



# **New Zealand Validation of the Tinnitus Functional Index**

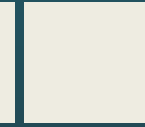
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# Tinnitus Functional Index

- a self-report measure
- evaluates the negative impact and severity of tinnitus
- recently developed in the United States

# Aims:

- to determine if the TFI is a reliable and valid measure of tinnitus-related distress in New Zealand
- to find out what changes, if any, need to be made to the TFI for New Zealand use

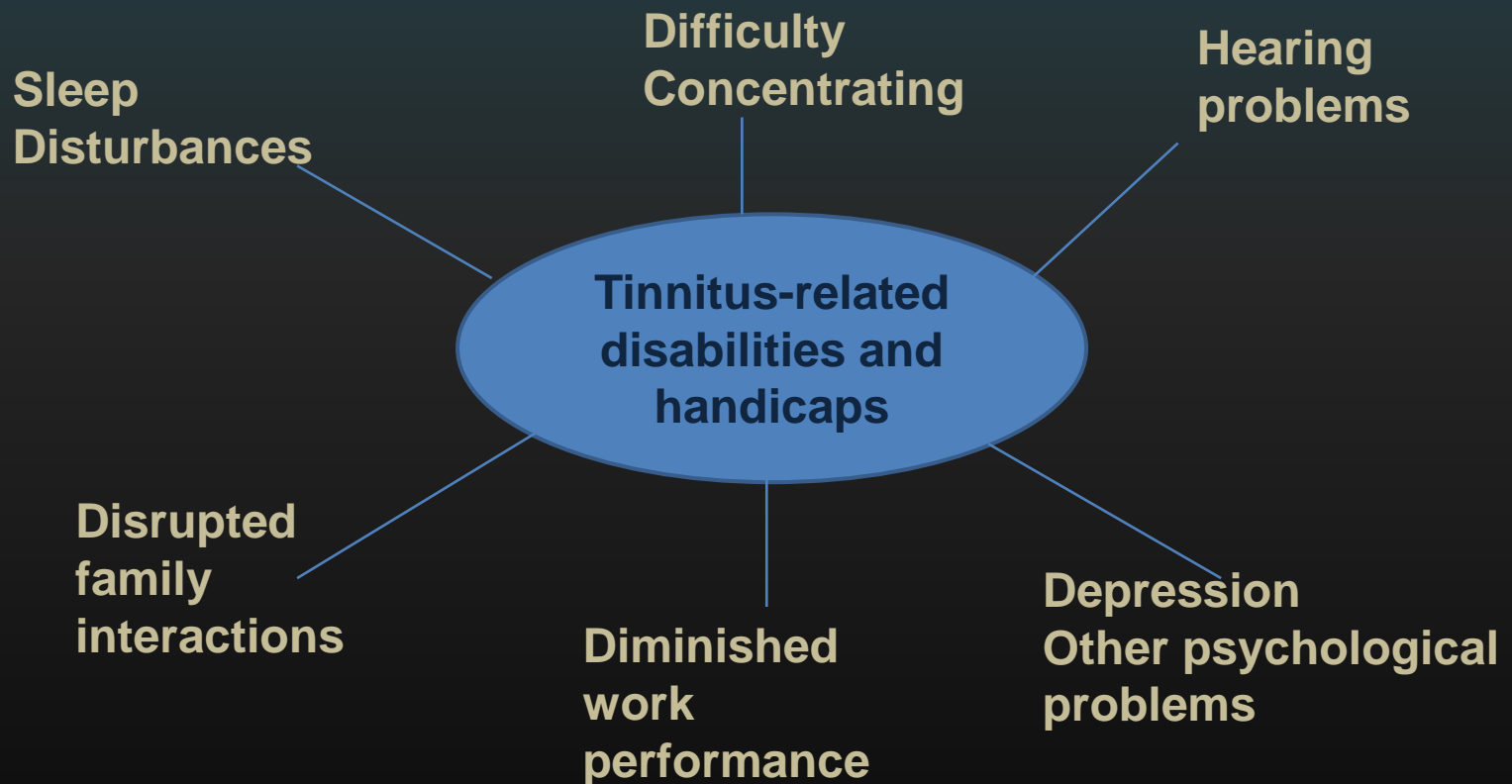


# Rationale

# Tinnitus



- Phantom auditory perception
- The perceived sensation of sound
- An incurable symptom that significantly impairs quality of life
- Affects 5% of New Zealanders



