EVIDENCE-BASED PRACTICE

Mario Svirsky and Sarah Gallant-New York University

Learning Objectives

- Learn the value of using evidence to shape clinical decision-making
- Review the types of studies that can be used as sources of evidence
- Understand the levels of evidence and how to use them to assess the quality and value of information
- Develop a system for using evidence-based practices in daily work

What Is Evidence-Based Practice?

- *"Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research."*
  - Dr. David L. Sackett, NHS Centre for Evidence Based Medicine

What Is Evidence-Based Practice?

Benefits of Evidence-Based Practice

- Reduce unnecessary costs
- Improve quality of care
- Efficiently evaluate the potential of new technologies

Barriers to EBP

- Educational
  - Lack of skills to assess and apply evidence among clinicians
  - Teaching based on accepted practices rather than evidence

Barriers to EBP

- Research
  - Lack of high-quality studies
  - Poor or incomplete reporting of research results

Barriers to EBP

- Clinical
  - Using understanding of disease process as the only guide for clinical practice
  - Relying exclusively on one's own training and common sense to evaluate new tests and treatments

Levels of Evidence

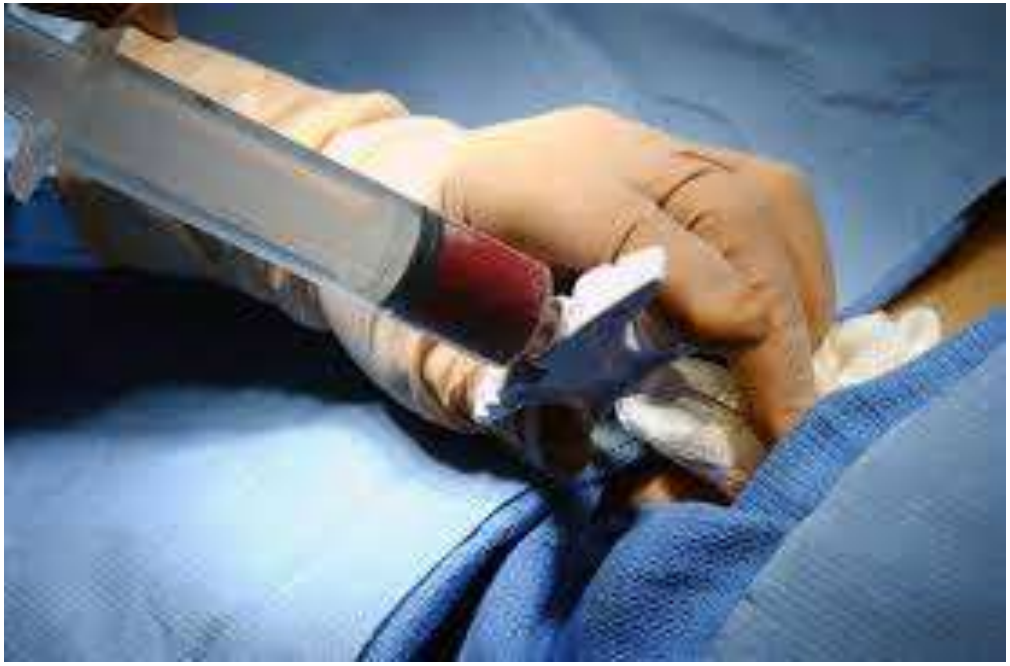
A Cautionary Tale

- "Bad science and breast cancer", Discover Magazine, August 2002, by Shannon Brownlee and Dan Winters
- Early 1980s
  - Dr. William Peters and colleagues at Dana-Farber Cancer Institute decided to **use combination chemotherapy with a bone marrow transplant** as a novel treatment for **large breast cancers**

Discover Magazine, August 2002

A Cautionary Tale

- Bone marrow was harvested before chemotherapy
- Injected back to the body after chemotherapy to rebuild immune system



A Cautionary Tale

- The technique had cured leukemias and lymphomas
- Involved high doses of several chemotherapy drugs to kill the tumor
- Side effect: many other cells in the body, including bone marrow, would be killed

Discover Magazine, August 2002

A Cautionary Tale

- Doctors were pleased to see the huge tumor disappear in a week
- Repeated on 29 women
  - Each responded well initially
  - 3 made a full recovery
- Doctors believed they had a cure for cancer, and the news spread

Discover Magazine, August 2002

A Cautionary Tale

- Insurers of these patients were reluctant to cover the bill: **$125,000 - $500,000**
  - Argued that the treatment was unproven and experimental
  - Women sued insurers

Discover Magazine, August 2002

A Cautionary Tale

- Evidence
  - Doctors testified that high-dose chemotherapy was "accepted practice"
  - Dr. Peters, 1993 paper, Journal of Clinical Oncology
    - Compared results of his high-dose cases with results for patients who had received standard doses of chemotherapy elsewhere
      - 70% of Peters' patients were cancer-free 48 months after treatment
      - Only 35% of standard dose chemo patients were cancer-free
      - Not a Randomized Controlled Trial

Discover Magazine, August 2002

A Cautionary Tale

- More and more began to try the technique for their high-risk breast cancer patients
  - Side effects included painful destruction of intestinal lining, nausea, vomiting, diarrhea, infections, organ damage
  - 1 in 5 died directly from the treatment
  - Nonetheless, high-stage breast cancer had a 50-70% chance of relapsing after standard chemotherapy

Discover Magazine, August 2002

A Cautionary Tale

- By 1994, 4000 bone marrow transplants were being performed on breast cancer patients each year
- However, some doctors and scientists realized there was still no proof that the treatment saved lives
  - Peters 1993: subjects chosen for high dose chemo were healthier at baseline than most breast cancer patients and might have done just as well on standard dose chemo

Discover Magazine, August 2002

A Cautionary Tale

- A randomized clinical trial was funded by the NIH
  - Women with breast cancer likely to recur after surgery
  - Randomly assigned to
    - moderately high dose of chemotherapy
    - or high-dose chemotherapy and then a stem-cell transplant
  - Few women were willing to sign up due to risk of not being assigned to the high-dose group
  - Trial took twice as long as planned

Discover Magazine, August 2002

A Cautionary Tale

- 1999 American Society of Clinical Oncology Meeting
  - NIH trial showed women receiving transplant were slightly more likely to stay free of cancer
    - Survival advantage cancelled out because women were also more likely to die from the transplant treatment
  - 3 smaller trials found no significant benefit in high-dose chemo and transplant over standard treatment
  - But a fifth trial underway in South Africa was showing promising results!

Discover Magazine, August 2002

A Cautionary Tale

- After the meeting, two American oncologists organized an audit of the South African data
  - There were charts for only 62 out of 154 patients
  - Those 62 charts only had 1-2% of the typical information
  - They included numerous unsigned notes and other problems
  - No evidence of randomization
  - No records of patients receiving standard treatment
  - American Society of Clinical Oncology: the South African's results "should not be used as the basis for the treatment of any patient."
  - Too late for six patients from Seattle under the age of 50 who were given the South African regimen for women with metastatic breast cancer

Discover Magazine, August 2002

A Cautionary Tale

- **20 years** passed from the first trial of high-dose chemotherapy to the first clinical trial's conclusion
- Total cost: about **$3 billion**
- **4000-9000 women** estimated to have died from the treatment rather than their breast cancer

Discover Magazine, August 2002

Steps in the EBP Process

- 1: Frame the Clinical Question
- 2: Find the Evidence
- 3: Assess the Evidence
- 4. Make the Decision

http://www.asha.org/members/ebp/

1: Framing the Clinical Question

Population	Intervention	Comparison	Outcome
Elderly patient with profound hearing loss	Cochlear implantation	Hearing aids	Improved speech perception
Pre-lingually deafened children	CI before age 2	CI after age 4	Integration into mainstream schooling
Adults with unilateral hearing loss and tinnitus	Unilateral CI	No intervention	Tinnitus resolution

2: Finding the Evidence

- Cochrane Library
- PubMed/MEDLINE
- EMBASE
- CINAHL (Cumulative Index to Nursing and Allied Health Literature)

2: Finding the Evidence

- **Cochrane Library**
  - completed systematic reviews
  - protocols for questions of therapy
  - abstracts of effectiveness
  - clinical trials registry
  - health technology assessment
  - economic evaluation studies

THE COCHRANE COLLABORATION®

2: Finding the Evidence

- **PubMed/MEDLINE**
  - Largest online bibliographic database of health-related studies

2: Finding the Evidence

- **EMBASE**
  - Focuses more on drug-related research, clinical trials, and some conference proceedings than PubMed

2: Finding the Evidence

- **CINAHL** (Cumulative Index to Nursing and Allied Health Literature)
  - Focused on allied health and nursing
  - More likely than MEDLINE to contain studies with negative findings

3: Assessing the Evidence

Types of Evidence

- Meta-analysis and systematic review
- Randomized controlled trial
- Controlled trial
- Cohort study
- Case-control study
- Non-intervention studies with subject acting as own control
- Case series
- Case reports
- Opinions of respected authorities
- Reports of expert committees

Expert Opinions

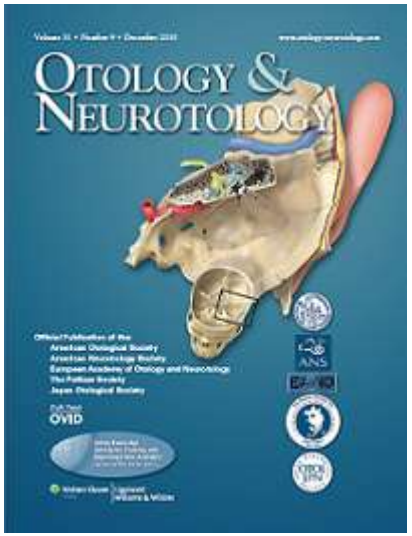
- Based on physiology, bench research, or clinical experience
  - Individuals
  - Committees

Expert Opinions

- Limitations:
  - Vulnerable to:
    - Selective use of evidence
    - Bias stemming from personal experience
    - Flawed assumptions about disease
    - External influences (professional norms, patient expectations, etc)

Example: Expert Opinions

- **European Bilateral Pediatric Cochlear Implant Forum Consensus Statement**
- Ramsden JD, Gordon K, Aschendorff A, et al. *Otology and Neurotology*, 2012; 33:561-565.



