SPAU332
Hearing Aids I

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Hearing Aid Candidacy
- Factors to consider -

Learning objectives: Understand the selection criteria and candidacy considerations associated with amplification.

Key learning outcomes

1

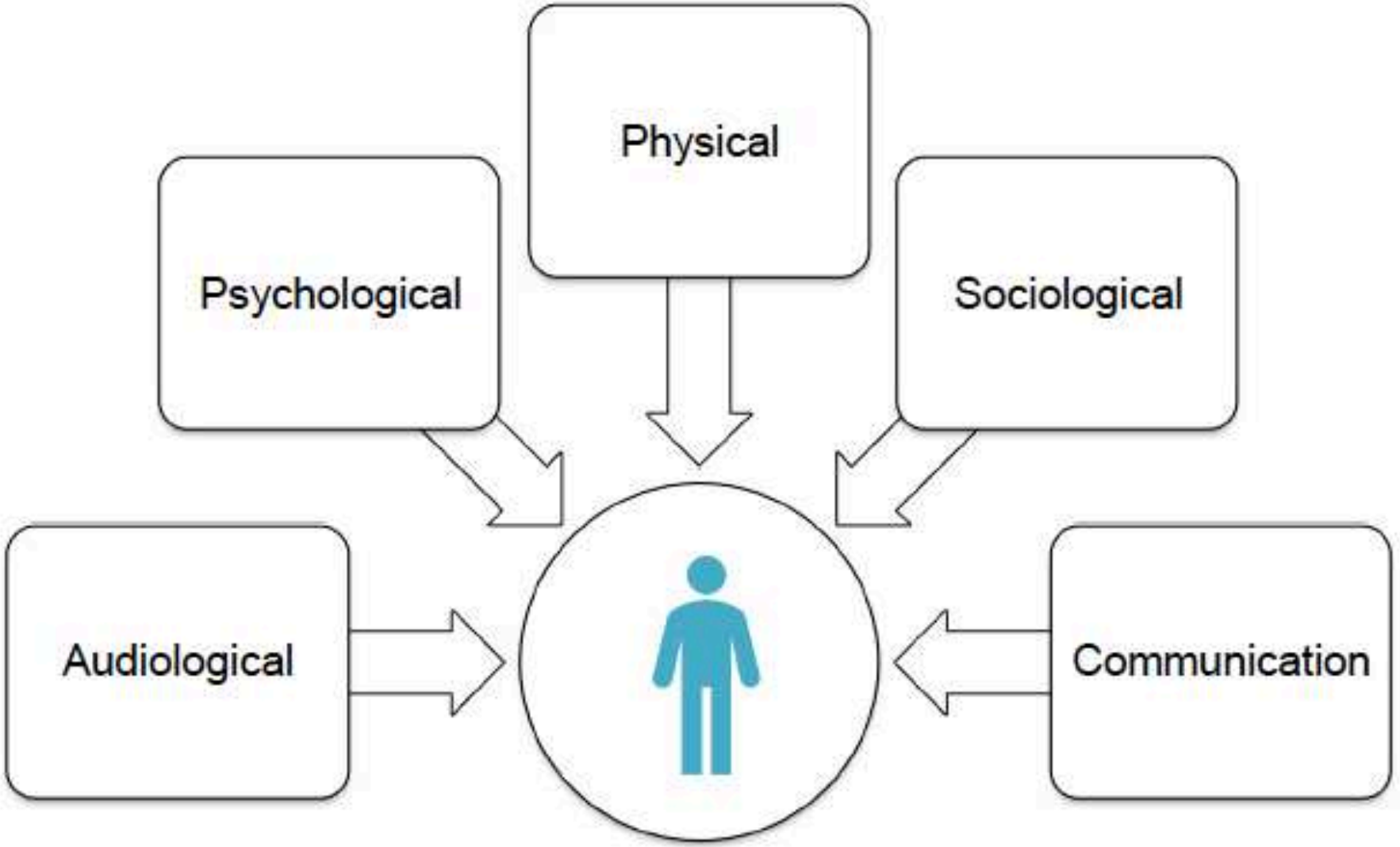
Identify whether a patient is a candidate for hearing aids.