# Why do we need self-report measures?

- Tinnitus is a subjective phenomenon
- No objective tests to:
  - verify the presence of tinnitus
  - evaluate tinnitus severity
- The qualities of the sound (loudness, pitch) do not predict extent of subjective suffering
- Tinnitus-related complaints (sleep, psychological problems) amenable to treatment- can improve QOL if not cure the problem

# Tinnitus Questionnaires

- Nine tinnitus questionnaires developed between 1988 and 1999 for scaling the negative impact and severity of tinnitus.
- Wide range of uses:

## Discriminative uses

### Clinical context:

- measuring tinnitus severity (mild, moderate, severe)
- identifying major areas of complaint
- help clinicians structure individualised treatment programs for patients

### Research Arena

- defining and selecting subject samples with certain level of severity

## Evaluative uses:

### Clinical context:

- monitoring progress over time

### Research arena:

- evaluating the efficacy of tinnitus treatments in clinical trials.

# Why was the Tinnitus Functional Index developed?

Limitations of nine pre-existing tinnitus questionnaires:

✘ Not specifically designed to have high responsiveness to treatment-related change.

✘ Do not comprehensively cover the multiple domains of tinnitus-related complaints.



The TFI was developed with the aims that it would:

- ✓ have high validity for scaling the negative impact and severity of tinnitus
- ✓ have high responsiveness to treatment-related change
- ✓ provide comprehensive coverage of multiple tinnitus severity domains.





# The Tinnitus Functional Index



- Developed and validated in the United States
- Shown to have met its three main aims
- Can be used for both clinical and research purposes

# Psychometric Validation of the TFI

- Only validated in the United Kingdom
  - strong convergent and divergent validity shown
- Not validated in any other country

## Why validate?

- Cultural differences between populations = questionnaire items mean different things
- A questionnaire may need modification
- Previous tinnitus questionnaires developed in the US and validated in NZ have shown sensitivity to cultural difference
- Sensitivity to cultural difference important to evaluate as it will also indicate the TFIs potential for use as a standardized outcome measure
- Reliability and validity must be assessed before being used in a different cultural context

# Tinnitus Handicap Questionnaire

Subscale			Item Content
Subscale1	Social, Emotional, Physical Effects	NZ	1, 9, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 27
	Social, Emotional, Physical Effects	USA	1, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 27
Subscale2	Hearing Problems	NZ	3, 4, 6, 7, 21, 23
	Hearing problems	USA	3, 4, 5, 6, 21, 23, 7, 10
Subscale3	Effect on noisy situations and family	NZ	5, 10
	Patient's view of their tinnitus	USA	2, 8, 25, 26

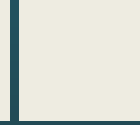
# Aims and objectives of the present study

## Study Aims:

- to determine if the TFI is a reliable and valid measure of tinnitus-related distress in New Zealand
- to find out what changes, if any, need to be made to the TFI for New Zealand use

## Study Objectives:

- to examine the factor structure of the TFI
- to assess internal consistency reliability of the TFI
- to assess test-retest reliability of the TFI
- to assess convergent and divergent validity of the TFI
- to compare results with the original questionnaire



# Methods

## ❑ Quantitative study

## ❑ Secondary data:

### - Tinnitus Drug Study

- 318 tinnitus patients recruited for a study of drug use among persons with tinnitus
- factor analysis & internal consistency reliability

### - Hearing Aid Clinical Trial

- 40 tinnitus patients recruited
- test-retest reliability & convergent and divergent validity

## □ Statistical Analyses:

### Statistical Packages used:

SAS and SPSS

### Factor analysis:

Principal components analysis with varimax rotation  
Eight-factor solution examined

### Internal Consistency Reliability:

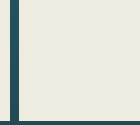
Cronbach Alpha

### Test-retest Reliability

Pearson Correlations

### Convergent and Divergent Validity:

Pearson correlations computed to examine relationship between TFI and Tinnitus Handicap Questionnaire (THQ), and Hearing Handicap Inventory (HHI)

