

Knowledge is power:
using eAudiology to improve hearing-related
knowledge for
patients, partners and professionals

Melanie Ferguson, PhD
NIHR Nottingham Biomedical Research Centre
Nottingham, UK

Overview



- Introduction: hearing-related knowledge is poor
- Participatory approach to eHealth education (C2Hear)
- Evaluation of C2Hear for patients
- Research into practice
- Including others: partners and professionals
- Development and evaluation of individualised learning

Self-management of long-term conditions enhances healthcare



- Those who take an active role in their care are more likely to adopt better health behaviours and have better outcomes

(Mosen et al, 2005)

- Provision of education to improve knowledge
- Strategies to support adherence to treatment
- Tailoring of practical support
- Social support e.g. partners, peers, professionals

(Taylor et al 2014)

- Audiology: knowledge exchange and patient education
→ self-management and patient-centred care
- NICE guidelines on hearing loss recommend that good quality information is provided to patients and their family

(Grenness et al, 2016; Barker et al, 2016; NICE 2018)

Question

If you are an audiologist

- How confident are you that the information and advice you offer your first-time hearing aid patients is
 - understood
 - absorbed
 - and then acted upon

once they leave the comfort of your clinic room?



Delivery and retention of information in new hearing aids users is poor



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

51% found difficulties using aid at first

(AoHL Hear Me Out, 2011)

25% of information at fitting forgotten 6 weeks later: closed set

(Reese & Hnath-Chisolm, 2005)

Retention of information in first-time hearing aid users after 6 weeks, free recall

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

(El-Molla et al, BAA, 2012)

Knowledge of all things hearing is poor

- Patients, public, practitioners
 - Experienced hearing aid users
 - hearing aids and how to use them - poor to excellent *(Desjardin & Doherty, 2009)*
 - 60-80% did not know how to use the telephone *(Goggins & Day, 2003)*



Hearing aid non-use

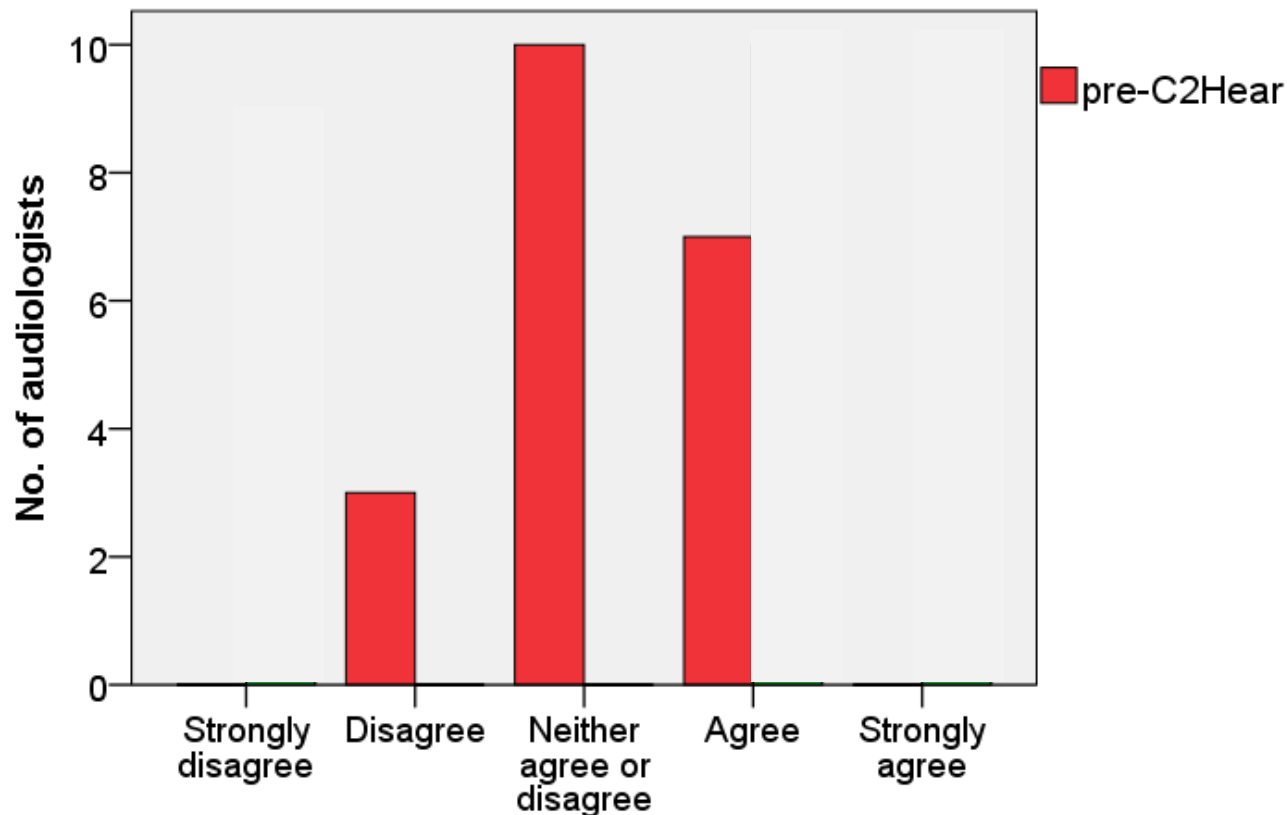
Costs: financial - individual and healthcare systems
person with hearing loss = communication difficulties
→ reduced social interaction → poorer QoL

- Health context
 - better knowledge increases patient satisfaction and treatment compliance *(Murray et al, 2005)*
- 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)

Question to audiologists:

I am confident that the information given is remembered and acted upon by my hearing aid patients



- Only one-third reported they were confident

(Hajat, 2016)

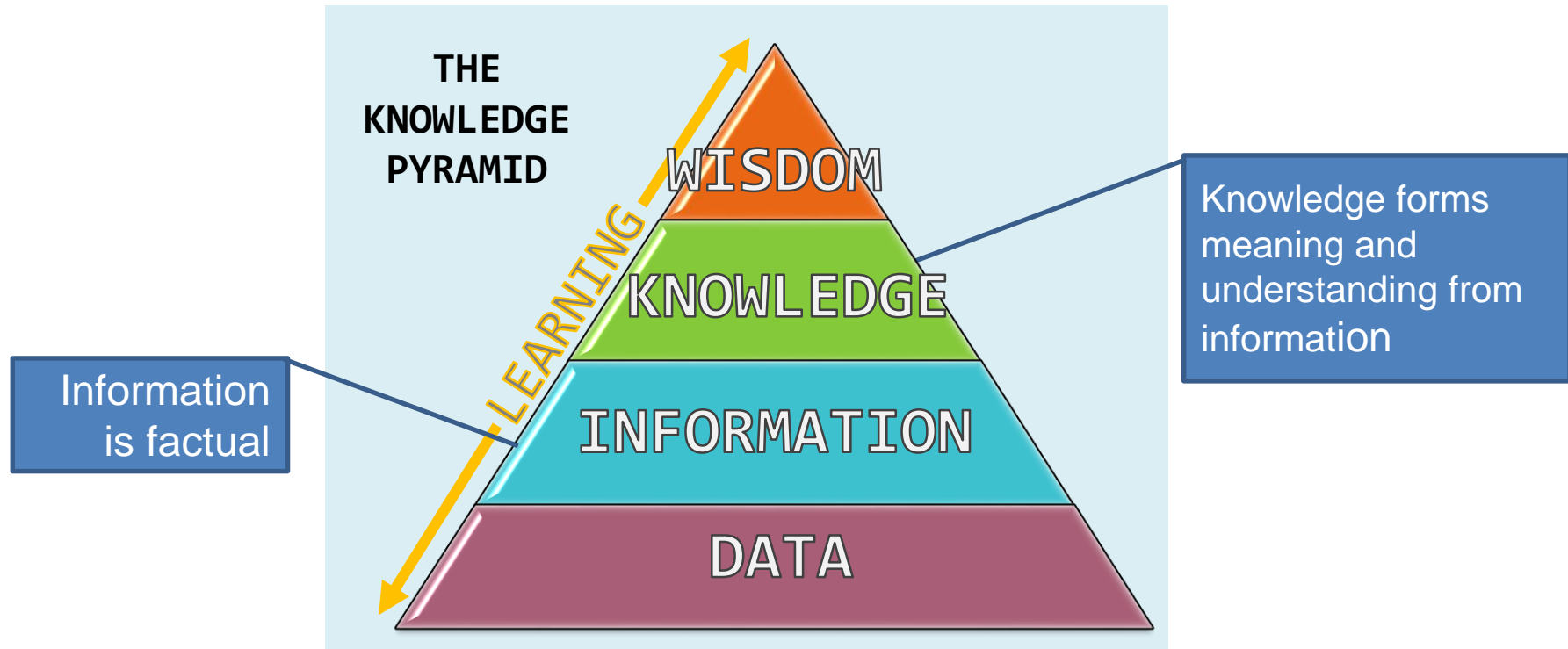


Remote delivery of supplementary information and advice to patients

- Home-communication program – video tapes
(Kramer et al, 2005)
- Education program
(Lundberg et al, 2011)
 - written, telephone follow-up
 - internet delivery, email feedback
(Thoren et al, 2011, 2014;
Malmberg et al, 2017)
- I-ACE (Individualised Active Communication Enhancement)
(Hickson et al, 2007)
- One-way delivery of information is not the same as educating the patient to increase their knowledge base
(Boothroyd, 2007)



Learning requires more than just giving information



Constructivist learning theory

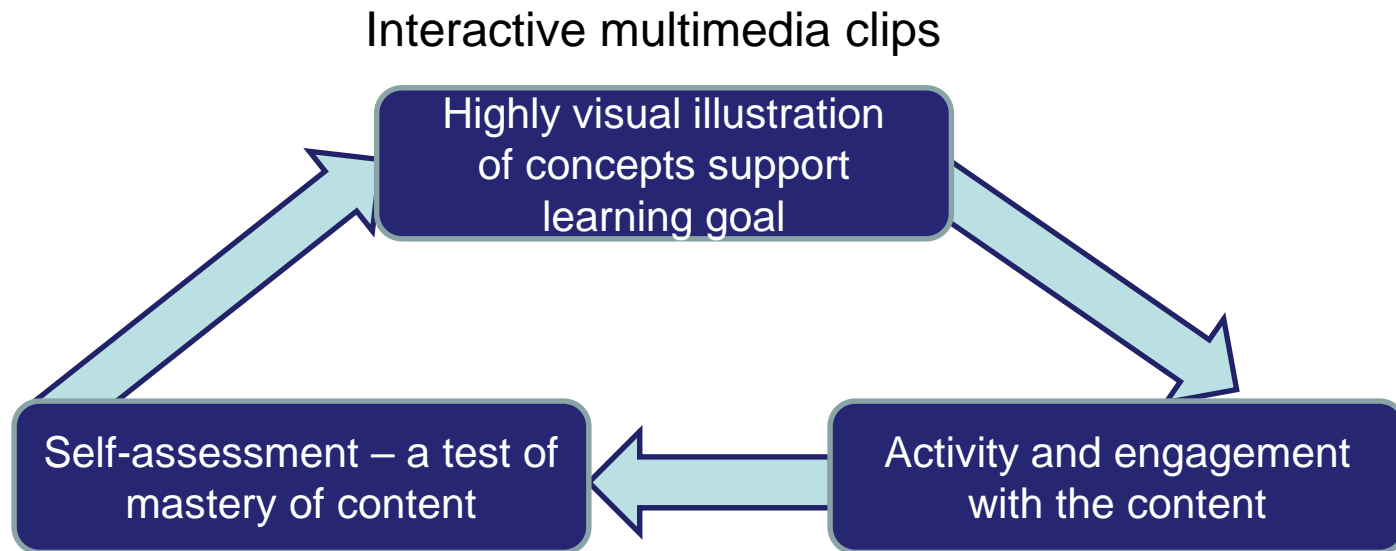
Promotion of learning occurs when:

- learners construct an internal representation by taking an active role
- interactivity with learning materials is high

(Zhang et al, 2006)

Re-usable learning objects (RLOs)

Commonly used in eLearning environments



- Participatory approach → high quality materials aligned to the user's needs
- Improve motivation and compliance with health treatments

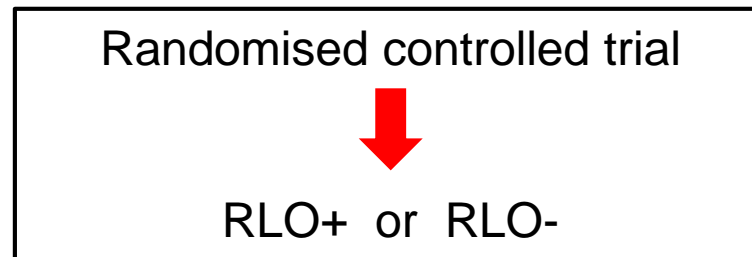


The University of
Nottingham

HEAR-IT study

Q: Do video tutorials (or RLOs) *supplement* advice and information provided by audiologists and result in enhanced benefit and use for hearing aid users?

1. To *develop* a series of reusable learning objects (RLOs)
 - range of auditory rehabilitation subjects
 - accessible to hearing aid users and their families
2. To *evaluate* the benefits and cost-effectiveness of the RLOs



Research for Patient Benefit

inspired by patients and practice

Participatory approach to developing eHealth education



Participatory approach: to identify content

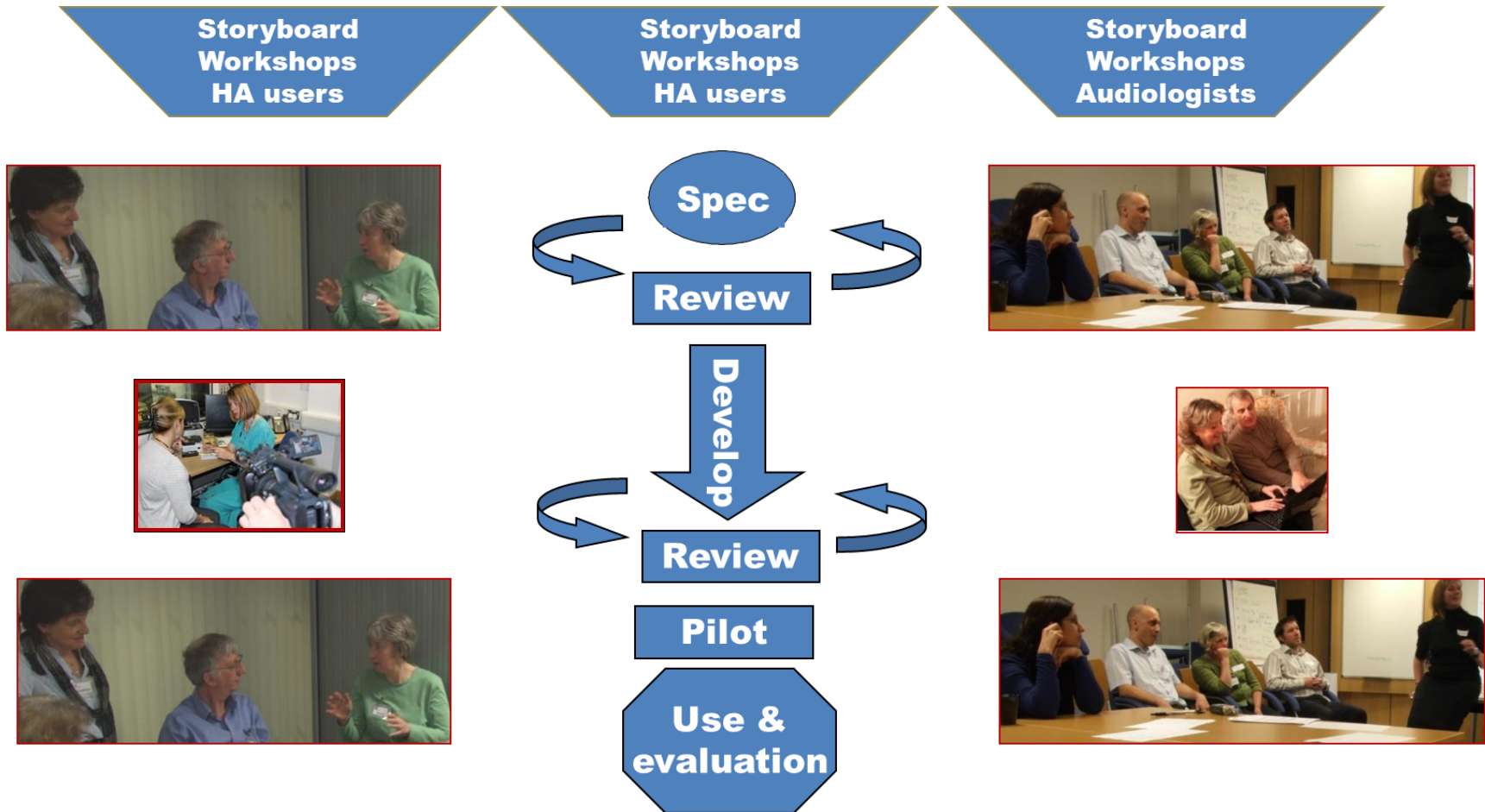


Consensus
n=33 Hearing
Healthcare
professionals

n=33 hearing aid users
n=11 audiologists



Participatory approach: to develop RLOs

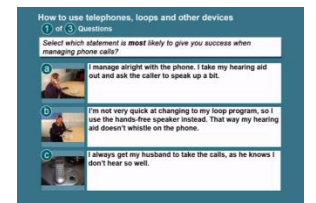


(Ferguson et al, Int J Audiol, 2018)

Based on educational principles

Each reusable learning object (RLO) has:

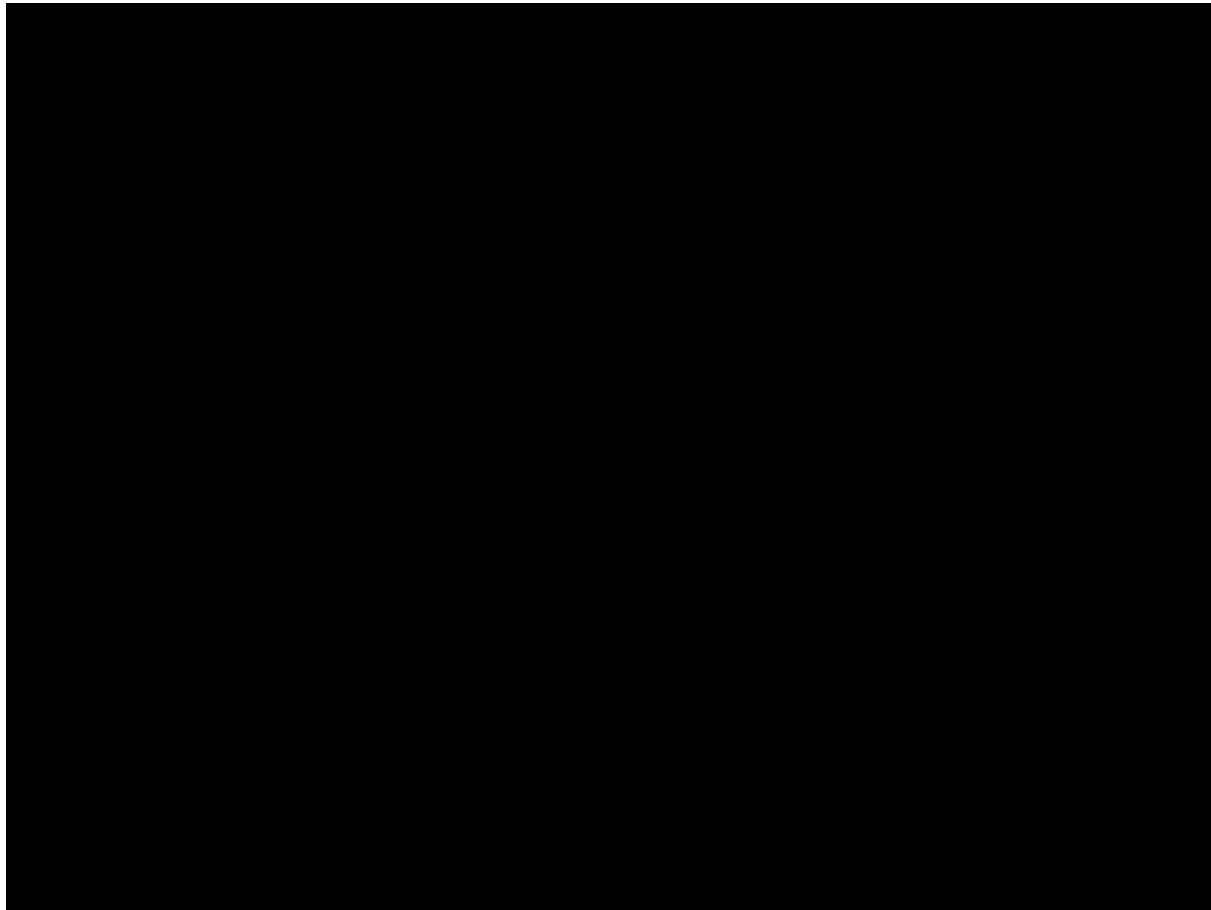
- Learning outcomes
- Subtitles
- Reinforcement and consequences
- Variety of images
 - Photos, animations, videos, patient testimonials
- Interactive quiz
- Problems? go back to audiology



(Ferguson et al, Int J Audiol, 2018)

Acclimatisation: demonstration of the concept

Learning outcome: be aware of how you adapt to listening with your hearing aids



Based on educational principles

Each reusable learning object (RLO) has:

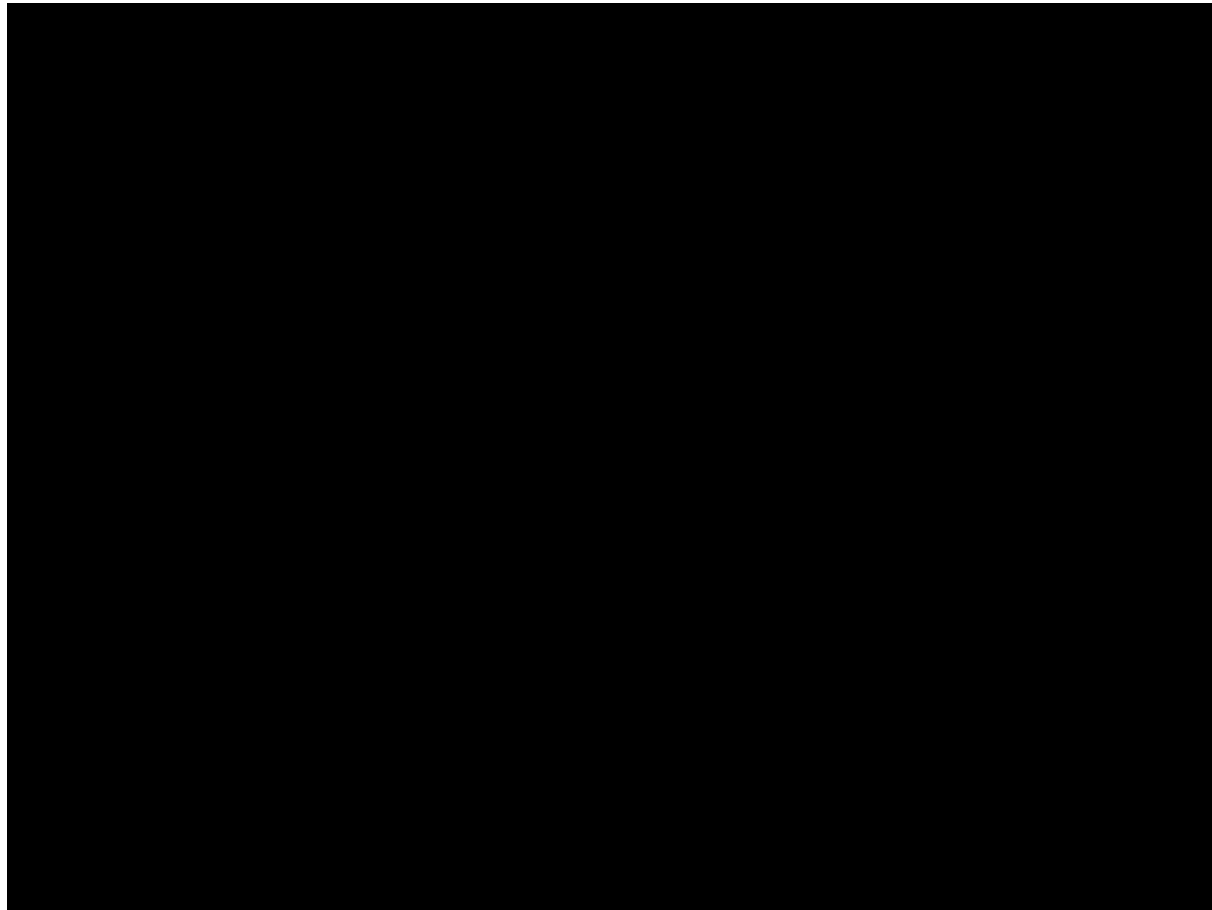
- Learning outcomes
- Subtitles
- Reinforcement and consequences
- Variety of images
 - Photos, animations, videos, patient testimonials
- Interactive quiz
- Problems? go back to audiology



(Ferguson et al, Int J Audiol, 2018)

Hearing aid insertion

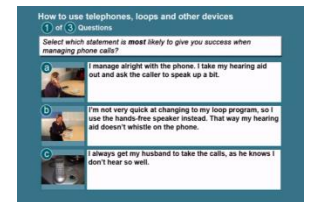
Reinforcements and consequences: “recognise the shape of your earmould with the shape of your ear”



Based on educational principles

Each reusable learning object (RLO) has:

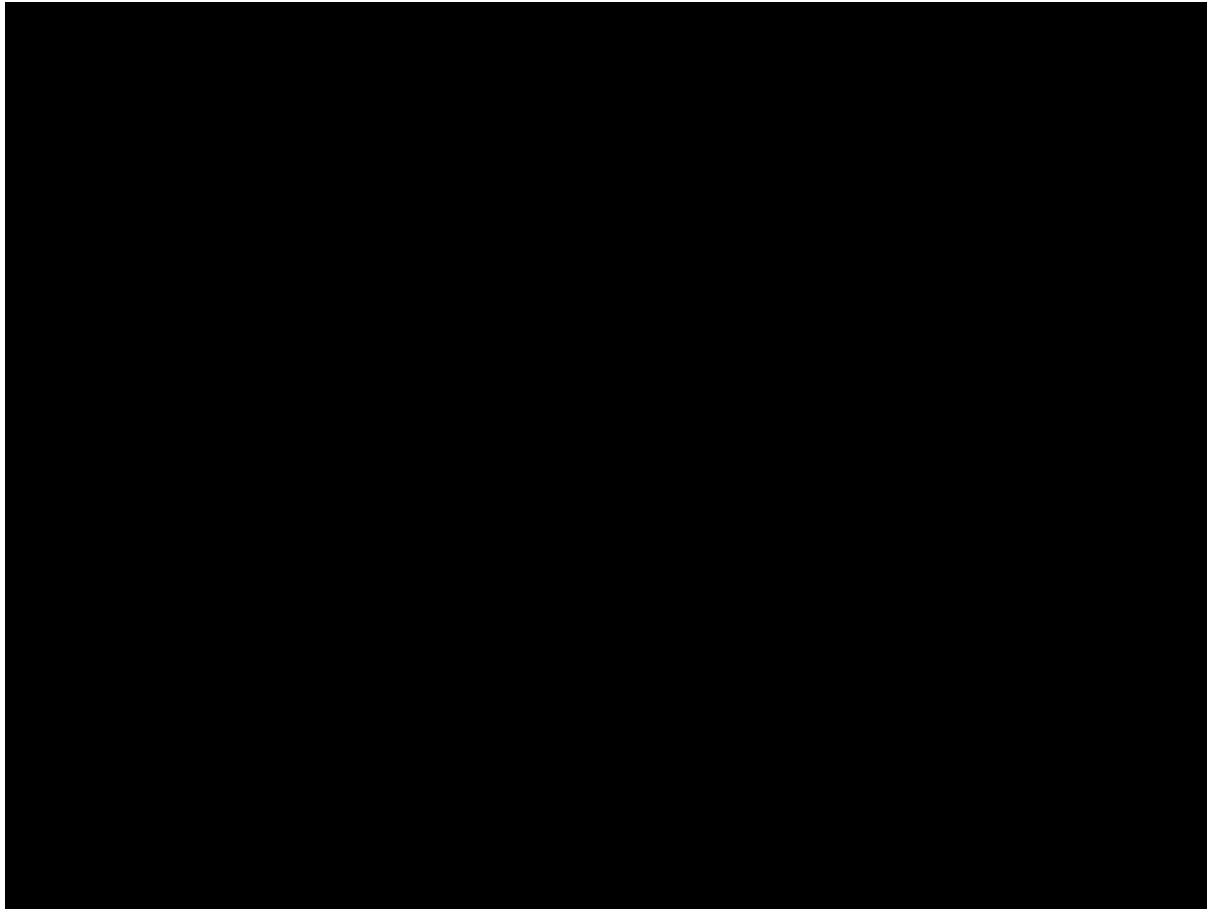
- Learning outcomes
- Subtitles
- Reinforcement and consequences
- Variety of images
 - Photos, animations, videos, patient testimonials
- Interactive quiz
- Problems? go back to audiology



(Ferguson et al, IJA, 2018)

Testimonials: communication partners

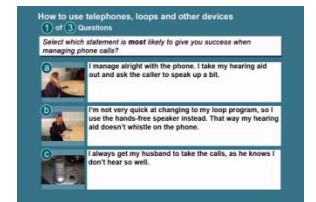
“hearing loss is not visible in anyway”



Based on educational principles

Each reusable learning object (RLO) has:

- Learning outcomes
- Subtitles
- Reinforcement and consequences
- Variety of images
 - Photos, animations, videos, patient testimonials
- Interactive quiz
- Problems? go back to audiology



(Ferguson et al, IJA, 2018)

Interactive quiz: Q&A

2 of 2

Select the statement: that is the **correct** action if you experience pain or discomfort from your earmould

a



Continue to wear the hearing aid despite the pain.

b



Contact Audiology- there may be a problem with the fitting of the earmould.

c



Give up wearing the hearing aid.

Interactive quiz: additional tips

2

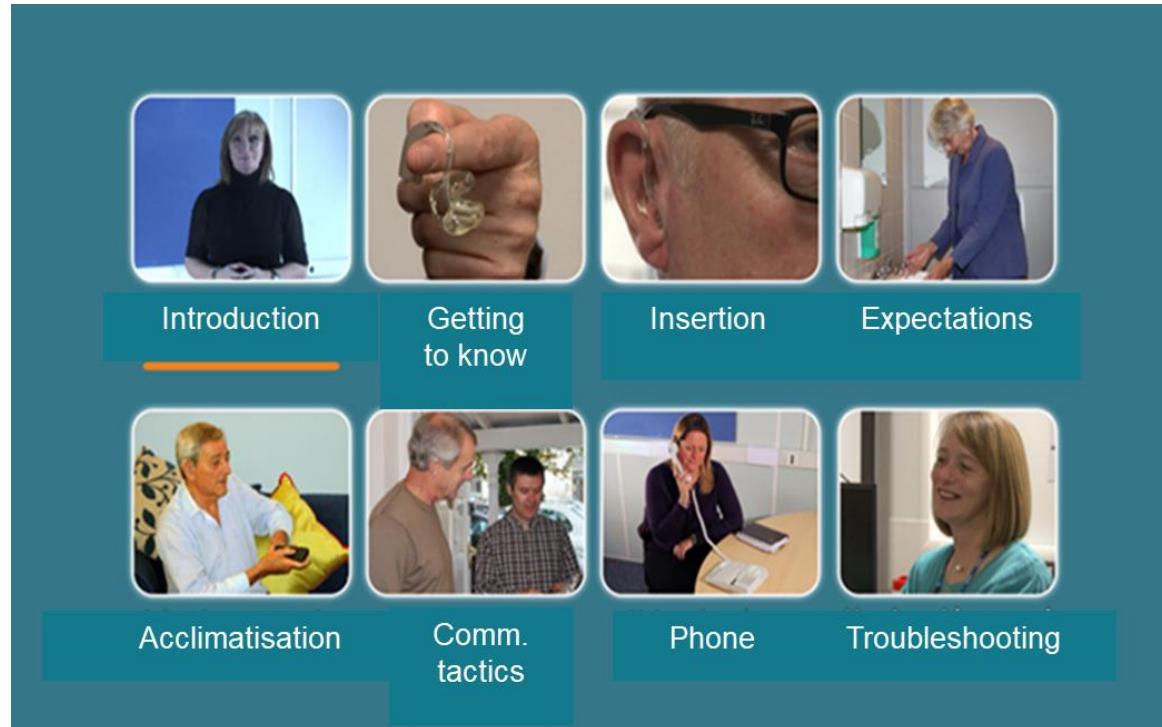


The correct answer is **b**

The earmould may feel strange to begin with, however there should be no pain or discomfort.