2

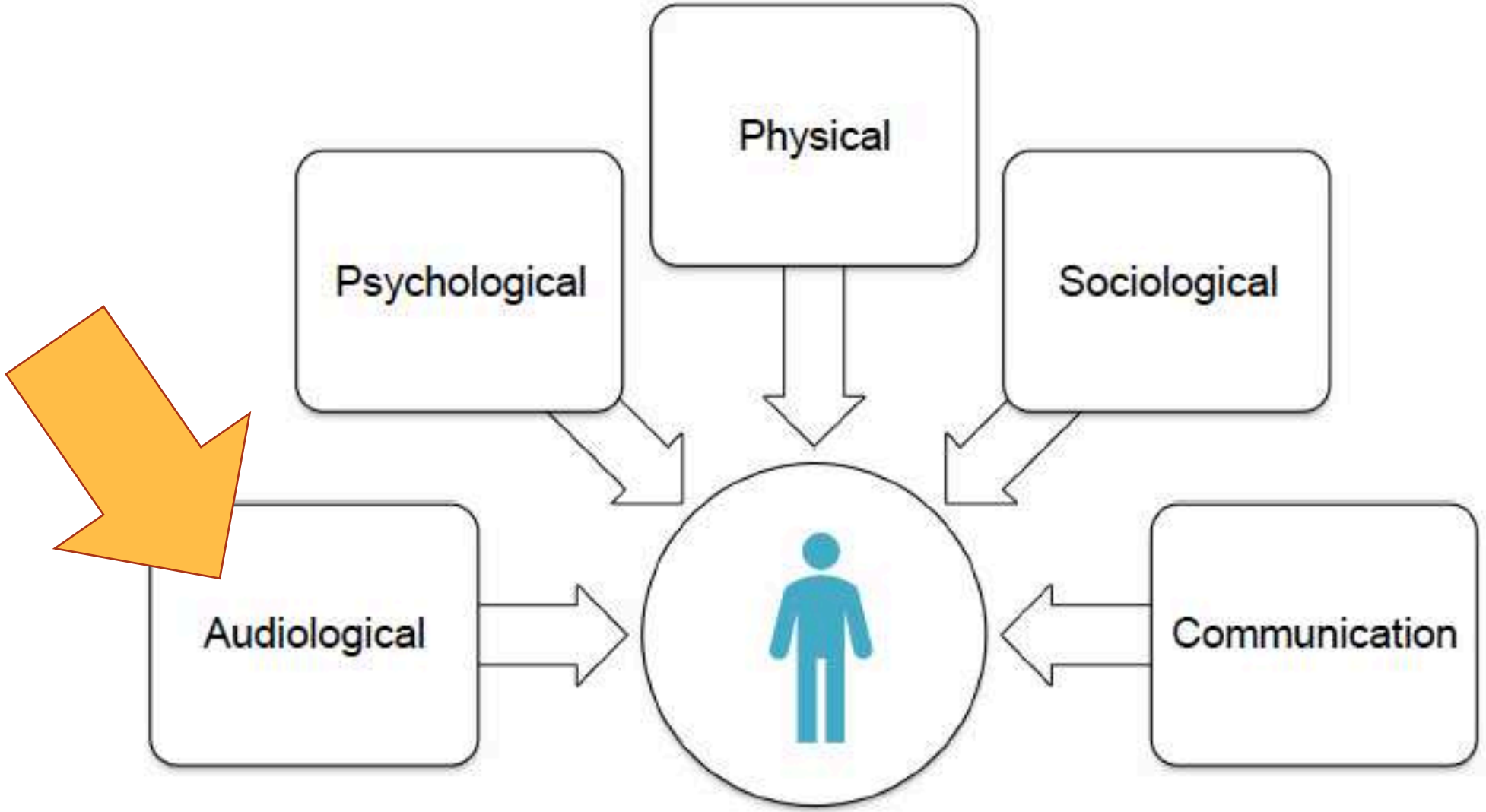
Consider more general factors in addition to audiological profile prior to hearing aid selection.