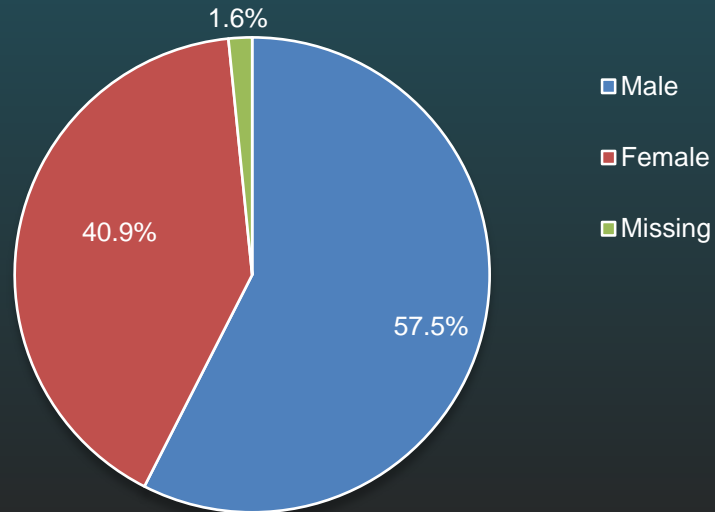


# Results

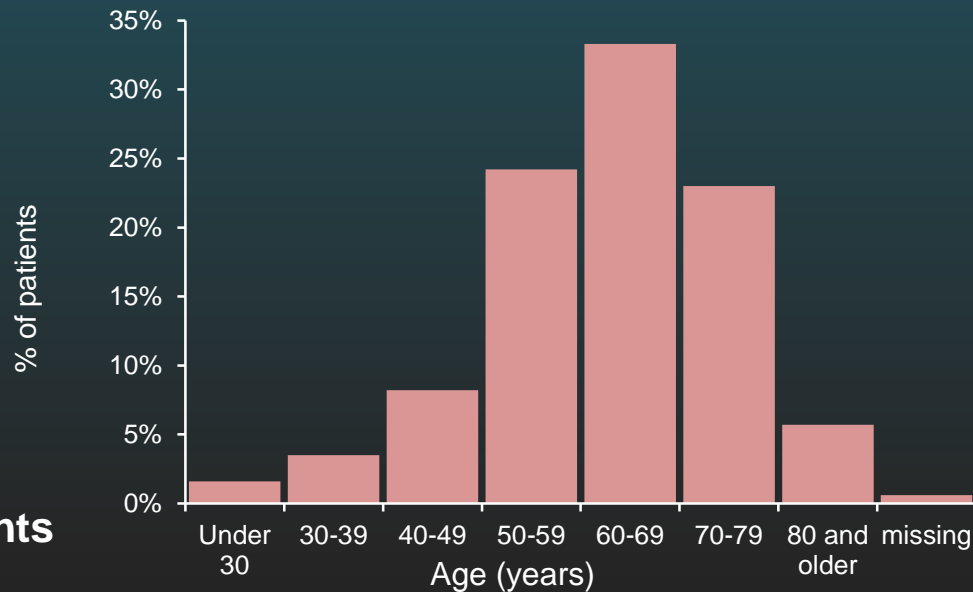


# Demographic Characteristics (Tinnitus Drug Study)

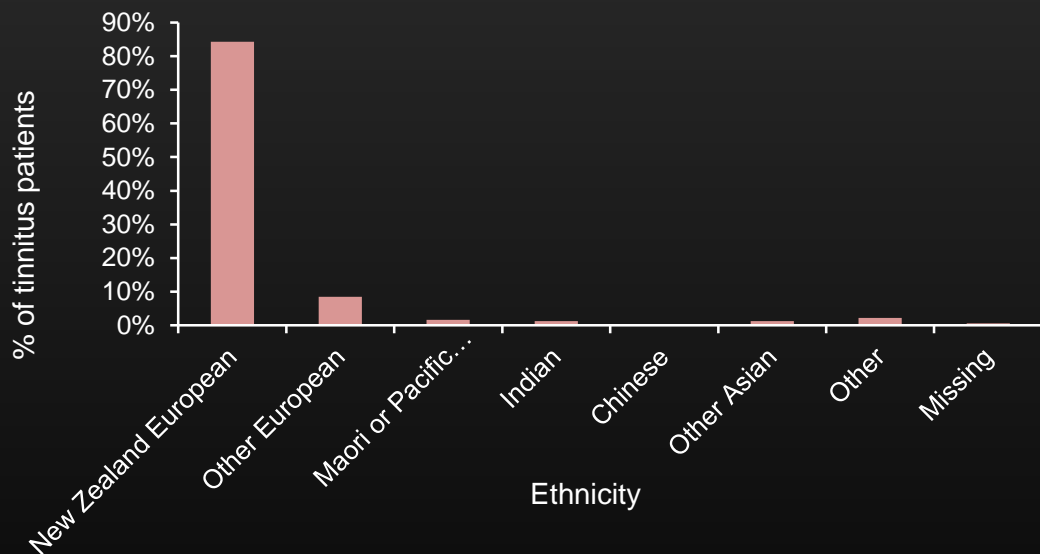
## Gender Distribution of Tinnitus Patients



## Age distribution of Tinnitus Patients

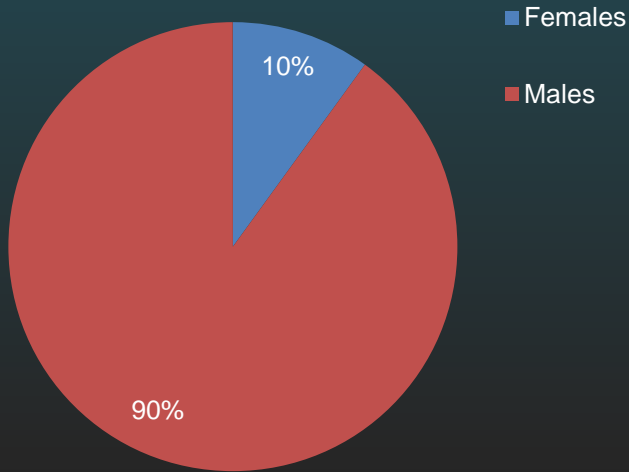


