

# **Aural Rehabilitation and Challenges Associated with Participation and Compliance**

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# The brain must.....

- Detect
- Discriminate
- Localize
- Segregate auditory figure from ground
- Perceptually learn new as well as familiar auditory dimensions
- Recognize and identify the source
- Introspect the perceived sound

Phillips, 2002

# Gatehouse characterizes hearing disability as being embodied by poorer:

- Speech communication
- Access to environmental and other non-speech sounds
- Spatial hearing
- Selective attention

# What hearing aids don't do

- resolve impaired frequency resolution
- rectify impaired temporal processing
- undo maladaptive listening strategies
- Provide proper localization cues\*
- “properly” reverse neural plastic effects
- correct for changes in cognitive function
- meet “unrealistic” expectations



Returns and exchanges average as high as 20% for hearing aids.....Blaming failure on a single factor is too simplistic

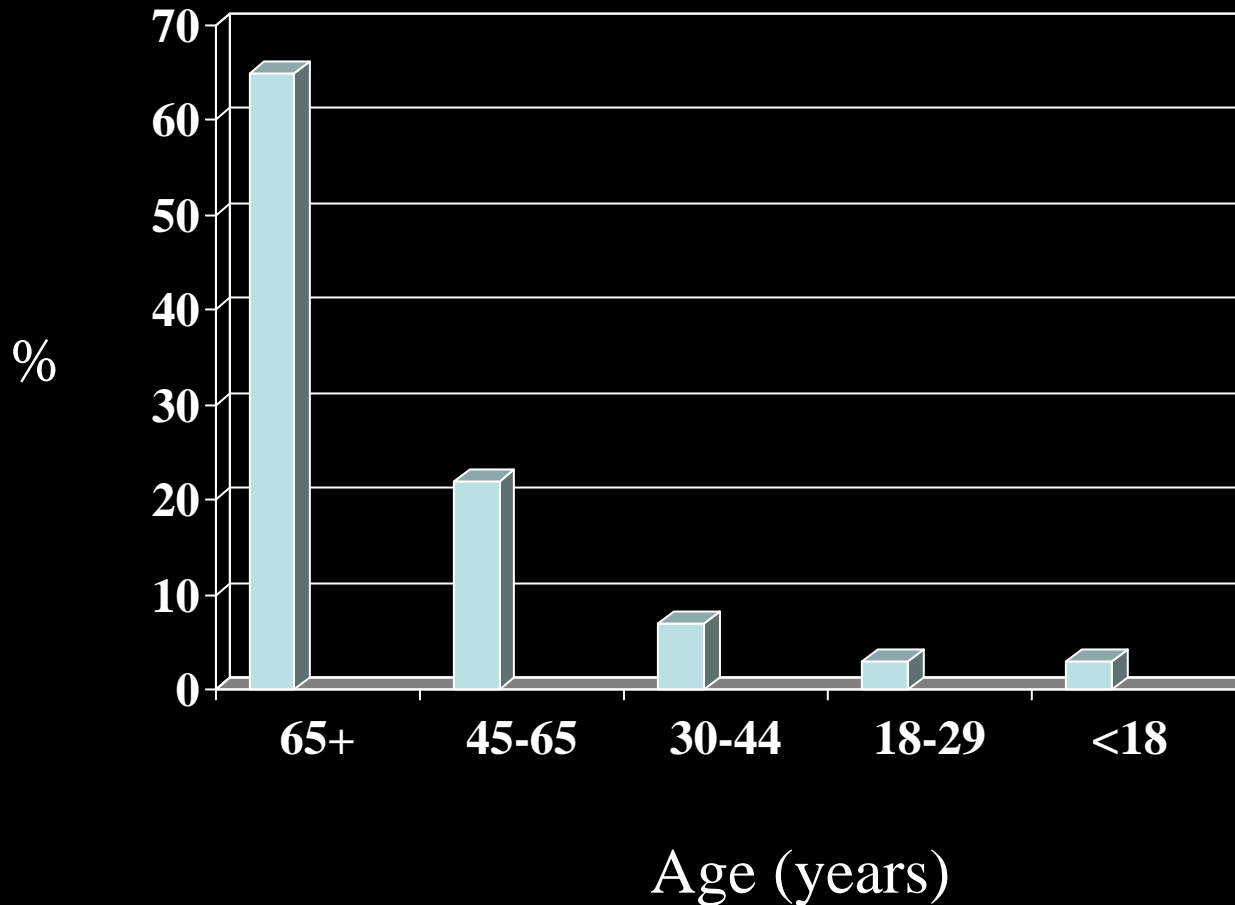
Failure is a product of:

- inaudibility
- poor benefit/cost ratio
- unrealistic expectations and inadequate counseling
- neural plasticity
- cognitive changes
- poor listening habits

# Expectations vs. Goals

- Expectations has a product orientation
  - Patient assumes passive role
  - Whatever goes wrong is the professional's fault
- Goals has a rehabilitation orientation
  - Patient assumes active role
  - Patient shares in the process

# Hearing aid patients by age



From Strom, Hearing Review, 2001

# Impact of aging on speech perception

Even in the absence of hearing loss, older subjects require 3-5 dB higher SNR than young listeners (Schneider, Daneman and Murphy, 2005).



