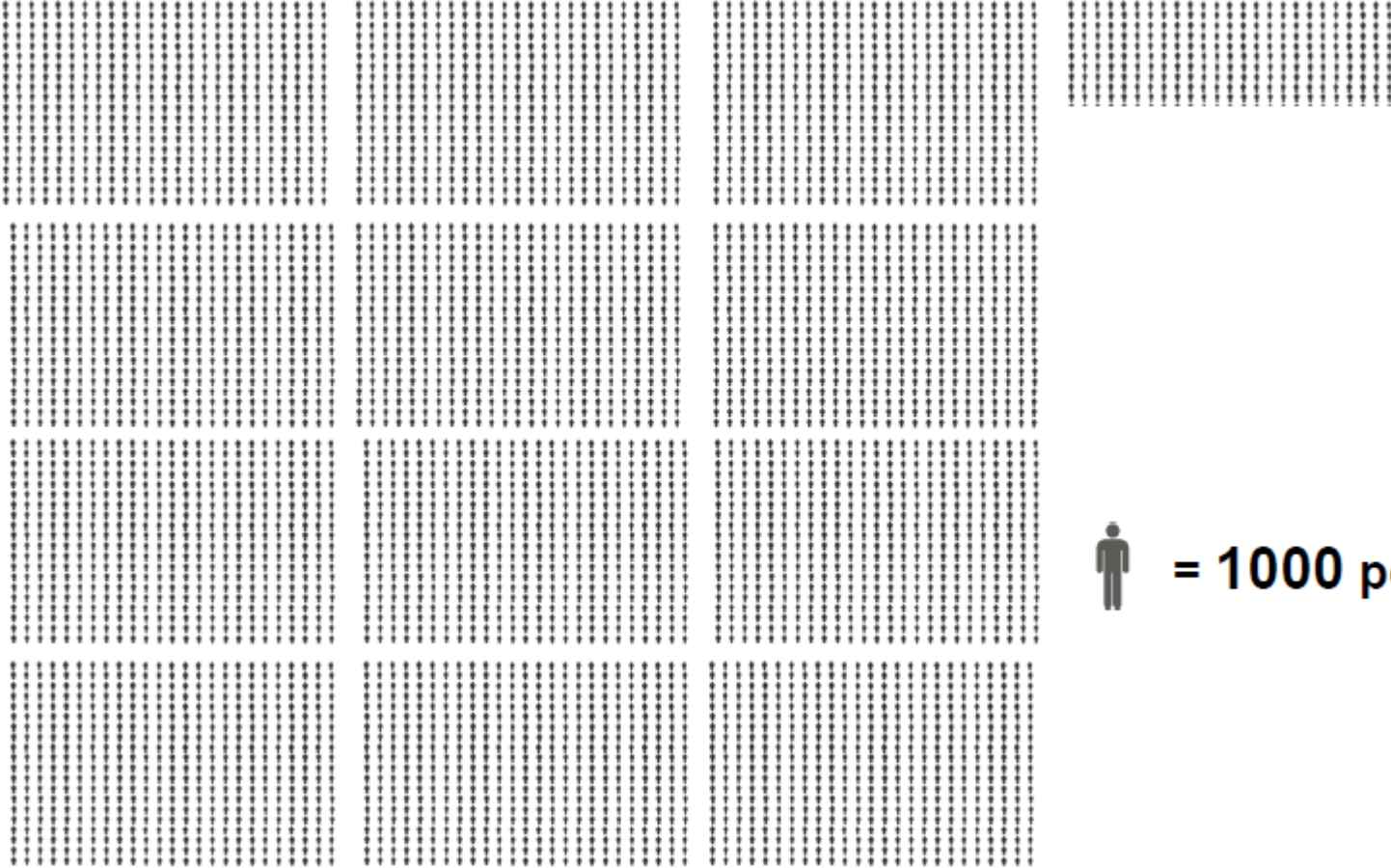
Optimistic estimate



 = 1000 people

Ration of Audiologists to General Population

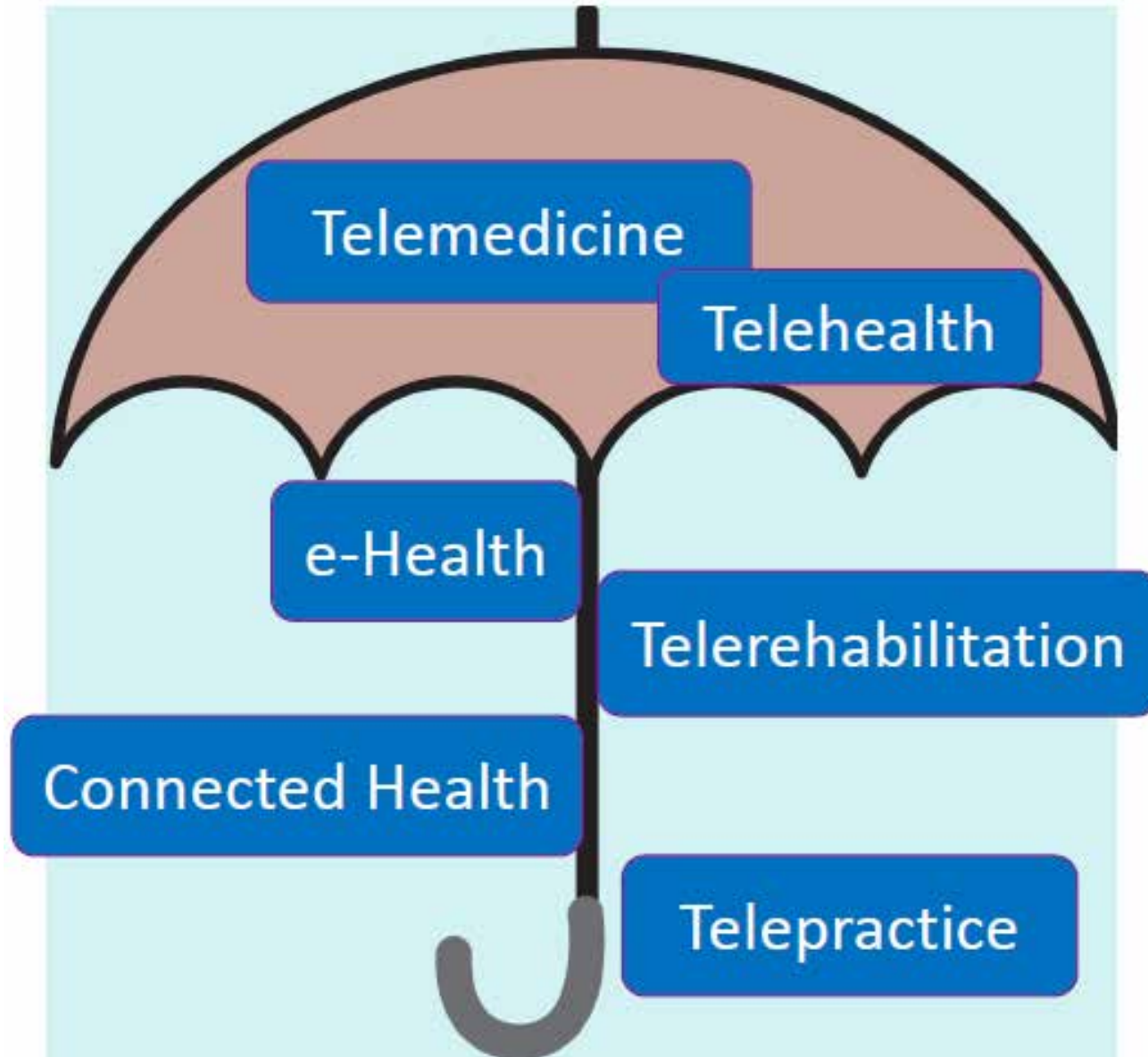
Pessimistic estimate



 = 1000 people

Evolving Terminology

- Health care providers are faced with a plethora of terms/definitions describing the use of information and communication technology to deliver health services, mainly due to:
 - » Rapid innovations/growth in telecommunication technology
 - » Response to changing health needs and contexts in society
 - » A dynamic model of service provision
- The evolution of terms may help distinguish emerging applications from historical ones. However, the use of differing terminology to describe services may be confusing to:
 - » People accessing the services
 - » Policy makers
 - » Other stakeholders



- ASHA has adopted the term **telepractice**
- The application of telecommunication technology to the delivery of audiology professional services at a distance (<https://www.asha.org/Practice-Portal/Professional-Issues/Telepractice/>)
- It is common for health care disciplines to use the prefix tele-:
 - **Tele-audiology**: the utilization of telepractice to deliver audiological diagnostic treatment and management services.
- The World Health Organization (WHO) has started using the term “electronic” to replaced “tele” and the prefix e- (as in e-Health):
 - **eAudiology**: a more general term that describes the application of information, computer or communication technology to audiological practices.

What do these terms have in common?