## Ethnic Distribution of Tinnitus Patients

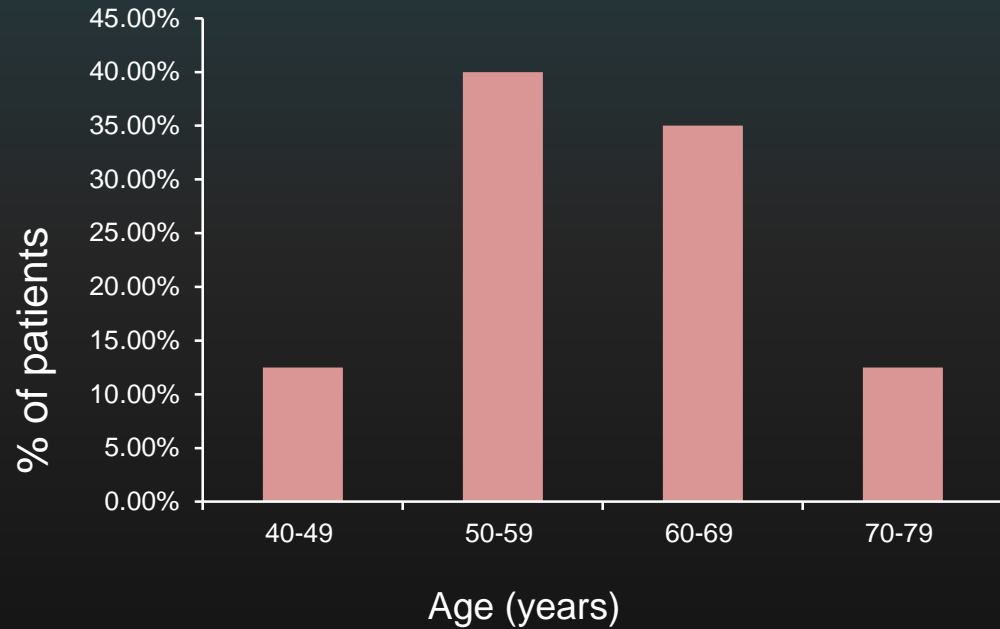


# Demographic Characteristics (Hearing Aid Clinical Trial)

## Gender Distribution of Tinnitus Patients



## Age Distribution of Tinnitus Patients



# Factor Structure of the TFI

- 8 factor solution of the TFI in New Zealand showed the same internal structure as the original questionnaire