European Bilateral Pediatric Cochlear Implant Forum Consensus Statement

- Goals
  - "Establish a consensus statement that could guide centers developing current best practice for treatment of bilateral sensorineural deafness in children with cochlear implants"
- Method
  - 2 day meeting attended by delegates and scientific experts
  - Presented and interpreted existing literature
  - Discussed and agreed on a statement

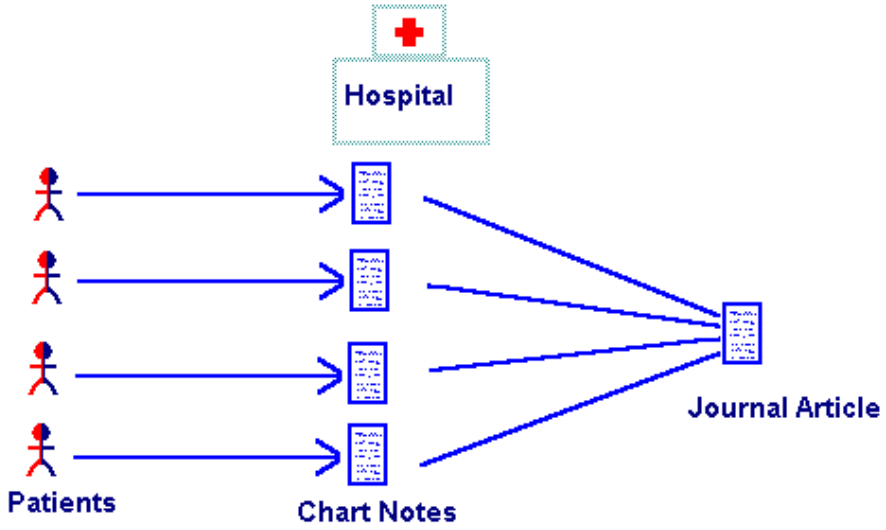
European Bilateral Pediatric Cochlear Implant Forum Consensus Statement

- Conclusions

  - "Currently we feel that the **infant or child with unambiguous cochlear implant candidacy should receive bilateral cochlear implants simultaneously as soon as possible after definitive diagnosis of deafness** to permit optimal auditory development;
  - an **atraumatic surgical technique** designed to preserve cochlear function, minimize cochlear damage, and allow easy, possibly repeated re-implantation is recommended."

Case Series and Case Reports

- Interesting observations about a single patient or selected group of patients
  - No controls
  - Patients often seen over a short time course



Consecutive or non consecutive

Case Series and Case Reports

- Strengths
  - Easy to write
  - Can be used to generate hypotheses or direct design of future studies

Case Series and Case Reports

- Limitations
  - Susceptible to bias regarding subject selection and characteristics observed

Example: Case Series

- **Cochlear implantation for unilateral deafness with and without tinnitus: A case series**
- Tavora-Vieira D, Marino R, Krishnaswamy J, Kuthbutheen J, Rajan GP. *Laryngoscope*, 2013; 123(5): 1251-1255

Cochlear implantation for unilateral deafness with and without tinnitus: A case series

- Goal
  - Investigate cochlear implantation in patients with unilateral deafness with and without tinnitus
- Design
  - Prospective case series

Cochlear implantation for unilateral deafness with and without tinnitus: A case series

- Method
  - 9 postlingually deafened subjects with unilateral hearing loss
    - With and without tinnitus ipsilaterally
    - Functional hearing in contralateral ear
  - Implanted with standard electrode

Cochlear implantation for unilateral deafness with and without tinnitus: A case series

- Method
  - Speech perception in noise was tested using the Bamford-Kowal-Bench presented at 65 dB SPL
  - Speech, Spatial, and Qualities (SSQ) of Hearing Scale was used to evaluate the subjective perception of hearing outcomes
  - Tinnitus Reaction Questionnaire assessed the effect on tinnitus

Cochlear implantation for unilateral deafness with and without tinnitus: A case series

- Results
  - All patients were implanted with the Med-El Flex soft electrode
  - Are regularly wearing the speech processor and find it beneficial in improving their ability to hear, particularly in noise
  - Decrease of tinnitus perception reported
  - Improvement of sound localization sounds reported

Cochlear implantation for unilateral deafness with and without tinnitus: A case series

- Conclusions
  - "CI was successful for all nine patients, with improvement of speech recognition in noise, self-perceived improvement of hearing, and for tinnitus control"
  - "Several factors such as deafness duration, age of deafness onset, the presence of residual hearing, patient motivation, and the rehabilitation intensity need to be further investigated in order to understand their impact on performance after implantation."

Cochlear implantation for unilateral deafness with and without tinnitus: A case series

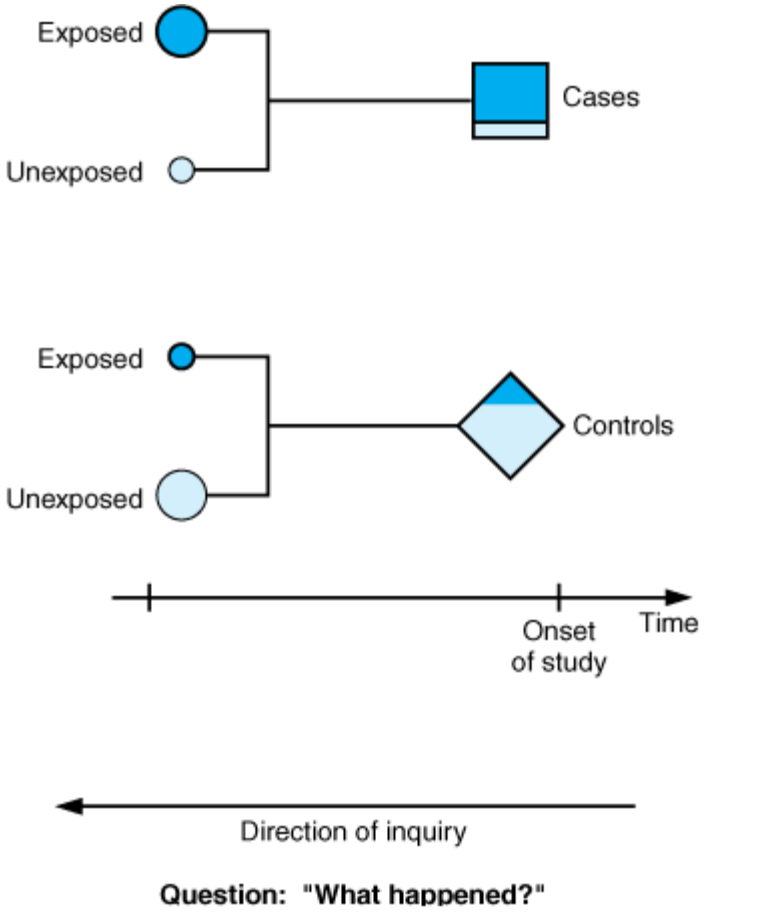
We can't tell whether the improvement is due to the intervention, procedural learning, or other factors.

TABLE II.
BKB-SIN SNR Values Pre-, and 3 Months Post-Cochlear Implantation; the Mean and SD for All Spatial Conditions.