Tele-Audiology

eAudiology

Tele-practice

- The use of technology to **break down barriers of geography and access to health care and/or education**
- They all describe care provided by a non-traditional modality
- They describe a **specific delivery model of care within the field of audiology**
- **Have the capability of providing services across all age groups and with continuity of care**

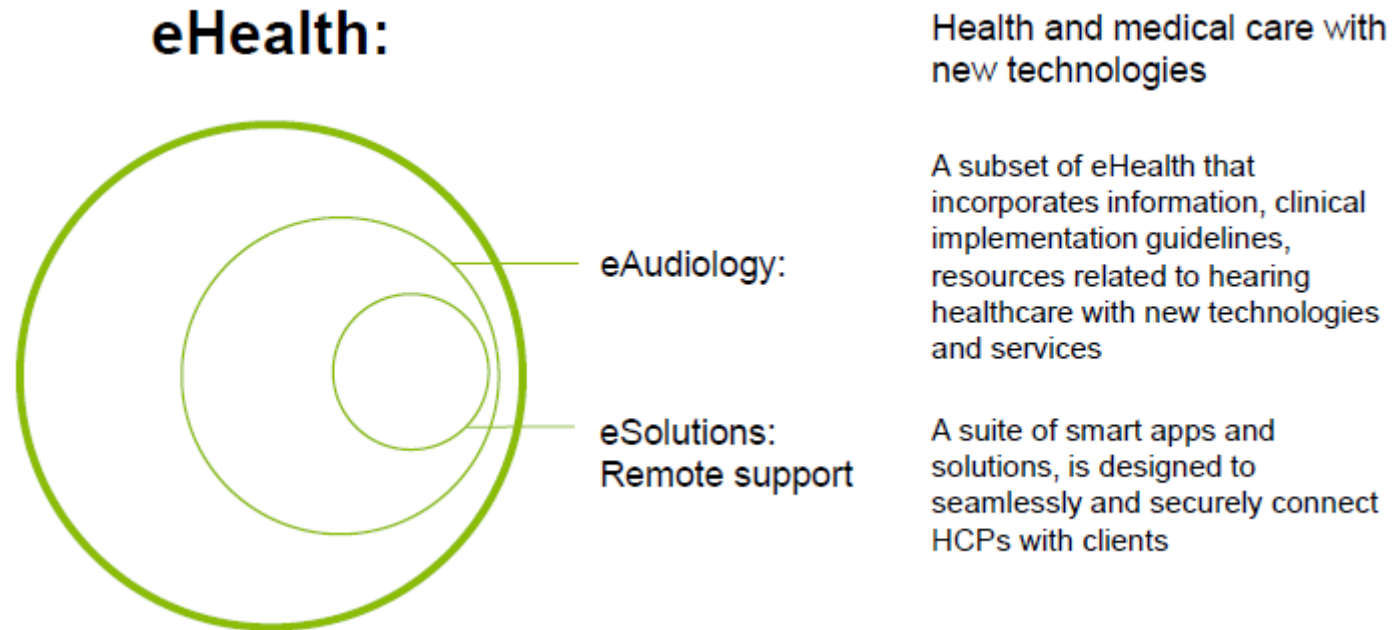
Defining eAudiology

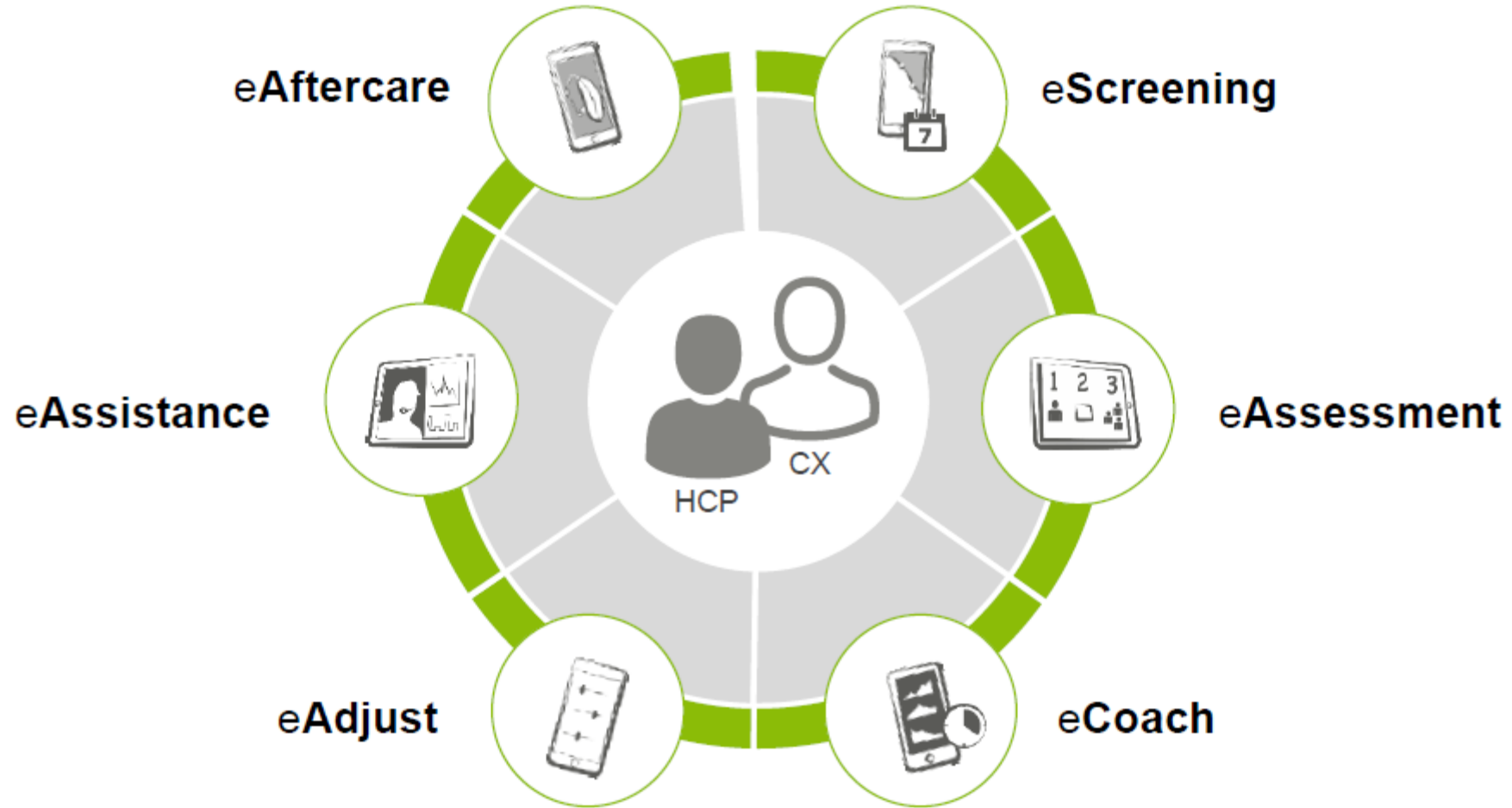
Phonak expert consensus



The evolution of terminology used to describe remote delivery of health services

“eAudiology” encompasses technologies and services that enable remote provision of audiologic care at each stage along the patient journey





The growing interest in eAudiology

- An increasingly important service delivery medium due to many factors:
 - Improved equity of access to care
 - Reduced travel time/cost
 - Improved flexibility around the delivery of care
 - Greater choices in the format of the services/applications
 - More effective/efficient communication
 - Generalization of skills/troubleshooting in home/preferred environment

Close to 80% of people with hearing loss do not have access to hearing health care services because they live in developing countries where audiologists/hearing health care professionals are unavailable.

(Fagan & Jacobs, 2009; Goulios & Patuzzi, 2008; Swanepoel & Hall, 2010; Swanepoel, Hall & Biagia, 2011)

This is certainly true for people needing to travel outside of a remote area to reach a provider; however, it is also true that access can be difficult in more urban areas and eAudiology has the potential to improve efficiency in the healthcare system.

(Nemes, 2010; Swanepoel, 2013)

Is eAudiology being practiced?

- 2002 survey on the use of eAudiology among ASHA members (ASHA, 2002):
 - 12% of audiologists were engaged in eAudiology services
 - 40% (of those not already providing services) expressed an interest in incorporating such services into their practice

- Recent surveys suggest that most audiologists possess a **positive attitude towards eAudiology**, especially when considering adult-focused services related to follow-up clinical services (Eikelboom & Swanepoel, 2016; Singh et al., 2014)
 - Results suggest a low level of overall experiences (15.5%) with eAudiology

Barriers to eAudiology

Patient barriers

Lack of confidence in accessing services

Fear of technology

Fear of loss of personal connection

HCP barriers

Integration within day to day services

Fear of technology

Fear of loss of personal connection



Attitudes towards eAudiology

Why study attitudes?

- Broens et al. (2007) and Hailey & Crowe (2000) conducted meta-analysis of telemedicine interventions, and found that successful telemedicine implementations have:
 - » **Reliable technological systems** that support the intervention
 - » **Stakeholders that buy-in**

It's the clinician's buy in that shapes the success.....

- **Acceptance** by clinicians is a key factor in determining **success** with telemedicine interventions

(Al-Qirim, 2007; May, 2006)

- The practitioner is described as:

- *“The most important initial gatekeeper for success with telemedicine interventions....”*

(Whitten & Mackert, 2005)

Qualitative study of attitudes



Michael Boretzki



Stefan Launer



Kathy Pichora-Fuller

Study I: Qualitative Study

- Interview-based qualitative study exploring attitudes toward eAudiology
- Potential participants were nominated by a panel of 3 experts, with the goal of inviting hearing
- Health care professionals with varied but relevant work histories
- 60-100 minute long interviews of 11 hearing health care practitioners (data saturation was obtained) were conducted
- Interviews were transcribed and coded by 2 independent coders

A total of 97 codes emerged, clustering into core themes:

- Advantages & Disadvantages of eAudiology

- **Advantages**

- Accessibility
- Convenience

- **Disadvantages**

- Relationship quality

.....it's a **gut feeling**.....

