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**British Tinnitus
Association**

The healthcare cost of tinnitus management in the UK

David Stockdale, Don McFerran, Peter Brazier, Clive Pritchard,
Tony Kay, Christopher Dowrick, Derek J Hoare

RESEARCH ARTICLE

Open Access

An economic evaluation of the healthcare cost of tinnitus management in the UK

David Stockdale¹, Don McFerran², Peter Brazier³, Clive Pritchard⁴, Tony Kay⁵, Christopher Dowdick⁶ and Derek J Hoare^{7*}



Abstract

Background: There is no standard treatment pathway for tinnitus patients in the UK. Possible therapies include education and reassurance, cognitive behavioural therapies, modified tinnitus retraining therapy (education and sound enrichment), or amplification of external sound using hearing aids. However, the effectiveness of most therapies is somewhat controversial. As health services come under economic pressure to deploy resources more effectively there is an increasing need to demonstrate the value of tinnitus therapies, and how value may be

RESEARCH ARTICLE

Open Access

Tinnitus services in the United Kingdom: a survey of patient experiences

Don McFerran^{1*} , Derek J. Hoare², Simon Carr³, Jaydip Ray³ and David Stockdale⁴



Abstract

Background: Tinnitus service provision in the United Kingdom has been investigated from the healthcare provider's perspective demonstrating considerable regional variation particularly regarding availability of psychological treatments. An audiological-based tinnitus service, however, was reportedly available for all tinnitus patients in the UK. The aim of the current study was to define and evaluate nationwide tinnitus healthcare services from the patients' viewpoint.

Methods: Secondary analyses were performed on data from a 33-item questionnaire provided by the British Tinnitus Association. The questionnaire had been distributed via email and social media.

BACKGROUND

- No standard tinnitus pathway in UK
- Good Practice Guide for England
- NICE Clinical Knowledge Summary but no Guidance or PathwayYet!
- Cost of tinnitus studies
 - Netherlands Maes 2013
 - USA Goldstein 2015
- No cost or treatment cost-effectiveness studies in UK

QUESTIONS TO ANSWER

Cost of treatment per patient

Health outcome per patient

Cost-effectiveness

National costs

METHODOLOGY

- Identification of the most common treatment pathways
 - Literature review
 - National statistics
 - Expert opinion (Health Economists, ENT, Audiology, General Practice, Tinnitus Research, Tinnitus Charitable Sector)
 - Patient survey
- Excel-based economic model
 - The probabilities associated of patients receiving a particular combination of therapies
 - The cost of each therapy
 - The accumulated cost for each treatment pathway
 - The health benefits for patients arising from the combination of therapies received