Threshold elevation can account for nearly all of the changes in speech perception with age (in quiet or in less demanding listening environments.)

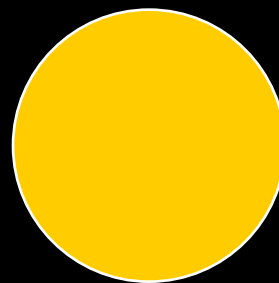
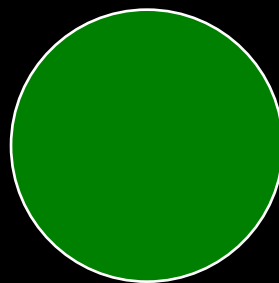
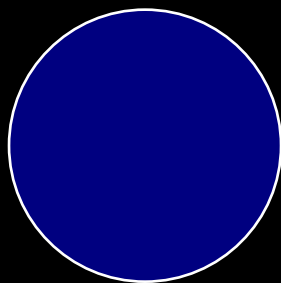
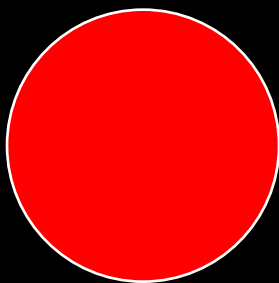
Humes 1996

# Perceptual and cognitive declines (resource limitations) in elderly

- Speed of processing
- Working memory
- Attentional difficulties (noise, distraction and executive control)