.....the in-person experience is **richer**.....

“You almost need to be in [the client’s] presence to understand their body language and eye contact and their tone. I’m not exactly sure what it is. It’s almost an intangible thing to me. In order to feel comfortable with someone and trust them, I would prefer to have built that in person.”

-Audiologist (public setting), 18 years of experience

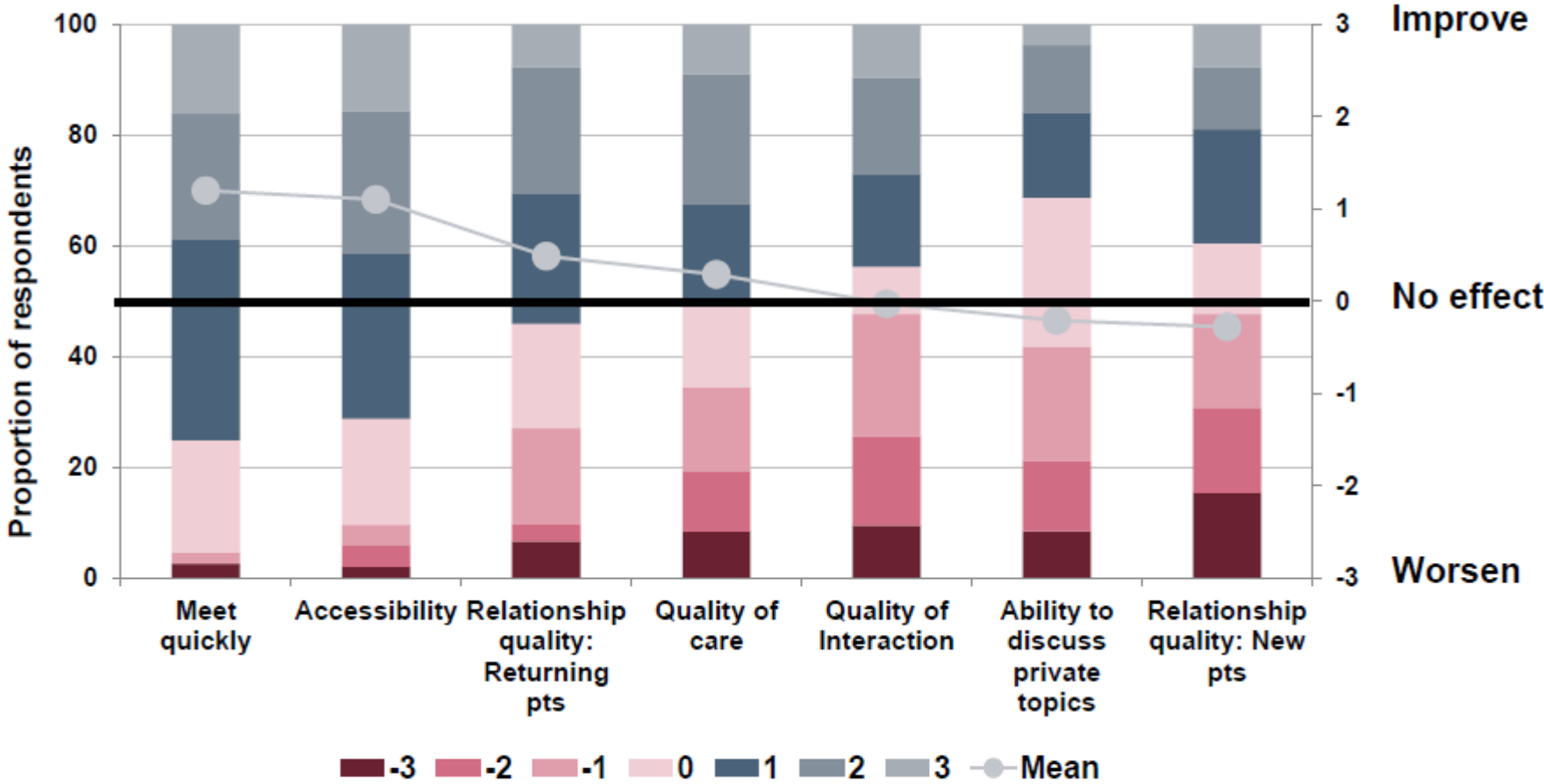
Qualitative study: Major themes revealed

- eAudiology is well-suited for some clinical tasks and patient populations, and not others
- **Well suited**
 - Aural rehab
 - Follow up appointments
 - Issue of accessibility
- **Not well suited**
 - Diagnostics
 - New patients
 - Children

Study II: Quantitative survey of attitudes

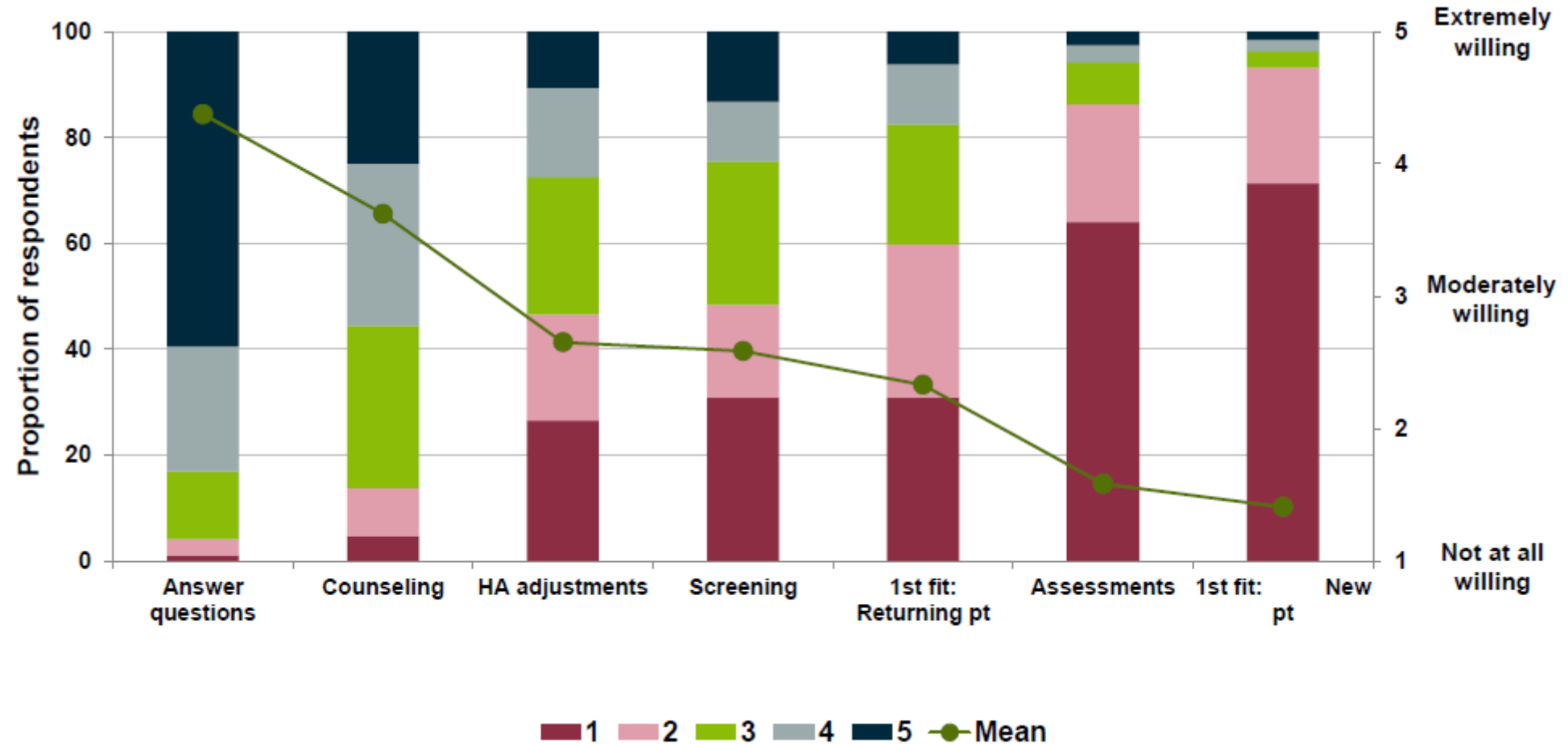
- Goal: to survey attitudes towards eAudiology in a large sample of hearing health care practitioners
- Participants:
 - Recruited through electronic mailing lists and postings at conferences
 - 202 practitioners (*M=39.3 years age*)
 - 28: Owned their own clinic(s)
 - 109: Worked in a private practice
 - 53: Worked in a non-profit environment