OUTCOMES

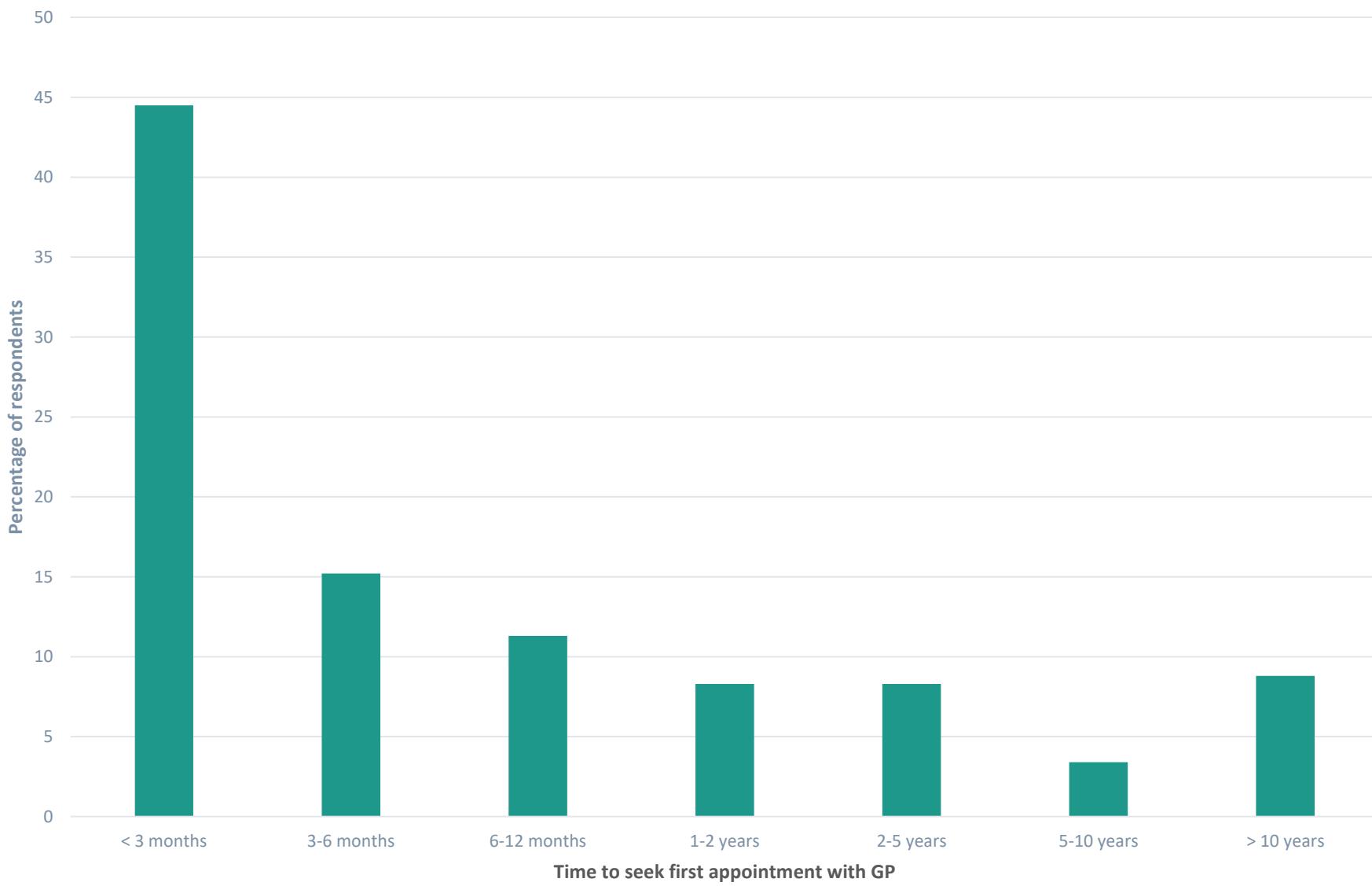
- QALY (Quality adjusted life years)
 - Habituation leads to increased QALY
 - Discharge to self-management is zero QALY gain
- ICER (Incremental cost effectiveness ratio. Cost per QALY gained)
 - £20,000 – threshold generally accepted by NICE
 - £12,936 – latest threshold (Claxton et al 2013)