Subscale	Item Content
Intrusiveness	1,2,3
Sense of Control	4,5,6
Cognitive	7,8,9
Sleep	10,11,12
Auditory	13,14,15
Relaxation	16,17,18
Quality of Life	19,20,21,22
Emotional	23,24,25

# Internal Consistency Reliability

Cronbach Coefficient Alpha for the Tinnitus Functional Index and subscales in New Zealand and the United States

	New Zealand	United States
Overall TFI	0.97	0.97
Intrusive	0.82	0.85
Sense of control	0.80	0.82
Cognitive	0.97	0.96
Sleep	0.95	0.97
Auditory	0.97	0.97
Relaxation	0.94	0.96
Quality of life	0.93	0.93
Emotional	0.93	0.94

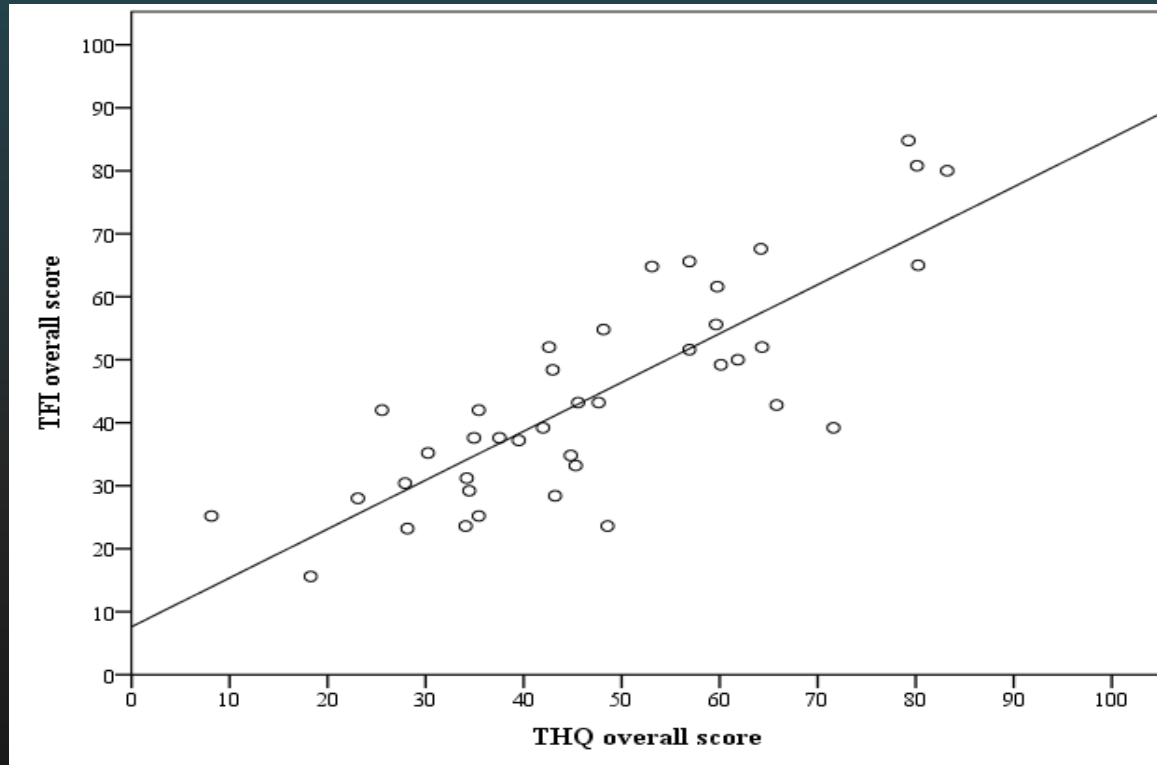
# Test-retest Reliability

Pearson correlations

	New Zealand	United States
Overall TFI	0.83	0.78
Intrusive	0.83	0.83
Sense of control	0.63	0.75
Cognitive	0.72	0.66
Sleep	0.87	0.78
Auditory	0.80	0.90
Relaxation	0.61	0.67
Quality of life	0.75	0.63
Emotional	0.72	0.76