Wingfield and Tun, 2001-  
Seminars in Hearing

**Say the colors of the dots  
as quickly as you can  
from left to right**



**Say the colors in which  
the words are printed  
as quickly as you can  
from left to right**

**HARD WHEN OVER AND**

**Say the colors in which  
the words are printed  
as quickly as you can  
from left to right**

**GREEN**

**BLUE**

**YELLOW**

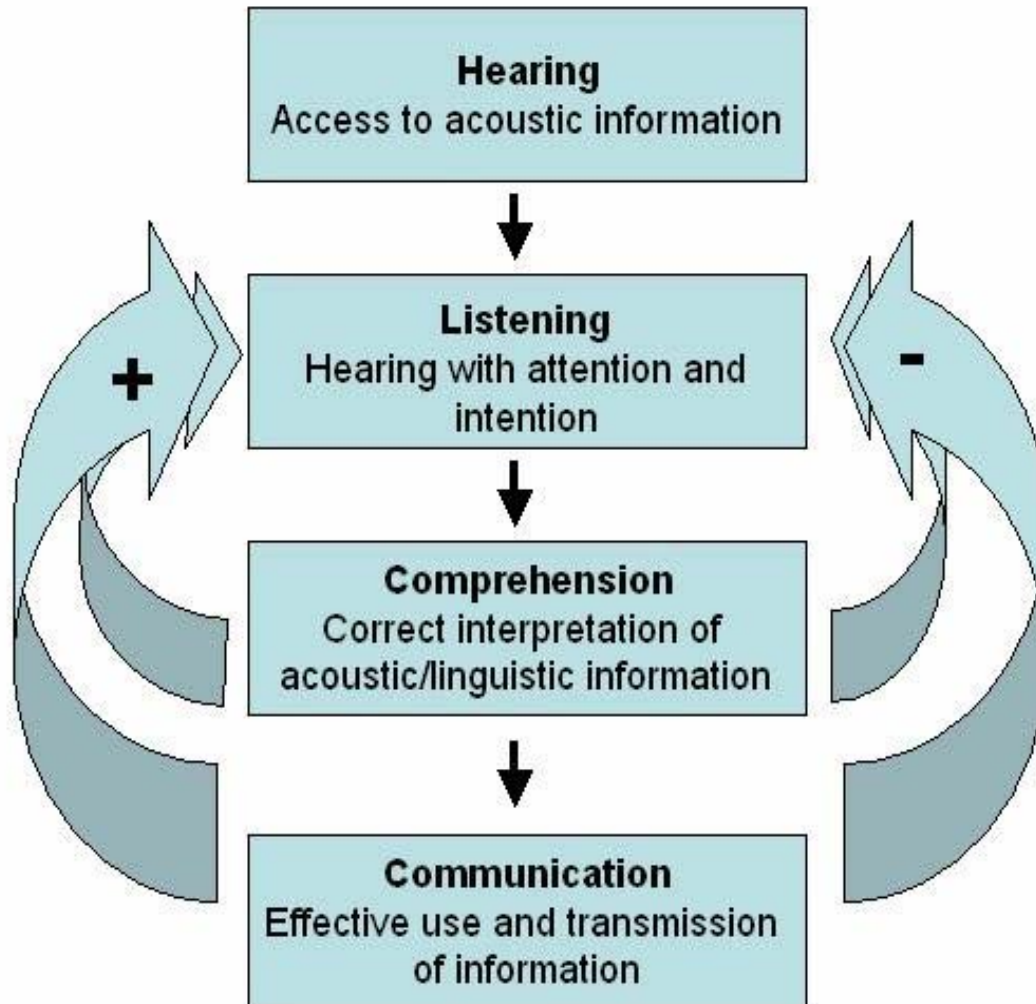
**RED**



Why do patients seek our help?

# Elements of Communication

(Kiessling, et al, 2003; Sweetow and Henderson-Sabes, 2004)





## Potential impediments to achieving mastery of these elements

- Hearing loss
- Neural plasticity and progressive neurodegeneration
  - Morest, 2004
- Global cognitive decline
- Maladaptive compensatory behaviors
- Loss of confidence
  - Saunders and Cienkowski (2002)

# The biggest mistake we currently make may be.....

- Making hearing aids the focus of our attention, when the focus should be....
- Enhancing communication

# How to do it?

- All patients should be told at the outset of the appointment (even during the scheduling) that they will be receiving:
  - a communication need assessment and
  - an overall individualized communication enhancement plan that will consist of...
    - Education and counseling
    - communication strategies
    - individualized auditory training
    - hearing aids and / or ALDs
    - group therapy

# Communication Needs Assessment

*Measures beyond the audiogram that can be used to define residual auditory function.*

## **Subjective measures**

- Characteristics of Amplification Tool (COAT)
- The Client Oriented Scale of Improvement (COSI)
- Expected Consequences of Hearing Aid Ownership (ECHO)
- Hearing Handicap Inventory for the Elderly – Screening HHIE-S
- The Hearing Handicap Inventory for Adults (HHIA)
- Communication Scale for Older Adults (CSOA)
- Communication Confidence Test

# Communication Needs Assessment

*Measures beyond the audiogram that can be used to define residual auditory function.*

## **Objective procedures**

- QuickSIN
- Hearing in Noise Test (HINT)
- Acceptable Noise Levels (ANL)
- A test of binaural interference
- Letter – number sequencing (listening span)

## **Combined methods**

- Performance Perceptual Test (PPT)

# Benefits of AR Programs

- Reduced return rate of hearing aids
- Increased sale of assistive listening devices
- Fewer trouble-shooting visits
- Referrals from friends, co-workers, and family members
- Free advertising provided by satisfied hearing aid users
- Good community relations



# So why should AT be expected to produce benefit?

- Acuity and sensitivity are lower level functions
- Higher level functions (i.e. speech in noise) require more complex (hierarchical) processing (such as hemifields and temporal analysis) that may utilize multiple channels of perceptual processing not governed by critical bands

# What happened to Aural Rehabilitation?

- declined because outcome measures concentrated on auditory training and speechreading and didn't consider emotional and psychological by-products
- boring?
- too speech pathology like?
- too time consuming?
- lack of reimbursement

# Aural (auditory, audiologic) rehab.....

Should NOT be considered an add-on!

Incorporate it at the very beginning

# What we can learn from learning theory?

1. Distribution of practice should be suitable for the task to be learned.
2. Active participation by the learner is superior to passive receptivity.
3. Practice material should be varied so that the learner can adapt to realistic variation and so that his motivation during drill is improved.
4. Accurate performance records need to be maintained in order to evaluate progress and effects of training.
5. The most useful single contribution of learning theory is the provision for immediate knowledge given to learners regarding their performance.

Wolfle (1951)

Experience is a wonderful  
thing.

It enables you to recognize a  
mistake when you make it  
again.

# Training is not a new concept....

But now we have the means to do it effectively.....via computer aided auditory rehabilitation....so that.....