END USER SURVEY

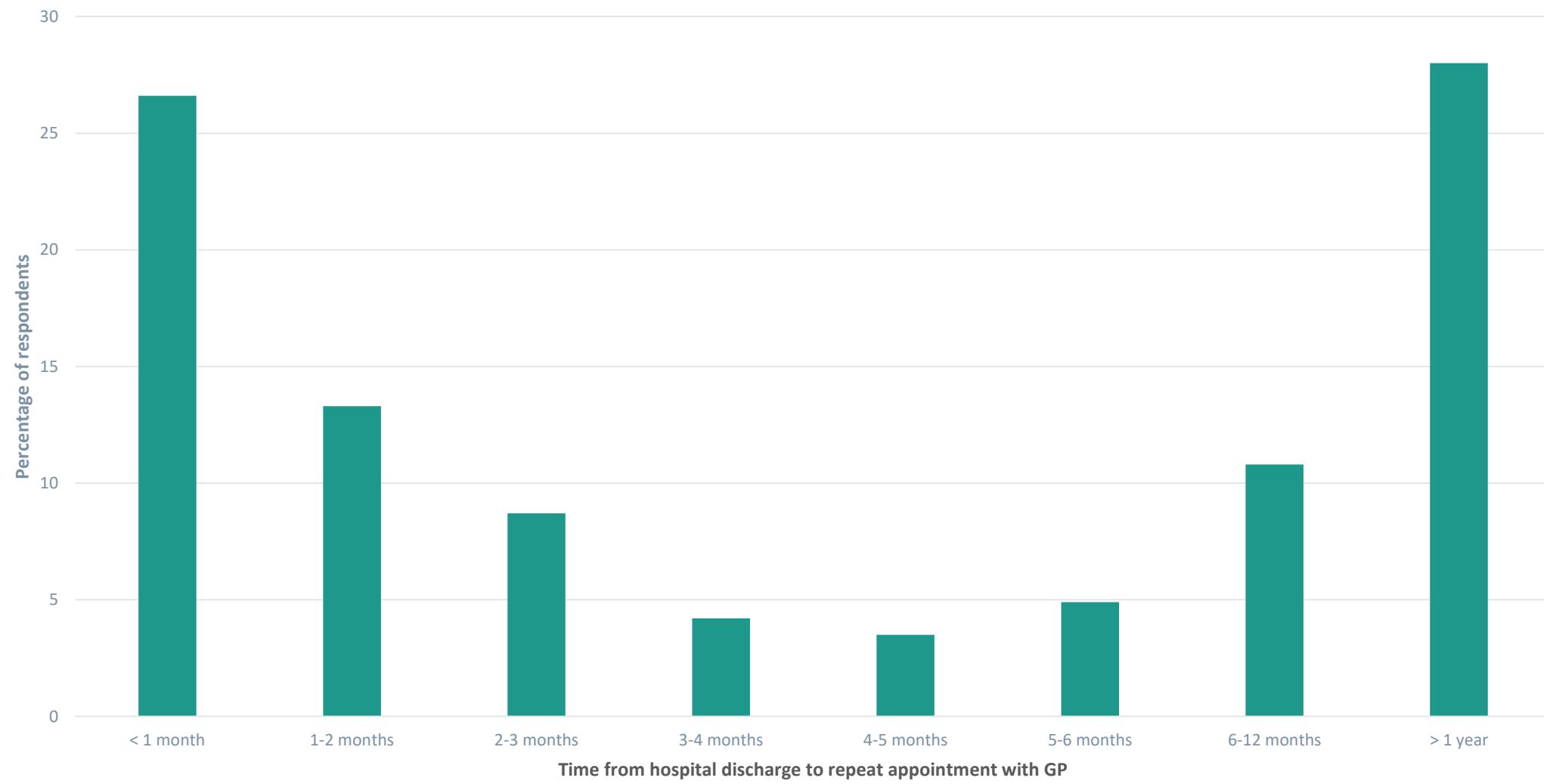
- 33 item questionnaire
- Distributed to BTA members via e mail and to BTA followers via social media
- Approximately 12,500 people contacted
- 977 replies
- 937 after duplicates and non-UK respondents removed
- 440 women, 425 men, 1 transgender
- Modal age group 50-69

END USER SURVEY

- Action in primary care
 - 76.6% referred on to secondary care
 - 20.1% received drugs (psychoactive drugs, nasal decongestants, betahistine, antibiotics)
 - 19.5% no action
- Action in secondary care
 - Just over half undergo MRI
 - 98.0% audiogram
 - 67.7% discharged after diagnostic process
 - 32.3% referred for therapy (Audiologists or Hearing Therapist)
 - 2.6% referred to a psychologist