3

Consider both electroacoustic and non-electroacoustic characteristics when selecting a hearing aid.



Based on Lesner & Kricos, 1995



Audiological Status

- Type/pathology of hearing loss
- Degree and contour of hearing loss/dynamic range
- Speech discrimination (in quiet & noise)

Type/pathology of hearing loss

- Sensorineural hearing loss –requires compensation for loss of sensitivity and compression to address reduced dynamic range
- Continued middle ear disorders –may need more ventilation of ear canal & systems that bypass middle ear structures
- In cases of a discharging ear, is a hearing aid the best option?
- Retrocochlear conditions –mixed outcomes from amplification. However may find features such as directionality, noise reduction, remote mic, T settings and FM systems useful

Degree and slope of hearing loss

- Determines amount of required amplification
- Also the ear mould/hearing aid style –do low frequencies need amplification more or less than mid/high
- Audibility vs comfort
- ULLs indicate dynamic range

Considering the pure tone audiogram alone, when would someone benefit from a hearing aid?

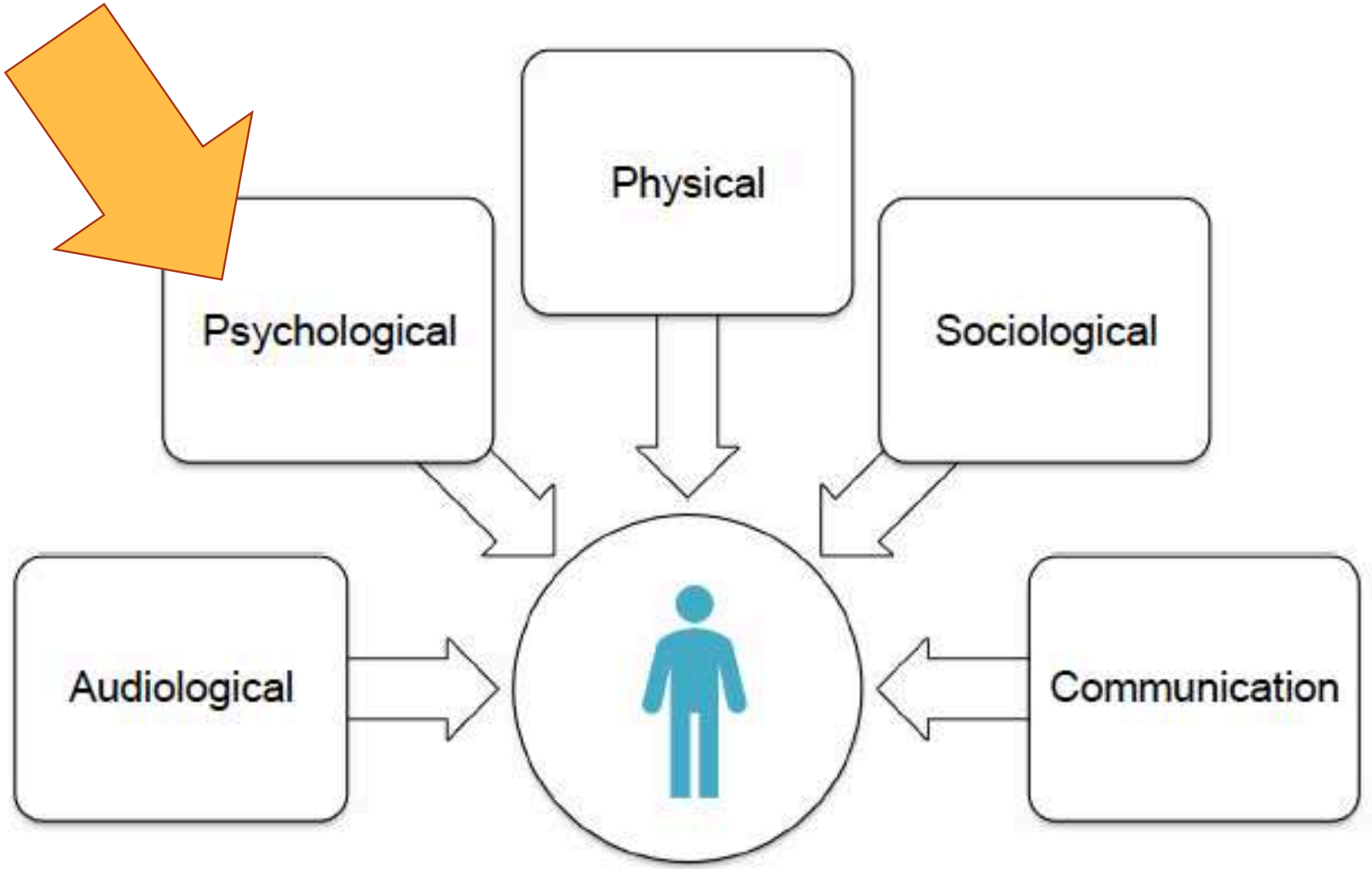
When should we provide a hearing aid?