	S0/N0 SNR (dB)			S0/Nci SNR (dB)			S0/Nhe SNR (dB)			Sci/Nhe SNR (dB)		
ID	Baseline	3 months	Improvement	Baseline	3 months	Improvement	Baseline	3 months	Improvement	Baseline	3 months	Improvement
S1	6	2.5	3.5	−3	−5	2	−1	−4.5	3.5	3	−0.5	3.5
S2	5	3	2	−2.5	−4.5	2	2	−3.5	5.5	4	−3	7
S3	4	2	2	−5	−5	0	3	0	3	0.5	−4	4.5
S4	12	7	5	−0.5	−1	0.5	5	0	5	3	−5	8
S5	5	0	5	−1	−1	0	3	0	3	5	0	5
S6	9	7	2	−2.5	−3	0.5	5	−1.5	6.5	3	−4.5	7.5
S7	8	7	1	−2	−3.5	1.5	−1	−3.5	2.5	−2	−3	1
S8	7	3.5	3.5	−4.5	−4	−0.5	−3	−3.5	0.5	3	−2	5
S9	−1	−1	0	−4	−3.5	−0.5	−2	−4.5	2.5	−1.5	−2.5	1
Mean	6	3	3	−3	−3	1	1	−2	4	2	−3	5
SD	4	3	2	2	2	1	3	2	2	2	2	3

Longitudinal Observational Studies

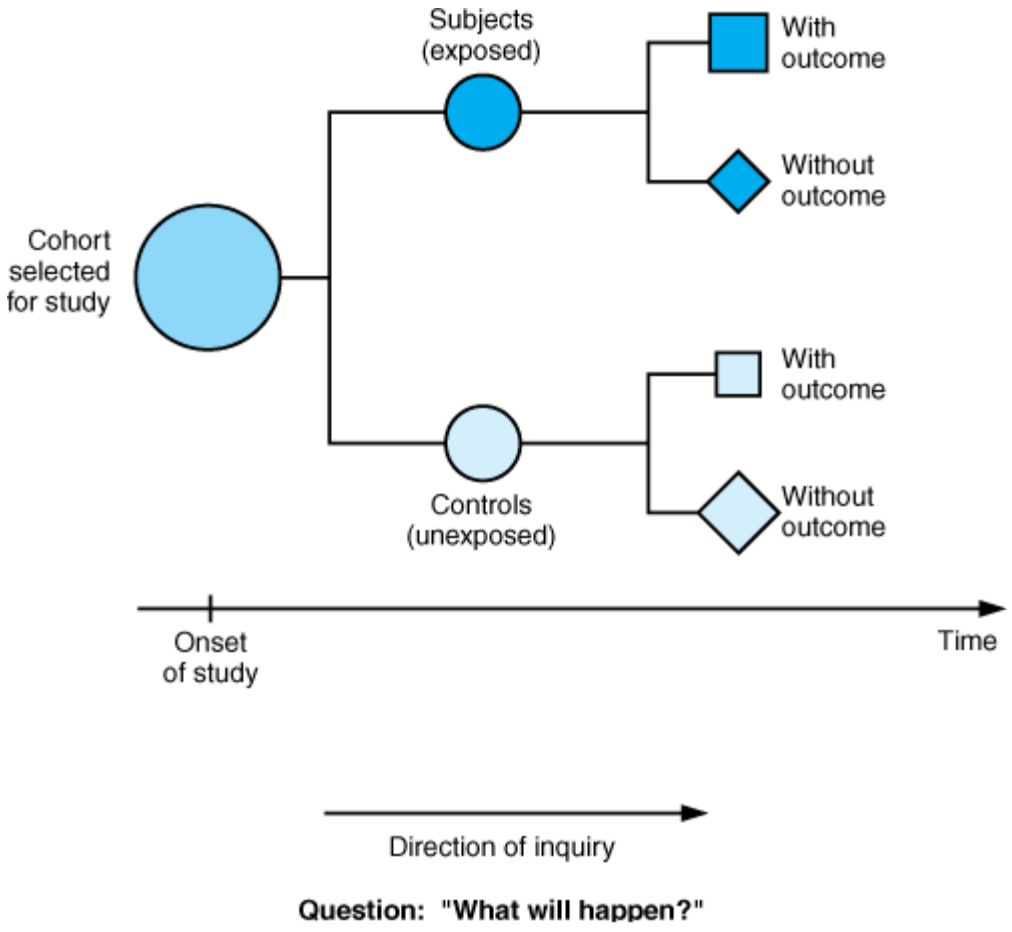
- Case-control
  - Retrospective



Source: Dawson B, Trapp RG: *Basic & Clinical Biostatistics*, 4th Edition: http://www.accessmedicine.com

Longitudinal Observational Studies

- Cohort
  - Prospective



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Case-control Studies

- Strengths
  - Good for rare diseases/events, examining conditions that develop over a long time, investigating preliminary hypothesis
  - Quick
  - Inexpensive

Case-control Studies

- Limitations
  - Many possible biases and errors
    - Observing a statistical relationship between two conditions does not mean that one condition actually caused the other
  - Depend on high-quality existing records
  - Difficult to select appropriate control group

Example: Case-Control Study

- **Case-Control Analysis of Cochlear Implant Performance in Elderly Patients**
- Friedland DR, Runge-Samuelson C, Baig H, Jenson J. *Arch Otolaryngol Head Neck Surg*. 2010; 136(5):432-438

Case-Control Analysis of Cochlear Implant Performance in Elderly Patients

- Objective
  - Characterize speech perception performance in elderly CI users compared with younger adult users
- Design
  - Case-control retrospective analysis from January 1, 1999 to January 28, 2008

Case-Control Analysis of Cochlear Implant Performance in Elderly Patients

- Methods
  - Medical records for 78 patients with age at implantation >65 analyzed for:
    - ear-specific preimplantation speech perception performance
    - length of deafness
    - age at implantation
    - 1-year postimplantation speech perception performance

Case-Control Analysis of Cochlear Implant Performance in Elderly Patients

- Methods
  - 28 elderly patients with complete data
  - Matched to 28 younger adult patients (age 18-64 at implantation) for preimplantation performance using Hearing in Noise Test – Quiet Scores
  - Measured one-year postimplantation performance on word and sentence testing

Case-Control Analysis of Cochlear Implant Performance in Elderly Patients

- Results
  - Of the matched older and younger patients, 55 of 56 showed improvement in their 1-year postimplantation compared with preimplantation scores
    - better preimplantation performance predicted better postimplantation performance
    - independent of age at implantation

Case-Control Analysis of Cochlear Implant Performance in Elderly Patients

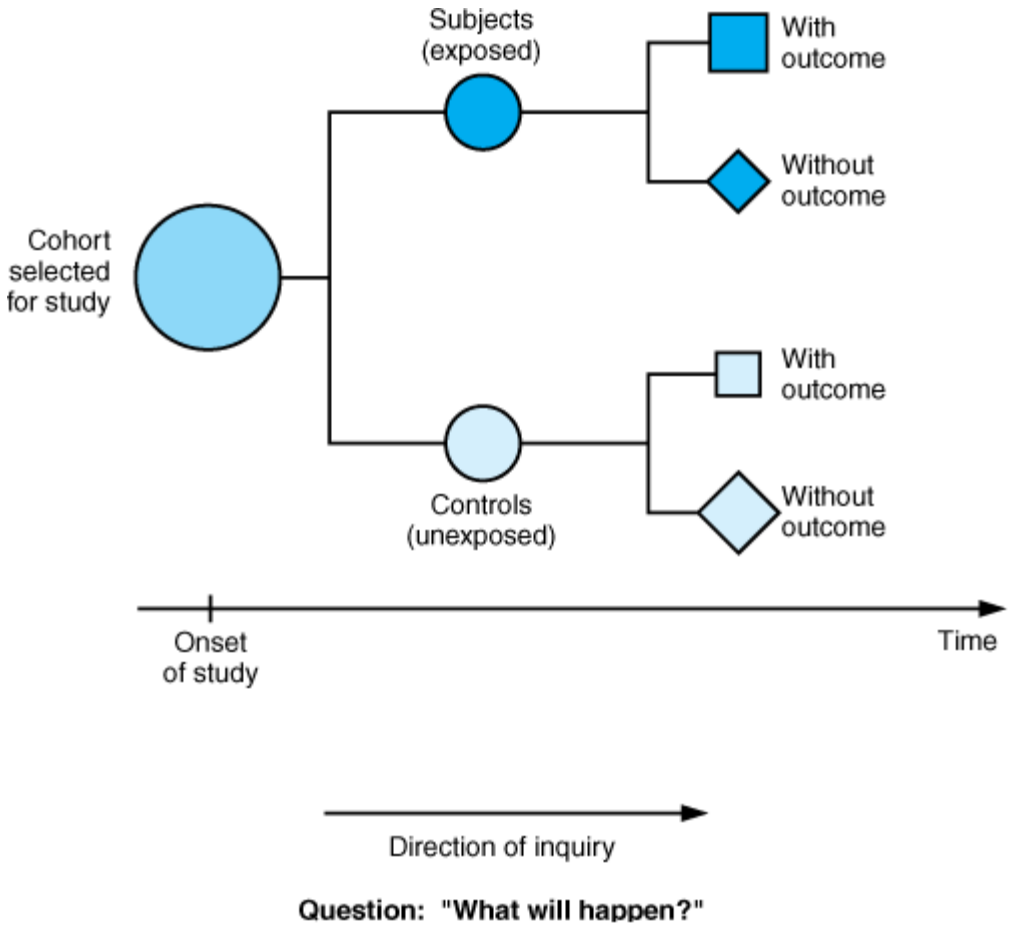
- Results
  - poorer postimplantation scores overall for the elderly patients compared with the younger ones

Case-Control Analysis of Cochlear Implant Performance in Elderly Patients

- Conclusions
  - "By using a cohort matched for preimplantation performance, this study demonstrated that elderly patients have performance scores that are strong but less so compared with their younger counterparts."
  - "These data may better provide guidelines for preimplantation counseling regarding postimplantation expectations for the elderly candidate."