- It can be performed in a private, non-threatening environment
- It can proceed at the individual's optimal pace
- Progress assessment can be done automatically

# Disclosure



# LACE

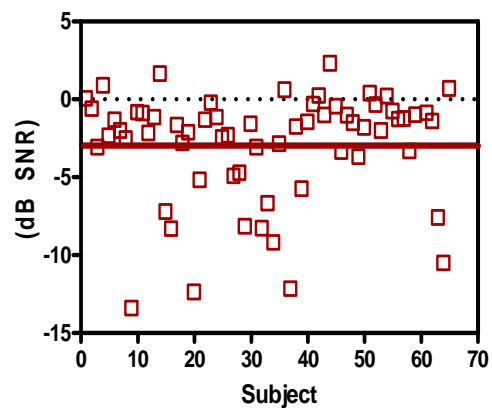
## (Listening and Communication Enhancement)

- Cognitive
  - Auditory Working Memory
  - Speed of Processing
- Degraded and competing speech
  - Background noise
  - Compressed speech
  - Competing speaker
- Context / Linguistics
- Interactive communication

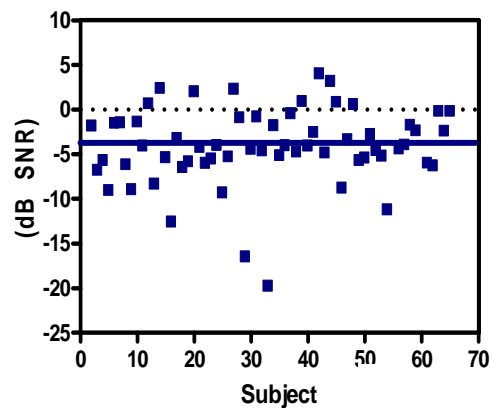
*All of the above are designed to enhance listening and communication skills and improve confidence levels*



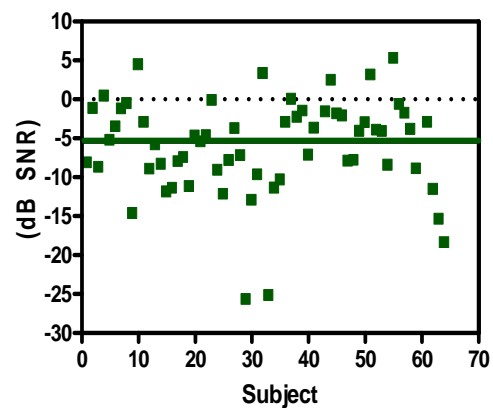
Difference in Average S/B Score  
1st to 4th Quarter



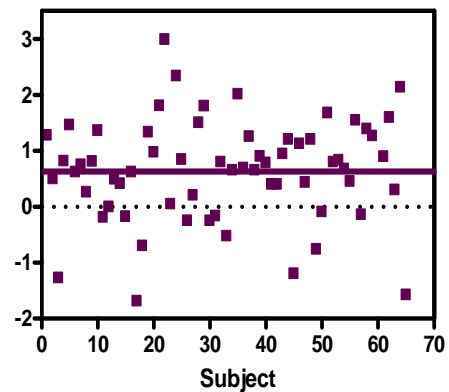
Difference in Average CS Score  
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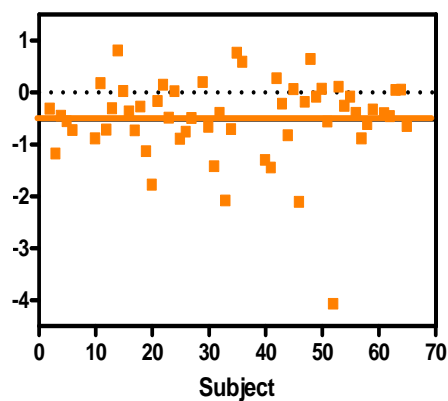
Difference in Average TC Score  
1st to 4th Quarter