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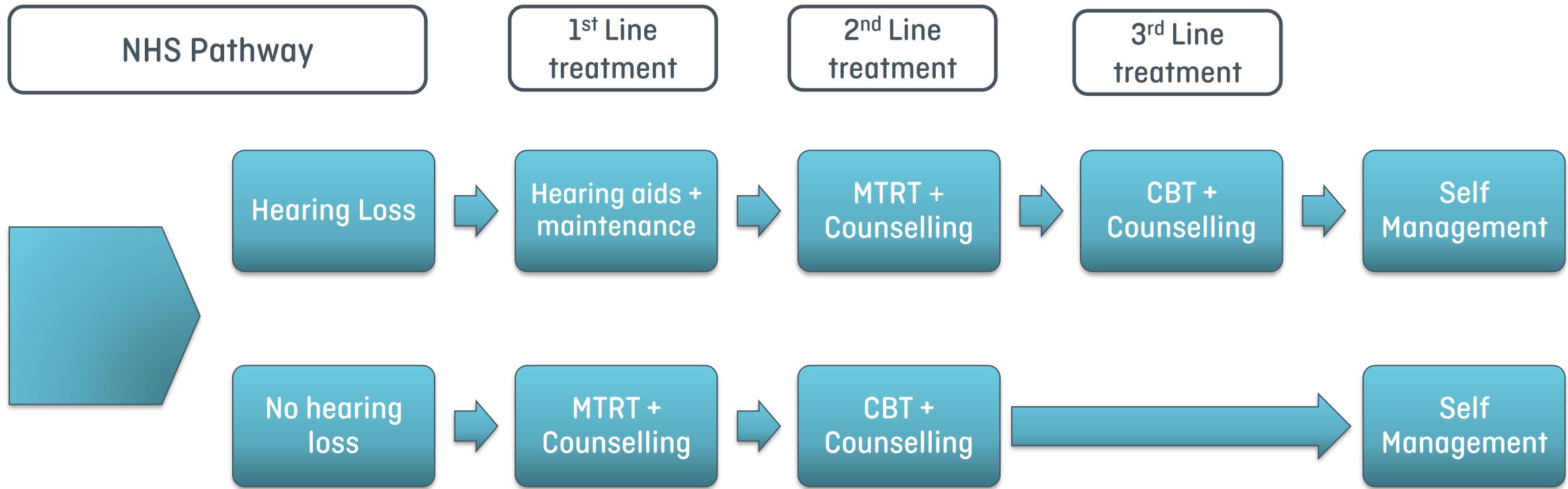


