Evidence-Based Decisions: FM Systems and Cochlear Implants

There are three basic types of FM receivers for cochlear implants:

1. Classroom Soundfield

   ----Advantages----
   1. Improves signal-to-noise ratio (SNR) by 5-10 dB
   2. Everyone in room benefits from the system
   3. No equipment for child
   4. Easy to troubleshoot

   ----Disadvantages----
   1. Improvements in SNR variable according to location and noise
   2. Often does not improve SNR to ASHA\(^1\) & ANSI\(^2\) levels

2. Desktop Soundfield

   ----Advantages----
   1. Provides as much SNR improvement as necessary
   2. SNR will meet ASHA\(^1\) & ANSI\(^2\) levels
   3. Brings desired signal closer to child’s ear
   4. Easy to troubleshoot

   ----Disadvantages----
   1. Improvements in SNR variable according to location and noise
   2. Speaker placement issues
   3. May not always achieve ASHA\(^1\) & ANSI\(^2\) levels
   4. Portable; easiest to transport

3. Direct Connect

   ----Advantages----
   1. Provides as much SNR improvement as necessary
   2. SNR will meet ASHA\(^1\) & ANSI\(^2\) levels
   3. No variation in SNR with head movement
   4. Portable; easiest to transport

   ----Disadvantages----
   1. Only one child receives benefit
   2. May require specialized cords, cables, and receivers
   3. Troubleshooting more difficult

Evidence-Based Research

ASHA\(^3\) strongly encourages the use of evidence-based practice, and declares that a well-designed meta-analysis is the highest-ranking and most credible form of evidence for studies of treatment efficacy. A meta-analysis synthesizes data across studies and yields cumulative results. We conducted a meta-analysis of 9 studies to compare benefits of the 3 types of FM receivers for cochlear implants\(^4\).

Meta-analysis results:

- **Classroom Soundfield:**
  * Improvement of 3.1% (± 5.1)
  - No significant improvement compared to implant alone
  - Significantly poorer than direct connect

- **Desktop Soundfield:**
  * Improvement of 17.1% (± 8.8)
  - Significant improvement compared to implant alone
  - Significantly poorer than direct connect

- **Direct Connect:**
  * Improvement of 38.0% (± 5.7)
  - Significant improvement compared to implant alone
  - Significantly better than classroom and desktop
References


Studies included in the meta-analysis