Difference in Average TW Score  
1st to 4th Quarter

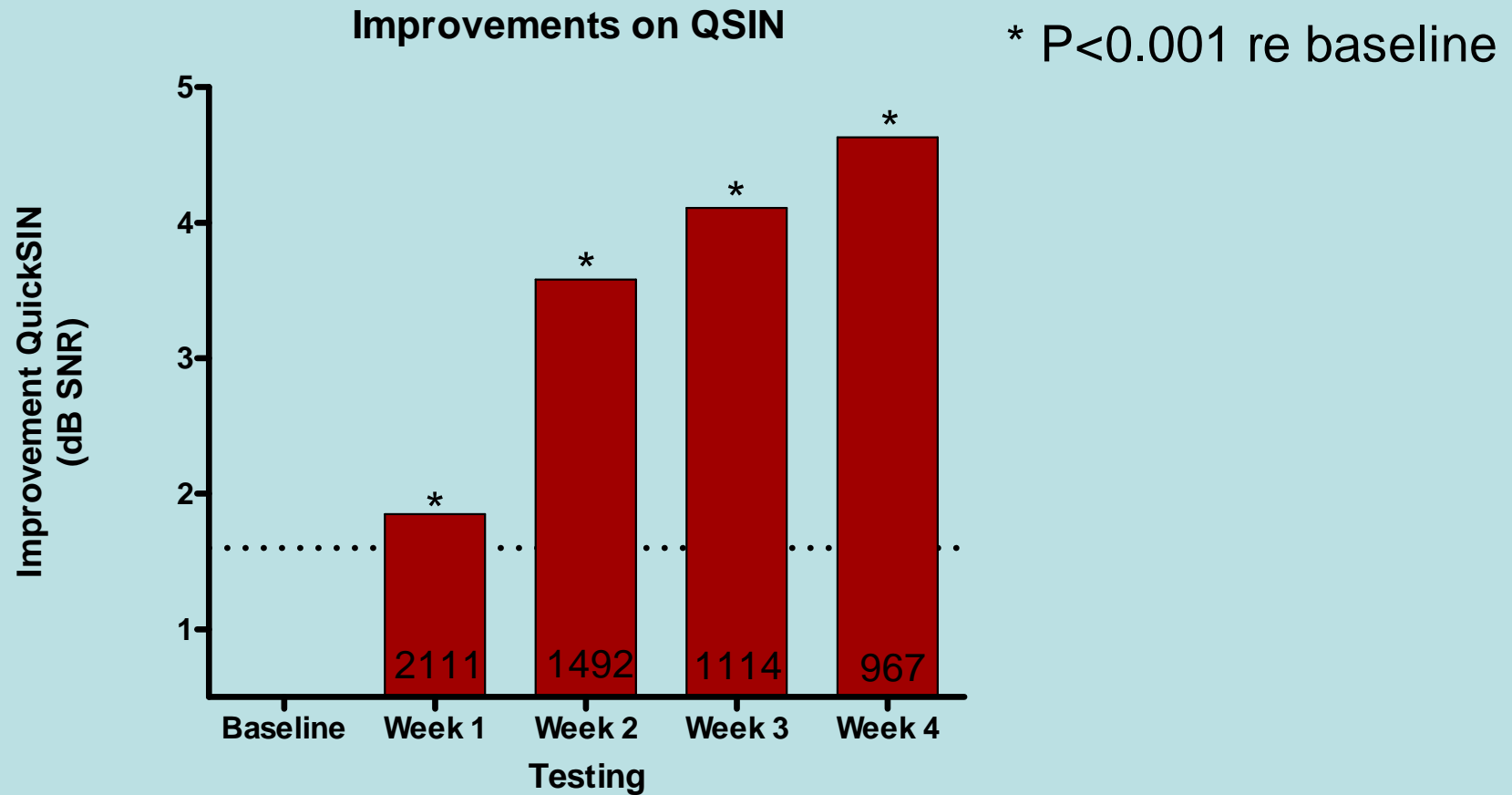


Difference in Average MW  
Score 1<sup>st</sup> to 4<sup>th</sup> Quarter



# Why do individuals with similar losses differ so much?

- Subtle reorganization could produce diverse presentations by scattering the deficit in neural space
- And, individuals' brains differ (i.e. variations in fissural patterns and propensities for adaptation and recovery)

