

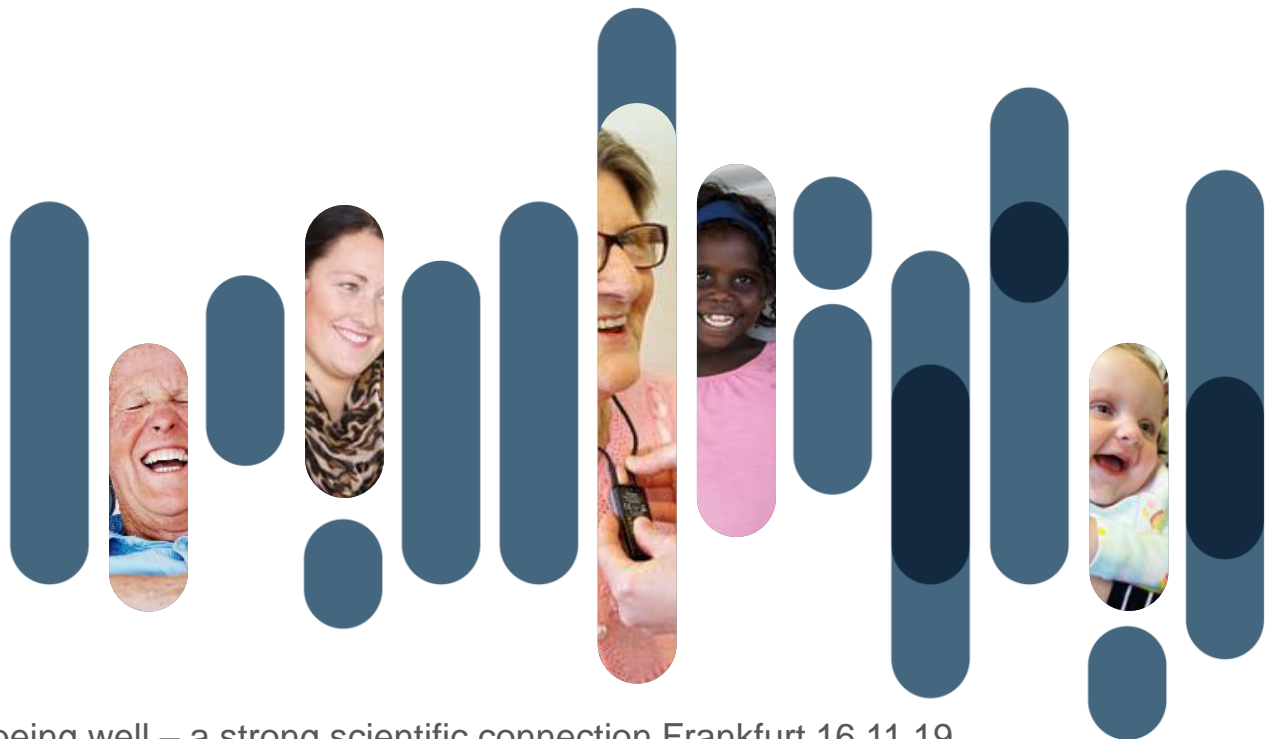
mhealth technologies empower hearing aid users to self-manage their hearing loss

Presented by:

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Phonak Hearing well and being well – a strong scientific connection Frankfurt 16.11.19