# Convergent Validity

Pearson correlation between the Tinnitus Functional Index and Tinnitus Handicap Questionnaire overall scores



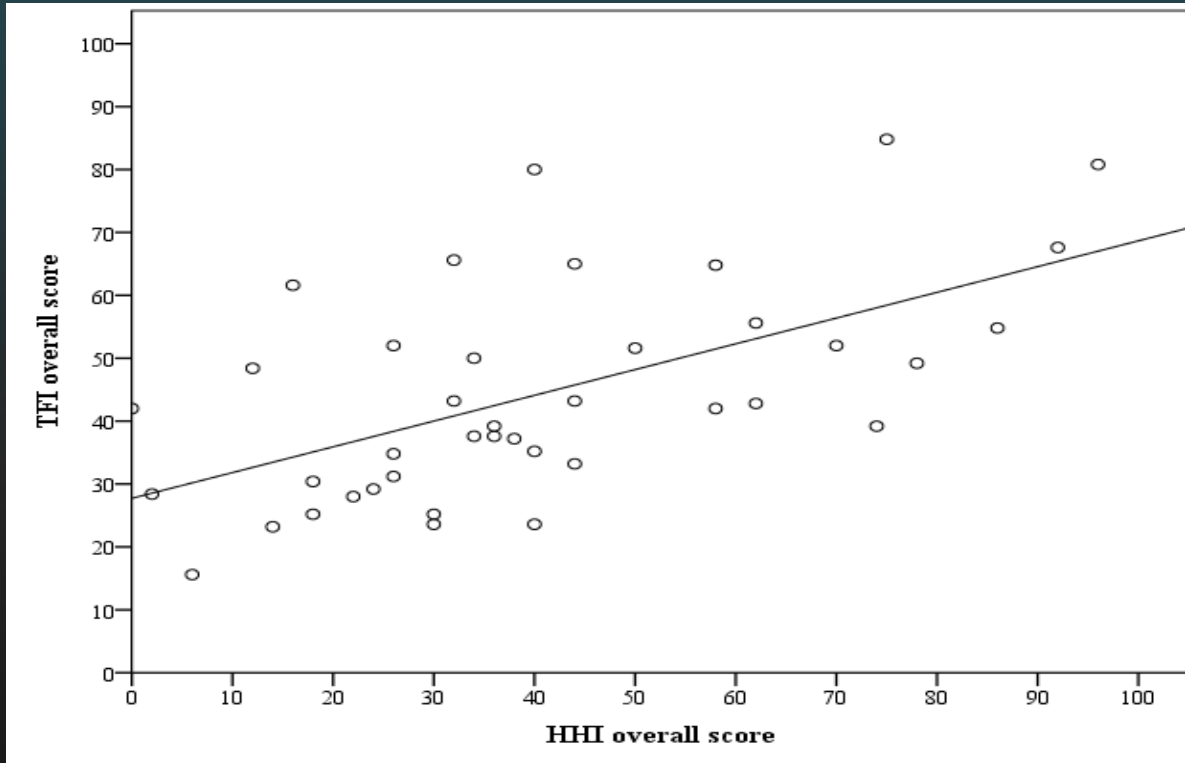
$r(38) = .717, p < .001$

# Convergent Validity

- Correlation matrix showed strong correlations between several combinations of correlations, for example:
  - TFI *Auditory* subscale and THQ *hearing difficulties* subscale
  - TFI *Quality of Life* subscale and THQ *social, physical and emotional effects* subscale
  - TFI *Emotional* subscale and THQ *social, physical and emotional effects* subscale

# Divergent Validity

Pearson correlation between the Tinnitus Functional Index and Hearing Handicap Inventory overall scores



$r(38)=.394, p<.005$

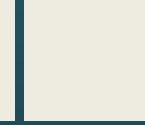




# Summary of key findings and Implications



- Satisfactory psychometric performance shown
- Factor structure remained unchanged
  - modification not needed for use in NZ
  - results of clinical trials conducted in the US and NZ can be compared
- TFI is a reliable and valid measure of tinnitus severity in the NZ population
  - Can be used both for clinical and research purposes in NZ



**Thank You**



**Questions???**