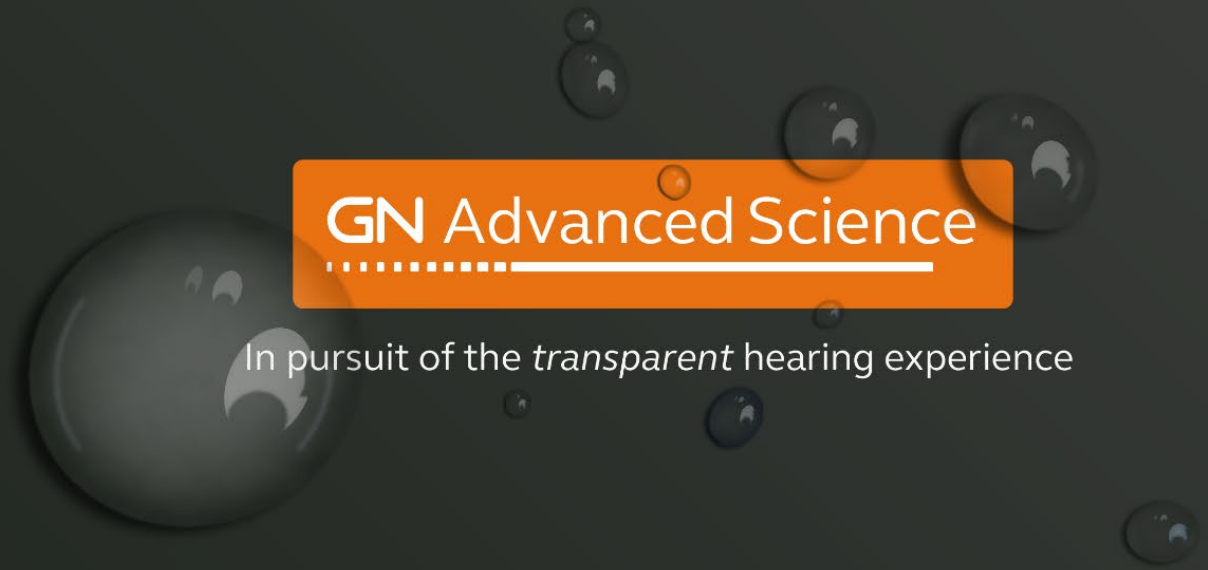
GN Advanced Science
In pursuit of the *transparent* hearing experience

Connected Audiology

…and the changing hearing healthcare landscape

Vidya Krull, PhD, CCC-A, Research Scientist

Andrew Dittberner, PhD, VP, Research

GN Advanced Science


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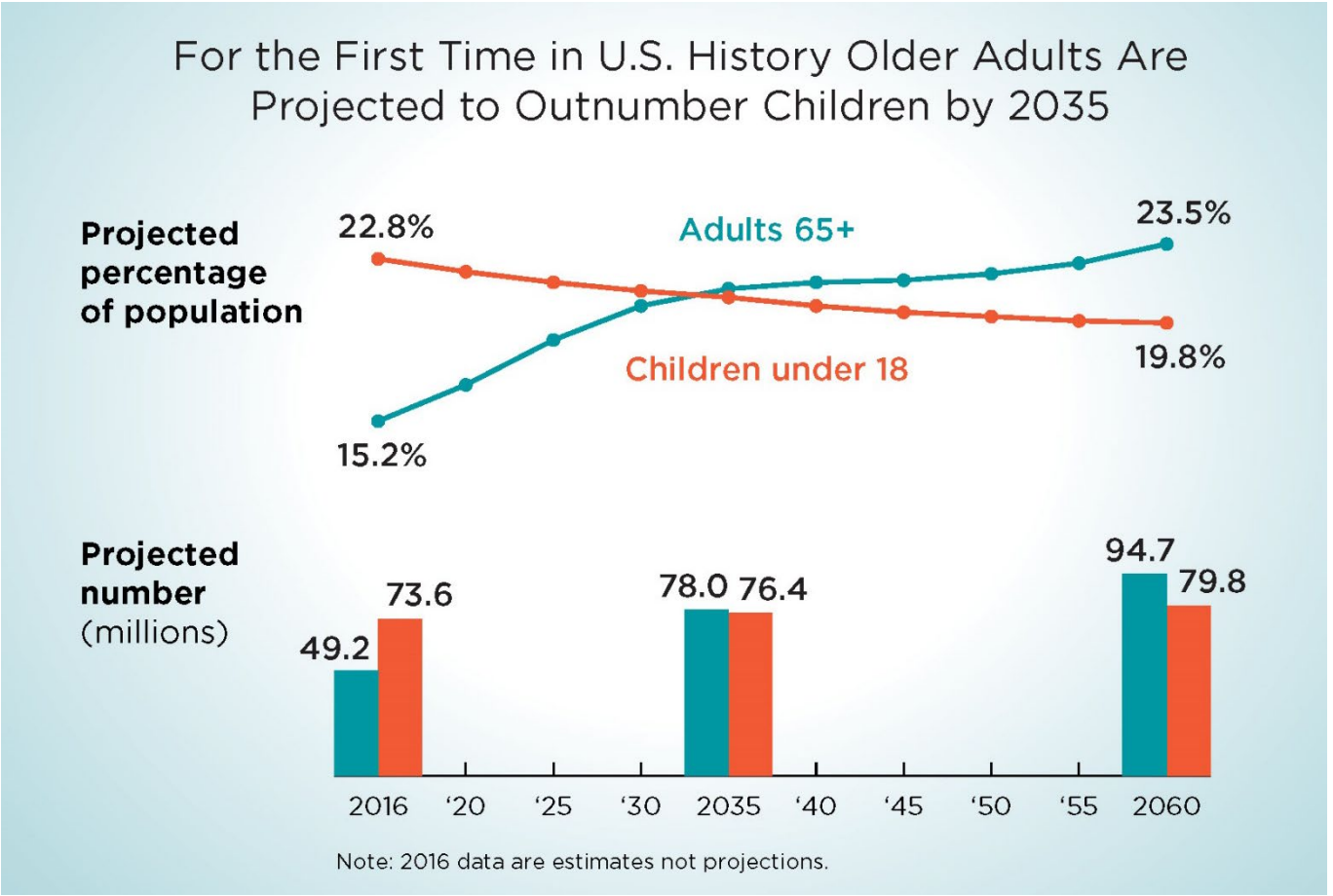
PROMISE
https://goo.gl/u2nqCi