Perceived effect of eAudiology on hearing care

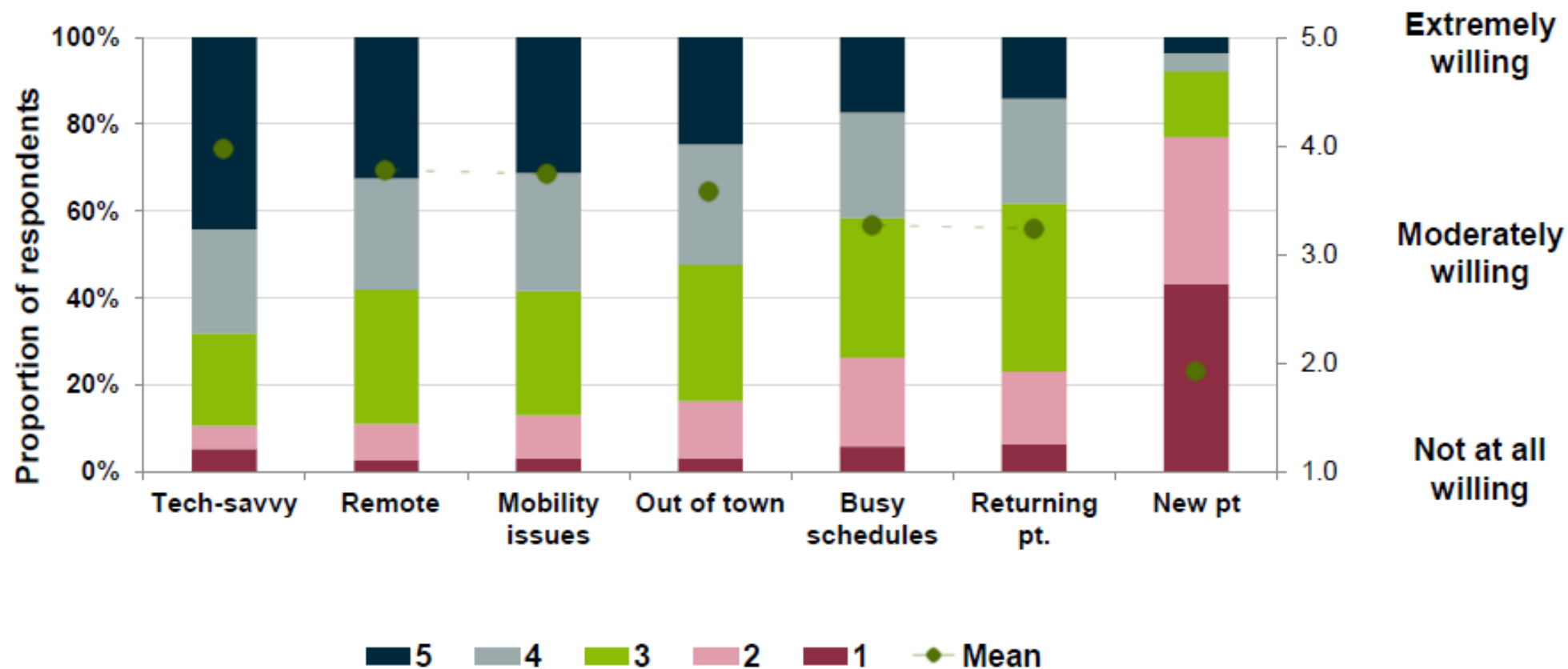


Singh et al. (2014, IJA, 532, 850-860)

Willingness to use eAudiology: Clinical tasks



Willingness to use eAudiology: Patient Groups



Study II: Quantitative survey of attitudes

- Results

- On average, it is believed that eAudiology will increase accessibility, but will likely have minimal effect on hearing health care
- Significant proportions of clinicians have opposing attitudes towards eAudiology
- Willingness to conduct eAudiology sessions are highly dependent on:

Clinical Tasks	Patient Populations
High for counseling-based behaviors Cautious for more technical tasks Reluctance with diagnostics & first fittings	High: tech savvy, mobility issues, or travel long distance Reluctance for new patients