NHS
National Institute for
Health Research

Nottingham Biomedical
Research Centre, UK



Benefits of mhealth



Increase access



Empowerment



Greater knowledge



Engagement



Self-management



Awareness of hearing loss



Big data



New service models

Mobile tech for connected hearing healthcare and self-management

Smartphone-
connected
hearing aids



Auditory-cognitive
training

Alternatives:
Hearables
PSAPs



Pre-assessment/
pre-fitting preparation

Hearing health
education

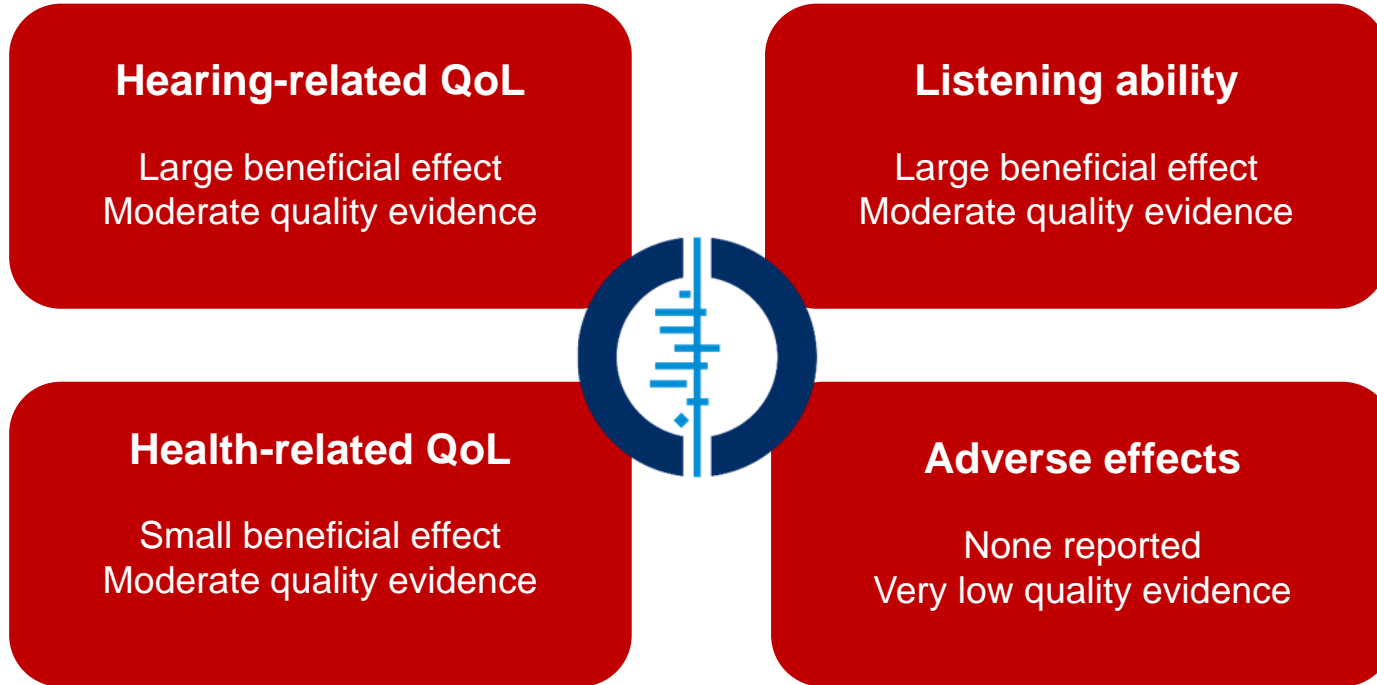


Remote device
adjustment

Smartphone-connected hearing aids



Hearing aids are effective



“The evidence is compatible with the widespread provision of hearing aids as the first-line clinical management in those seeking help for hearing difficulties”

Hearing aids get bad press. Why?

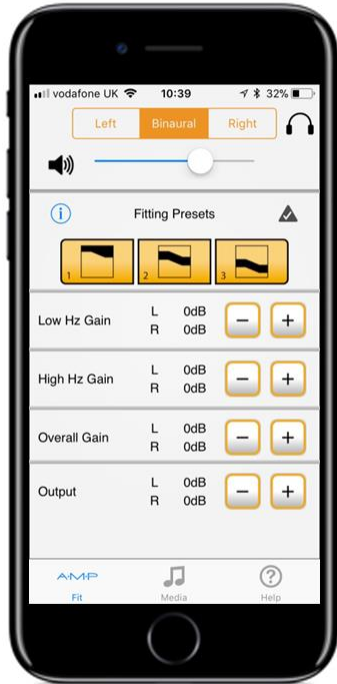


STIGMA!



Can new technologies help?

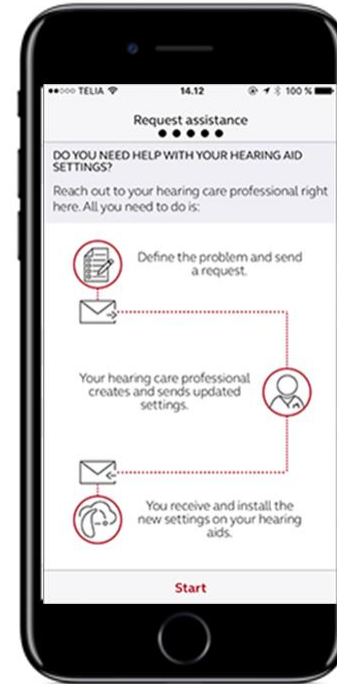
Smartphone connectivity



Self-fitting



User-adjustment



Remote delivery



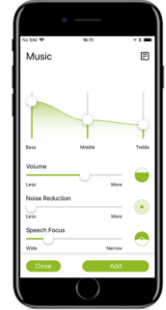
RQ: Does the functionality of a smartphone app provide benefits in everyday life?