The audiologist may need to re-shape the earmould or re-instruct you.

The final product and it's delivery



51%



15%



33%



	50-54 yo	70-74 yo
PC use	85%	36%
Internet use	66%	17%

(Henshaw et al, J Med Int Res, 2012)

Evaluation of interactive multimedia RLOs



Evaluation of effectiveness (RCT) n=203

Take-up and adherence



Self-management



HA knowledge & skills



HA use



Valued by users



Health economics



(Ferguson et al, Ear Hear, 2016)

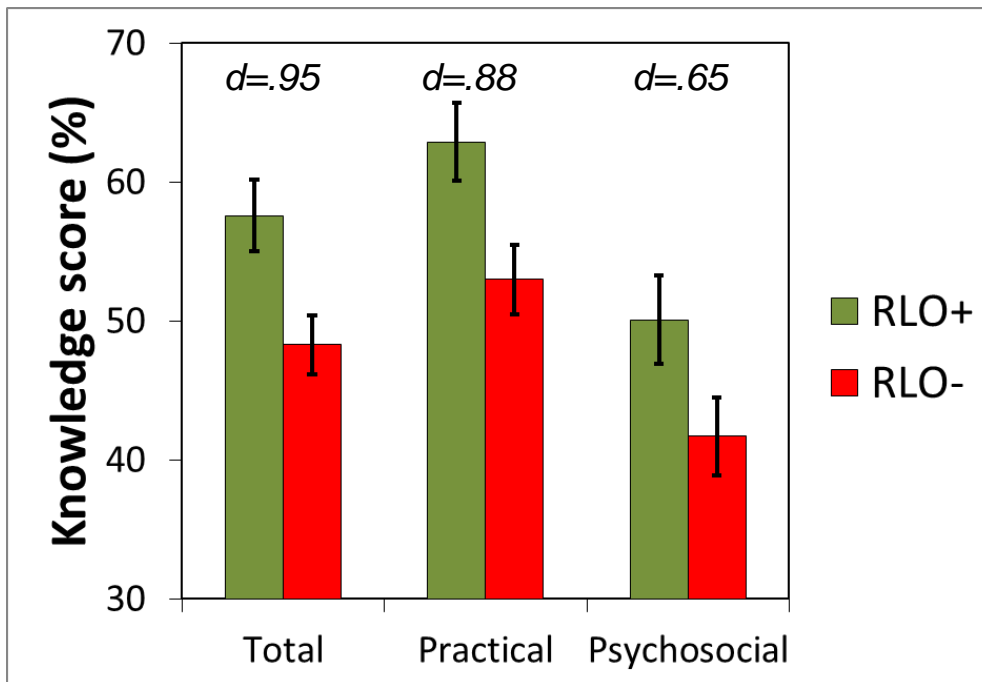


(Ferguson et al, Ear Hear, 2016)



RLO+: better knowledge of hearing aids and communication

20 item questionnaire; free recall 6 weeks post-fitting



Error bars = mean +/- 95% CI

Highly significant effect of group

- total, practical, psychosocial ($p < .001$)
- generally large effect sizes

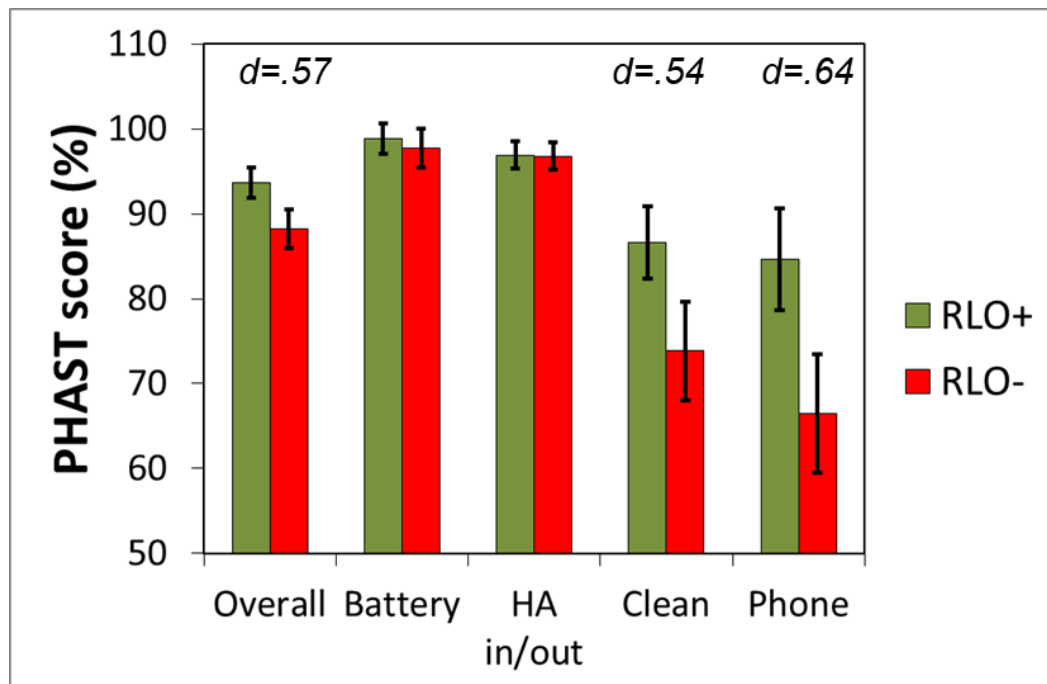
E.S. Cohen's d
 ≥ 0.8 large
 ≥ 0.5 moderate
 ≥ 0.2 small

(Ferguson et al, Ear Hear, 2016)



RLO+: better practical hearing aid handling skills

Practical Hearing Aid Skill Tasks: 18 items



Error bars = mean +/- 95% CI

Highly significant effect overall ($p < .001$)

- earmould clean and phone use ($p < .001$)
- moderate effect sizes

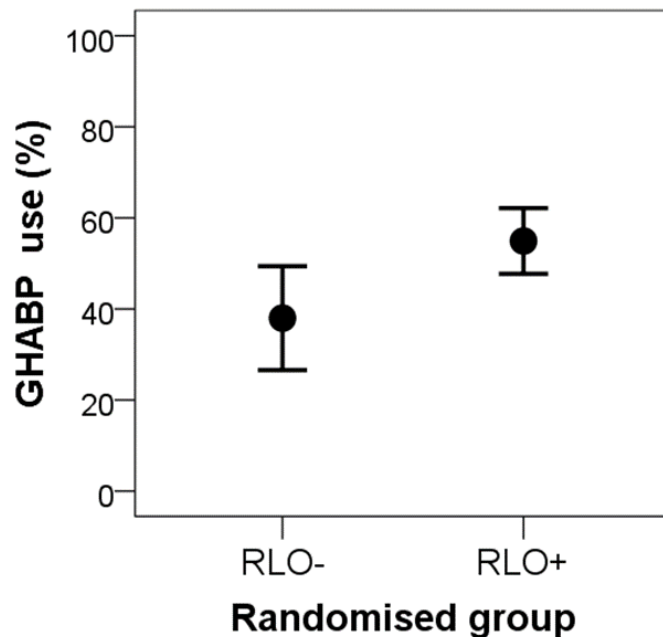
E.S. Cohen's d
 ≥ 0.8 large
 ≥ 0.5 moderate
 ≥ 0.2 small

(Ferguson et al, Ear Hear, 2016)



RLO+: hearing aid use greater in those who do not wear them all the time

Glasgow Hearing Aid Benefit Profile: 4 situations



Use < 70%

- Significant effect ($p < .05$)
- 15% difference
- $d = .88$ large effect size

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

No effect on outcomes for benefit, satisfaction, anxiety, depression

(Ferguson et al, Ear Hear, 2016)



Positive feedback on RLOs



• Gave me confidence to use HAs and communicate	83%	2%
• If I had a problem I would refer back to RLOs	93%	5%
• Quiz was valuable to show me what I'd learned	86%	2%
• Prefer RLOs to written information	83%	7%

(Ferguson et al, Ear Hear, 2016)

RLOs are effective

Take-up and adherence

Take-up = 78%
94.3% watched all RLOs

Self-management

2+ times = 49.9%
Re-use suggested self-management

HA knowledge & skills

Better knowledge on HAs and communication & HA handling skills

HA use

Greater use (GHABP) in suboptimal users

Valued by users

Rated RLOs as highly useful (9/10)
Improved confidence
Preferable to written info

Health economics

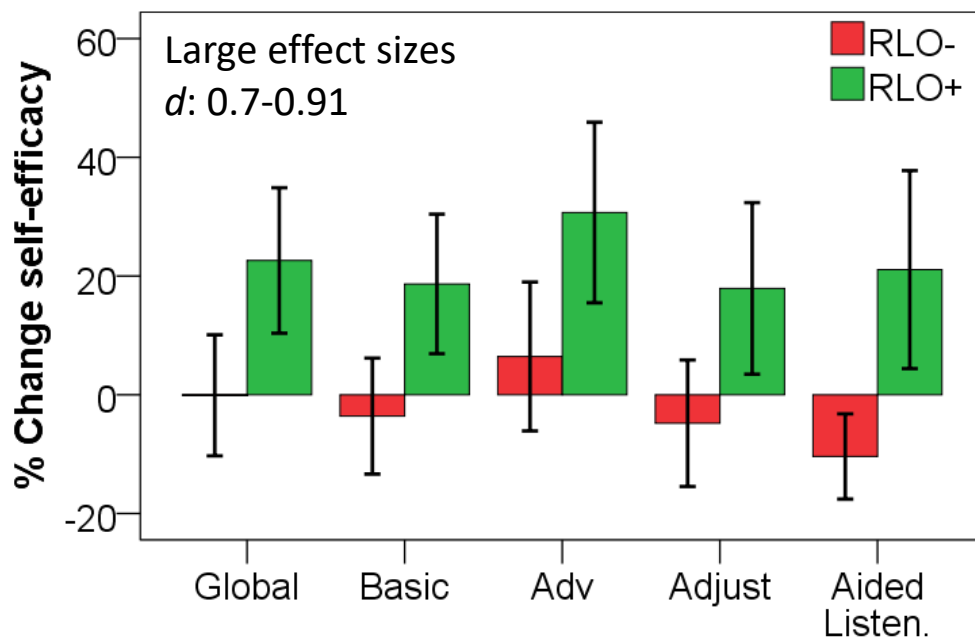
RLOs were a very effective and cheap healthcare intervention