Study III: Patient attitudes towards eAudiology



Michael Boretzki



Stefan Launer



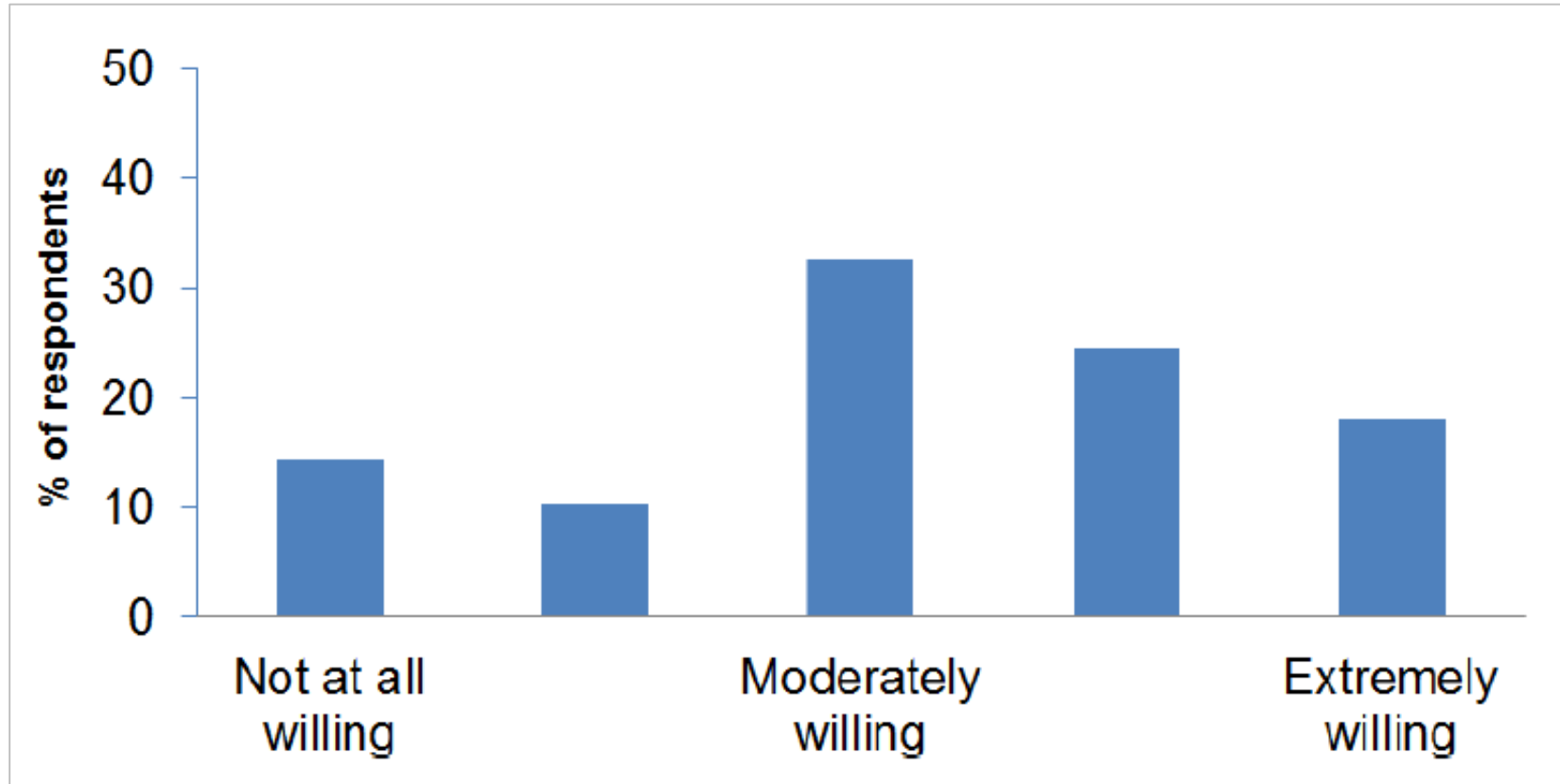
Kathy Pichora-Fuller

Patient attitudes towards eAudiology

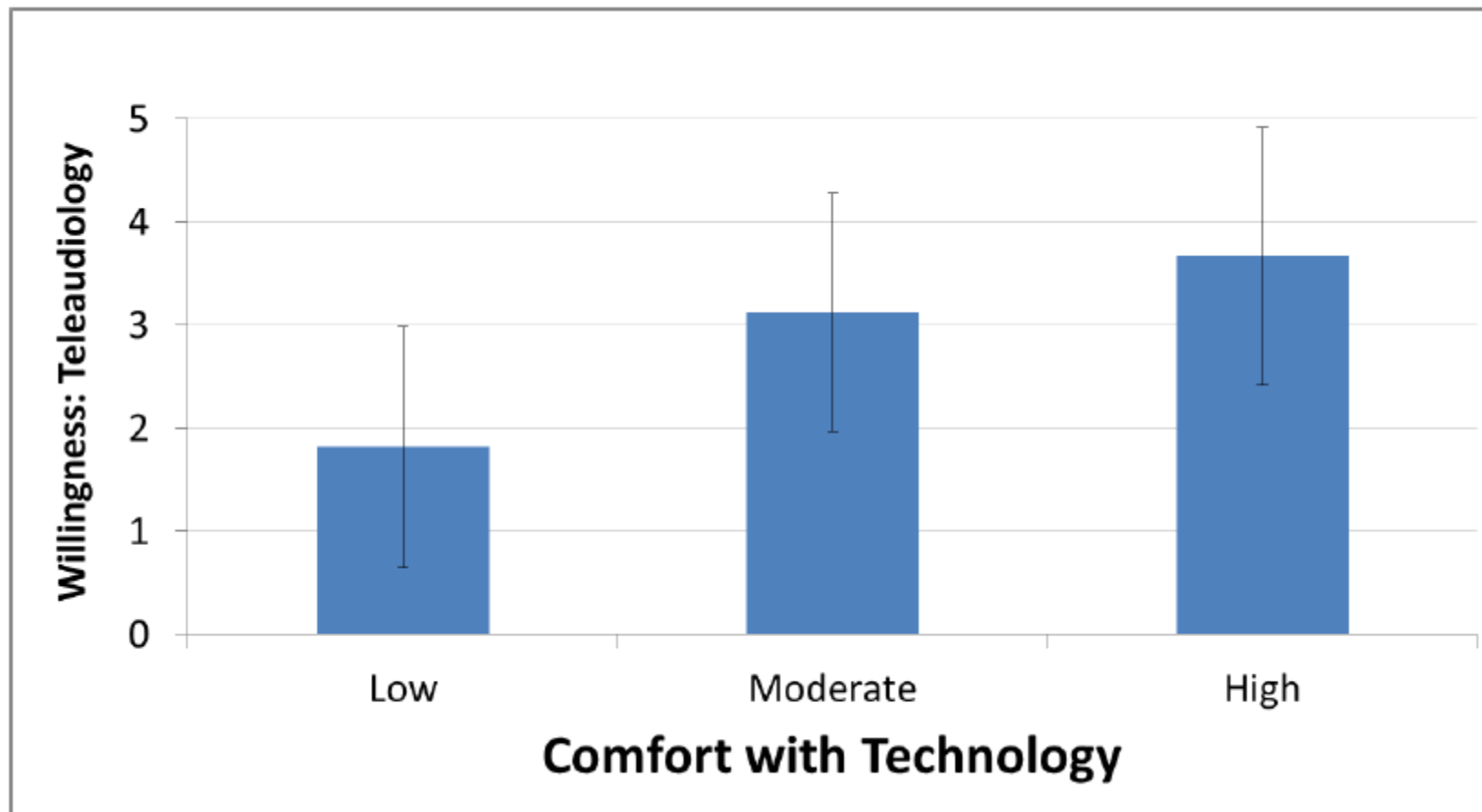
- Questionnaire design
- Posting at 50+ audiology clinics (electronic or paper copies)

- 224 respondents
 - All had experience with at least one audiology appointment
 - 129 males; 95 females
 - Mean age = 67.1 years

Patient willingness to use eAudiology



Willingness to have an eAudiology appointment: Comfort with technology



Perceived benefits of eAudiology



Study III: Technical feasibility study



Gina Angley, Au.D.
Vanderbilt University



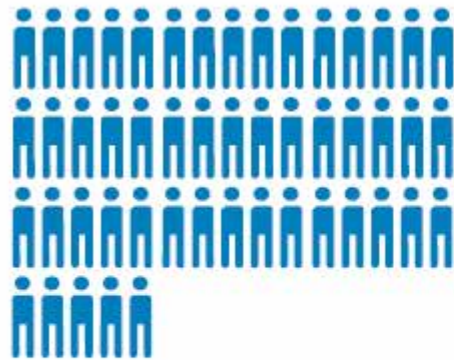
Anne Marie Tharpe, Ph.D.
Vanderbilt University



Jean Anne Schnittker, Au.D.
Sonova

Technical feasibility study

- Purpose: To evaluate feasibility & perceived benefits of remote support follow-up appointments in a controlled clinical environment and in participants homes



50 users
100+ sessions

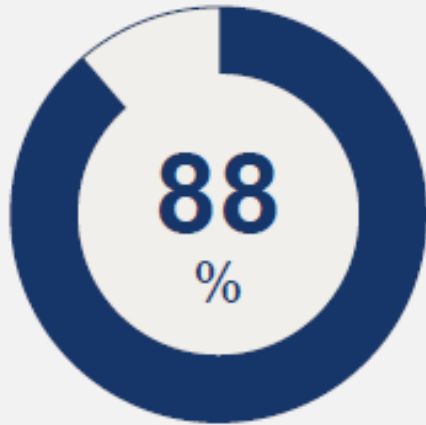


65
Mean age(32-88)

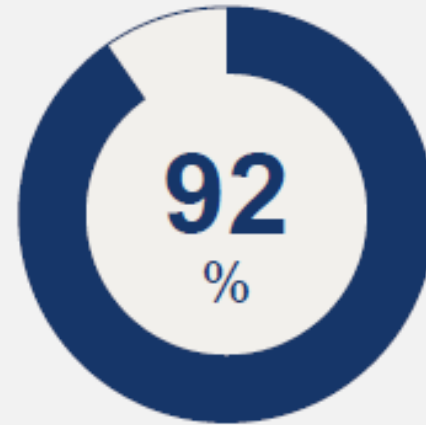


35 min
Average travel time

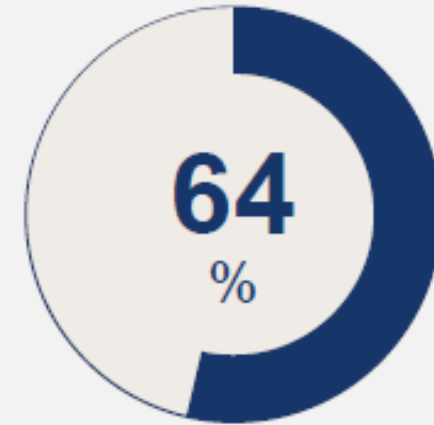
Subjects reported.....



Prefer remote support under difficult conditions

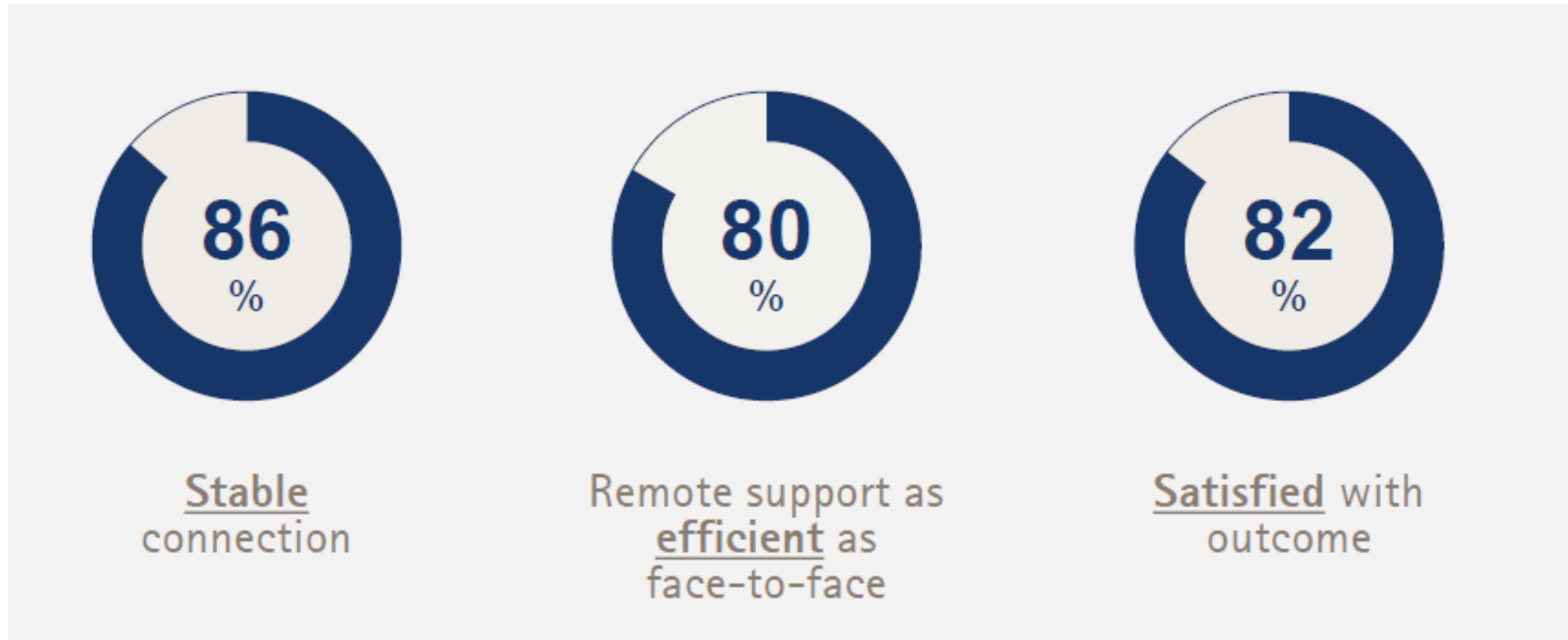


Would recommend remote support to other users



Would prefer remote support if offered a choice

Audiologists reported.....