- **Aims**

1. To assess benefits of the smartphone app
2. To explore and identify usability and user's preferences of the app

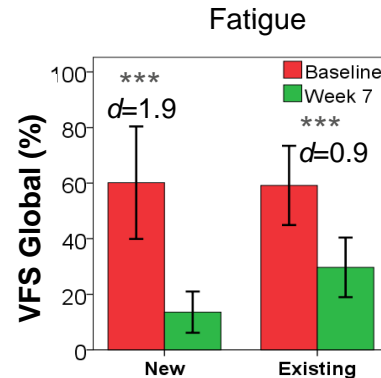
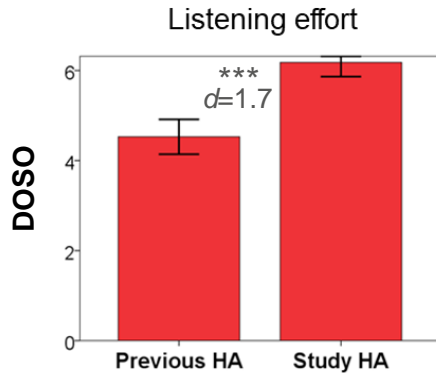
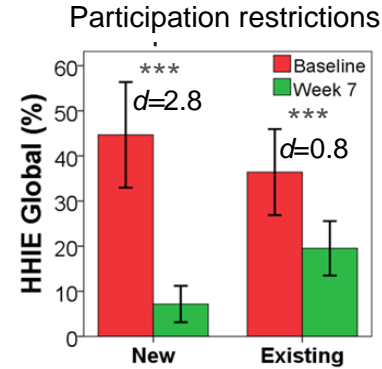
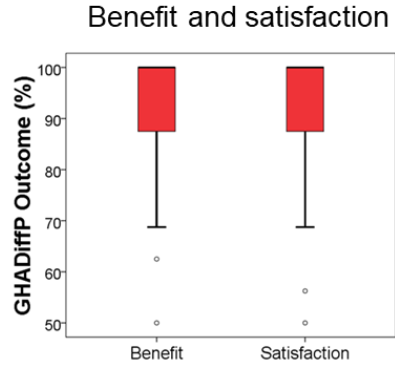
- **Methods**

- n=44 hearing aid users
 - New n = 14; existing n = 30
 - Age: new = 66.7 yrs; existing = 69.8 yrs
 - PTA_{0.5-4kHz}: new = 36 dB HL; existing = 43 dB HL
- Owned Apple iPhone ≥ 5.0 (iOS 10+)
- Single centre, prospective, observational design
 - 7 weeks, 3 visits
- Mixed methodology
 - Quants and quals, including 2 focus groups



Phonak Audeo B90-Direct
Phonak Digital Adaptive

Hearing aid outcomes improved: large clinical effect sizes



E.S. Cohen's d
 ≥ 0.8 large
 ≥ 0.5 moderate
 ≥ 0.2 small

Patient feedback of the app

Star rating was high



App met their needs

- Extremely well = 68%
- Somewhat well = 26%

Best feature

- Ability to adjust, improved listening = 42%
- Use in different environment = 26%

Situations app most useful

- Conversation in noise = 50%
- Watching TV = 32%

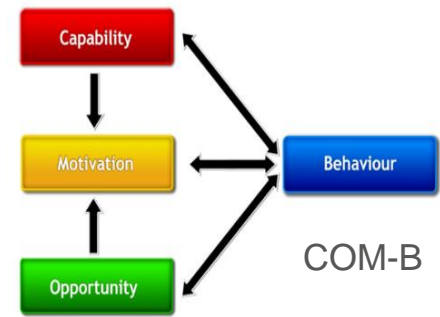
Did you experience tiredness?