Longitudinal Observational Studies

- Cohort
  - Prospective



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http://www.accessmedicine.com

Cohort Studies

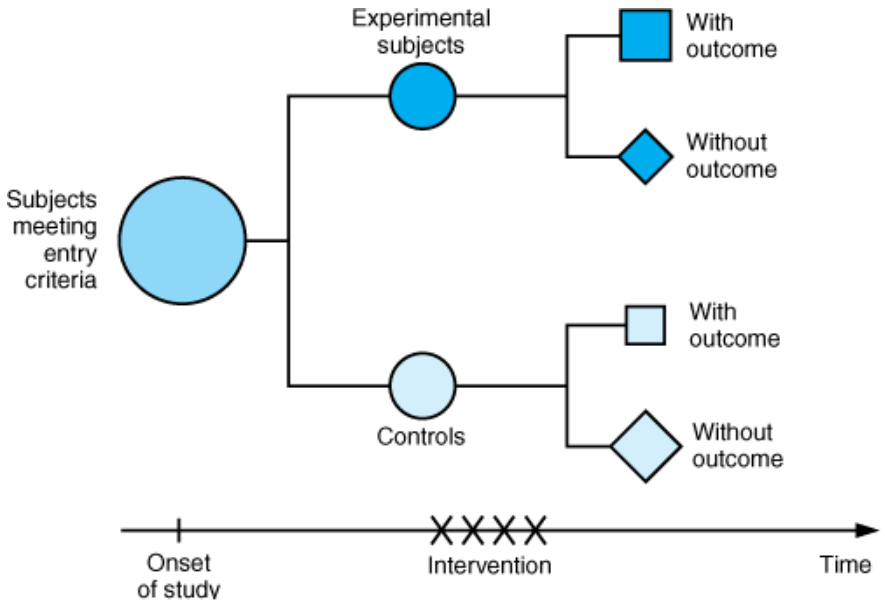
- Strengths
  - Time sequence allows strong evidence supporting possible causes and effects
  - Good for studying causes of conditions, courses of disease, risk factors

Cohort Studies

- Limitations
  - Costly
  - Can be difficult to follow up patients consistently
  - Difficult to prove causation
    - No interventions are involved (but there can also be interventional cohort studies- CI field.
    - Effect may occur a long time after exposure
    - Other events occurring in the intervening period may have affected the outcome

Controlled Clinical Trial

- Two groups
  - One receives experimental procedure
  - One receives standard or placebo
- Randomized?
- Blinded?



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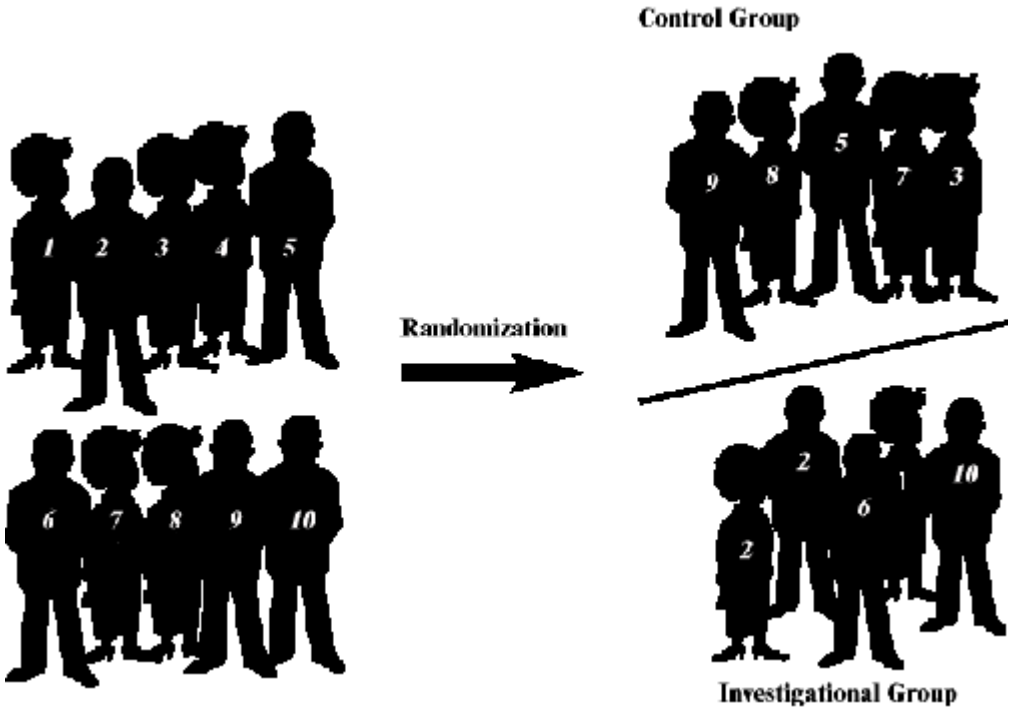
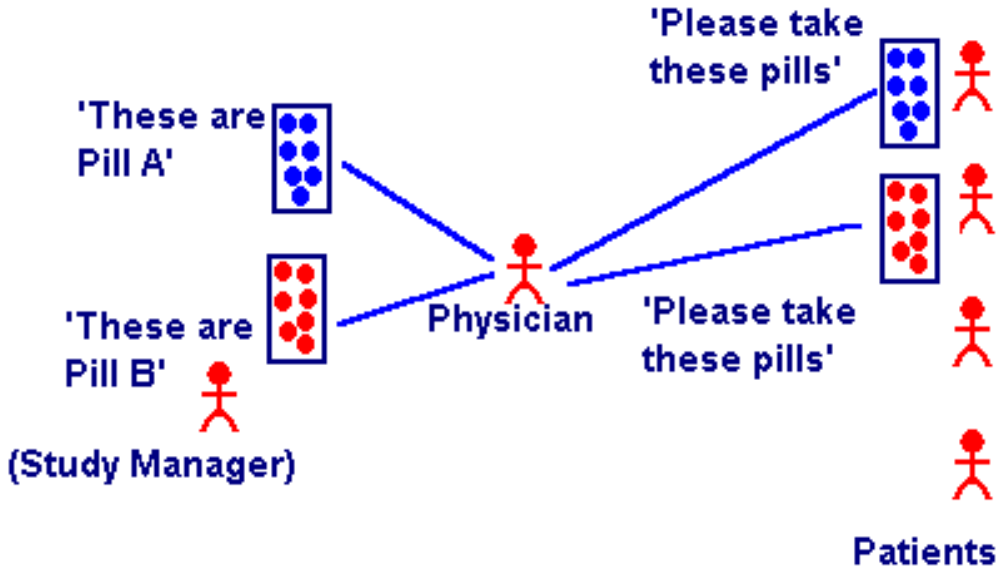
Controlled Clinical Trial

- Randomized?



Controlled Clinical Trial

- Blinded?



Controlled Clinical Trial

- Strengths
  - More likely than studies without controls to detect whether a difference in outcomes is due to the experimental treatment or to some other factor
    - Factors other than the clinical intervention that contribute to outcome tend to be equally represented in each group
  - Greatest justification for concluding causality
  - Less vulnerable to biases, especially when randomized and/or blinded

Controlled Clinical Trial

- Limitations
  - Expensive
  - Requires a long follow-up period
  - May involve complicated ethical issues

Example: Controlled Trial

- **A Prospective, Randomized Study of Cochlear Implants.**
- Noel L. Cohen, Susan B. Waltzman, Susan G. Fisher, and the Department of Veterans Affairs Cochlear Implant Study Group. N Engl J Med 1993; 328:233-237

A Prospective, Randomized Study of Cochlear Implants

- Methods
  - 82 patients randomly assigned to receive one of three cochlear implants
    - Ineraid multichannel (Implant 1)
    - Nucleus multichannel (Implant 2)
    - 3M/Vienna single channel (Implant 3)

A Prospective, Randomized Study of Cochlear Implants

- Methods
  - 24 hearing tests were used to assess the patient's performance:
    - Before implantation
    - 12 months after implantation
    - 24 months after implantation

A Prospective, Randomized Study of Cochlear Implants

- Methods
  - 82 patients randomly assigned to receive one of three cochlear implants
  - 24 hearing tests were used to assess the patient's performance
  - A composite index score was calculated

A Prospective, Randomized Study of Cochlear Implants

- Results
  - All patients were able to hear with their implants
  - Ability to distinguish some words and sentences
    - 60% with Implant 1
    - 63% with Implant 2
    - 5% with Implant 3
  - Composite scores for Implant 1 and Implant 2 were higher than Implant 3
  - When 24 patients from implant 2 received an improved speech processor, their composite index increased significantly within 3 months

A Prospective, Randomized Study of Cochlear Implants

- **Conclusions**
  - "Multichannel cochlear implants are superior to single-channel implants, especially for understanding speech. Changes in speech processing can improve patients' performance. "

Meta-analysis/Systematic Reviews

- Use published information from other studies
- Systematic review
  - Asks clearly formulated question
  - Uses systematic and explicit methods to identify, select and critically appraise relevant research
  - Collects and analyse data from the studies that are included in the review.
- Meta-analysis
  - Pools data and analyzes it quantitatively

Meta-analysis/Systematic Reviews

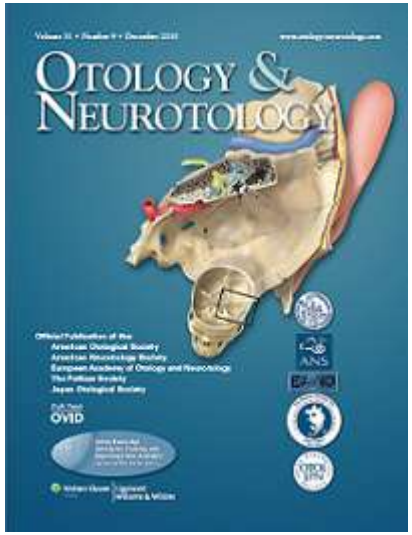
- Strengths
  - Provides a summary conclusion from multiple studies
  - Can make small studies more useful

Meta-analysis/Systematic Reviews

- Limitations
  - Quality of the studies included may not be uniformly high
  - Vulnerable to inclusion of fraudulent studies
  - May fail to address differences in design, subject choice, etc among included studies

Example: Systematic Review

- **The Effectiveness of Bilateral Cochlear Implants for Severe-to-Profound Deafness in Adults: A Systematic Review**
- Van Schoonhoven J, Sparreboom M, van Zanten BGA, et al. *Otology & Neurotology*, 2013; 34(2): 190-198.