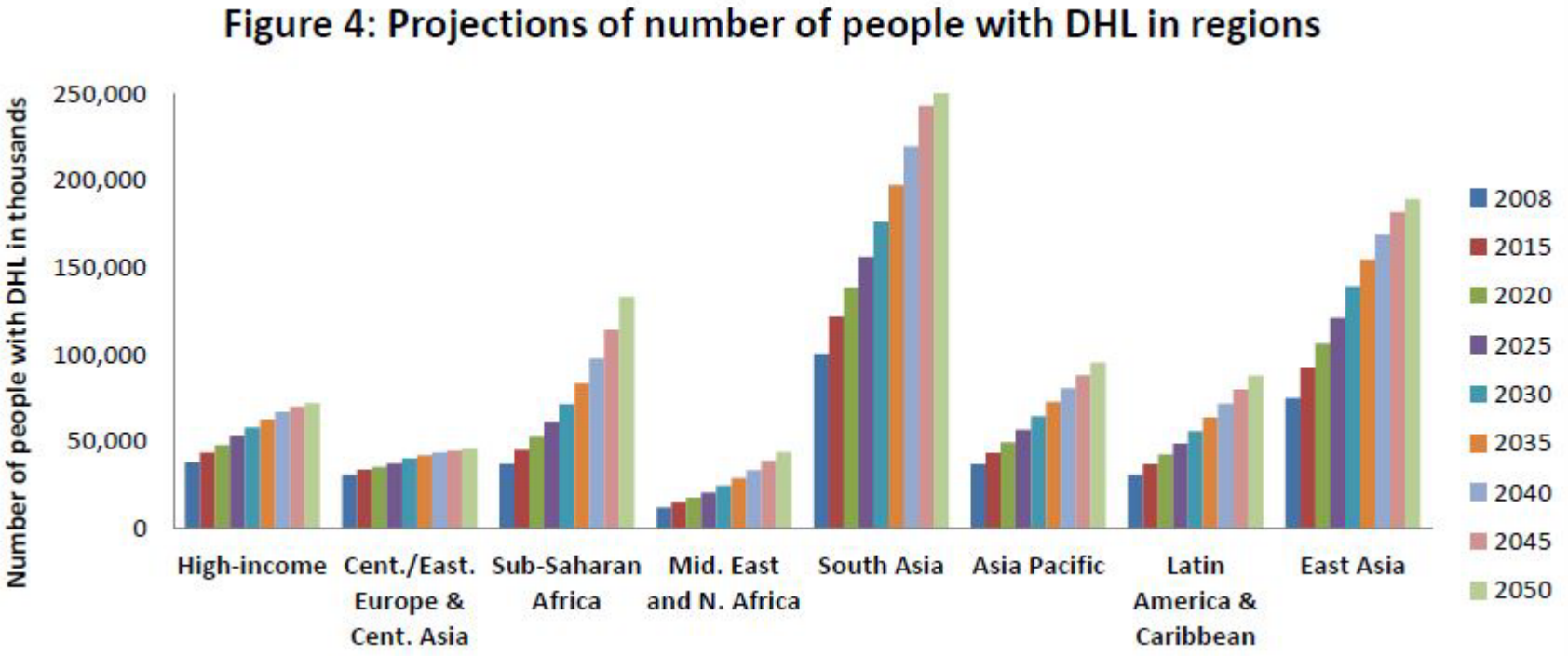
At the crossroads

- Aging population



https://www.census.gov/programs-surveys/popproj.html

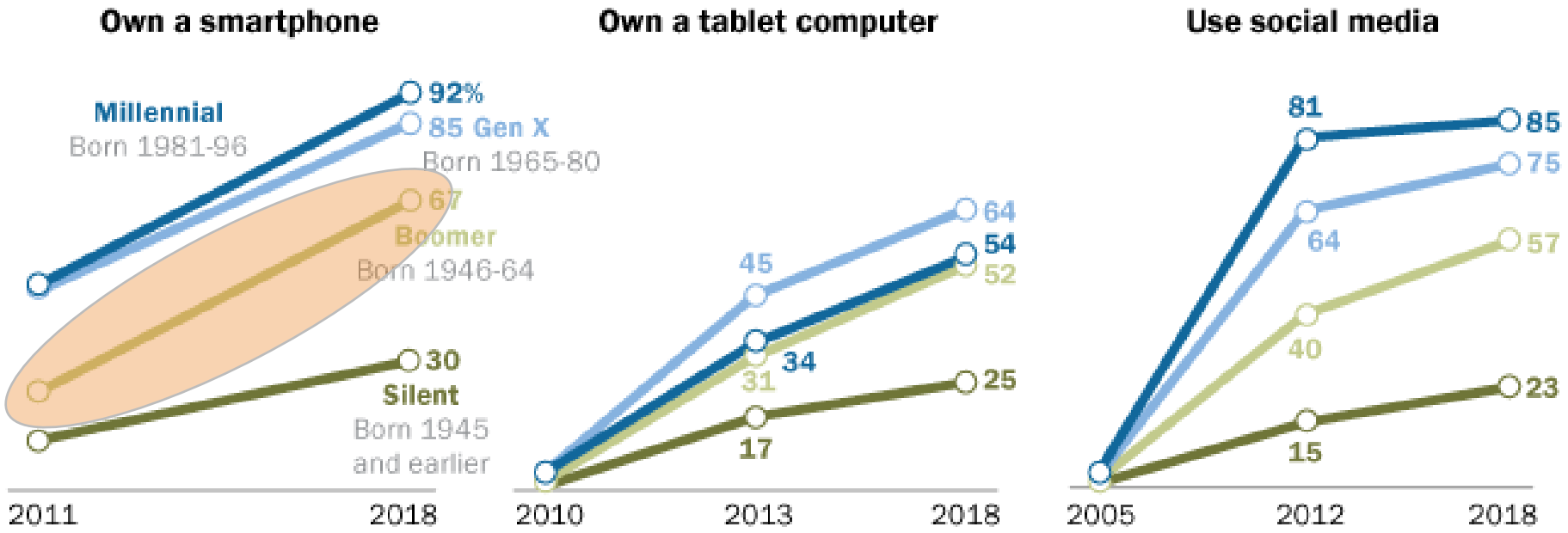
DHL = Disabling Hearing Loss (defined as hearing thresholds greater than 40 dB (HL?) in the better ear for adults)



World Health Organization (2018)