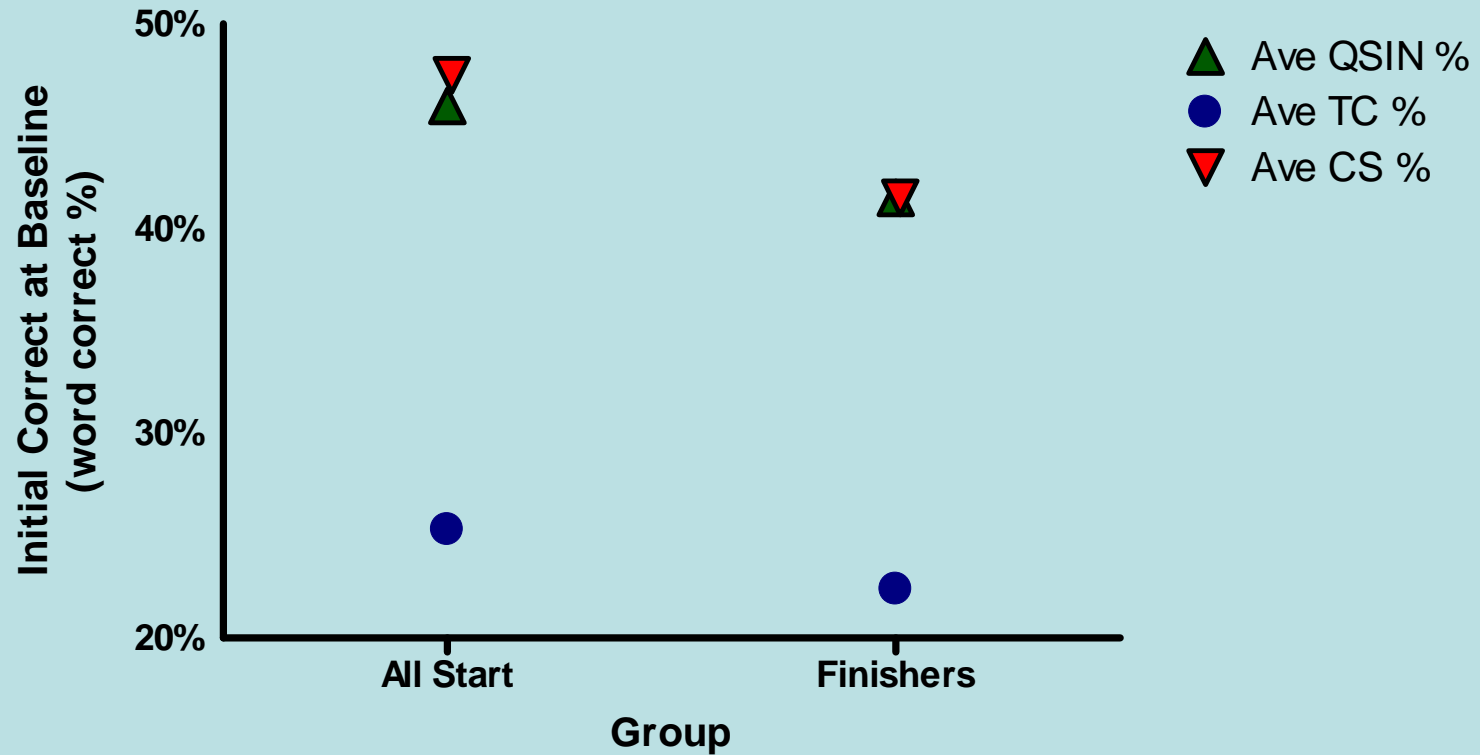


All changes are significant from week to week, except 3 vs 4

Notice the N!!!



## Initial Scores of All Trainees vs Trainees that Finish



# The biggest unresolved questions

- **Will patients do it? Cost of effort (Bentler)**
  - They do for physical therapy Why? MD recommendation, immediate modeling of therapy after surgery?
  - Wayner for 14 years 87% group participation; 3%RFC
- **Will audiologists recommend it?**
  - Impact on return for credit rate?

# Why audiologists don't recommend AR

- Belief that hearing aids alone are adequate
- Lack of belief in outcome measures
- Belief that additional resources (time, money) are required
- Lack of reimbursement
- Reluctance to ask patients to spend more time or money
- Inertia
- Laziness

# Improving Compliance

# Typical non-compliance rates

- About 50% for medication regimens and “much higher” for lifestyle prescriptions and other more behaviorally demanding regimens (Haynes et al, 2002).
- Non-compliance with prescribed medication regimens for hypotensive treatment ranges from 5% to 80% among glaucoma patients (Olthoff et al, 2005).
- Vincent (1971) reported that 43% of glaucoma patients refused to take the physician-ordered measures necessary to prevent blindness, even when that refusal had already led to impairment in one eye.
- Similar percentages were recently reported by Bakhshi et al (2010) in a study of patients with retinoblastoma.



# Patients who don't follow orders.....

- defy prediction
- no defining characteristics as a group
- intelligence, age, gender, and economic background not correlated
  - Cameron, 1996; Bakshi, 2010

# Social and psychological factors thought to influence compliance

- knowledge and understanding including communication
- quality of the interaction including the patient-provider relationship and patient satisfaction
- social isolation and social support including the effect of the family
- health beliefs and attitudes-health belief model variables
- factors associated with the illness and the treatment including the duration and the complexity of the regimen.

• Cameron C. 1: J Adv Nurs. 1996 Aug;24(2):244-50.