The Effectiveness of Bilateral Cochlear Implants for Severe-to-Profound Deafness in Adults: A Systematic Review

- Goals
  - Assess clinical effectiveness of bilateral cochlear implantation compared with unilateral cohclear implantation or bimodal stimulation in adults with severe-to-profound hearing loss

The Effectiveness of Bilateral Cochlear Implants for Severe-to-Profound Deafness in Adults: A Systematic Review

- Data Sources
  - MEDLINE and Embase were searched for English language studies published between October 2006 and March 2011

The Effectiveness of Bilateral Cochlear Implants for Severe-to-Profound Deafness in Adults: A Systematic Review

- Study Selection
  - Studies comparing bilateral cochlear implantation with unilateral cochlear implantation and/or with bimodal stimulation, in adults with severe-to-profound sensorineural hearing loss
    - Yield:
      - 14 studies included
        - 1 randomized controlled trial
        - 5 cross-sectional studies
        - 8 studies with subjects acting as their own controls

The Effectiveness of Bilateral Cochlear Implants for Severe-to-Profound Deafness in Adults: A Systematic Review

- Study Selection
  - Factors analyzed
    - Speech perception in quiet and in noise
    - Sound localization and lateralization
    - Speech production
    - Health-related quality of life
    - Functional outcomes

The Effectiveness of Bilateral Cochlear Implants for Severe-to-Profound Deafness in Adults: A Systematic Review

- Conclusions
  - **Pooling of data not possible** due to heterogeneity of studies
  - Average level of evidence of the included studies was low

The Effectiveness of Bilateral Cochlear Implants for Severe-to-Profound Deafness in Adults: A Systematic Review

- Conclusions
  - All studies showed significant bilateral benefit in localization over unilateral cochlear implantation
  - Bilateral cochlear implants were beneficial for speech perception in noise under certain conditions and several self-reported measures
  - Most outcomes showed no bilateral benefit for speech perception in quiet

Levels of Evidence

- Systematic Review
- I
  - Evidence obtained from at least one properly designed randomized controlled trial
- II-1
  - Evidence from well-designed controlled trials, which lack randomization
- II-2
  - Evidence from well-designed cohort or case control studies, preferably from more than one center/research group
- II-3
  - Evidence from multiple time series
- III
  - Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

US Preventive Services Task Force, 1989

4: Making the Decision

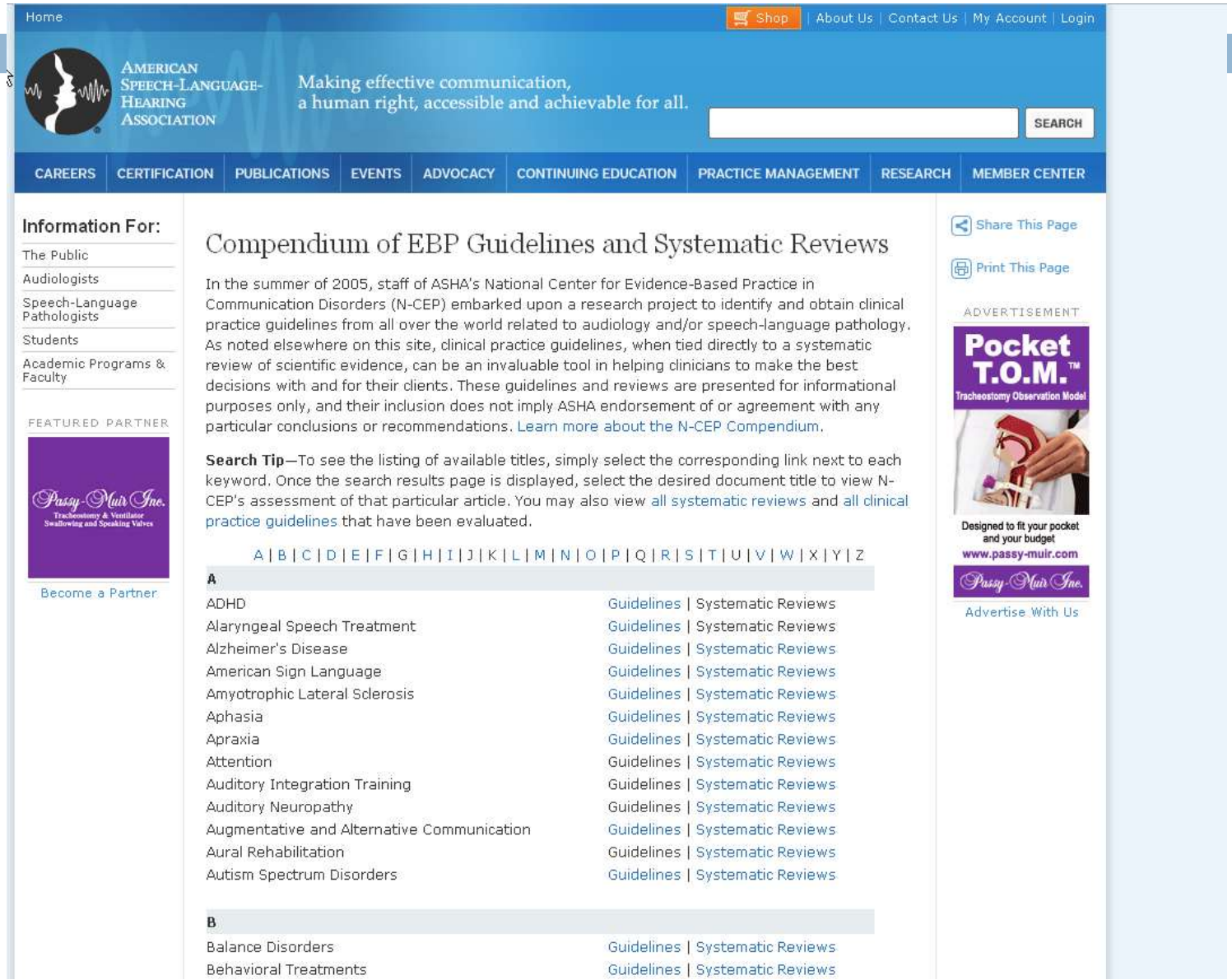
4: Making the Decision

- How relevant to your patient is the evidence you have found?
  - Does the patient fit the study population?
  - Is the study outcome a relevant goal for this patient?
- Consider the patient's perspective
- Consider cost-effectiveness

Sources

- American Speech-Language-Hearing Association. Evidence Based Practice (EBP). Available at http://www.asha.org/members/ebp/ . Accessibility verified July 11, 2013.
- Bess, FH. Evidence-Based Audiology. *American Journal of Audiology*, 4:5.
- Brownlee S, Winters D. Bad Science and Breast Cancer. *Discover,* August 2002. http://discovermagazine.com/2002/aug/featbad . Accessibility verified July 11, 2013.
- Cohen NL, Waltzman SB, Fisher SG. A Prospective, Randomized Study of Cochlear Implants. *New Engl J Med*, 1993; 328:233-237.
- Dawson B, Trapp RG. Chapter 2. Study Designs in Medical Research. In: Dawson B, Trapp RG, eds. *Basic & Clinical Biostatistics*. 4th ed. New York: McGraw-Hill; 2004. http://www.accessmedicine.com/content.aspx?aID=2046062. Accessed July 3, 2013.
- Friedland DR, Runge-Samuelson C, Baig H, Jenson J. Case-Control Analysis of Cochlear Implant Performance in Elderly Patients *Arch Otolaryngol Head Neck Surg*. 2010; 136(5):432-438
- Ramsden JD, Gordon K, Aschendorff A, et al. European Bilateral Pediatric Cochlear Implant Forum Consensus Statement. *Otology and Neurotology*, 2012; 33:561-565
- Sackett DL, Rosenberg WM, Muir Gray JA, Haynes RB, Richardson WS. Evidence-based medicine: What it is and what it isn't. *British Medical Journal* 1996; 312:71-72.
- SUNY Downstate Medical Center. Evidence Based Medicine Tutorial. Available at http://library.downstate.edu/EBM2/contents.htm. Accessibility verified July 11, 2013.
- Tavora-Vieira D, Marino R, Krishnaswamy J, Kuthbutheen J, Rajan GP. Cochlear implantation for unilateral deafness with and without tinnitus: A case series *Laryngoscope*, 2013; 123(5): 1251-1255
- U.S. Preventive Services Task Force (USPSTF). USPSTF Procedure Manual. Section 4: Evidence Report Development. Available at http://www.uspreventiveservicestaskforce.org/uspstf08/methods/procmanual4.htm. Accessibility verified July 11, 2013.

ASHA- www.asha.org/members/ebp/compendium



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American Speech-Language-Hearing Association

Making effective communication, a human right, accessible and achievable for all.