Millennials lead on some technology adoption measures, but Boomers and Gen Xers are also heavy adopters

% of U.S. adults in each generation who say they ...



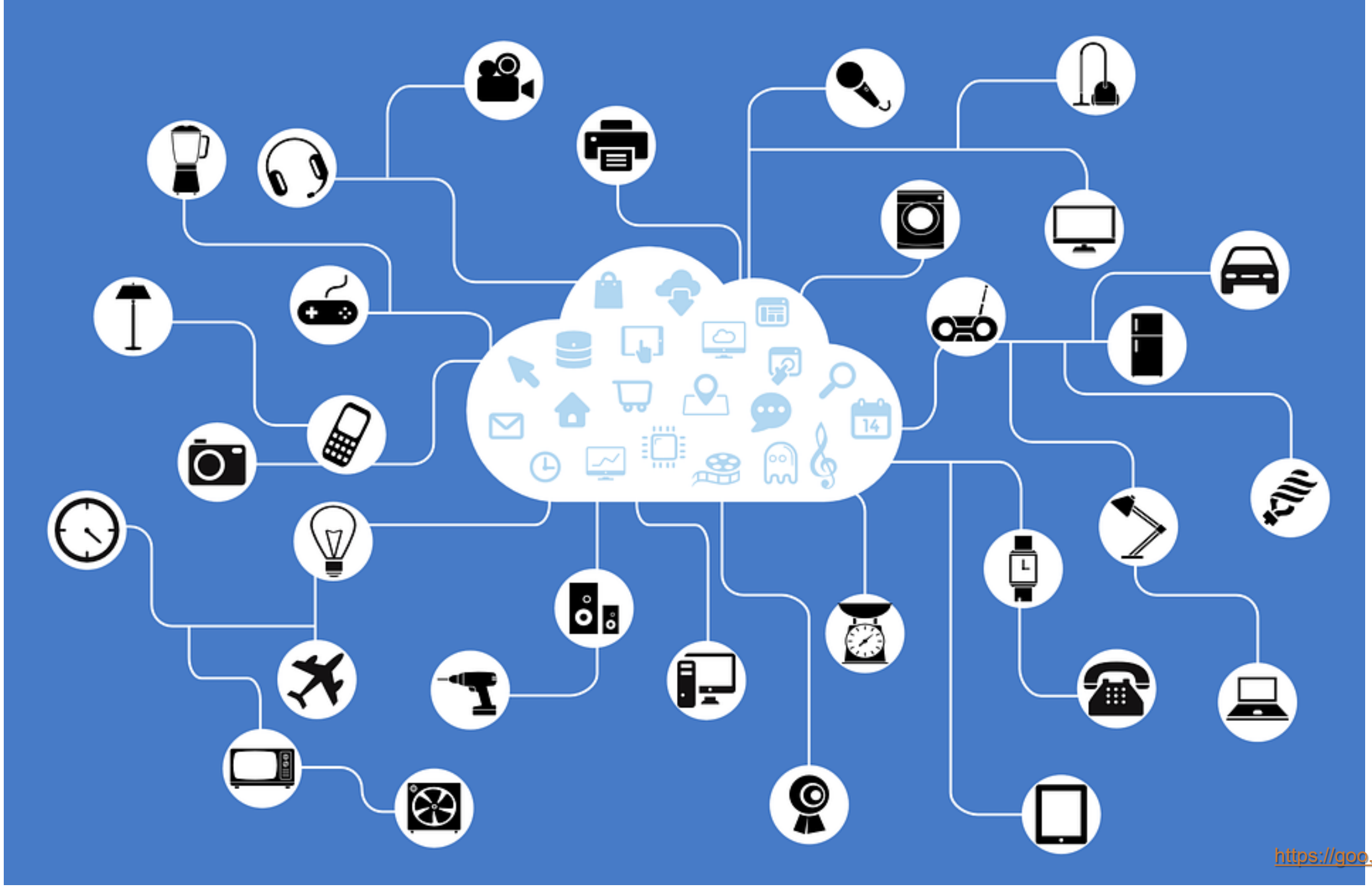
Source: Survey conducted Jan. 3-10, 2018. Trend data are from previous Pew Research Center surveys.