- Fitting hearing aids when people first begin to experience hearing loss results in better long-term outcomes than when getting hearing aid fittings are delayed (Davis et al. 2007).

- Defining this point varies on shape and degree of hearing loss. Generally when thresholds fall below 30 dB HL at 2 kHz, we could expect noticeable benefit from aiding.

Speech Discrimination

- Providing amplification is not just about making sounds audible, but about improving speech intelligibility.
- For this reason tests of speech discrimination in quiet & noise provide indications of hearing aid benefit and how much SNR boost is required.



Psychological Status

- Cognitive and mental status
- Motivation
- Attitude and perceptions

Cognitive and mental status

- Cognitive function –working memory is a predictor of hearing aid benefit in older adults –less so for younger adults (Fullgrabe & Rosen, 2016).
- Social isolation and cognitive decline. Aiding lowers risk of cognitive disorders including Alzheimer's disease and dementia.
- Self-efficacy beliefs –does the patient feel able to manage hearing aids?

Motivation

- Why has the patient come in to see you?

- Are they ready to take action to address their communication challenges?

(History taking and questionnaires can provide this information)

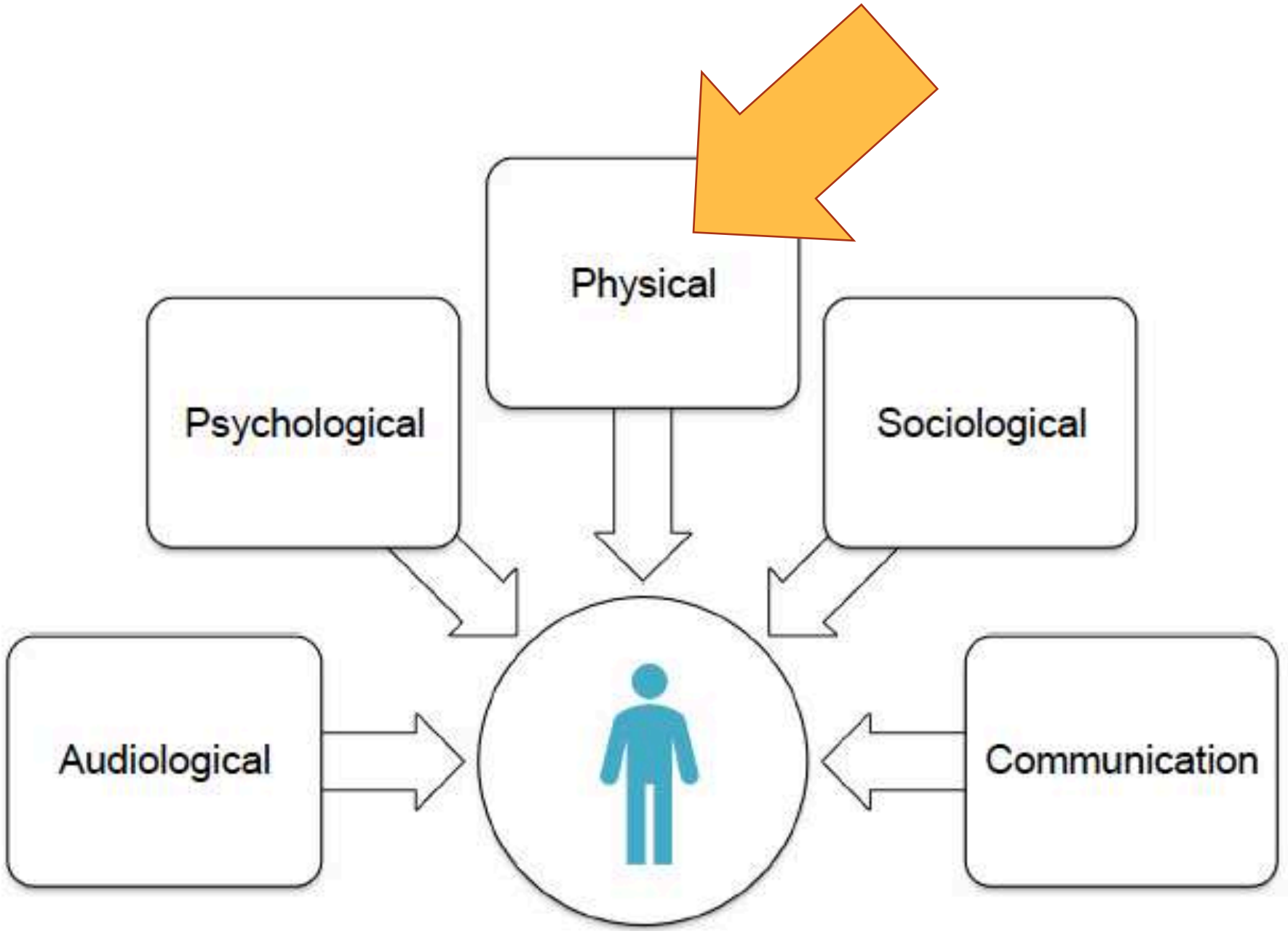
Motivation

- It is important to note that decisions about whether and when to fit hearing aids should not be based primarily on the degree of hearing loss.

- A systematic review by Knudsen et al. (2010) found that hearing sensitivity of pure-tone audiometry is a poor predictor of hearing aid use and that self-perceived activity limitations are better predictors.