SEARCH

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Compendium of EBP Guidelines and Systematic Reviews

In the summer of 2005, staff of ASHA's National Center for Evidence-Based Practice in Communication Disorders (N-CEP) embarked upon a research project to identify and obtain clinical practice guidelines from all over the world related to audiology and/or speech-language pathology. As noted elsewhere on this site, clinical practice guidelines, when tied directly to a systematic review of scientific evidence, can be an invaluable tool in helping clinicians to make the best decisions with and for their clients. These guidelines and reviews are presented for informational purposes only, and their inclusion does not imply ASHA endorsement of or agreement with any particular conclusions or recommendations. Learn more about the N-CEP Compendium.

Search Tip—To see the listing of available titles, simply select the corresponding link next to each keyword. Once the search results page is displayed, select the desired document title to view N-CEP's assessment of that particular article. You may also view all systematic reviews and all clinical practice guidelines that have been evaluated.

A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

A	
ADHD	Guidelines | Systematic Reviews
Alaryngeal Speech Treatment	Guidelines | Systematic Reviews
Alzheimer's Disease	Guidelines | Systematic Reviews
American Sign Language	Guidelines | Systematic Reviews
Amyotrophic Lateral Sclerosis	Guidelines | Systematic Reviews
Aphasia	Guidelines | Systematic Reviews
Apraxia	Guidelines | Systematic Reviews
Attention	Guidelines | Systematic Reviews
Auditory Integration Training	Guidelines | Systematic Reviews
Auditory Neuropathy	Guidelines | Systematic Reviews
Augmentative and Alternative Communication	Guidelines | Systematic Reviews
Aural Rehabilitation	Guidelines | Systematic Reviews
Autism Spectrum Disorders	Guidelines | Systematic Reviews

B	
Balance Disorders	Guidelines | Systematic Reviews
Behavioral Treatments	Guidelines | Systematic Reviews

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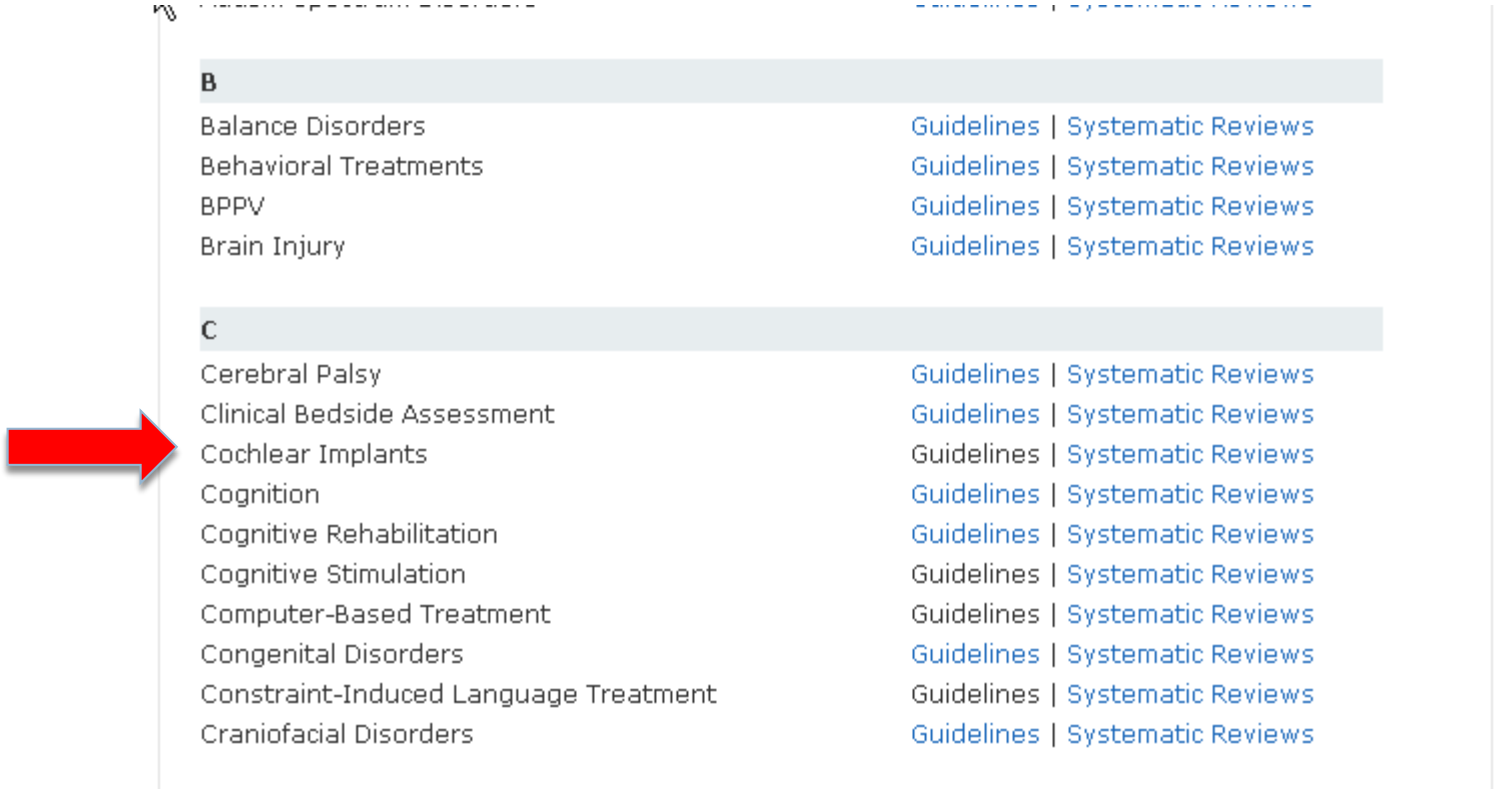

B	
Balance Disorders	Guidelines | Systematic Reviews
Behavioral Treatments	Guidelines | Systematic Reviews
BPPV	Guidelines | Systematic Reviews
Brain Injury	Guidelines | Systematic Reviews
C	
Cerebral Palsy	Guidelines | Systematic Reviews
Clinical Bedside Assessment	Guidelines | Systematic Reviews
Cochlear Implants	Guidelines | Systematic Reviews
Cognition	Guidelines | Systematic Reviews
Cognitive Rehabilitation	Guidelines | Systematic Reviews
Cognitive Stimulation	Guidelines | Systematic Reviews
Computer-Based Treatment	Guidelines | Systematic Reviews
Congenital Disorders	Guidelines | Systematic Reviews
Constraint-Induced Language Treatment	Guidelines | Systematic Reviews
Craniofacial Disorders	Guidelines | Systematic Reviews

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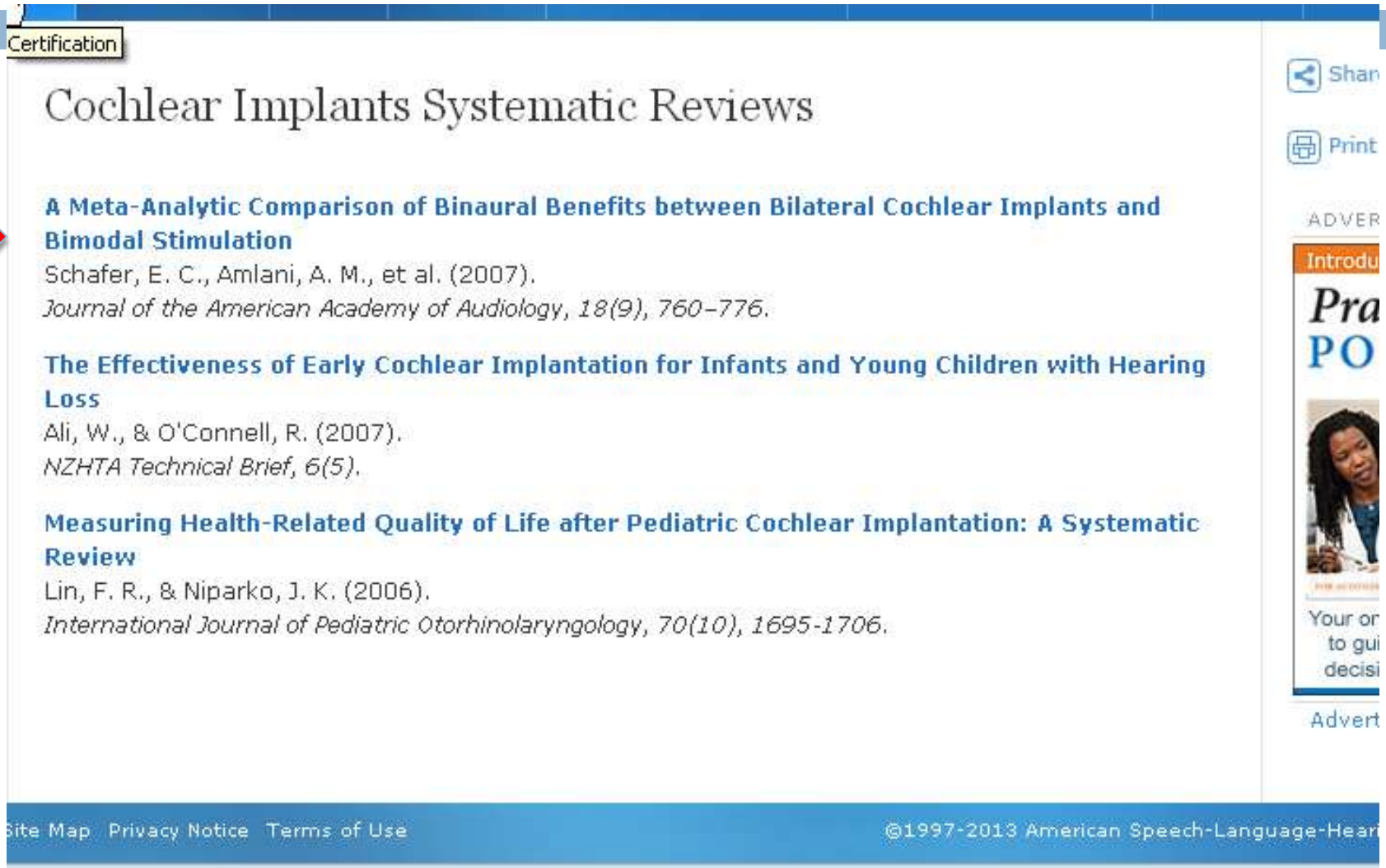

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EBP Compendium: Summary of Systematic Review

A Meta-Analytic Comparison of Binaural Benefits between Bilateral Cochlear Implants and Bimodal Stimulation

Schafer, E. C., Amlani, A. M., et al. (2007).