PEW RESEARCH CENTER

https://goo.gl/aUbp3i

At the crossroads

- Aging population
- **Technological innovation**



https://goo.gl/grsY2r

At the crossroads

- Aging population
- Technological innovation
- **Consumerism**

New drivers in a connected future

Traditional TeleAudiology

Remote environments

Need for timely care

Resource constraints

Cost savings

Practice reach

Connected Audiology

(includes TeleAudiology, mobile apps, mobile web, virtual reality, augmented reality, and wearable devices)

Urban environments

Quick redressal

Convenience

User control and engagement

Personalization

Through the lens of Telehealth [VA]

- 38 Telehealth programs in 2016
  - TeleRetinal Imaging
  - TeleIntensive Care
  - TeleSurgery (Pre- & Post- Care)
  - TeleCardiology
- 88-94% satisfaction rates among veterans [https://www.va.gov/COMMUNITYCARE/docs/news/VA_Telehealth_Services.pdf]
- “Anywhere to Anywhere” initiative [http://connectedcare.va.gov/]
  - VA Mission Act 2018 [https://www.va.gov/opa/pressrel/pressrelease.cfm?id=4054]

At the crossroads

- Aging population
- Technological innovation
- Consumerism
- **Legislative and regulatory changes**

…The traditional service delivery model is evolving

Key factors for successful patient outcomes

- Client-centered care (Grenness, 2014)
- Clinician expertise and interaction (cf., Naylor et al., 2015; Fabry and Groth 2017; Humes et al., 2017)
- Client perspective ≠ Clinician perspective (Poost-Foorrosh, 2014)
- Evidence-based practice requires ‘best available’ scientific evidence; Current level of evidence is “lower than optimal” (Tao et al., 2018; Paglialonga et al., 2018)