# Reasons

- Denial of the problem
- Cost (money, time, risk of failure) of the treatment
- Difficulty of the regimen
- Unpleasant outcomes or side-effects of the treatment
- Lack of trust
- Apathy
- Previous experience

# More reasons

- **Symptoms disappear before treatment is finished (inconsistency)**
- **The treatment causes more symptoms than the illness**
- **“It can’t happen to me”**
- **Life-style changes are too hard to make**
- **Work and family demands interfere with following the therapy correctly**
- **Patients come to identify the treatment with their illness**

# Predictive factors

- Experience with the health care system.
  - In a study of 186 physicians and their patients with diabetes, heart disease, and hypertension, the strongest correlation with whether they would stick with treatment was for whether patients got their questions answered.
- Other factors that mattered
  - doctor's level of job satisfaction
  - how many patients he or she sees per week
  - whether patients scheduled a follow-up appointment

DiMatteo, et al, 1993

When patients do ask questions, they are usually interrupted within 23 seconds

- Marvel MK, Epstein RM, Flowers K, Beckman HB. Soliciting the patient's agenda: have we improved? *JAMA*.1999; 281(3):283 - 287.

## Still more reasons

- Failure to persuade that compliance is in their best interest
- Lack of “rewards” or recognition for effort
- Patients are “experts” about their own lives and experiences
- Audiologists may not always know when their patients are complying

– Haynes, et al, 2006

## Difference between non-compliance with physicians versus non-compliance with audiologist

- Medical condition deteriorates versus status quo for hearing
- The power of the institution (hospital) to compel patients to comply is eliminated when the rehabilitation takes place at home.



# Suggestions

- Compliance generally increases if patients are given clear and understandable information about their condition and progress in a sincere and responsive way
- Simplify a patient's instructions or treatment regimen as much as possible.
- Having systems in place to generate patient treatment or appointment reminders

# More suggestions

1. Establish a sense of trust
2. Discover the patients' needs
3. Dialogue, rather than monologue
4. Don't force “the close”
5. Always follow up (tele-health?)

Pawar, 2005

# Listen and respect your patients' concerns

- Finding out patients' attitudes and past experiences can deeply affect compliance and save time and problems later.
- If, for example, your patient is firmly opposed to engaging in therapy, you could ask the following open-ended questions:
  - When you came in today, what were you hoping I might do for you instead of prescribing this therapeutic approach?
  - What are your main concerns about doing this therapy?
  - What do you think might happen if you do it?

# Recommendations on monitoring

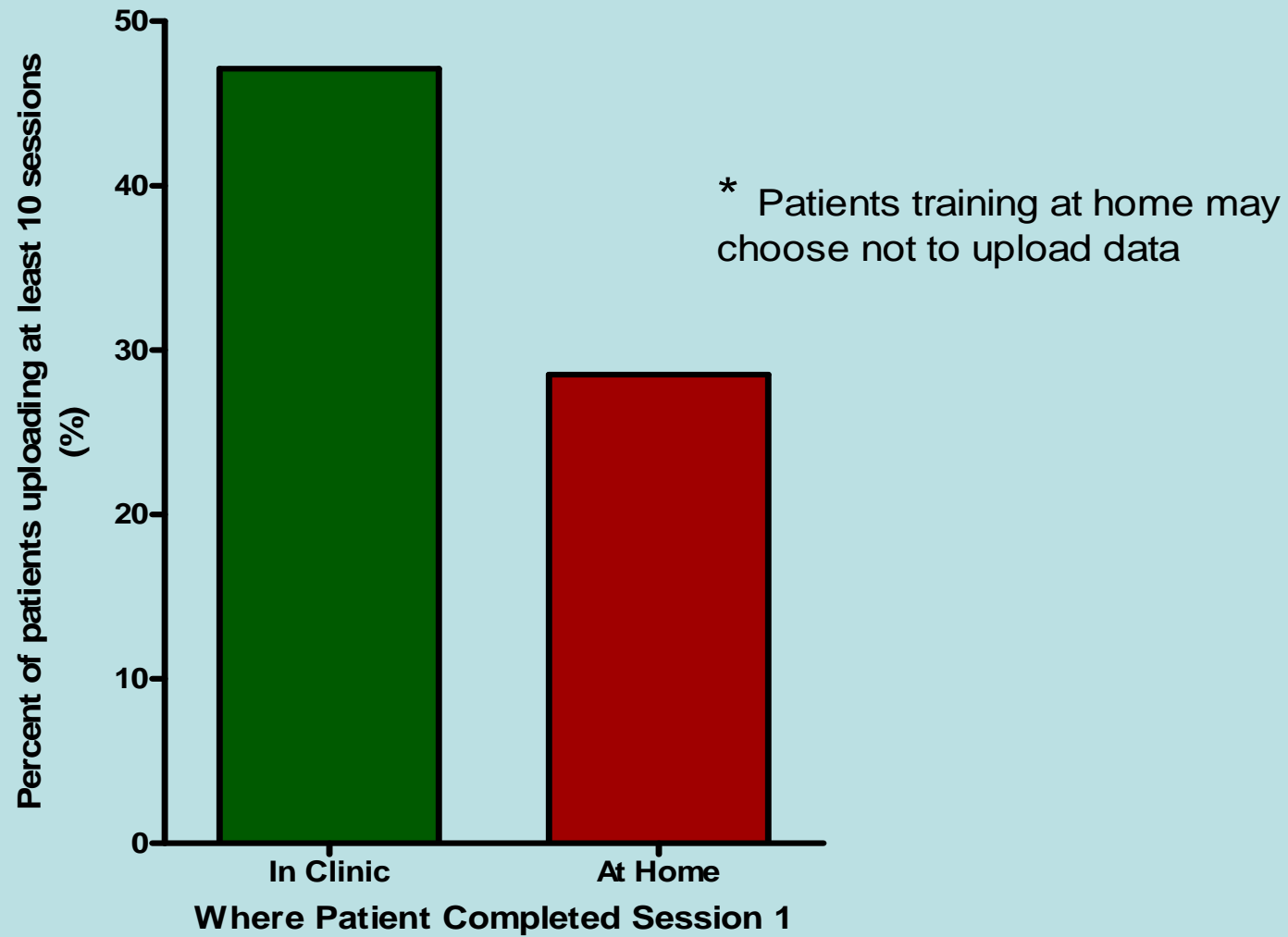
- Call two days after dispensing
- Check in every few days
- If patient stops training, call to find out why
- Remind patient that training effects continue right through to the end
- New auto-monitoring