Study III Summart: Technical feasibility



The benefits of eAudiology



The benefits of eAudiology
for patients

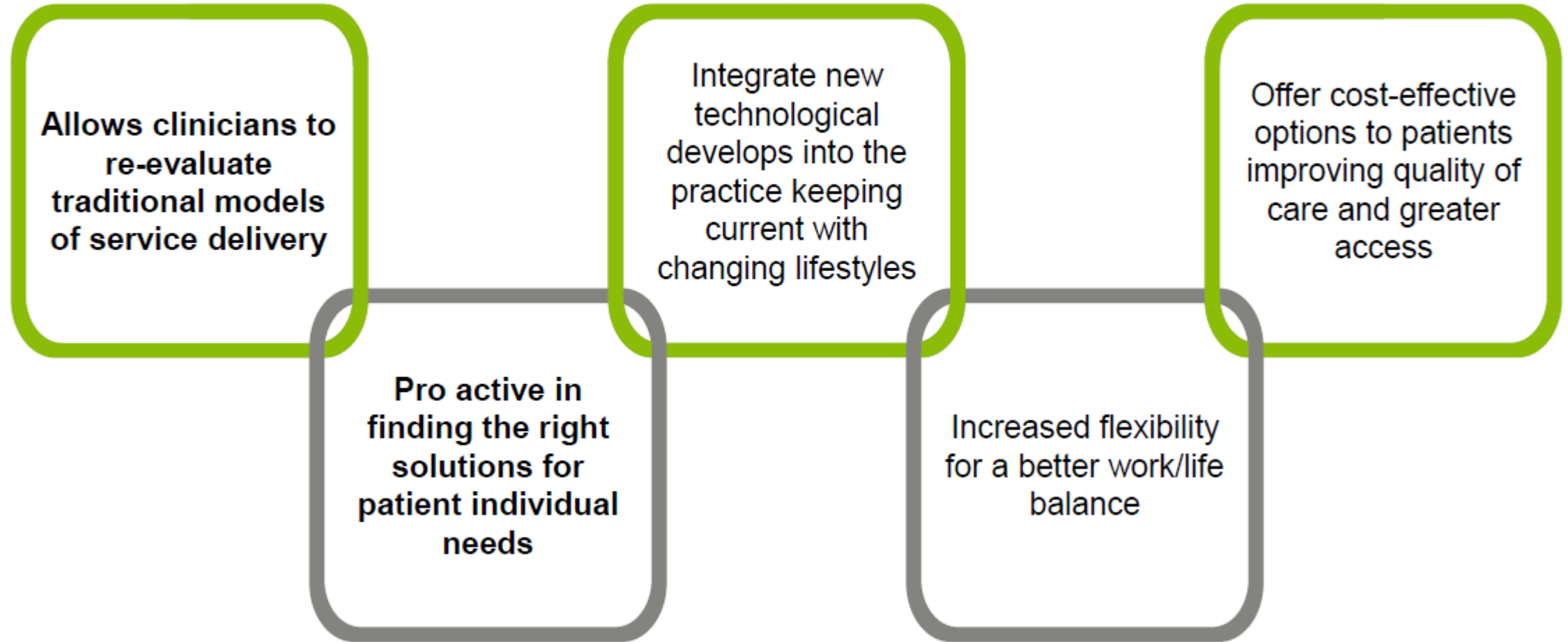
Benefits of eAudiology for Patients

- Overcome challenges of distance and access to care Swanepoel,D.W , Hall, J. (2010)
- May now be a preferred style of receiving services Carr, G. (2017)
- Accommodate busy lifestyles
- Facilitate the inclusion of family in the hearing management process by removing geographic
- Barriers and appointment conflicts



The benefit of eAudiology
for HCPs

Benefits to HCPs





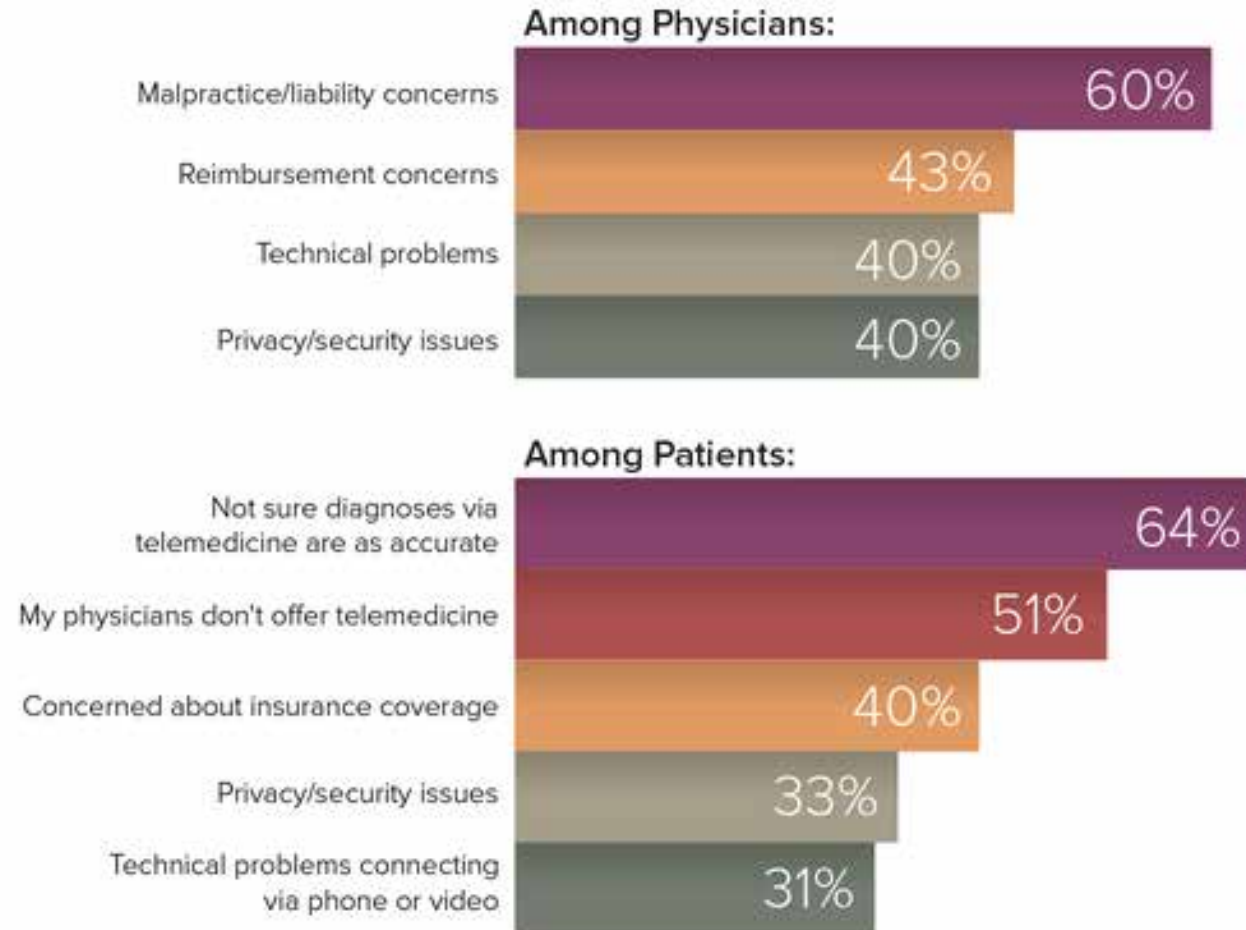
How eAudiology can
benefit business practice

Benefits to the Business Practice

- Distinguish the business from competitive threats such as OTC, internet sales and hearable devices
- Elevate the value of audiology services
- Expand patient reach
- Expand hearing aid fitting solutions (patients in their everyday settings)
- Potential cost savings, increased efficiency, improved workflow and patient satisfaction*

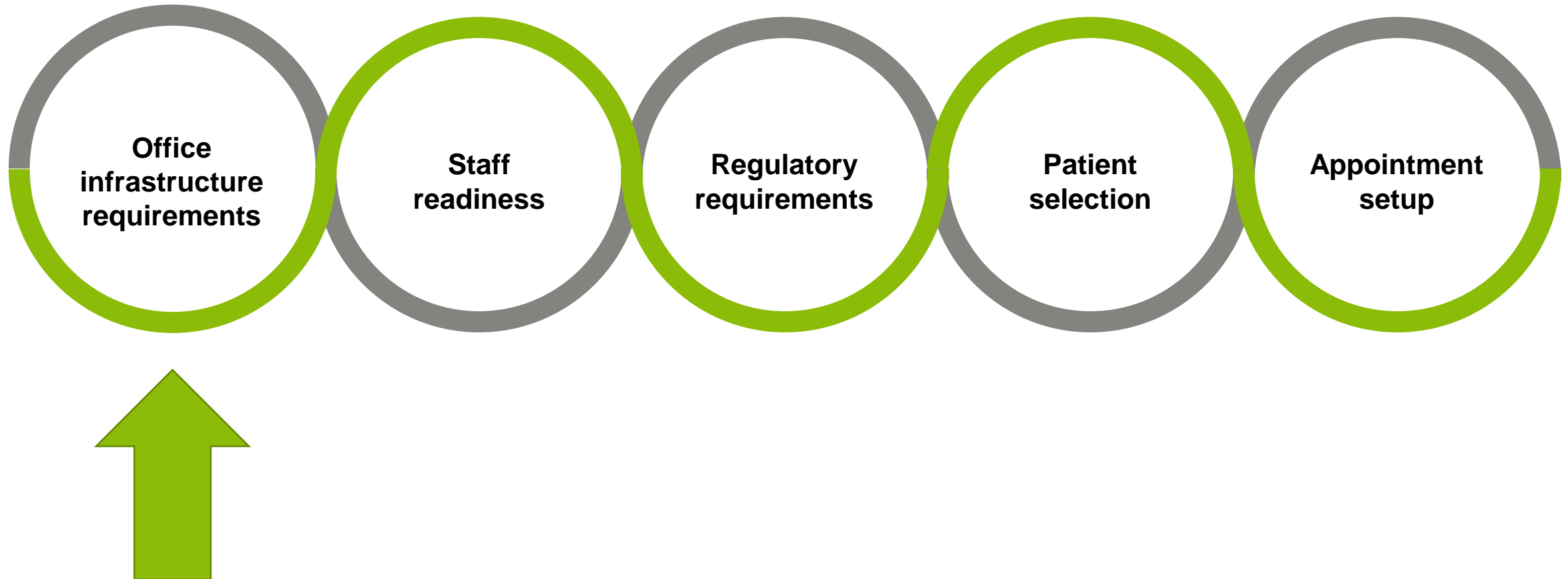
**Ballachanda B. Critical steps in establishing a teleaudiology practice. (2017). Hearing Review, 24 (1), 14.*