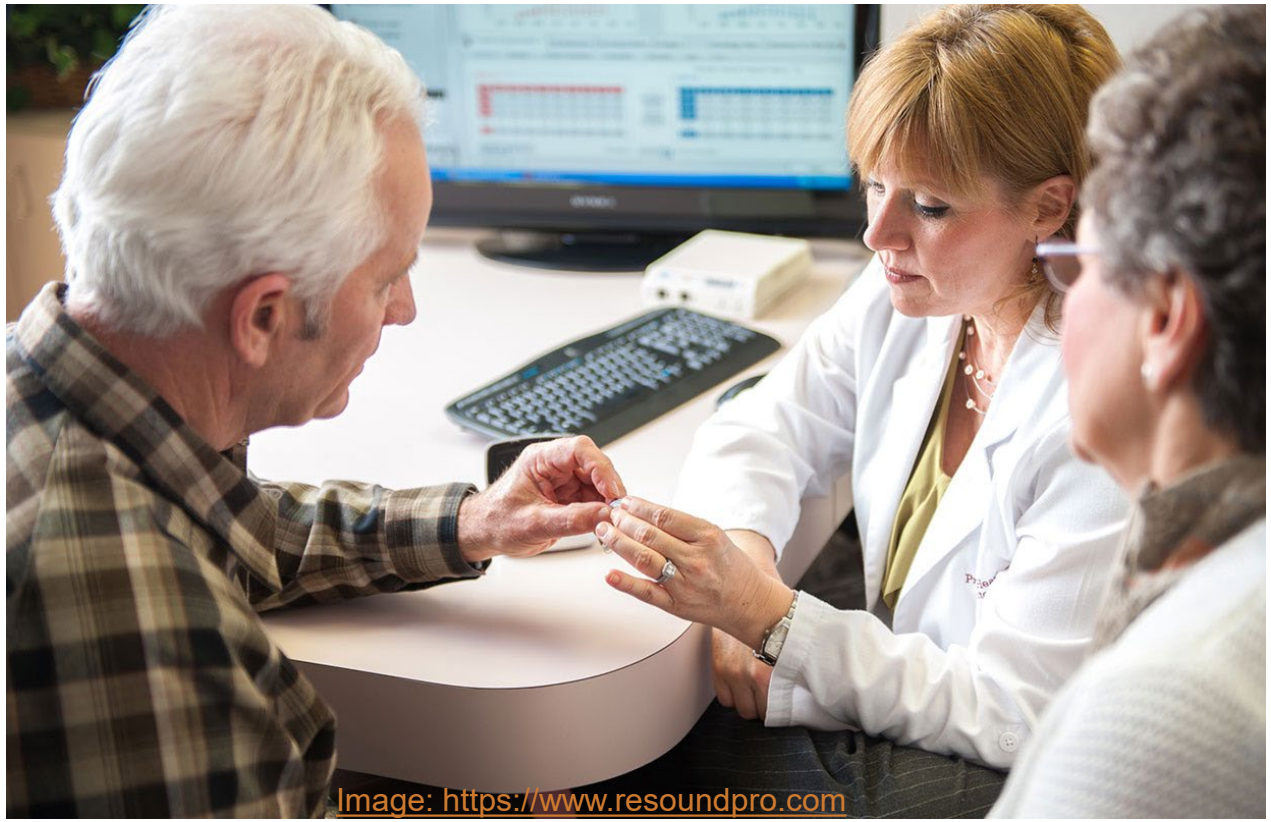
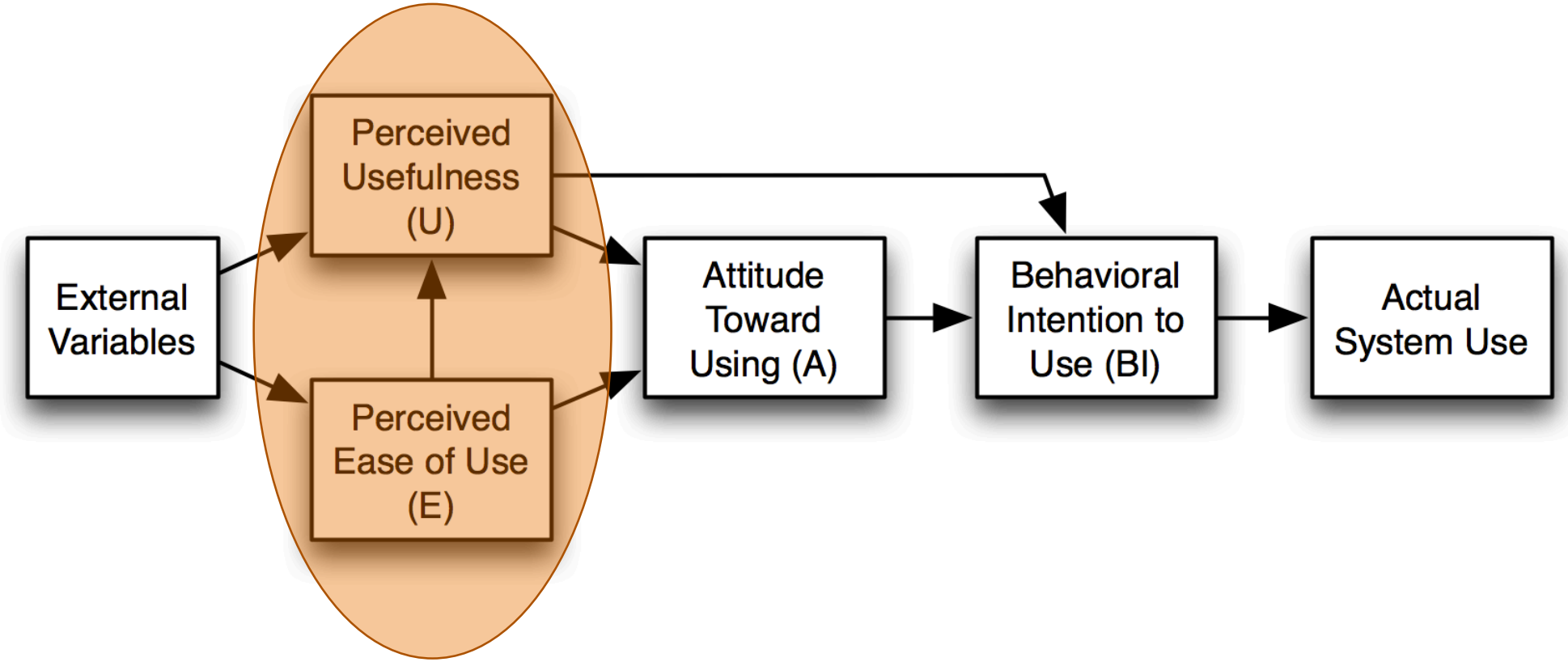


Image: https://www.resoundpro.com

Technology Acceptance Model



https://chirr.nlm.nih.gov/tam.php
https://goo.gl/5PnajF

Perceived usefulness and ease of use: Practitioner

- Low, but positive regarding accessibility (Singh et al., 2014, Canada, 202 providers)
- Positive attitudes, but limited clinical adoption (Eikelboom and Swanepoel, 2016, 28 countries, 269 audiologists)
- Positive attitudes, and see potential value for some clients (Brännström et al., 2016, Sweden, 4 audiologists)
- Willing to integrate technology into patient care (Kimball et al., 2018, United States, 287 practitioners)