# LACE Clinic Edition (CE)





## LACE CE and Compliance



# Effects of Training Commitment Agreement

# Commitment Form

**I agree to complete 10 LACE sessions**

— Patient name

**I will finish the 1st five sessions by:**

**I will finish the 2nd five sessions by:**

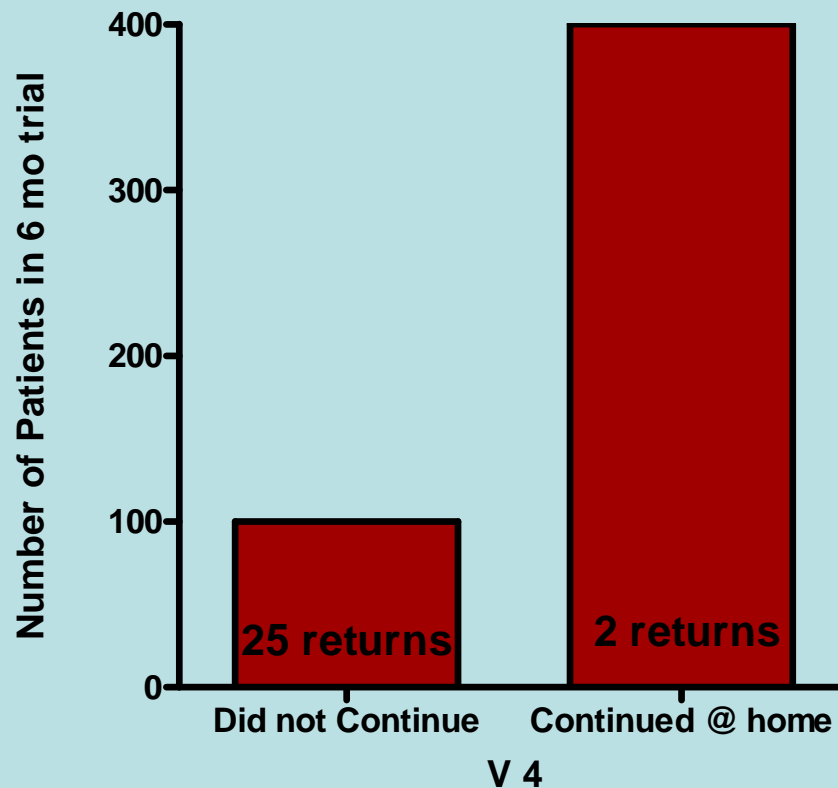
***Questions? Call your LACE Coach,***  
\_\_\_\_\_ ***at***

\_\_\_\_\_.





## Posey Compliance Data Beta v. 4



### 6 month trial of CE (one session in clinic)

80% compliance and 0.005% RFC overall

25% RFC of patients that did not train  
(*same RFC as the 6 months prior to study*)

(*0% RFC if patient trained 4 days or more*)

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Thanks for listening!