Journal of the American Academy of Audiology, 18(9), 760–776.

Indicators of Review Quality:

The review addresses a clearly focused question	No
Criteria for inclusion of studies are provided	Yes
Search strategy is described in sufficient detail for replication	No
Included studies are assessed for study quality	No
Quality assessments are reproducible	No

Description: This is a meta-analysis of studies investigating the outcomes for individuals using bilateral cochlear implants or bimodal stimulation.

Question(s) Addressed:

Question not specifically stated.

Population: Subjects with bilateral cochlear implants (CI) or bimodal input

Intervention/Assessment: Bilateral cochlear implants or bimodal input compared to monaural cochlear implant or hearing aid.

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Intervention/Assessment: Bilateral cochlear implants or bimodal input compared to monaural cochlear implant or hearing aid.

Number of Studies Included: 16

Years Included: January 2000–December 2005

Findings:

Conclusions:

- **Hearing/Balance Treatment**
  - "The general findings of this study indicate that cochlear implant users who are stimulated binaurally—either bilateral or bimodal—will perform significantly better at fixed levels of noise than a listener having a monaural cochlear implant or hearing aid. In fact, bilateral and bimodal stimulation was found to provide listeners with an overall average improvement ranging from 15.3 to 30.7 percentage points across the combined effects of binaural summation, binaural squelch, and the head-shadow effects compared to a monaural cochlear implant or hearing aid. The binaural-listening improvements were similar between users of bilateral implants and bimodal stimulation" (pp. 770–771).
  - "Given the results of the meta-analysis and the consistent reports of subjective benefits in the literature, clinical recommendations regarding the use of bimodal or bilateral listening arrangements are supported" (p. 774).

Keywords: Hearing Loss; Deafness; Cochlear Implants

Access the Review

Added to Compendium: August 2010

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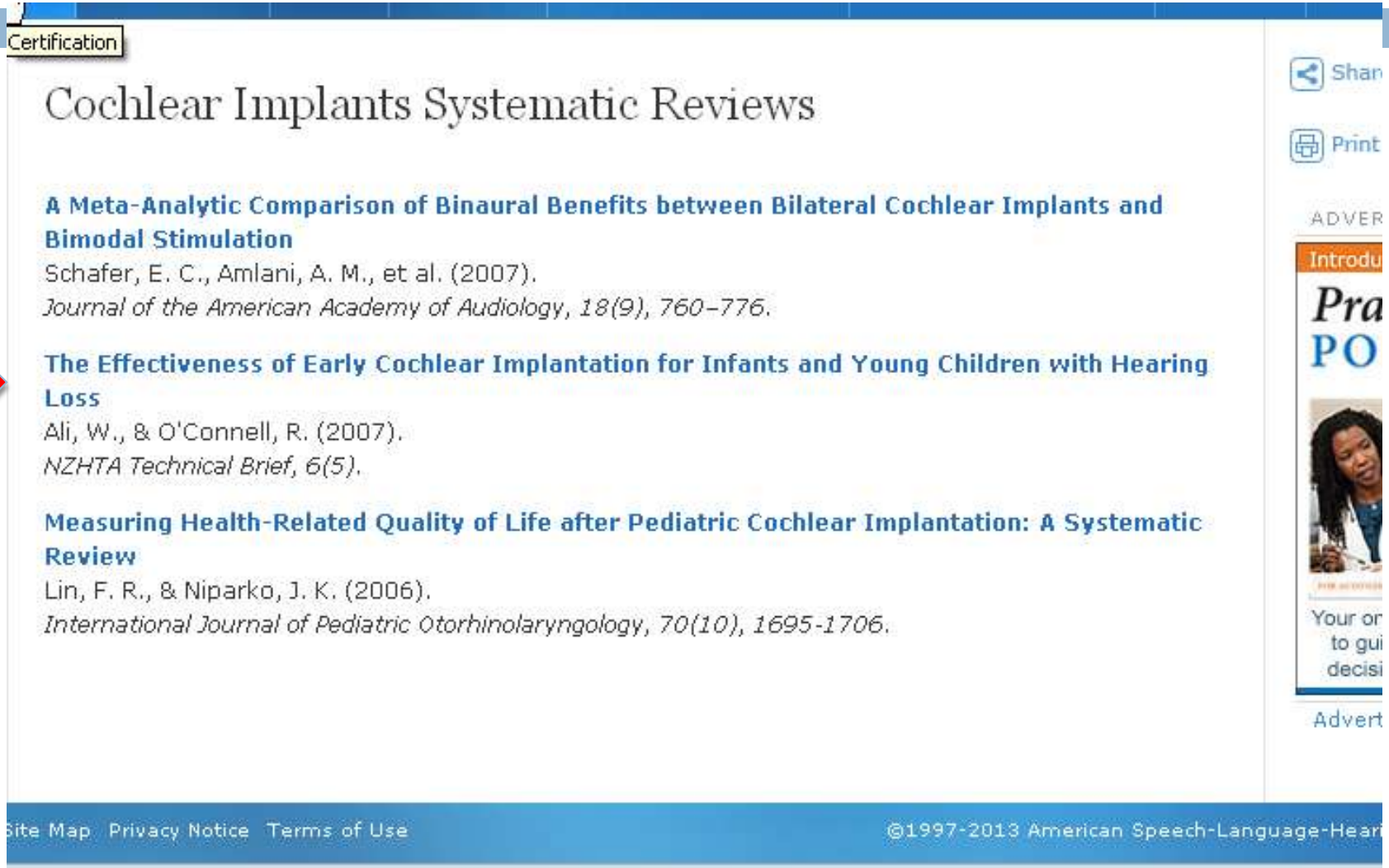

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EBP Compendium: Summary of Systematic Review

New Zealand Ministry of Health

The Effectiveness of Early Cochlear Implantation for Infants and Young Children with Hearing Loss

Ali, W., & O'Connell, R. (2007).

NZHTA Technical Brief, 6(5).

Indicators of Review Quality:

The review addresses a clearly focused question	Yes
Criteria for inclusion of studies are provided	Yes
Search strategy is described in sufficient detail for replication	Yes
Included studies are assessed for study quality	Yes
Quality assessments are reproducible	Yes

Description: This is a systematic review of peer-reviewed literature examining the effectiveness of cochlear implantation among children at a young age (under 2 years old) compared with implantation of children at an older age.

Question(s) Addressed:

What is the effectiveness of cochlear implantation at a younger age compared to implantation at a later age on audiological performance, communication, education, and quality of life?

Population: Children (2 years of age and older)