(Ferguson et al, Ear Hear, 2016)



Early delivery improves self-efficacy

Measure of Audiological Rehabilitation for Self-efficacy for Hearing Aids (MARS-HA): 20 items



RCT, n=47
First-time hearing
aid users

- Early delivery of C2Hear 'primes' patients for their hearing aid fitting

(Gomez & Ferguson, in prep)

Underlying processes

Contextual factors

- Anything external to the intervention that informs why the intervention works

Greater hearing aid self-efficacy predicted:

- Greater use
- Reduced emotional consequences of hearing loss (e.g. anxiety)
- Greater hearing aid handling skills and knowledge

Causal mechanisms

- Also known as mechanisms of impact, refers to how the intervention elicits its effects

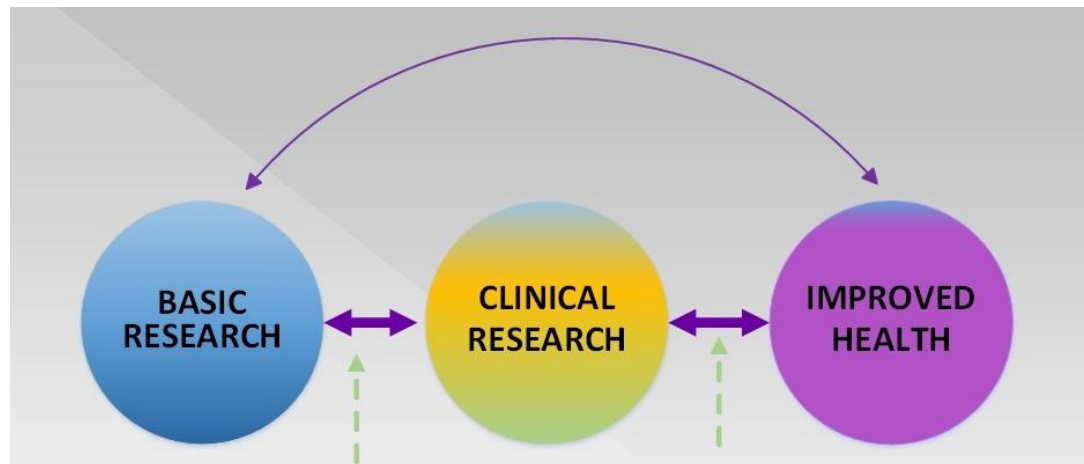
Improved hearing aid handling skills and knowledge led to:

- Greater use, benefit and satisfaction
- Reduced emotional consequences of hearing loss (e.g. anxiety)
- Increased patient activation

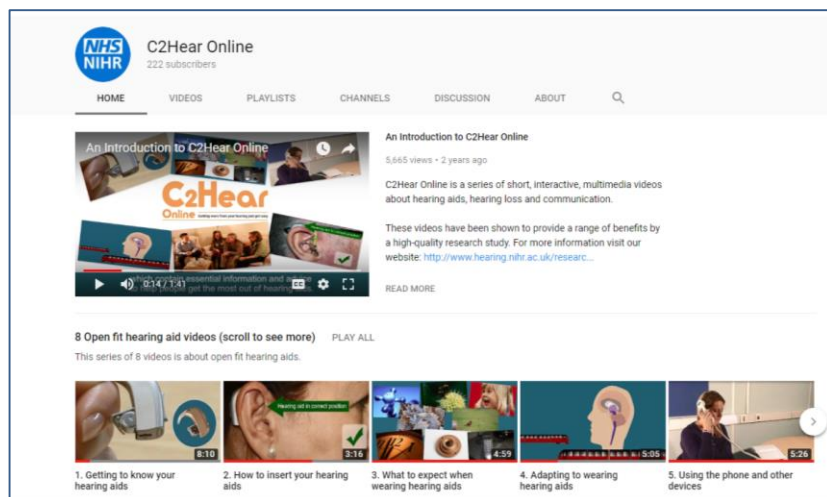
(Maidment et al, Int J Audiol, submitted)

(Process evaluation of complex interventions: Medical Research Council guidance. Moore et al. BMJ, 2015)

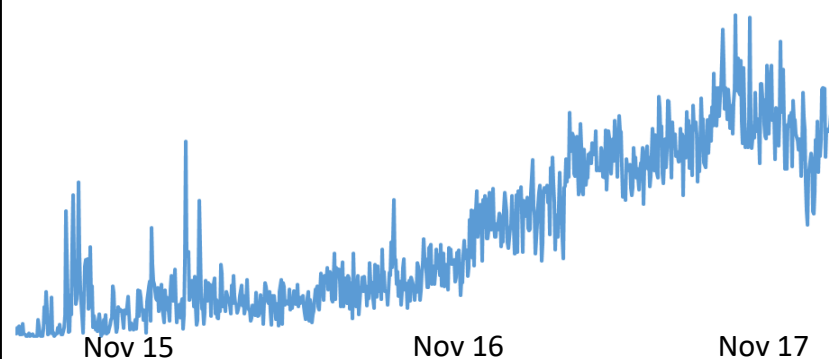
Research into practice



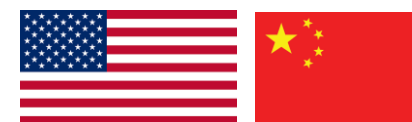
Getting C2Hear out there



>130,000 unique views



- 4x increase in second year, ~6000/month
- Views from >50 countries: 38% UK 38% N America
- Used in UK audiology departments, on ~30 websites
- Included in national guideline documents
- Research Impact awards



British Society of Audiology
KNOWLEDGE | LEARNING | PRACTICE | IMPACT



NICE
National Institute for
Health and Care Excellence

Just google 'C2Hear Online' and select 'YouTube' option

What the end-users say

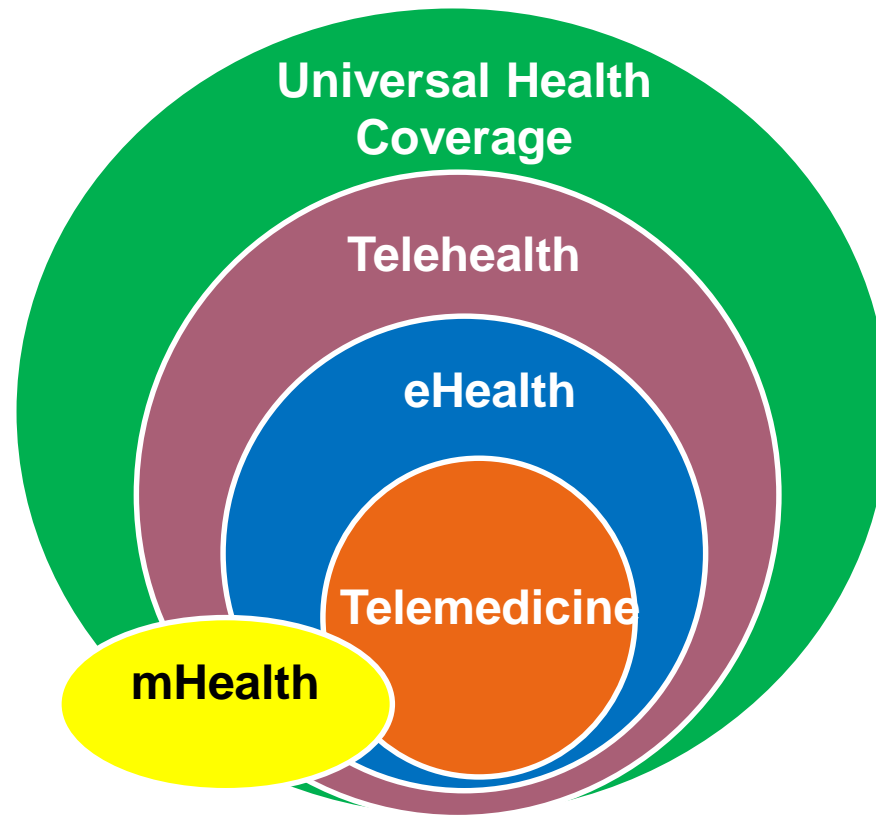
“if it wasn’t for the DVD I would have stopped wearing my HAs”

“some were in 2 minds if they wanted HAs..... were reassured and referred themselves”

“some have undertaken repairs at home reducing need to attend the drop-in clinic”

“it’s a fab thing you have done”

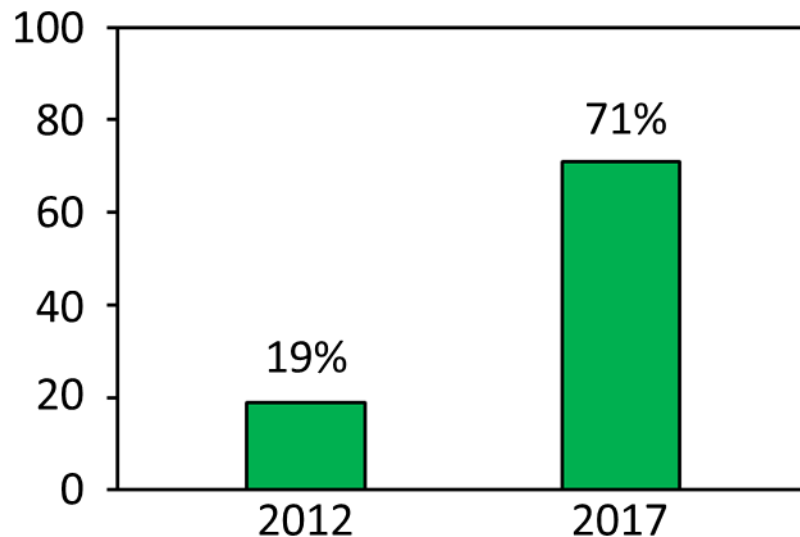
What is mHealth?



- Delivers healthcare by mobile technologies
- A subgroup of telehealth, ehealth and telemedicine

Mobile technology use is increasing in older adults

Smartphone ownership in 55+ year olds



	2014	2016	Increase (%)
All adults	66	72	9
55-64	49	59	20
65-74	26	39	50
75+	7	15	115

(Deloitte, 2017)

Internet-smartphone mode of delivery (mHealth): benefits

Overcome barriers
time, mobility, geography



Greater accessibility

Easy access and convenience



Empowerment

Personalised tailored information to
meet individual's needs



Better knowledge and
understanding

Interactive, enabling self-monitoring
and self-evaluation



Greater engagement and
self-management

Social network opportunities



Increase social support

Limited healthcare resources



Low cost, high volume,
new service delivery models

Training healthcare workers



Increase awareness of hearing loss

and more.....

