Journal reading

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Analysis of Adherence to AAO-HNSF Clinical Practice Guidelines for Sudden Hearing Loss

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Sudden hearing loss

- SHL = sudden subjective hearing loss in one or both ears

Sudden Sensorineural Hearing Loss (SSNHL)	Conductive	Mixed

A major subset affecting ~27/100,000 people

15000–60000 ER or primary-care visits annually in U.S

- **Physical exam** distinguishes causes (ear canal, tympanic membrane, middle ear pathology)
- **Tuning fork tests** aid differentiation → guide SSNHL workup.
  - Weber : sound lateralizes to affected ear → CHL; away → SNHL.
  - Rinne : bone > air conduction → CHL; bone < air conduction → opposite ear SNHL

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Sudden Sensorineural hearing loss (SSNHL)

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- **"Nerve hearing loss" :** sensorineural, within 72 hr, ≥ 30 dB loss at ≥ 3 contiguous frequencies
- **Typically unilateral** and may be **accompanied by tinnitus or vertigo(30-60%)**
- → Tinnitus may persist, more emotional, social, communication dysfunctions and decreased QoL (strong patient motivation for treatment)

- **Idiopathic SSNHL** : ~ 90% of cases → no identifiable cause after adequate workup

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Sudden Sensorineural hearing loss (SSNHL)

Sudden Sensorineural Hearing Loss (SSNHL)

- **"Nerve hearing loss" :** sensorineural, within 72 hr, ≥ 30 dB loss at ≥ 3 contiguous frequencies
- **Spontaneous recovery reported in 32–65% (may be overestimated)**
- **Prognosis** depends on age, vertigo, degree/configuration of loss, and time to treatment

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Study objective

- **2019 AAO-HNSF Guidelines** standardize SHL/SSNHL management
- → emphasize **urgent workup with audiometric testing** as a missed/late diagnosis and treatment may lead to poorer prognosis

- To evaluate how well clinicians across the United States **adhere to the 2019 AAO-HNSF guidelines** for diagnosing and managing **sudden hearing loss**, using a large-scale healthcare database

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Database used

TriNetX – a large, federated U.S. healthcare research network.

- Includes **>100 million patient records** from **60+ academic medical centers**.
- Contains diagnoses, procedures, medications, and lab results.
- Data are **de-identified**, **HIPAA-compliant**, and **updated every few weeks**, penn State IRB approved

Data analysis

- Conducted using TriNetX's "analyze outcomes" tool
- Used **ICD-10 codes** to identify SHL/SSNHL cases
- Evaluations limited to **3 months post-diagnosis** to avoid unrelated imaging or treatment data

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Study design

- **Retrospective cohort study** using TriNetX data
- **Analysis date:** 2024/03/18
- **Study period:** 2012/12 – 2022/12 (10 years)
- **Population:** Adults (≥18 years) with **unilateral sudden hearing loss (SHL)**.
- **Excluded:** Bilateral SHL cases.

- **Guideline Reference - 2019 AAO-HNSF Guidelines for SHL/SSNHL management**

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Measured outcomes

1. **Audiogram timing after diagnosis**

~ 6 months as scheduling challenges are common and expected → realistic time frame for evaluation

2 weeks (recommended)	2-4 weeks	1-3 months	3-6 months	anytime

2. **Diagnosis classification :** SSNHL, conductive hearing loss (CHL), or mixed type

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Measured outcomes - adherence

1. **Imaging adherence:** for retrocochlear pathology
    a. **MRI** or **Auditory Brainstem Response (ABR)** within 2 weeks, 1 month, and 3 months
    b. **CT scans not recommended** due to very low-yield (discouraged per guidelines)
2. **Treatment adherence:**
    - **Steroid use** within 2 weeks (systemic or intratympanic)
    - Optional: **Hyperbaric oxygen**.

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SHL clinical practice guideline

- Developed per **AAO-HNSF Clinical Practice Guideline Development Manual (3rd Ed.)**
- **Multidisciplinary group** : ENT, otology, neurotology, family med, audiology, EM, neurology, radiology, nursing, advocacy.
- **Systematic literature review** + review of 2012 guideline
- → Systematic search (2011/01 – 2017/07): MEDLINE, EMBASE, Web of Science, CINAHL, Cochrane, NICE…

Sudden hearing loss	**Sudden deafness**	**Sudden sensorineural hearing loss**	**Idiopathic sudden hearing loss**

- Captured all relevant CPGs, systematic reviews, RCTs.

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Key updates from 2012 guideline

- Added **10 new CPGs**, **29 systematic reviews, 36 RCTs**
- Emphasized **urgency** of evaluation and time-to-treatment.
- Clarified terminology—“SSNHL” used to mean idiopathic SSNHL (> 90% of cases).
- Updated **Key Action Statements (KASs)** and evidence profiles (e.g., KAS 1 to 13 refined)
- Added **algorithm**, highlighted **shared decision-making and patient education** tools.

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Evidence grading system

- Based on **Oxford Centre for Evidence-Based Medicine (OCEBM)** Levels 1–5.
- Categories: Treatment, Harm, Diagnosis, Prognosis.
- **A:** Systematic review of RCTs.
- **B:** High-quality RCTs or consistent observational data.
- **C:** Non-randomized or historically controlled studies.
- **D:** Case reports or mechanistic reasoning.
- **X:** Exceptional situations where benefit clearly > harm despite no trials.