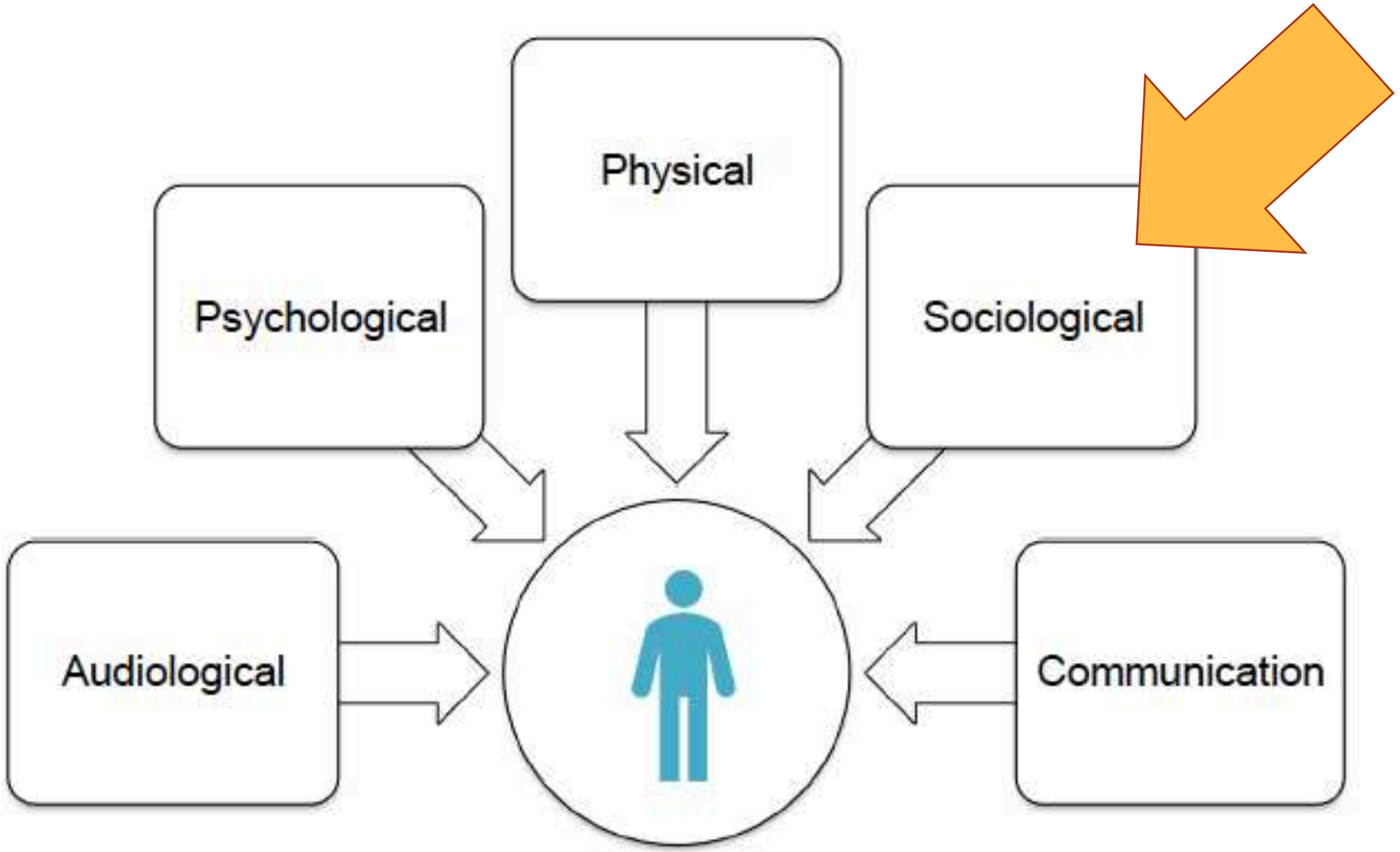
Attitudes and Perceptions

- Has the patient tried hearing aids before?
- Cosmetics.
- Disclosure of hearing status to others.
- Perception of patient’s own hearing difficulties.