- No= 87%
- Yes, only once = 8%

What the patients say

“It’s great. It gives you control....it’s not other people running my life, it’s me”

“In a restaurant, it meant I didn’t have to sit with my back to the wall anymore – I could sit where I wanted”



Capability

- User-adjustability led to inc participation**
- Experience
- Complexity of controls

Opportunity

- Listening context
- Less stigma
- Societal smartphone norms

Motivation

- Empowerment
- Increased confidence
- Benefitted others

Conclusion: Smartphone-connected hearing aids get good press



Less fatigue and effort

EMPOWERMENT



Improved listening and participation

STIGMA!



Hearing health education



Why is hearing health education important?



- **Hearing aids are difficult to use**

- 51% found difficulties using aid at first

“You get a lot of information ...by the time you get home, you’ve forgotten most of it.”

(AoHL, 2011)

- **Retention of information is poor**

- Overall = 49.6%: practical = 62.9%, psychosocial = 34.3%

(El-Molla et al, 2013)

- **Hearing aid users have a desire for additional information**

- both before and after the fitting appointments

(Laplante-Levesque et al, 2013; Kelly et al, 2013)

- **Health context**

- better knowledge increases patient satisfaction and treatment compliance

(Murray et al, 2005)

- **Self-management**

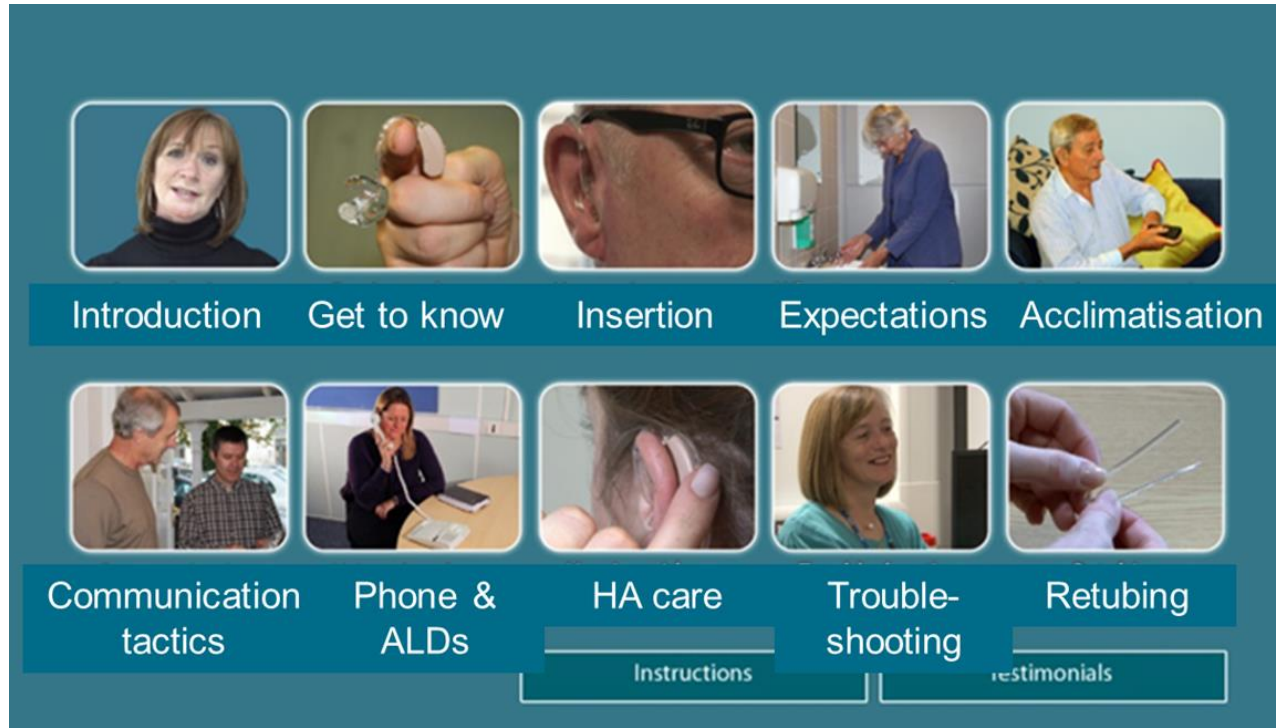
- better self-management → adoption of better health behaviours → better outcomes

(Mosen et al, 2007)

- hearing: knowledge, self-efficacy and psychosocial

(Convery et al, 2018)

C2Hear: reusable learning objects (RLOs) → multimedia-based programme for hearing aid users