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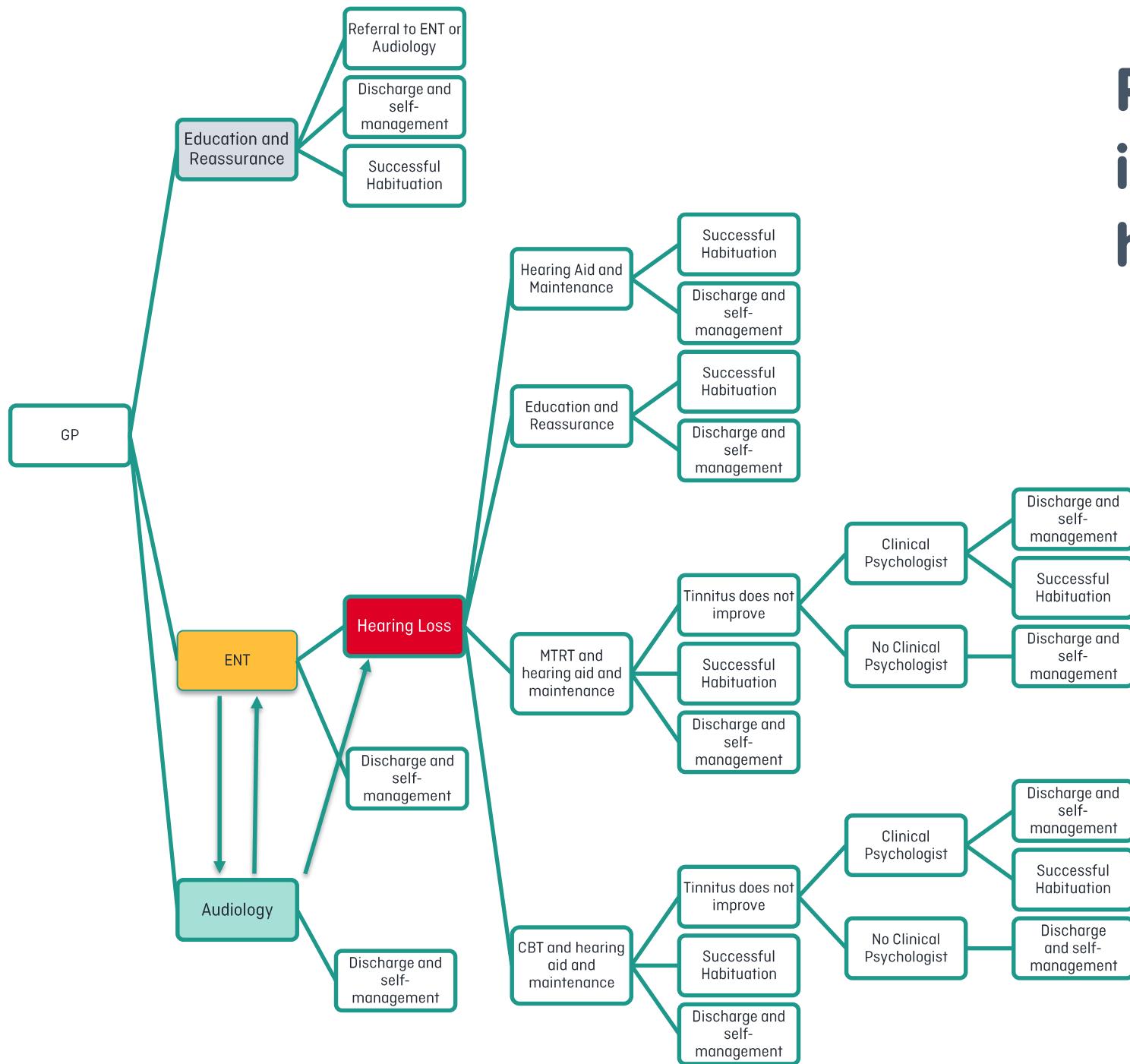
END USER SURVEY

- After secondary care
 - 38.5% back to their GP: 70.0% within one year; 39.9% within 2 months
 - Of those 36.5% referred back to secondary care
 - Equivalent to 13.0% of the total survey population
 - Revolving door healthcare
- But
 - Survey is of people who are interacting with a tinnitus charity
 - Higher impact tinnitus may be over-represented
 - Dissatisfied may be over-represented