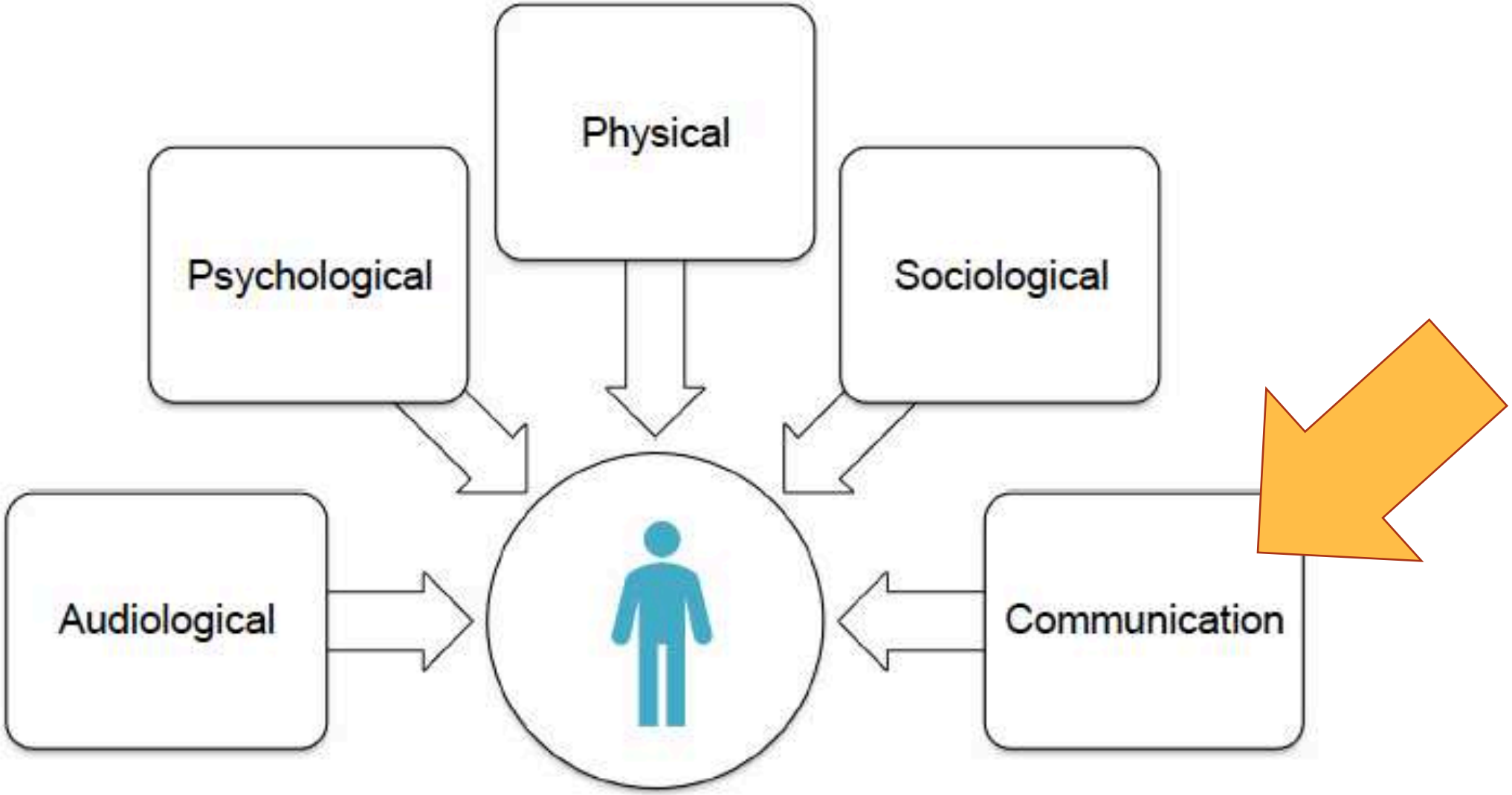
Physical Status

- Craniofacial status (Cleft palate – ME problems)
- Structure of outer & middle ear
- Visual status
  - Handling of hearing aid
  - Accessing support material
- Manual dexterity – handling of hearing aid
- General health
  - Conditions affecting hearing loss, and ability to manage ‘daily wear’



Sociological Status

- Family support
  - Living arrangements
  - Lifestyle
- Employment/education
- Social and physical environments
  - Hobbies, activities



Communication Status

- Auditory speech perception
- Auditory-visual speech perception
- Are the hearing aids for speech perception or awareness of sound (latter is common in patients who predominantly communicate using SL)