Perceived barriers to telemedicine



Implementing eAudiology

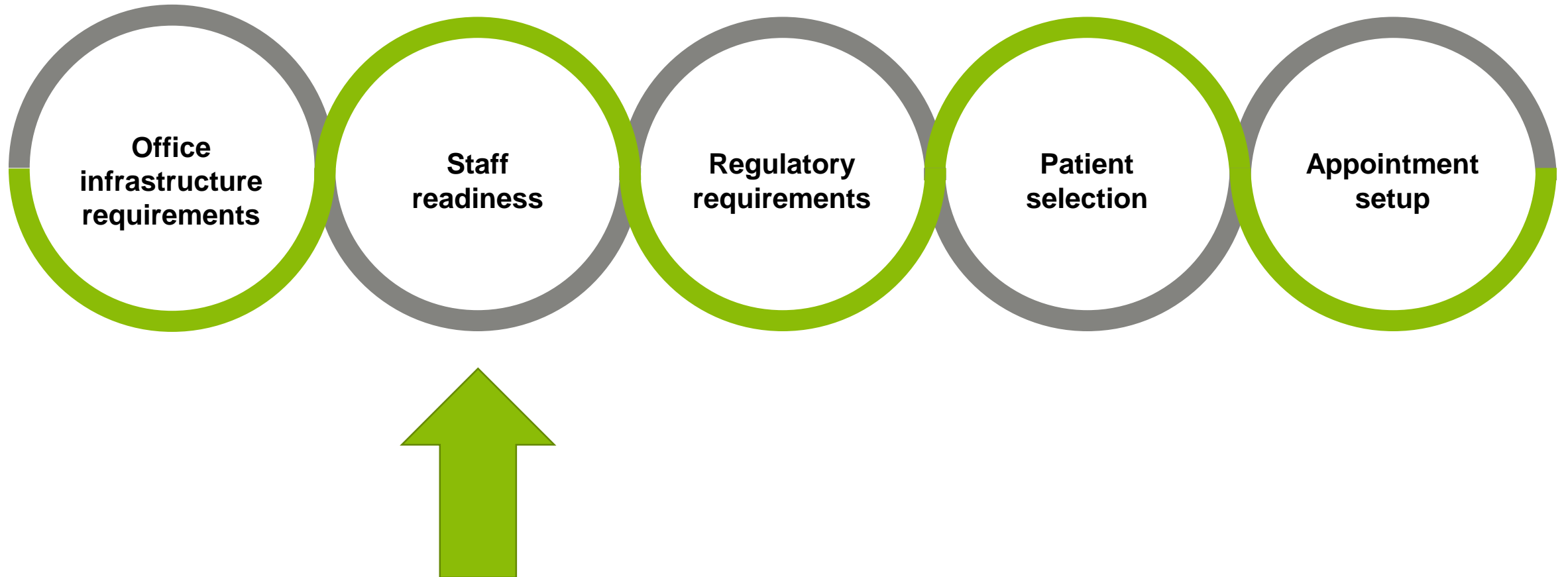
Top things to consider to set up eAudiology in your clinic



Office infrastructure & readiness

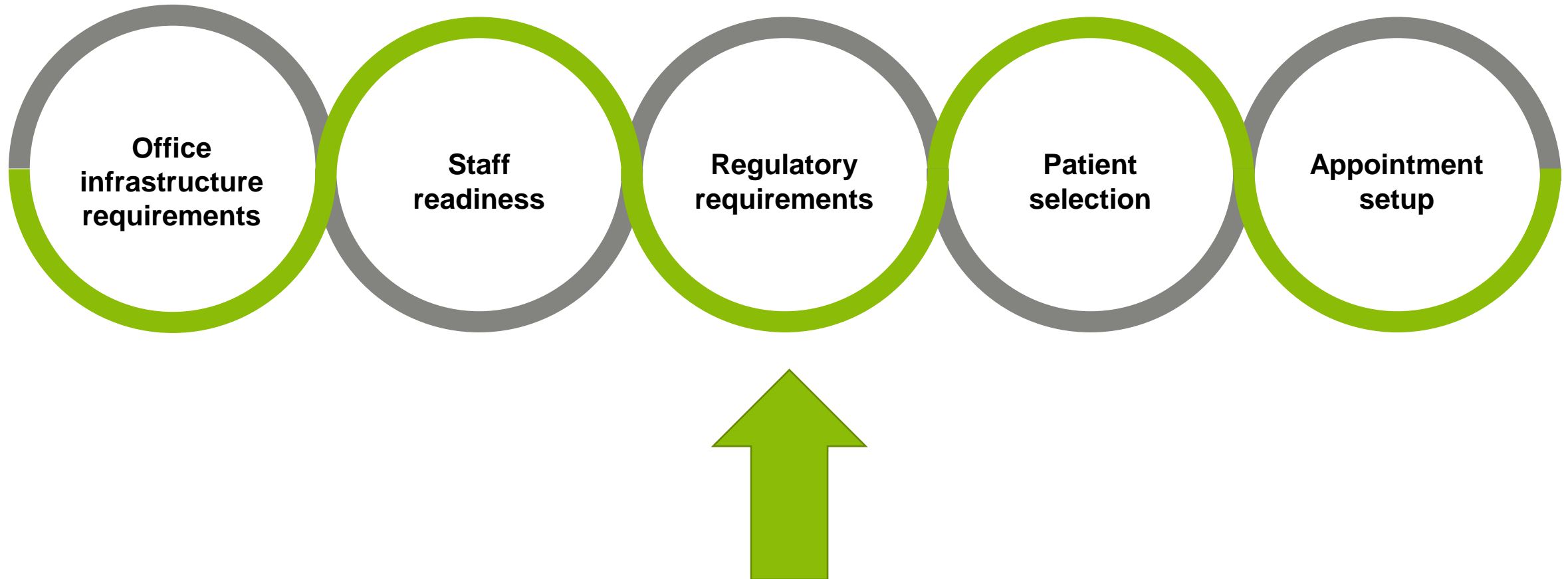
- Wifi/ LAN bandwidth = 5Mbit/s:
 - This is to ensure best experience during audio and/or video call appointments
 - To check your internet speed down load a app like speedtest by Ookla (<http://www.speedtest.net/apps/desktop>) or use Phonak Target to test remote support connection in Phonak Target -> Setting.
- Hardware:
 - Headphone/headset, PC, camera
- Environment:
 - Quiet room ensuring privacy

Top things to consider to set up eAudiology in your clinic



- Onboarding – all Hearing Care Professionals and Front Office Personal should be appropriately trained
 - Internal trial runs: We recommend trialing remote support appointments internally to ensure that your technology and service is fully ready to be offered to your patients
- Behavior change for the audiologist
- Must assess which clinical tasks are appropriate for eAudiology
- Communication behaviors will be different.... What will be interpreted from non-verbal communication?
- Continuing education: Ongoing education process as learning will continue and services are being initiated.

Top things to consider to set up eAudiology in your clinic



Regulatory requirements

- eAudiology provides a new method to connect with and service your patient's hearing needs, therefore there may be regulatory considerations in your country to be aware of before embarking upon this.
- **Licensing and certification**
 - State & federal licensing laws with respect to your practice location as well as the location in which the patient will be receiving services
- **Billing**
 - If you plan to bill separately for these services ensure you are up to date regarding reimbursement structures and requirements for data collection
- **Record keeping**
 - How and which data should be stored, as well as documentation of informed consent
- **Privacy & security**
 - Is data encryption required to ensure patient confidentiality and security?