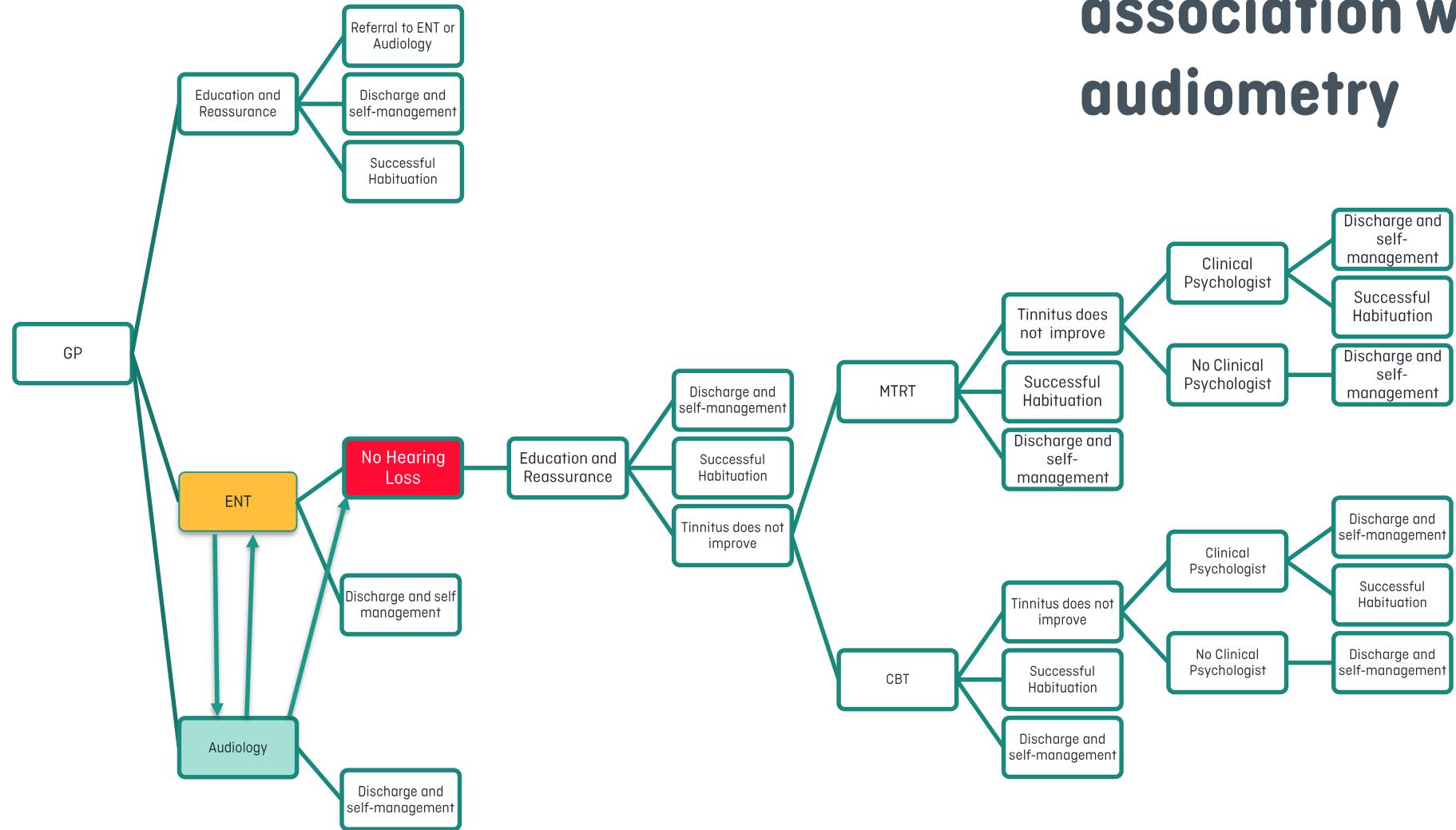
Early economist's view of pathway



Pathways for tinnitus in association with hearing loss



Pathways for tinnitus in association with normal audiology



ASSUMPTIONS

- 50% undergo MRI scan
- Hearing aids are fitted bilaterally
- Hearing aids have a 4 year life span
- Hearing aids require 1 maintenance session per year
- Hearing aids use 36 batteries per year
- Patients on average visit their GPs twice prior to referral
- From GP to successful habituation or discharge to self care happens within 1 year
- Habituation happens in 25% of cases overall
- Successful habituation gives an annual QALY gain of 0.02
- People who do not receive treatment show 0 QALY gain