Hearing aid selection

Hearing Aid Selection

Electroacoustic characteristics

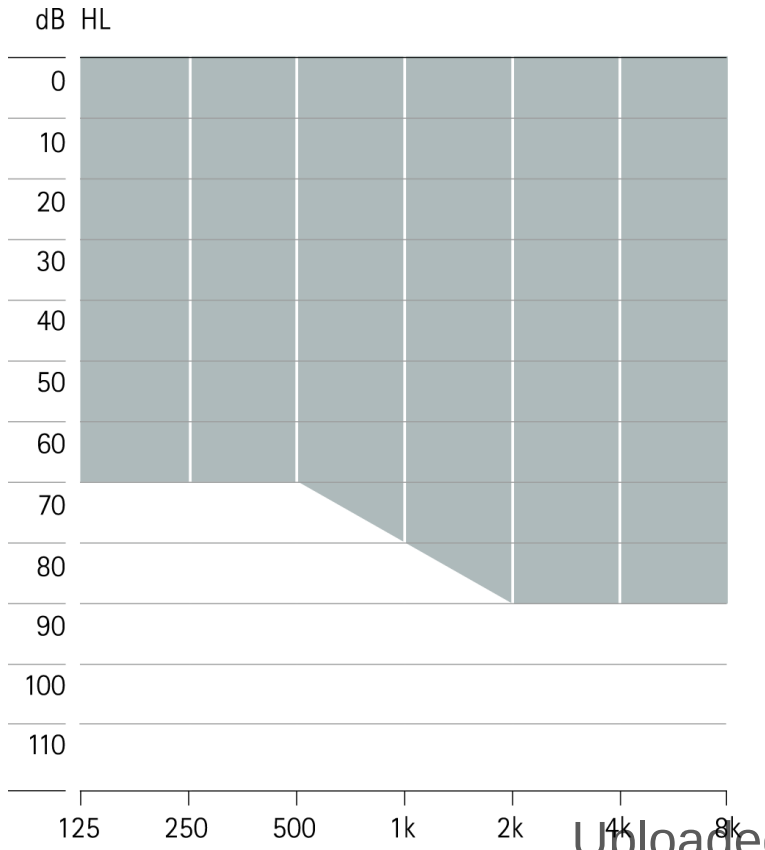
Non-electroacoustic characteristics

Electroacoustic characteristics

- Fitting range
- Acoustics
- Frequency shifting/lowering
- Additional hearing aid features

Fitting range

- Does the hearing aid provide adequate amplification?
- Is there scope for increasing gain if the hearing changes?



Hearing aid Acoustics

- Think about the hearing loss contour and how the ear mould/custom fitting may change the acoustics of the ear.

Additional hearing aid features

- Noise reduction algorithms
- Feedback reduction
- Directional microphones

Non-electroacoustic characteristics

- Unilateral vs bilateral
- Form factor
- Controls
- Connectivity solutions
- Cost

Unilateral vs bilateral

Binaural processing:

- Loudness summation
- Localisation -ITDs & ILDs
- Speech intelligibility particularly in noise
- Auditory deprivation

Style/Form Factor

Ease of handling

- Insertion/removal
- changing batteries

Appearance of hearing aids

- Remember, motivation is the best predictor of self-perceived benefit

Controls

- **Volume control**
  - Consider accidental activation
  - Key requirement in fluctuating hearing loss
- **Profiles/programs**
  - Balance between giving the patient control over what they hear and ensuring consistent auditory input.
- **How easy are they to use?**

Connectivity Solutions

- Broadly help with improving the SNR
- Multiple devices can be confusing for some patients
- However can really help other patients with accessing telephone, TV, and remote mic (engaging in meetings)

Cost

- Substantial investment for patient and/or department
- Devices need replacing after approximately 5 years (some shorter/longer lifespans)
- Cost effectiveness?

Recommended Reading(s)

- Fitting and Dispensing Hearing Aids –Taylor & Mueller – Chapter 6

- Mueller (2016)

  https://www.audiologyonline.com/articles/hearing-aid-selection-fitting-tips-17202