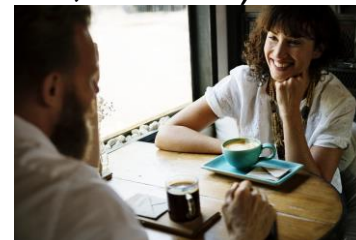


Including others: partners, professionals



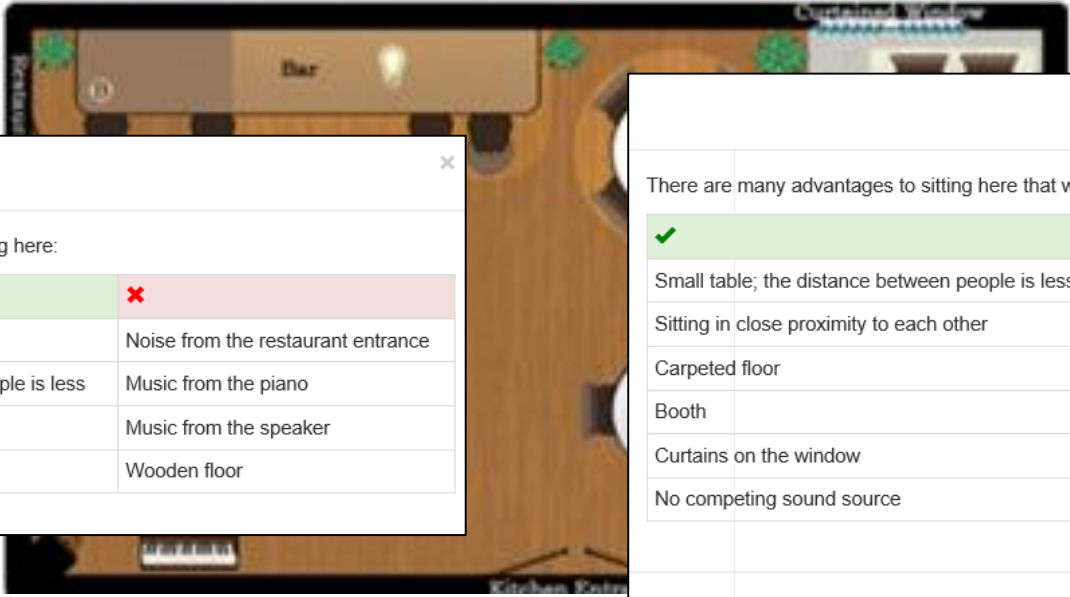
mRLOs for communication partners

- Support and involvement from others improved outcomes (Scarinci et al, 2008)
- Aligned coping strategies between people with hearing loss and their family and friends → positive effect and improved outcomes (Barker et al, Int J Audiol, 2017)
- Focus groups suggested that CPs would value information *relevant to them* (Ferguson et al, Ear Hear, 2016)
- Repurposed Communication Tactics RLO for ‘others’
 - Designed specifically for mobile-technologies (e.g. smartphones, tablets)
 - Added more activities



Additional activities I

Controlling the environment – restaurant



There are some disadvantages to sitting here:

✓	✗
Plenty of light	Noise from the restaurant entrance
Small table; the distance between people is less	Music from the piano
Sitting opposite each other	Music from the speaker
	Wooden floor

There are many advantages to sitting here that would make conversation easier:

✓
Small table; the distance between people is less
Sitting in close proximity to each other
Carpeted floor
Booth
Curtains on the window
No competing sound source

Choose the best location to hear conversation as well as possible

Additional activities II

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

Joint-working between partners



Think aloud and video analysis

(Henshaw et al, BSA, 2017)

Greatest impact for joint-working

- Increased CP's hearing-related knowledge, and highlighted difficulties faced by the PHL

"I expected the hearing aids to bring his hearing back to normal... I understand better now" (CP)

"It's rather nice for them to fully appreciate [the challenges]" (PHL)

- Prompted novel discussions about challenging everyday communication situations

"I never thought about that...out in traffic... Did you hear me?" (CP)

"When I'm at the golf club it's terrible, when you get 12 people around the table" (PHL)

- CPs would change their behaviour to help improve communication based on their learning

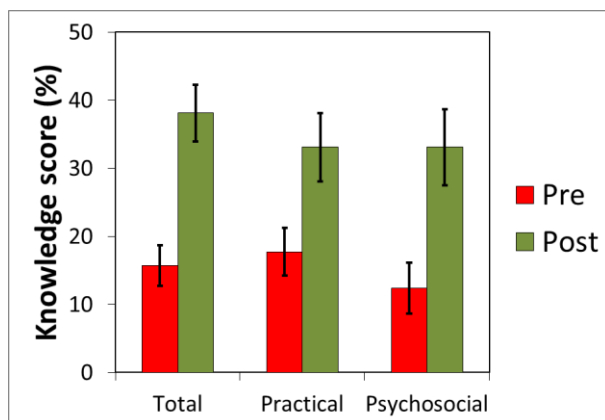
"That's what we shall look for [a quiet restaurant table]" (CP)

"We are both on the same wavelength, we can look for it now" (PHL)

(Henshaw et al, BSA, 2017)

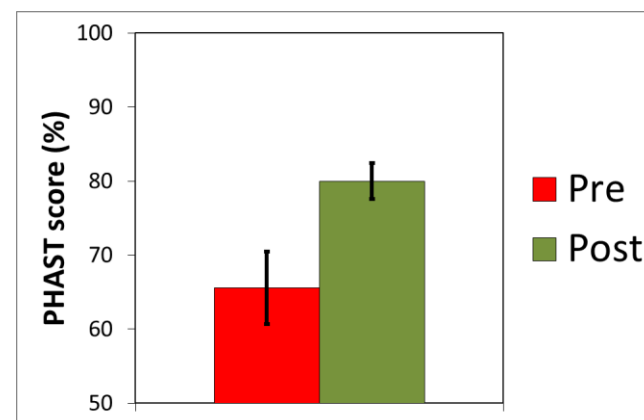
Residential carehome staff: knowledge and practical hearing aid skills improve

n = 25 care home staff
n = 3 homes



Knowledge of hearing aids and communication

Significant pre-post improvement $p < .001$; $d = 3.6$



Practical hearing aid skills

Significant pre-post improvement $p < .001$; $d = 3.3$

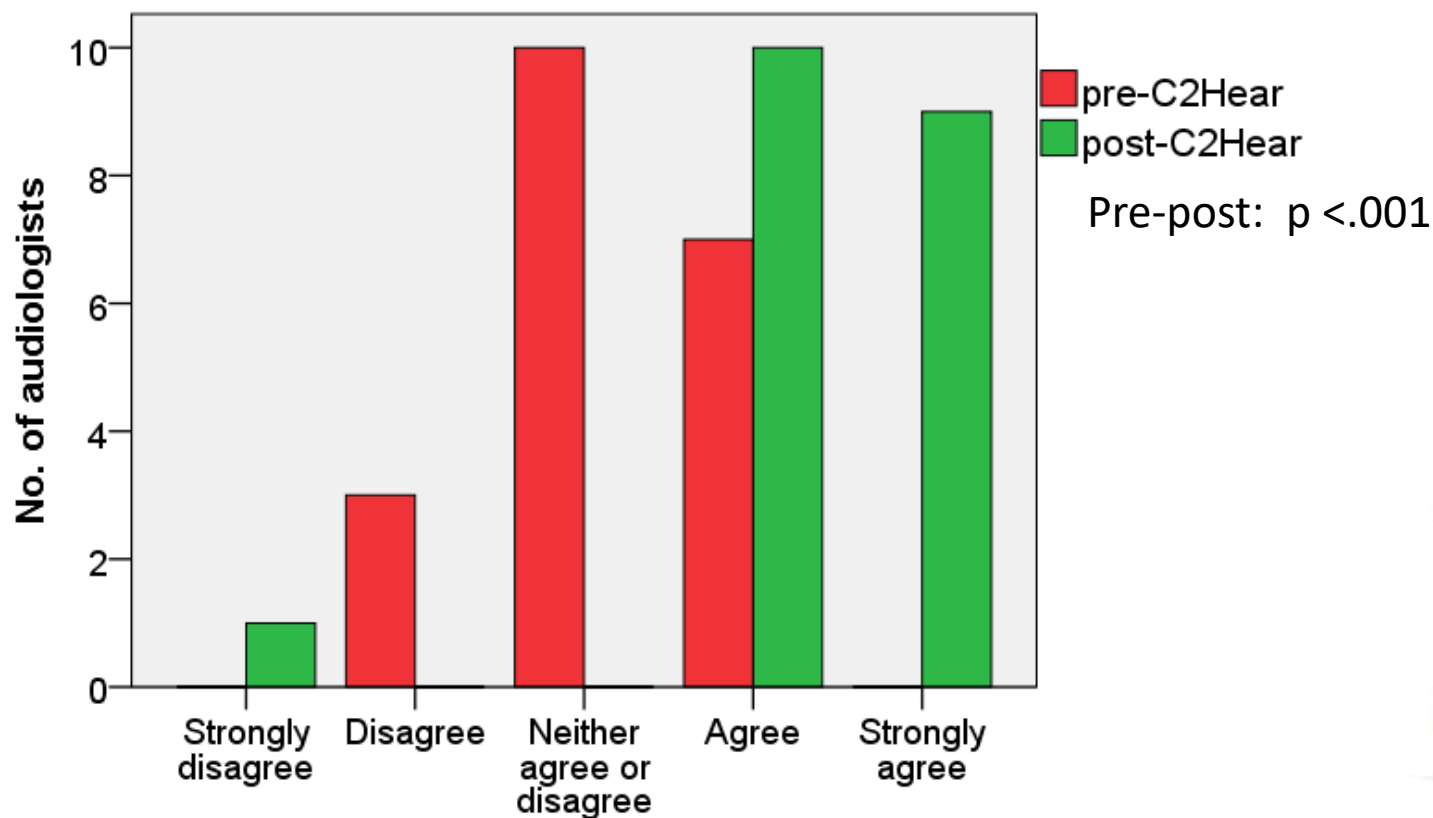
“This should be made mandatory at induction with annual refresher sessions”

“Awareness of hearing aids has definitely gone up with all of us”

(Rocks & Ferguson, BAA, 2013)

Question to audiologists:

I am confident that the information given is remembered and acted upon by my hearing aid patients