Participatory approach



C2Hear was clinically effective

- Evidence-based, randomised controlled trial (n=203)



knowledge



handling skills



self-management



hearing aid use



valued by users



self-efficacy

(Ferguson et al, Ear Hear, 2016; Gomez & Ferguson, Int J Audiol, 2019)

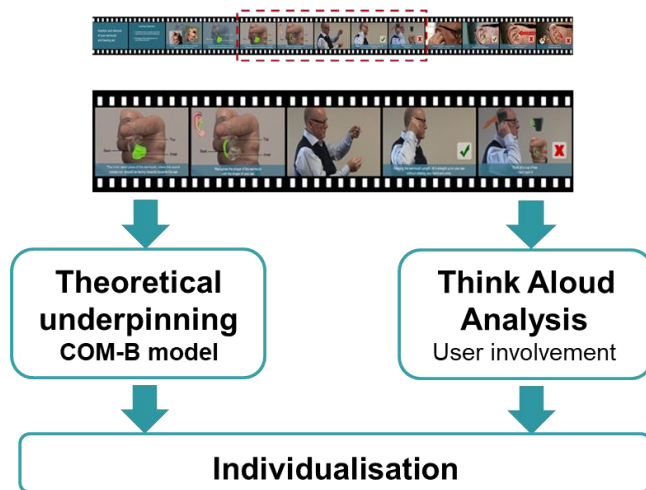
➤ Freely available multimedia RLOs on YouTube (>225k views) and standalone C2HearOnline.com

- Lots of positives but....
 - RLOs 5-8 minutes, too long
 - One size fits all
 - Limited interactivity



- To future-proof
 - Shorter
 - Individualise
 - Interactive

Individualised: tailored to meet user's specific needs (m2Hear)

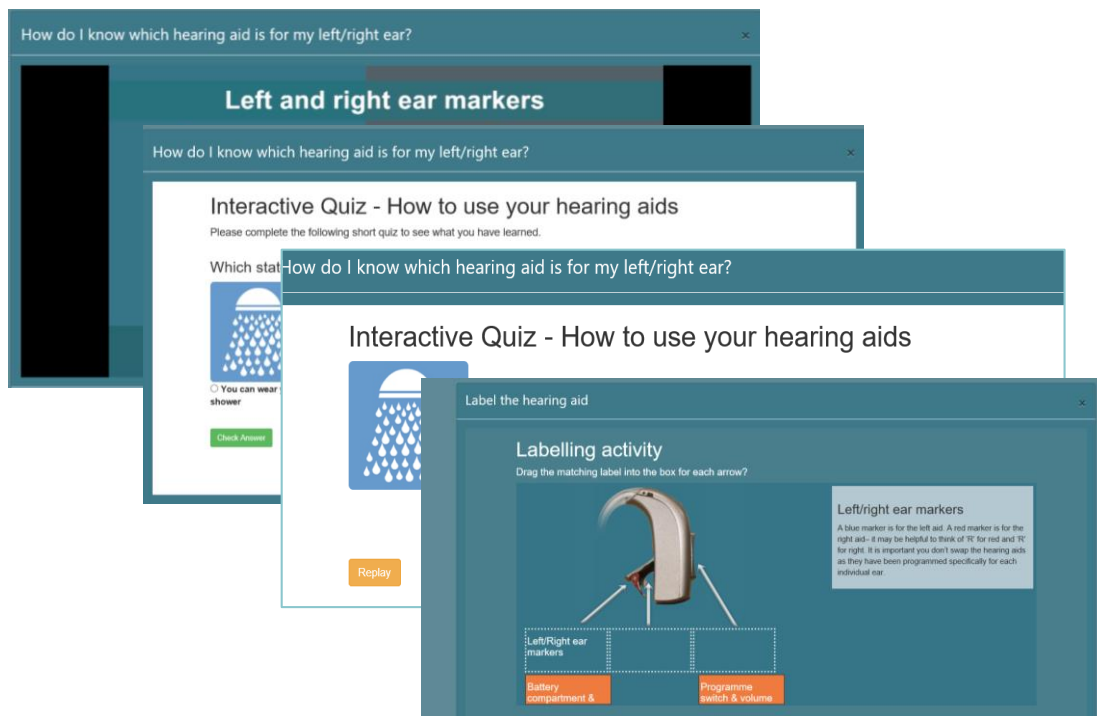
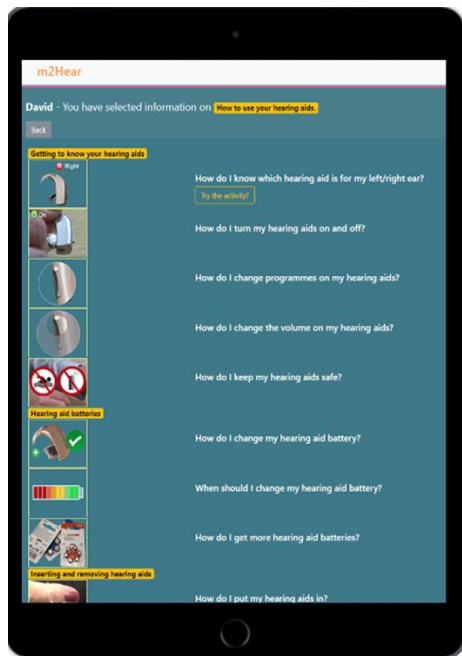