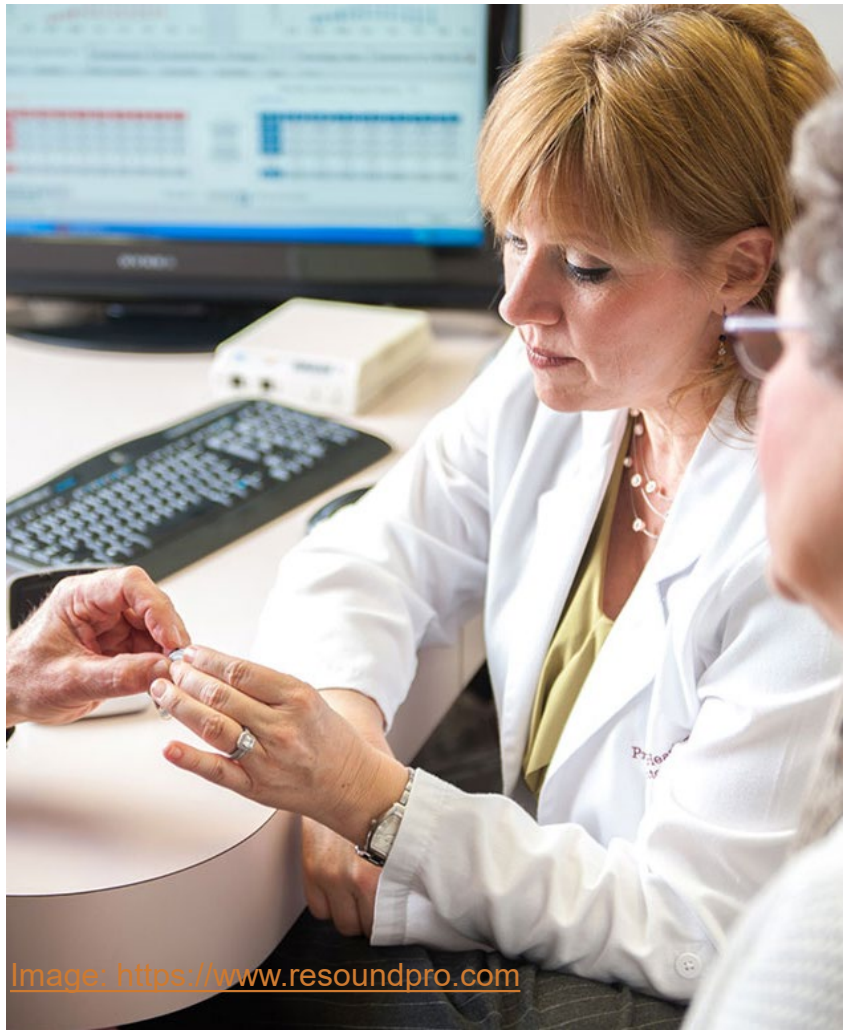


Image: https://www.resoundpro.com

Perceived usefulness and ease of use: Client

- Limited information, mixed findings, need for empirical research (Swanepoel and Hall (2010), 5 of 25 articles within scope of review)
- Comparable satisfaction for Teleaudiology and in-person care (Pross et al., 2016, United States, 42,697 veterans)