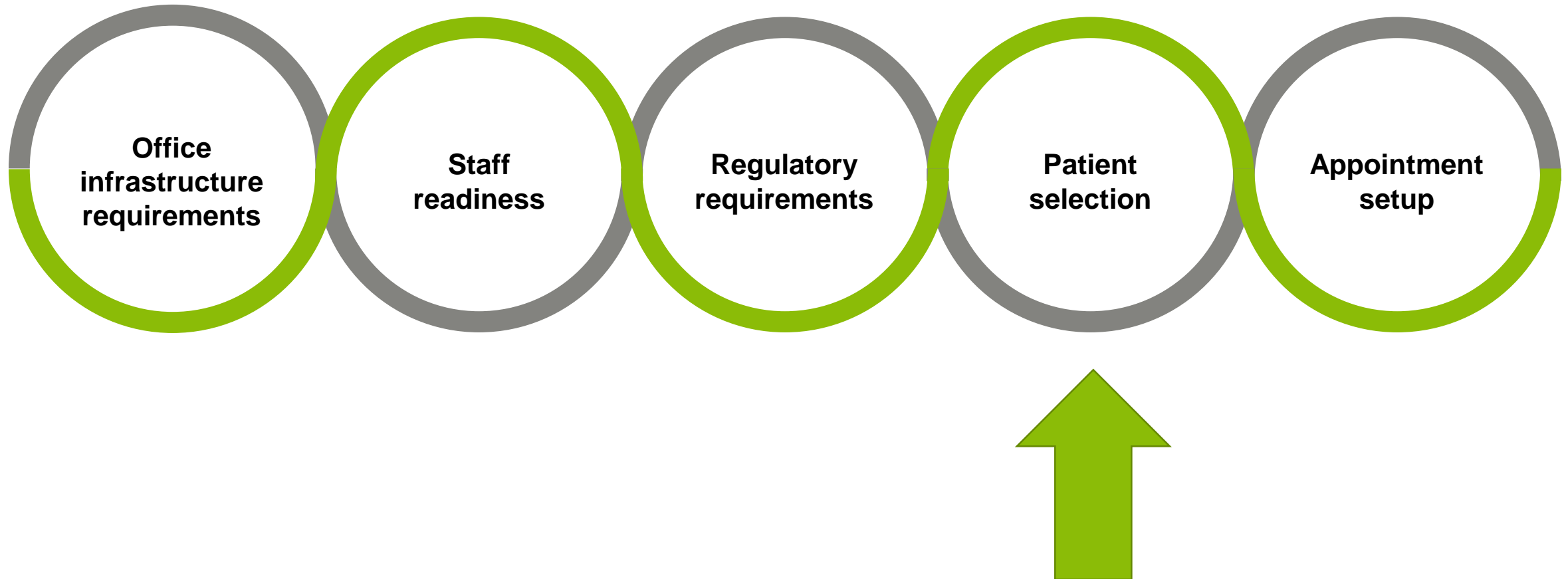
General practice standards checklist

- q My regulatory body endorses the use of eAudiology
- q I have reviewed all applicable position statements and will continue to adhere to the Code of Ethics and requirements that apply to my membership/certification
- q The provision of eAudiology services is in the best interest of my patient
- q I will deliver eAudiology services with the same standard of care used in traditional delivery models (i.e. face-to-face)

Overall, it is your job to be **knowledgeable** about and **compliant** with existing rules, regulations and guidelines regarding eAudiology including:

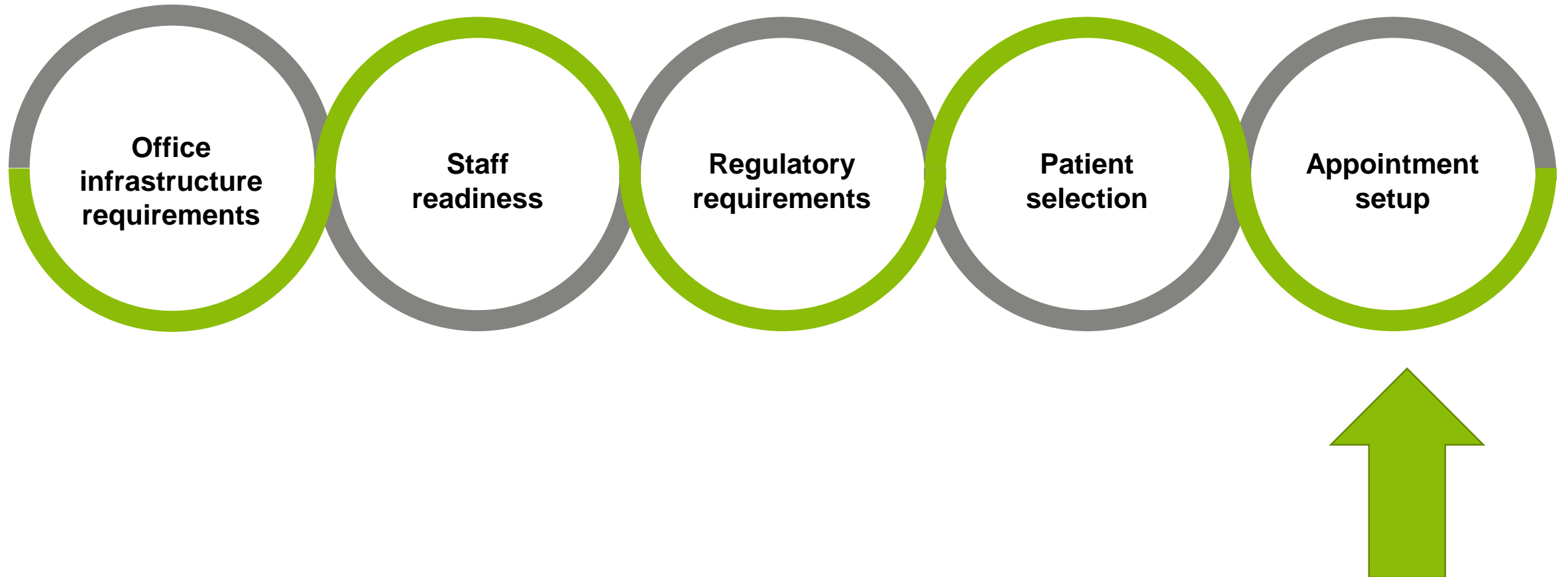
- Security
- Privacy protections
- Reimbursement for services
- Licensure & Liability

Top things to consider to set up eAudiology in your clinic



- Determine if the patient can be a candidate for eAudiology services before implementation
- Age, lifestyle, education, experience with technology and family involvement may influence patient candidacy ASHA (2018)
 - Uses electronic devices like a smartphone or computer on a daily basis
 - Can use programs/apps or websites like Skype on a daily basis
 - Can install apps on their own
 - Is willing to have remote online appointments

Top things to consider to set up eAudiology in your clinic



Appointment setup

- Options for managing online remote appointments include:
 - Setting aside a fixed time on a given day(s) per week
 - Integrate within in your daily schedule
- Length of appointments:
 - Remote support should not take longer than face to face appointments so schedule your standard amount of time for a follow up appointment. As with any new skill there is a learning curve initially, so you may want to allow a few extra minutes for yourself to familiarize yourself with the procedure (e.g. 45mins total).
- Your patients will value and appreciate remote support services for the time-saving it provides them.

Practical tips for eAudiology

Practical Tips: Patient

- Perform the **first fit** in the **office**
- If interested in Remote Support, get the patient setup at the face to face appointment
- Does the patient have email
 - Is the email on patient's phone and do they know the password
 - Do they have access to the playstore/applestore
- Download the app in the office + connect to the HAs
- Take the patient through the Remote Support set-up process
- Talk through app + how to accept the remote support session call
- Explain how to clean the HAs + ear piece
 - Troubleshooting to determine if they need to come into the office
- Discuss WiFi vs cellular network strength for the best fitting experience

Practical Tips: Audiologist

- Test your Internet Speed
- Use hearing aids that are **compatible** with Remote Support
- Check that the patient's smartphone compatible?
 - Compatibility Check: <https://marvel-support.phonak.com/en/audeo-m-cell-phone-compatibility/>
- Ensure you have a web camera + headset in the office
- Test Remote Support workflow before having the first real appointment
- Have a phone number for the patient in case they forgot about the appointment
- Ask the patient if they have new batteries in the HAs or a enough battery if rechargeable
- Turn video off (on both sides) if the connection during the appointment is not stable
- Think about how to schedule/manage the appointments + how to build it in your daily work
- Use the hearing diary + “chat function” to get more feedback from your patient

Getting started – Practice, Practice, Practice

1. Basic Infrastructure/Test your Internet speed
 - Recommend 5 Mbps upload/download speed
 - A quick Google search will highlight many websites/apps that will test connection speed
2. Check on ethical/license/billing/privacy information in your area
3. Make sure you have a compatible hearing aid and are signed up for Phonak eServices (or as applicable)
4. Try a Remote Support session with a colleague, family member, or friend to get a feel for how it works
5. Identify patients who you feel are good candidates
6. Start with a few appointments and build up your Remote Support offering

Phonak eAudiology Expert Circle



Recommendations for integrating eAudiology to reach new patients, enhance patient care and increase value of services

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- Joe Montano, Weill Cornell Medicine
- Karen Munoz, Utah State
- Christopher Spankovich, University of Mississippi Medical Center

- **Phonak Participants**

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- Marike Carstens, Senior Manager eSolutions
- Christine Jones, VP Audiology Phonak US
- Nicole Klutz, Audiology Manager
- Tania Rodrigues, Education and Training Manager, Sonova AG



Together,
we change lives