- 42 mRLOs
- Greater interactivity
- More activities



Access to individualised information to meet user's needs

How do I know which hearing aid is for my left/right ears?



5.1%



40.7%



35.6%



18.6%

Additional interactivity

How do I work with other to help me take part in conversations?

How do I work with others to help me take part in conversations?


Hearing problems and solutions activity

Here are some situations you might recognise with suggested solutions.


Activity: Drag which solution you think would be best to each problem.

✓ Helps communication


✗ Doesn't help communication




Face the person




Attract attention




Speak clearly




Be patient




Answering for others



Covering your face



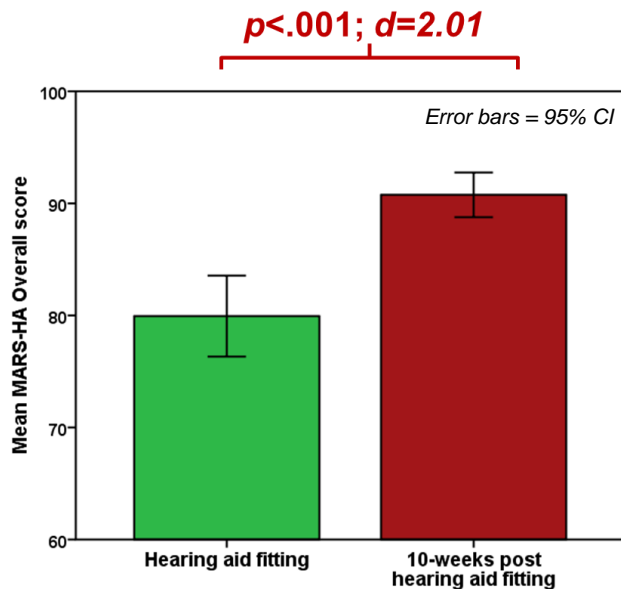
Shouting



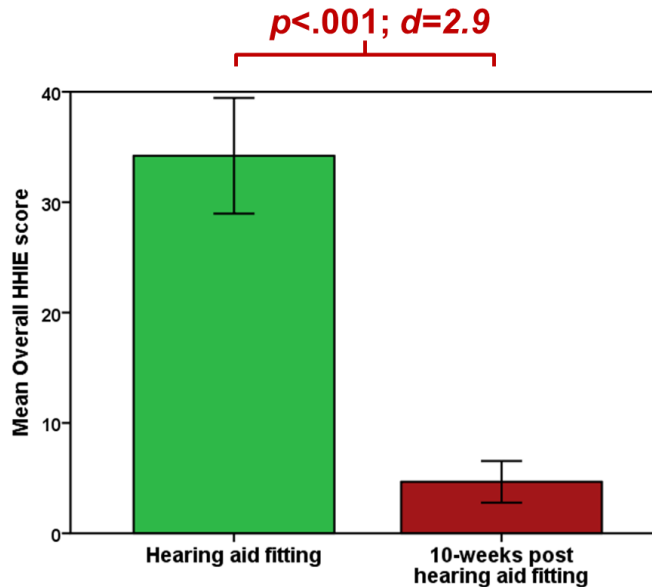
Talking from a different room

Self-efficacy for hearing aids and participation restrictions significantly improved

Self-efficacy for hearing aids (MARS-HA)



Participation restriction (HHIE)