- Majority with positive experiences, satisfaction, and potential value (Brännström et al., 2016, Sweden, 23 clients)
- Good or better compared to traditional face-to-face (Gladden, 2018, United States)

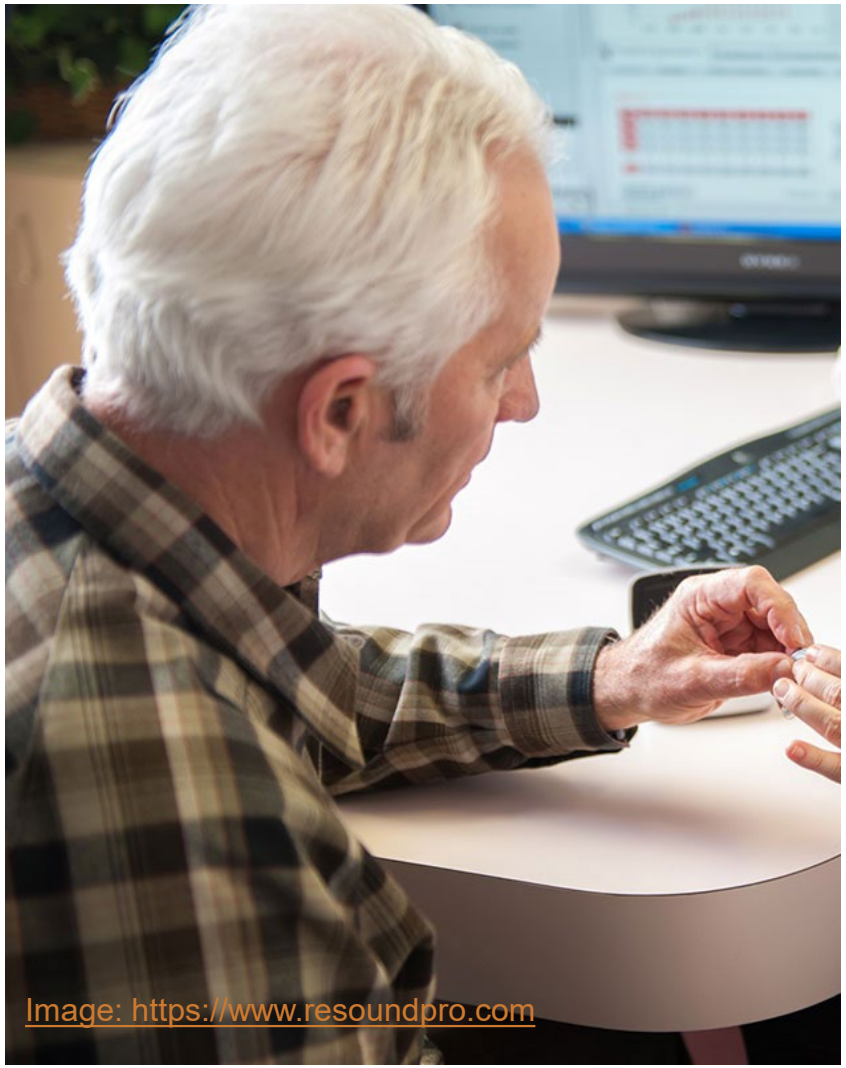
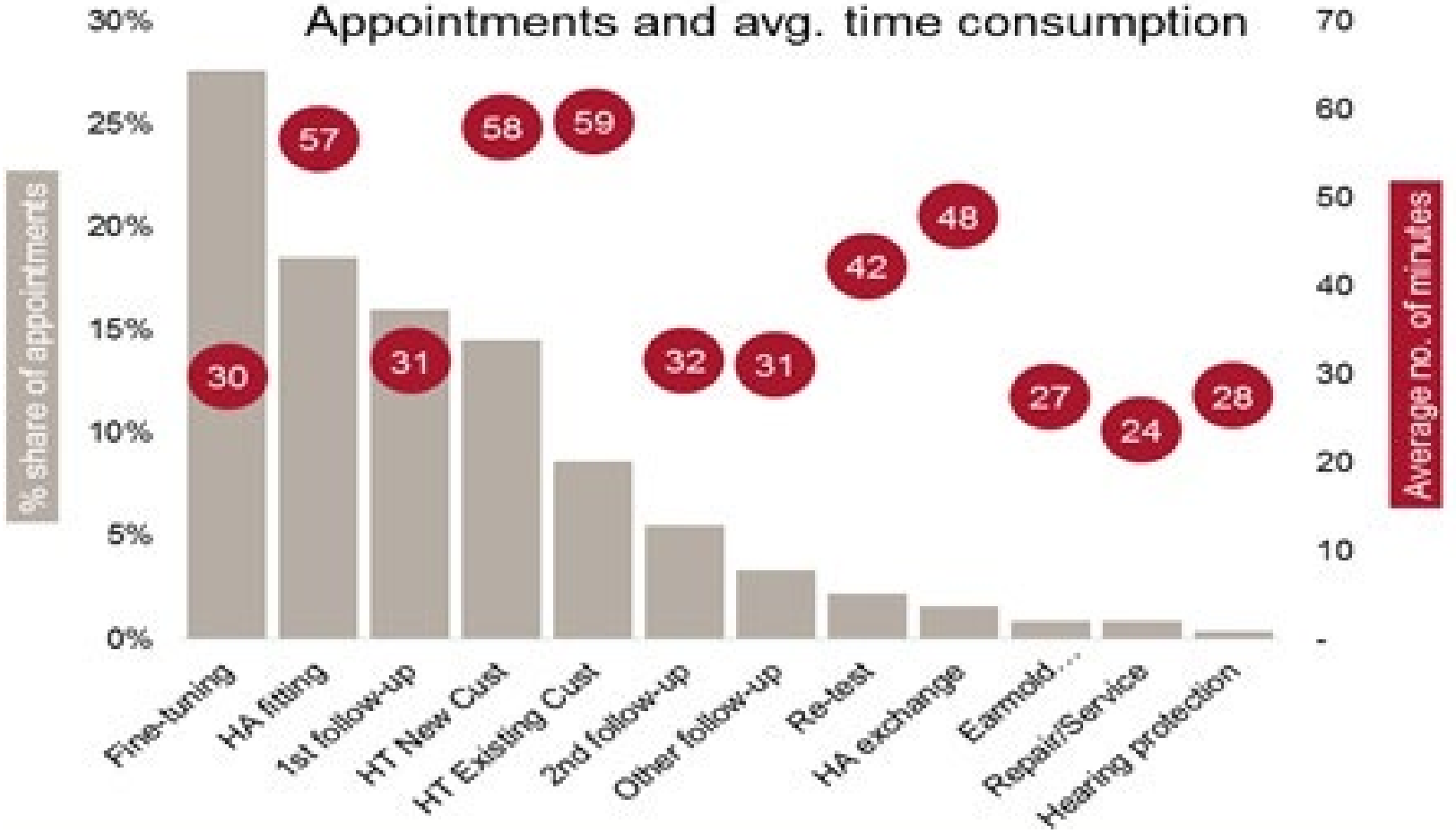