- Vast majority were more confident

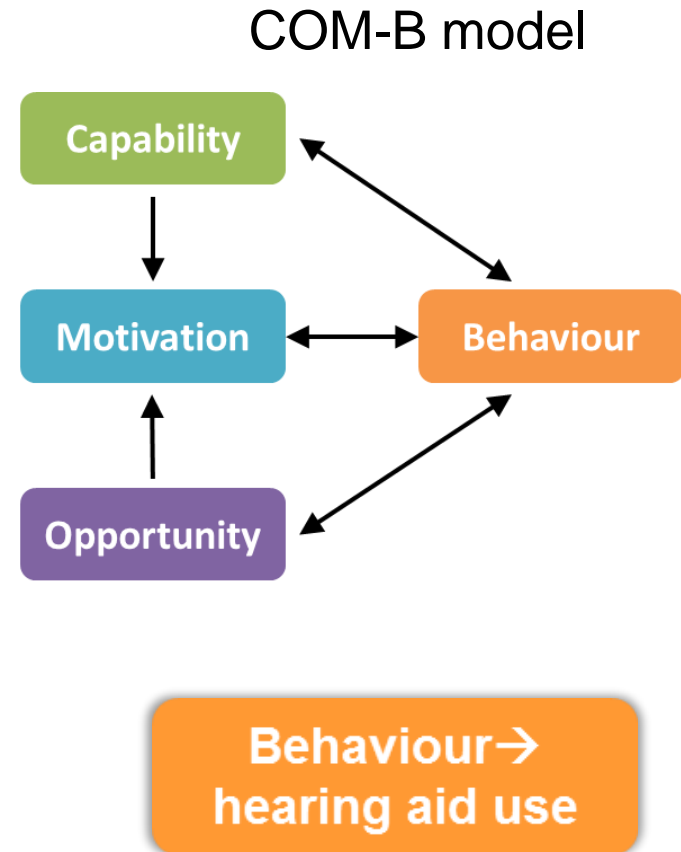
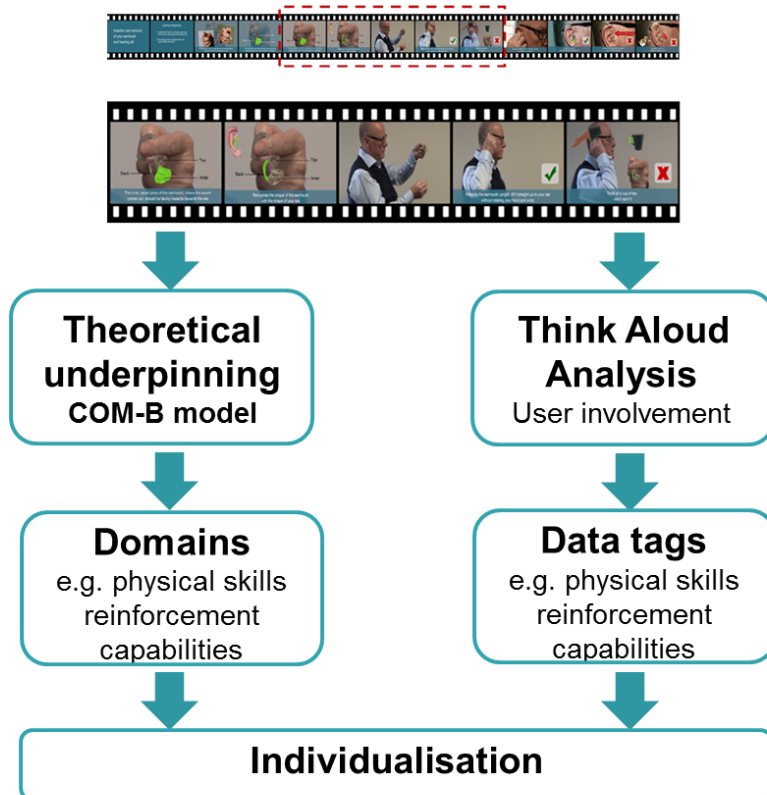
(Hajat, 2016)



mRLOs tailored for hearing aid users (m2Hear)



Phase 1: Development of m2Hear

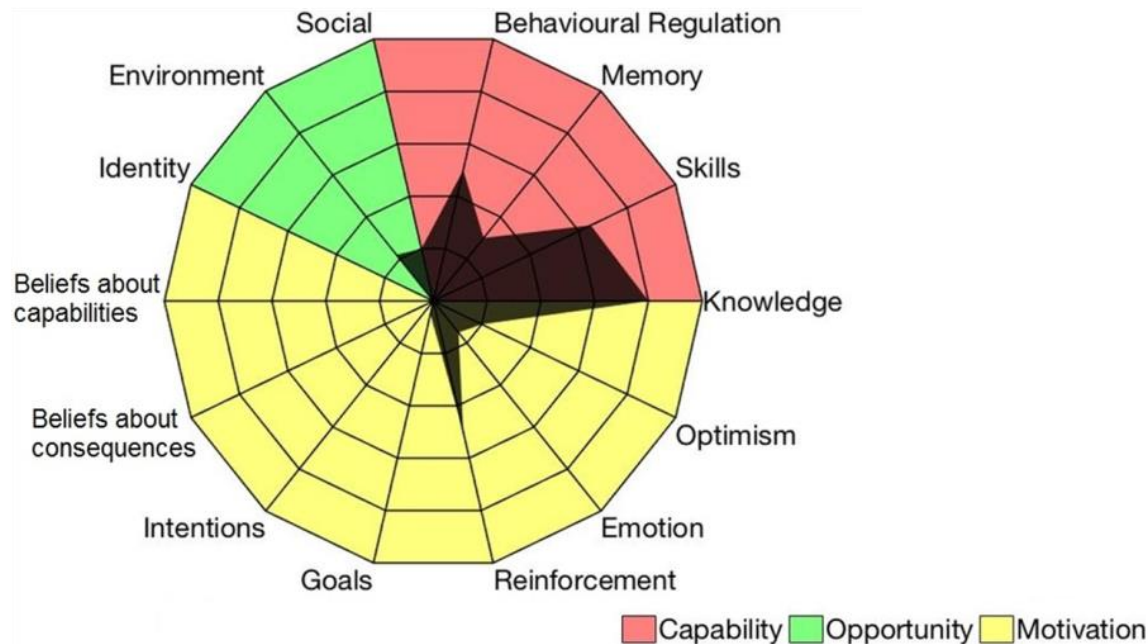


(Michie et al., 2011)

‘Active ingredients’ of m2Hear

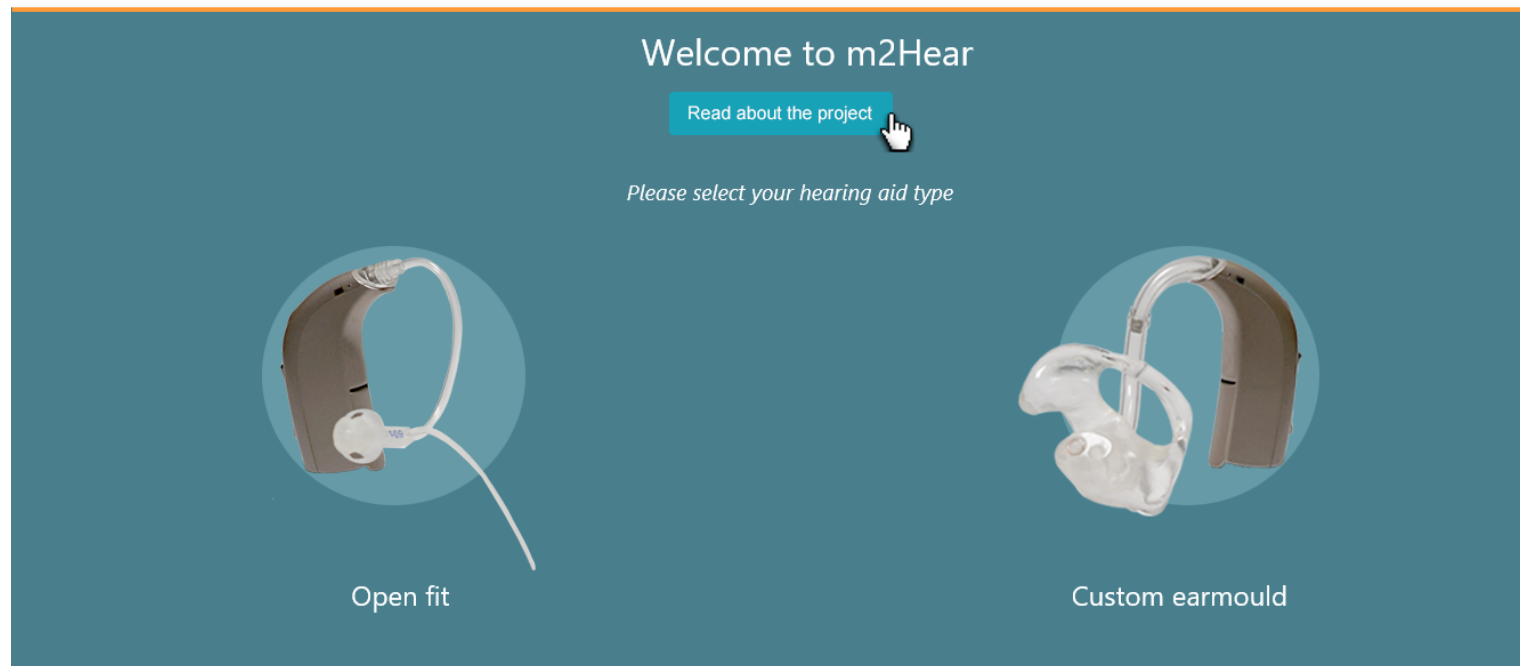
- Identified which aspects of the Theoretical Domains Framework (TDF) are present in each RLO → mapped onto the COM-B model

How to insert your hearing aids



(Maidment et al., in prep)

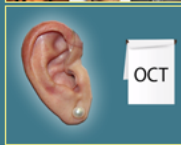
m2Hear interface



Individualised information to meet user's needs

Mel - You have selected information on **Getting used to your hearing aids.**

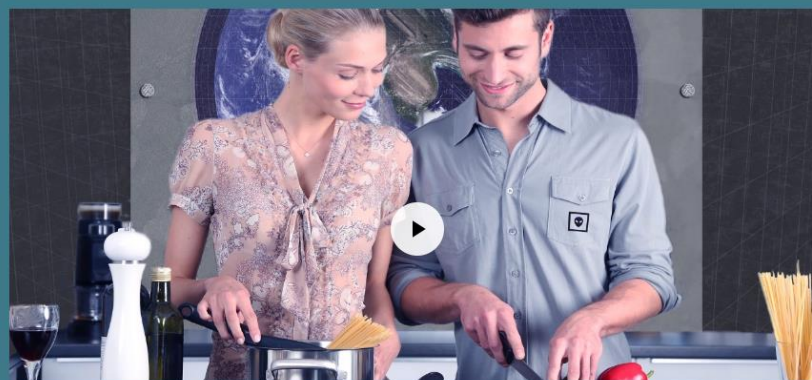
Back



What can I expect when wearing hearing aids for the first time?

How do I get used to wearing my hearing aids?

How can I get used to wearing my hearing aids?