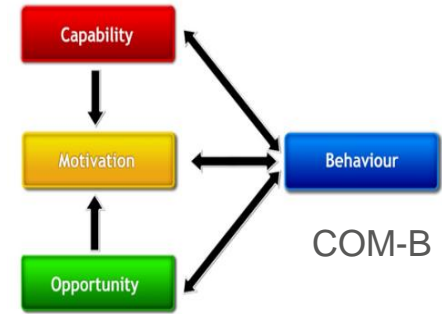
n=59 first-time hearing aid users

(Maidment et al, Int & Aud, 2019)

What the patients say

“I haven’t got to rely on anyone else...I’d rather be able to just do it myself”

“It’s [m2Hear] just really given me confidence – I feel I can cope with any situation now”



Capability

- Comprehensive, facilitating knowledge
- Concise, easy to retain
- Interactive, improved memory

Opportunity

- Better self-management
- Inclusive, shared with others
- Personalised, tailored to needs

Motivation

- Empowerment
- Greater self-efficacy
- Better coping
- Set expectations

Conclusion: hearing health education can benefit patients



- **Hearing aids became less difficult to use**
 - Practical hearing aid handling skills and self-efficacy for hearing aids significantly improved
- **Retention of information**
 - Knowledge of hearing aids and communication is significantly improved
- **Delivery through mhealth technologies is feasible**
 - m2Hear was used on mobile devices in around half of users
 - Adherence and ratings were high (92% and 84%)
 - Provided individualised, interactive learning that was beneficial
 - m2Hear was preferred to the original C2Hear
- **Self-management was improved**
 - Improved knowledge and self-efficacy → better self-management
 - Better self-management → improved social participation and reports of feeling empowered



Benefits of mhealth: summary



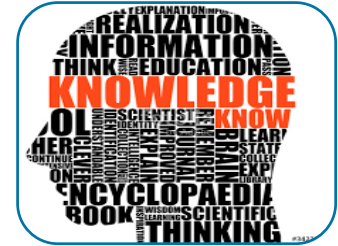
Increase access



Empowerment



Person-centred



Greater knowledge



User control



Self-efficacy



Self-management



New service models

Benefits of mhealth: empowerment



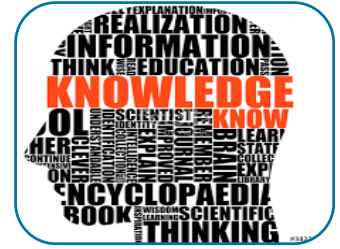
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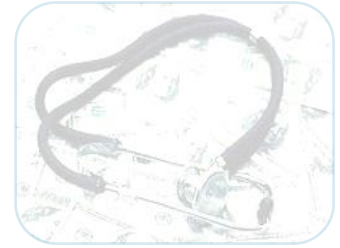
User control



Self-efficacy



Self-management



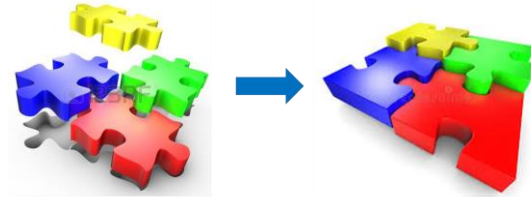
New service models

Empowerment: conceptualising empowerment



Harnessing the power of mhealth technologies: clinical implications

- Smartphone-connected hearing aids
 - enable greater user-control
 - encourage audiologists and their patients to use smartphone connectivity
 - Empowerment, less fatigue and stigma
- Hearing health knowledge
 - cornerstone of self-management and empowerment
 - importance can often be overlooked
 - delivered along the pathway
 - Improved hearing aid handling skills, self-efficacy, use, participation
- mhealth technologies can empower patients and lead to better patient outcomes



New service models

What will hearing healthcare look like in 5 years?

Thanks to...



NIHR Nottingham Biomedical Research Centre
Mild to moderate hearing loss team
David Maidment
Rachel Gomez
Alia Habib



Nottingham Audiology Services
Claire Benton



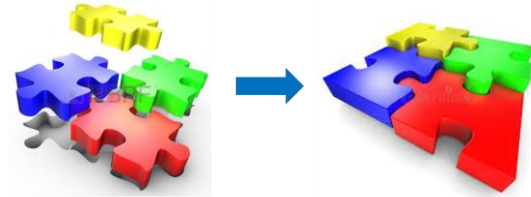
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Neil Coulson



Nicola Hildebrand
Marius Beuchart
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Harnessing the power of mhealth technologies: clinical implications

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