Image: https://www.resoundpro.com

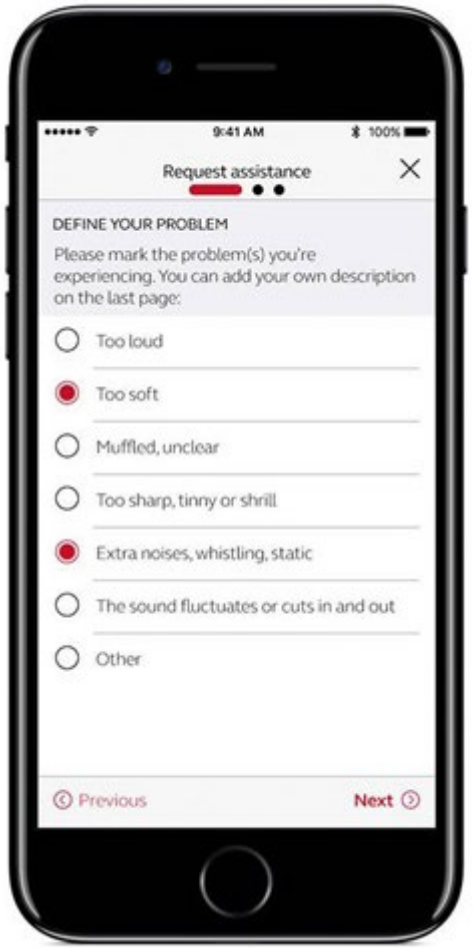
Traditional patient journey

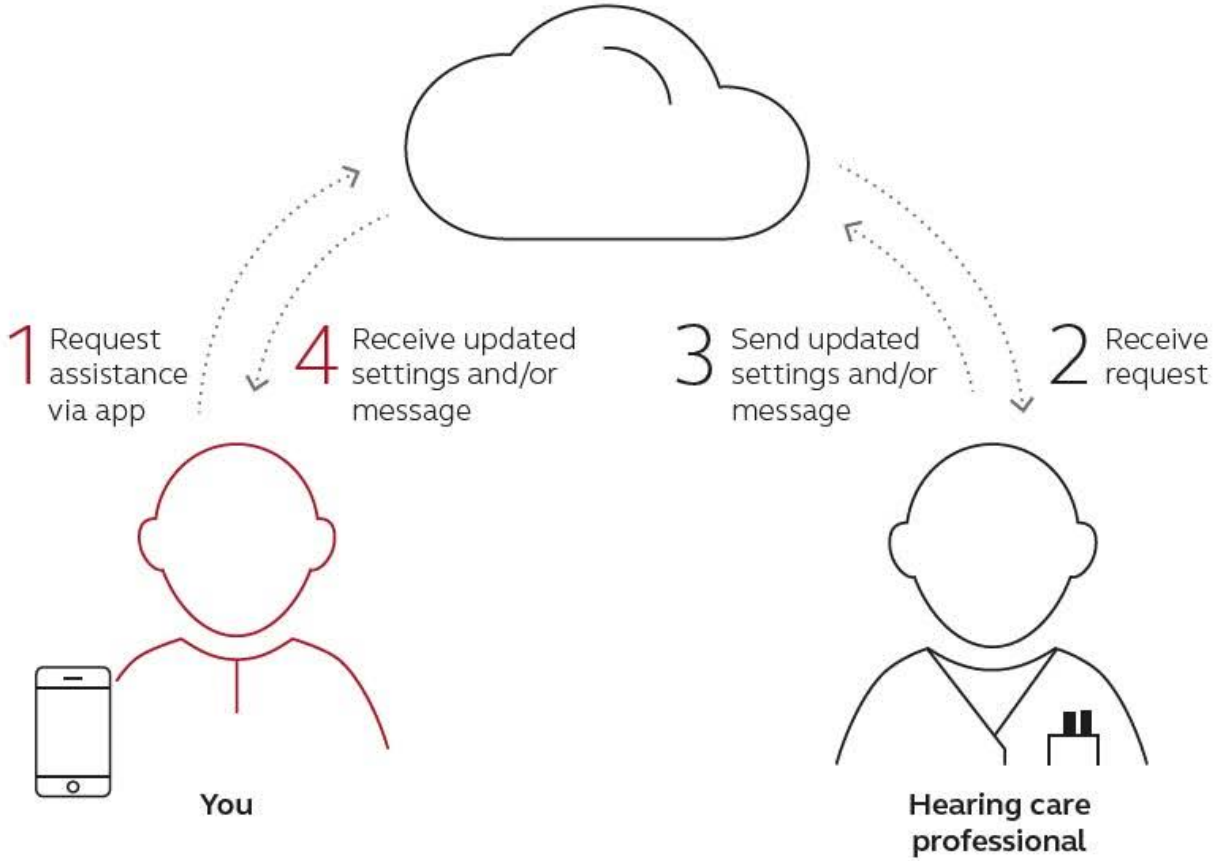
- Evaluation
  - Otoscopy
  - Audiometry
  - Immittance, OAEs, other
- Hearing aid fitting
  - First Fit
  - Fine-tuning
  - Verification
  - Validation
- Post-fitting
  - Adjustment
  - Service
  - Rehabilitation

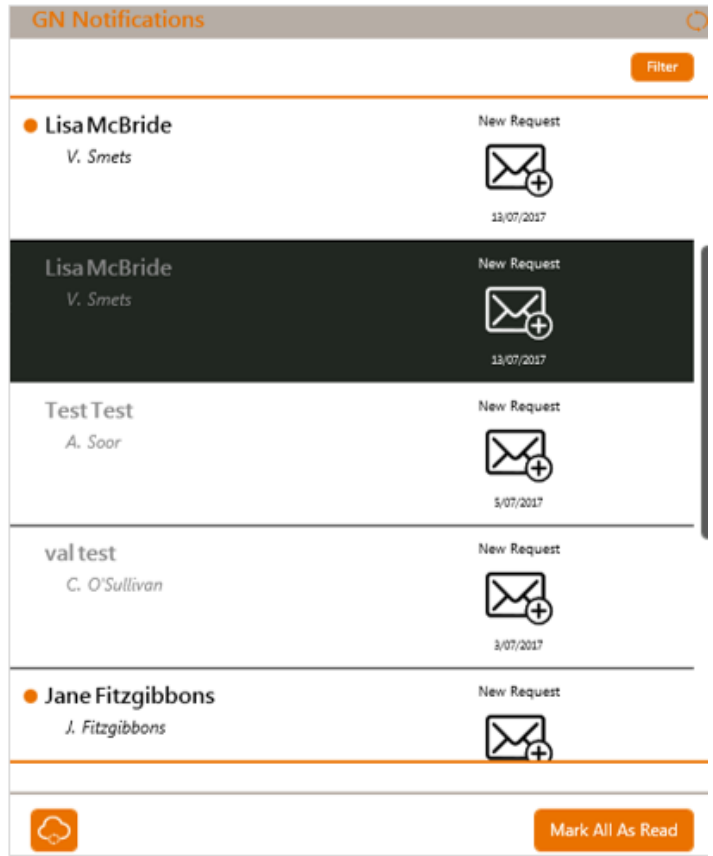


Groth et al., 2017

ReSound Assist







A few of the challenges ahead

- Data Security
  - Recent data protection laws, including General Data Protection Regulation, requiring pseudonymization or anonymization of data
- Infrastructure
  - Interoperability and standardization of protocols
  - Provider and user training
- Reimbursement
  - Uncharted territory for non-traditional service delivery models
- Equivalency
  - Paucity of high level of evidence

Thank you