0:42 / 2:01

You may wish to become familiar and comfortable
with the sounds in your own home at first




Individualised information to meet user's needs

Mel - You have selected information on **How to look after your hearing aids.**

[Back](#)

Hearing aid care



How do I clean my hearing aid ear tip and tubing?

[Try the activity?](#)

How do I clean my hearing aid ear tip and tubing?

Drag the pictures to show the correct order for cleaning your open fit ear tip and tubing. Select each picture to see a description.



That's correct! The tubing and hearing aid must be separated- the tubing should be cleared weekly or when there is a visible obstruction to maintain the sound from the hearing aid. Make sure to keep the hearing aid well away from water!

Step Two

Step Three



Step One

That's correct! The tubing and hearing aid must be separated- the tubing should be cleared weekly or when there is a visible obstruction to maintain the sound from the hearing aid. Make sure to keep the hearing aid well away from water!

[Close x](#)

Drag and drop

Improved outcomes for m2Hear

Outcome	c2Hear RLO+ (n=79)	m2Hear (n=30)
Hearing aid data logging (max hours/day)	8.0 (4.6)	9.8 (4.5)
System Usability Scale (≥ 68 above avg)	-	79.9 (5.6)

Average uMARS score (0=poor, 5=excellent)	C2Hear CP RLO	m2Hear
Overall App Quality	3.6	4.2
Engagement	3.1	3.6
Functionality	3.8	4.4
Aesthetics	3.0	4.2
Information	4.5	4.6
Subjective App Quality	3.3	4.1
Star Rating	3.7	4.0
Perceived Impact (Behaviour Change)	3.6	4.3

uMARS = user version Mobile Application Rating Scale

m2Hear viewed positively by user's

I was glad to be able to use m2Hear to help me remember things.

It was great that I could check things quickly, especially if I had forgotten something the audiologist told me.

It was easy to follow and well-structured. The information was clear and concise.

Summary of eHealth developments

November 2015



Freely available
online

2016/17



mRLOs for
communication
partners

2017/18



mRLOs tailored for
hearing aid users

(Ferguson et al, ASHA Perspectives SIG 7. submitted)

Take home messages



- eAudiology via remote technologies provides patient benefit by improving:



knowledge



handling
skills



self-
management



hearing
aid use



self-efficacy



valued by users

- Knowledge is power – and a mechanism of impact - leading to:
better hearing aid outcomes, reduced psychosocial effects (e.g. anxiety), and
greater patient activation
- The future is the 3 I's – individualisation, interactivity and inclusivity
- Involving partners in 'joint-working' with C2Hear prompts novel discussions about
challenging communication leading to behaviour change in partners

“technology works best when it brings people together”

(Matt Mullenweg)

Thanks to



Patient panels



Mild-moderate hearing loss team

Nottingham University Hospitals
NHS Trust



Clinical and academic colleagues



Funded by
NHS
National Institute for
Health Research


This paper presents independent research funded by the National Institute for Health Research (NIHR) under its Research for Patient Benefit (RfPB) Programme (Grant Reference Number PB-PG-0909-20294 and PB-PG-0815-20019). The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

References

- Action on Hearing Loss. (2011). Hear me out: Audiology services in Scotland - services provided, patients' experience and needs. In RNID (Ed.), (pp. 1-83). London.
- Barker, A., Leighton, P., & Ferguson, M. (2017). Coping together with hearing loss: a qualitative meta-synthesis of the psychosocial experiences of people with hearing loss and their communication partners. *International Journal of Audiology*, 56(5), 297-305. doi:10.1080/14992027.2017.1286695
- Barker, F., Mackenzie, E., Elliott, L., Jones, S., & de Lusignan, S. (2016). Interventions to improve hearing aid use in adult auditory rehabilitation. *The Cochrane Library*.
- Boothroyd, A. (2007). Adult Aural Rehabilitation: What Is It and Does It Work? *Trends in Amplification*, 11(2), 63-71.
- Deloitte. (2017). *State of the smart: seventh annual mobile consumer survey*. Retrieved from United Kingdom
- Desjardins, J. L., & Doherty, K. A. (2009). Do experienced hearing aid users know how to use their hearing aids correctly? *American Journal of Audiology*, 18, 69-76.
- El-Molla, F., Smith, Z., Henshaw, H., & Ferguson, M. (2012). *Retention of rehabilitation information by first-time hearing aid users with and without interactive patient information*. Paper presented at the British Academy of Audiology, Manchester.
- Ferguson, M. (2017). Knowledge is power: the power of mobile technologies to enhance hearing-related knowledge. *ENT and Audiology News*, 26, 82-84.
- Ferguson, M., Brandreth, M., Leighton, P., & Wharrad, H. (2018). Development of a multimedia educational programme for first-time hearing aid users: a participatory approach. *International Journal of Audiology, Early Online* 1-10. doi:10.1080/14992027.2018.1457803

- Ferguson, M. A., Brandreth, M., Leighton, P., Brassington, W., & Wharrad, H. (2016). A randomized controlled trial to evaluate the benefits of a multimedia educational programme for first-time hearing aid users. *Ear and Hearing, 37*(2), 123-136. doi:10.1097/AUD.0000000000000237
- Ferguson, M. A., Maidment, D. W., & Henshaw, H. (In press). Knowledge is power: improving outcomes for patients, partner and professionals in the digital age. *Perspectives of the ASHA Special Interest Groups*(SIG 7).
- Goggins, S., & Day, J. (2009). Pilot study: Efficacy of recalling adult hearing-aid users for reassessment after three years within a publicly funded audiology service. *International Journal of Audiology, 48*, 204-210.
- Gomez, R., & Ferguson, M. (in prep.). Improving self-efficacy for hearing aids: the early delivery of a multimedia-based education program in first-time adult hearing aid users. *International Journal of Audiology*.
- Grenness, C., Hickson, L., Laplante-Lévesque, A., & Davidson, B. (2014). Patient-centred audiological rehabilitation: Perspectives of older adults who own hearing aids. *International Journal of Audiology, 53*(sup1), S68-S75.
- Hajat, T. (2016). *Exploring the views of audiologists on the effectiveness of C2Hear for better information retention and knowledge on hearing aids for first time hearing aid users*. (BSc Audiology), De Montfort University.
- Henshaw, H., Barker, A., Maidment, D. W., Wharrad, H., & Ferguson, M. A. (2017). *'Thinking Aloud' to examine usability, relevance and impact of mHealth tailored to communication partners*. Paper presented at the British Society of Audiology Annual Conference, Harrogate, UK.
- Henshaw, H., Clark, D., Kang, S., & Ferguson, M. A. (2012). Computer skills and Internet use in adults aged 50-74 years: influence of hearing difficulties. *Journal of Medical Internet Research, 14*(4), e113. doi:10.2196/jmir.2036
- Hickson, L., Worrall, L., & Scarinci, N. (2007). A randomized controlled trial evaluating the Active Communication Education program for older people with hearing impairment. *Ear and Hearing, 28*(2), 212-230. doi:10.1097/AUD.0b013e31803126c8
- Kelly, T. B., Tolson, D., Day, T., McColgan, G., Kroll, T., & Maclaren, W. (2013). Older people's views on what they need to successfully adjust to life with a hearing aid. *Health and Social Care in the Community, 21*(3), 293-302.
- Kramer, S. E., Allessie, G. H. M., Dondorp, A. W., Zekveld, A. A., & Kapteyn, T. S. (2005). A home education program for older adults with hearing impairment and their significant others: A randomized trial evaluating short- and long-term effects. *International Journal of Audiology, 44*(5), 255-264.
- Laplante-Lévesque, A., Jensen, L. D., Dawes, P., & Nielsen, C. (2013). Optimal hearing aid use: Focus groups with hearing aid clients and audiologists. *Ear and Hearing, 34*(2), 193-202.

- Lundberg, M., Andersson, G., & Lunner, T. (2011). A randomized, controlled trial of the short-term effects of complementing an educational program for hearing aid users with telephone consultations. *Journal of the American Academy of Audiology*, 22(10), 654-662.
- Maidment, D. W., Brassington, W., Wharrad, H., & Ferguson, M. A. (In prep.). A process evaluation of a multimedia education programme for first-time hearing aid users.
- Malmberg, M., Lunner, T., Kähäri, K., & Andersson, G. (2017). Evaluating the short-term and long-term effects of an internet-based aural rehabilitation programme for hearing aid users in general clinical practice: a randomised controlled trial. *BMJ Open*, 7(5), e013047.
- Michie, S., van Stralen, M., & West, R. (2011). The Behaviour Change Wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science*, 6, 42. doi:10.1186/1748-5908-6-42
- Moore, G. F., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W., . . . Wight, D. (2015). Process evaluation of complex interventions: Medical Research Council guidance. *BMJ*, 350, h1258.
- Mosen, D. M., Schmittiel, J., Hibbard, J., Sobel, D., Remmers, C., & Bellows, J. (2007). Is patient activation associated with outcomes of care for adults with chronic conditions? *The Journal of ambulatory care management*, 30(1), 21-29.
- Murray, E., Burns, J., See, T. S., Lai, R., & Nazareth, I. (2005). Interactive Health Communication Applications for people with chronic disease. *Cochrane Database of Systematic Reviews*, 19(4).
- NICE. (2018). *Hearing loss in adults: assessment and management*. Retrieved from London:
- Reese, J. L., & Hnath-Chisolm, T. (2005). Recognition of hearing aid orientation content by first-time users. *American Journal of Audiology*, 14(1), 94-104.
- Rocks, T., & Ferguson, M. (2013). *Does training care-staff using interactive videos improve their hearing aid practical skills, understanding and perception of the importance of hearing aids?* Paper presented at the British Academy of Audiology Annual Conference, Manchester.
- Scarinci, N., Worrall, L., & Hickson, L. (2008). The effect of hearing impairment in older people on the spouse. *International Journal of Audiology*, 47(3), 141-151.
- Taylor, S. J., Pinnock, H., Epiphaniou, E., Pearce, G., Parke, H. L., Schwappach, A., . . . Greenhalgh, T. (2014). *A rapid synthesis of the evidence on interventions supporting self-management for people with long-term conditions: PRISMS—Practical systematic Review of Self-Management Support for long-term conditions*. Retrieved from NIHR Journals Library, Southampton, UK: <https://www.ncbi.nlm.nih.gov/books/NBK263840/>

- 
- Thoren, E., Svensson, M., Tornqvist, A., Andersson, G., Carlbring, P., & Lunner, T. (2011). Rehabilitative Online Education versus Internet Discussion Group for Hearing Aid Users: A Randomized Controlled Trial. *Journal of the American Academy of Audiology*, 22(5), 274-285.
- Thorén, E. S., Öberg, M., Wänström, G., Andersson, G., & Lunner, T. (2014). A randomized controlled trial evaluating the effects of online rehabilitative intervention for adult hearing-aid users. *International Journal of Audiology*, 53(7), 452-461.
- Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker, J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information and Management*, 43, 15-27.
- 