Annual tinnitus-related treatment costs

Treatment	Yearly cost (£)
Digital hearing aid	85.00
Hearing aid assessment	65.00
Hearing aid fitting	65.00
Hearing aid follow up	108.00
Hearing aid batteries	12.00
Hearing aid repairs	52.00
Cognitive Behavioural Therapy	471.00
Modified Tinnitus Retraining Therapy including wearable sound generator	303.00
GP session (11.7 minutes)	52.00
Pharmacotherapy - betahistidine	25.12
Pharmacotherapy - amitriptyline	13.29
Magnetic Resonance Imaging (MRI)	85.00
Associate Medical Specialist in ENT/Audiovestibular medicine (1 hour)	121.00
Audiologist (1 hour)	18.76
Clinical Psychologist (2 hours)	268.00

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2012 – 2013 costs

Probability modelling

Route	% people	% successful habituation	% discharge and self-manage
GP to Educational reassurance	23.31	13.29	10.02
GP to Educational reassurance to Audiology	14.40	4.28	10.11
GP to Educational reassurance to Audiology to ENT	1.08	0.01	1.07
GP to Educational reassurance to ENT	16.95	0.17	16.78
GP to Educational reassurance to ENT to Audiology	7.26	2.16	5.10
GP to ENT	21.00	0.21	20.79
GP to ENT to Audiology	9.00	2.68	6.32
GP to Audiology	6.51	1.936	4.574
(T) GP to Audiology to ENT	0.49	0.0053	0.4847

KEY RESULTS

- All active treatment pathways were cost-effective
- Pathways that incorporate ENT are more expensive than those that just use audiology services
- Education and either mTRT or CBT was cost-effective for those patients with tinnitus and normal hearing
- Across all pathways, ICER was £10,600 per QALY

KEY RESULTS

- GP education and reassurance is cheap and therefore has a low ICER (£681) but total life QALY gain is low.
- Original expert opinion suggested 15% discharged after ENT diagnostic workup. But patient survey suggested that 68% are discharged without intervention. If initially referred to audiology and then to ENT, this rises to 97%. This takes the ICER for these patients to £82,523.

SENSITIVITY ANALYSIS

- Model based on 25% of patients habituating, 75% not habituating and being discharged to self manage.
- If decrease to 20%, ICER £13,137
- If decrease to 15%, ICER £19,108
- 10% or lower, drops out of NICE cost-effectiveness range.

SENSITIVITY ANALYSIS

- Assumption of benefit from successful habituation 0.02 QALY per year. Derived from Health Utility Index mark 3 (HUI-3) scores reported by Swan et al., 2012
 - Increase benefit to 0.04: ICER £5,308/QALY
 - Decrease benefit to 0.01: ICER £21,232/QALY
- Limited access to CBT. Model assumed 100% access.
 - Reducing availability to one third improves overall ICER to £10,434/QALY, chiefly due to reduced costs.
 - But may impact negatively on other resources. Needs further exploration.

HEALTHCARE COSTS

- Average healthcare cost per tinnitus patient per year £717
- 43,900 GPs in the UK
- 24 consultations per year with primary complaint tinnitus
- Approximately 1,050,000 tinnitus consultations in primary care per annum
- Approximately £750 million per annum
- Equivalent to 0.6% of annual healthcare spending
- Societal costs £2.7 billion per annum

COMPARISON

- Maes et al 2013
 - Healthcare costs €1.9 billion per annum
 - Societal costs €6.8 billion per annum
 - Populations: UK 60M; Netherlands 12.5M
 - 2.3% of Dutch annual healthcare budget vs 0.6% of UK budget in the current study
- Differences
 - Unit costs. E.g. hearing aids
 - Dutch study based on general prevalence of tinnitus

SUMMARY

- Overall tinnitus management in the UK is cost-effective at £10,600 per QALY.
- Primary care education is cheap but the QALY gain is tiny.
- Discharge from ENT without any therapy produces a very high ICER.
- Patients attending via an audiology route are more likely to receive an intervention.
- At £717 per patient per annum, costs are comparable to other similar healthcare issues such as unexplained pain.

AFFILIATIONS

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TIME FOR
YOUR
QUESTIONS