Intervention/Assessment: Cochlear implantation

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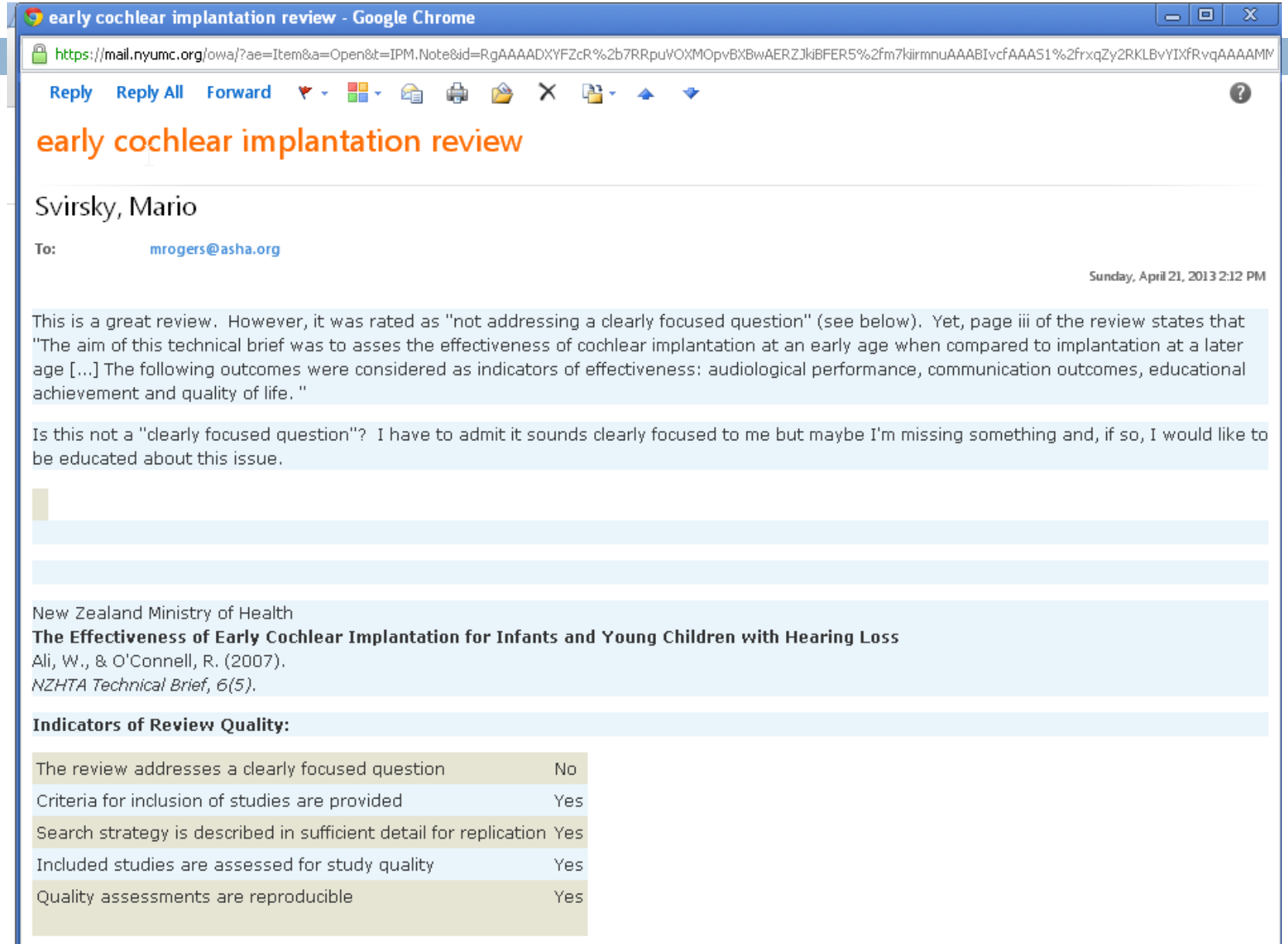

early cochlear implantation review - Google Chrome

https://mail.nyumc.org/owa/?ae=Item&a=Open&t=IPM.Note&id=RgAAAADXYFZcR%2b7RRpuVOXMOpvBXBwAERZJkiBFER5%2fm7kiirmnuAAABIvcfAAA51%2frxqZy2RKLBvYIXfRvqAAAAMM

Reply Reply All Forward

early cochlear implantation review

Svirsky, Mario

To: mrogers@asha.org

Sunday, April 21, 2013 2:12 PM

This is a great review. However, it was rated as "not addressing a clearly focused question" (see below). Yet, page iii of the review states that "The aim of this technical brief was to asses the effectiveness of cochlear implantation at an early age when compared to implantation at a later age [...] The following outcomes were considered as indicators of effectiveness: audiological performance, communication outcomes, educational achievement and quality of life. "

Is this not a "clearly focused question"? I have to admit it sounds clearly focused to me but maybe I'm missing something and, if so, I would like to be educated about this issue.

New Zealand Ministry of Health
The Effectiveness of Early Cochlear Implantation for Infants and Young Children with Hearing Loss
Ali, W., & O'Connell, R. (2007).
NZHTA Technical Brief, 6(5).

Indicators of Review Quality:

The review addresses a clearly focused question	No
Criteria for inclusion of studies are provided	Yes
Search strategy is described in sufficient detail for replication	Yes
Included studies are assessed for study quality	Yes
Quality assessments are reproducible	Yes

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Table 1 **NHMRC Evidence Hierarchy: designations of 'levels of evidence' according to type of research question** (including explanatory notes)

Level	Intervention [1]	Diagnostic accuracy [2]	Prognosis	Aetiology [3]	Screening Intervention
I [4]	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies
II	A randomised controlled trial	A study of test accuracy with: an independent, blinded comparison with a valid reference standard,[5] among consecutive persons with a defined clinical presentation[6]	A prospective cohort study[7]	A prospective cohort study	A randomised controlled trial
III-1	A pseudorandomised controlled trial (i.e. alternate allocation or some other method)	A study of test accuracy with: an independent, blinded comparison with a valid reference standard,[5] among non-consecutive persons with a defined clinical presentation[6]	All or none[8]	All or none[8]	A pseudorandomised controlled trial (i.e. alternate allocation or some other method)
III-2	A comparative study with concurrent controls: ▪ Non-randomised, experimental trial[9] ▪ Cohort study ▪ Case-control study ▪ Interrupted time series with a control group	A comparison with reference standard that does not meet the criteria required for Level II and III-1 evidence	Analysis of prognostic factors amongst persons in a single arm of a randomised controlled trial	A retrospective cohort study	A comparative study with concurrent controls: ▪ Non-randomised, experimental trial ▪ Cohort study ▪ Case-control study
III-3	A comparative study without concurrent controls: ▪ Historical control study ▪ Two or more single arm study[10] ▪ Interrupted time series without a parallel control group	Diagnostic case-control study[6]	A retrospective cohort study	A case-control study	A comparative study without concurrent controls: ▪ Historical control study ▪ Two or more single arm study
IV	Case series with either post-test or pre-test/post-test outcomes	Study of diagnostic yield (no reference standard)[11]	Case series, or cohort study of persons at different stages of disease	A cross-sectional study or case series	Case series

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- NZ REVIEW

COCHLEAR IMPLANTS

Key results and conclusions

The following conclusions are based on the current evidence available from this report's critical appraisal of literature published on the effectiveness of cochlear implants at a young age when compared to implantation at an older age for infants and young children.

- In general, implantation at a younger age improves the effectiveness of cochlear implantation in terms of audiological performance and communication outcomes.
- This is particularly evident when cochlear implantation occurs before the age of 24 months, which is more effective than implantation after 24 months
- It is not clear whether implantation prior to the age of 12 months improves effectiveness when compared to implantation after 12 months of age.
- Because of the short length of time that implantation has been used in large numbers of infants and young children less than 2 years of age, evidence of an increase in effectiveness is only available for immediate outcomes such as communication skills, and has only been observed up to about 5-8 years after implantation.
- It is not clear what effect cochlear implantation at a younger age has on long-term outcomes such as educational achievement, and quality of life.
- It is possible that those implanted at an older age (above 24 months) develop at a slower rate but eventually reach equivalent developmental milestones.

Levels of Evidence

- Systematic Review
- I
  - Evidence obtained from at least one properly designed randomized controlled trial
- II-1
  - Evidence from well-designed controlled trials, which lack randomization
- II-2
  - Evidence from well-designed cohort or case control studies, preferably from more than one center/research group
- II-3
  - Evidence from multiple time series
- III
  - Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

US Preventive Services Task Force, 1989

OTHER FACTORS TO CONSIDER

- Type of publication:
  - Peer-reviewed
    - Regular issue
    - Supplement
  - Conference papers
  - Trade journals
- Journals: review quality, impact factor

4: Making the Decision

4: Making the Decision

- How relevant to your patient is the evidence you have found?
  - Does the patient fit the study population?
  - Is the study outcome a relevant goal for this patient?
- Consider the patient's perspective
- Consider cost-effectiveness

Sources

- American Speech-Language-Hearing Association. Evidence Based Practice (EBP). Available at http://www.asha.org/members/ebp/ . Accessibility verified July 11, 2013.
- Bess, FH. Evidence-Based Audiology. *American Journal of Audiology*, 4:5.
- Brownlee S, Winters D. Bad Science and Breast Cancer. *Discover,* August 2002. http://discovermagazine.com/2002/aug/featbad . Accessibility verified July 11, 2013.
- Cohen NL, Waltzman SB, Fisher SG. A Prospective, Randomized Study of Cochlear Implants. *New Engl J Med*, 1993; 328:233-237.
- Dawson B, Trapp RG. Chapter 2. Study Designs in Medical Research. In: Dawson B, Trapp RG, eds. *Basic & Clinical Biostatistics*. 4th ed. New York: McGraw-Hill; 2004. http://www.accessmedicine.com/content.aspx?aID=2046062. Accessed July 3, 2013.
- Friedland DR, Runge-Samuelson C, Baig H, Jenson J. Case-Control Analysis of Cochlear Implant Performance in Elderly Patients *Arch Otolaryngol Head Neck Surg*. 2010; 136(5):432-438
- Ramsden JD, Gordon K, Aschendorff A, et al. European Bilateral Pediatric Cochlear Implant Forum Consensus Statement. *Otology and Neurotology*, 2012; 33:561-565
- Sackett DL, Rosenberg WM, Muir Gray JA, Haynes RB, Richardson WS. Evidence-based medicine: What it is and what it isn't. *British Medical Journal* 1996; 312:71-72.
- SUNY Downstate Medical Center. Evidence Based Medicine Tutorial. Available at http://library.downstate.edu/EBM2/contents.htm. Accessibility verified July 11, 2013.
- Tavora-Vieira D, Marino R, Krishnaswamy J, Kuthbutheen J, Rajan GP. Cochlear implantation for unilateral deafness with and without tinnitus: A case series *Laryngoscope*, 2013; 123(5): 1251-1255
- U.S. Preventive Services Task Force (USPSTF). USPSTF Procedure Manual. Section 4: Evidence Report Development. Available at http://www.uspreventiveservicestaskforce.org/uspstf08/methods/procmanual4.htm. Accessibility verified July 11, 2013.