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Guidelines recommendations

Table 3. Strength of Action Terms in Guideline Statements and Implied Levels of Obligation.

Strength	Definition	Implied obligation
Strong recommendation	A strong recommendation means that the benefits of the recommended approach clearly exceed the harms (or, in the case of a strong negative recommendation, that the harms clearly exceed the benefits) and that the quality of the supporting evidence is high (grade A or B).[a] In some clearly identified circumstances, strong recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits strongly outweigh the harms.	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Recommendation	A recommendation means that the benefits exceed the harms (or, in the case of a negative recommendation, that the harms exceed the benefits), but the quality of evidence is not as high (grade B or C).[a] In some clearly identified circumstances, recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits outweigh the harms.	Clinicians should also generally follow a recommendation but should remain alert to new information and sensitive to patient preferences.
Option	An option means that either the quality of evidence is suspect (grade D)[a] or well-done studies (grade A, B, or C)[a] show little clear advantage to one approach versus another.	Clinicians should be flexible in their decision making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role.

- **Strong Recommendation:** Benefits clearly > harms; high-quality evidence (A/B).
- **Recommendation:** Benefits > harms; moderate evidence (B/C).
- **Option:** Weak or inconclusive evidence (D) or little difference between approaches.

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Guidelines recommendations

1. Exclusion of conductive hearing loss	Clinicians should distinguish sensorineural hearing loss (SNHL) from conductive hearing loss (CHL) when a patient first presents with SHL.	Strong recommendation
2. Modifying factors	Clinicians should assess patients with presumptive SSNHL through history and physical examination for bilateral SHL, recurrent episodes of SHL, and/or focal neurologic findings.	Recommendation
3. Computed tomography	Clinicians should **not** order routine computed tomography (CT) of the head in the initial evaluation of a patient with presumptive SSNHL.	Strong recommendation against
4. Audiometric confirmation of SSNHL	In patients with SHL clinicians should obtain, or refer to a clinician who can obtain, audiometry as soon as possible (within 14 days of symptom onset) to confirm the diagnosis of SSNHL.	Recommendation
5. Laboratory testing	Clinicians should **not** obtain routine laboratory tests in patients with SSNHL.	Strong recommendation against
6. Retrocochlear pathology	Clinicians should evaluate patients with SSNHL for retrocochlear pathology by obtaining an MRI or auditory brainstem response (ABR).	Recommendation
7. Patient education	Clinicians should educate patients with SSNHL about the natural history of the condition, the benefits and risks of medical interventions, and the limitations of existing evidence regarding efficacy.	Strong recommendation

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Guidelines recommendations

8. Initial corticosteroids	Clinicians may offer corticosteroids as initial therapy to patients with SSNHL within 2 weeks of symptom onset.	Option
9a. Initial therapy with hyperbaric oxygen therapy	Clinicians may offer, or refer to a clinician who can offer, hyperbaric oxygen therapy (HBOT) combined with steroid therapy within 2 weeks of onset of SSNHL.	Option
9b. Salvage therapy with hyperbaric oxygen therapy	Clinicians may offer, or refer to a clinician who can offer, hyperbaric oxygen therapy (HBOT) combined with steroid therapy as salvage within 1 month of onset of SSNHL.	Option
10. Intratympanic steroids for salvage therapy	Clinicians should offer, or refer to a clinician who can offer, intratympanic steroid therapy when patients have incomplete recovery from SSNHL 2 to 6 weeks after onset of symptoms.	Recommendation
11. Other pharmacologic therapy	Clinicians should **not** routinely prescribe antivirals, thrombolytics, vasodilators, or vasoactive substances to patients with SSNHL.	Strong recommendation against
12. Outcomes assessment	Clinicians should obtain follow-up audiometric evaluation for patients with SSNHL at the conclusion of treatment and within 6 months of completion of treatment.	Recommendation
13. Rehabilitation	Clinicians should counsel patients with SSNHL who have residual hearing loss and/or tinnitus about the possible benefits of audiologic rehabilitation and other supportive measures.	Strong recommendation

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SHL clinical practice guideline

Strong Recommendations FOR

- **KAS 1:** Differentiate SNHL from CHL at first presentation.
- **KAS 7:** Educate patients about natural history, benefits/risks of therapy, evidence limits.
- **KAS 13:** Counsel on audiologic rehabilitation for residual loss/tinnitus.

Strong Recommendations AGAINST

- **KAS 3:** No routine CT head.
- **KAS 5:** No routine lab tests.
- **KAS 11:** No routine antivirals, thrombolytics, vasodilators, or vasoactive drugs.

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SHL clinical practice guideline

Recommendations FOR

- **KAS 2:** Assess for bilateral/recurrent loss & neurologic signs.
- **KAS 4:** Obtain audiometry within 14 days of onset.
- **KAS 6:** Evaluate for retrocochlear pathology (MRI or ABR).
- **KAS 10:** Offer intratympanic steroids if incomplete recovery 2–6 wks after onset.
- **KAS 12:** Follow-up audiometry at end of treatment and ≤ 6 months.

Options

- **KAS 8:** Corticosteroids as initial therapy within 2 wks.
- **KAS 9a:** HBOT + steroids within 2 wks (initial).
- **KAS 9b:** HBOT + steroids within 1 mo (salvage).

HBOT : potential additive benefit; HBOT alone not recommended.

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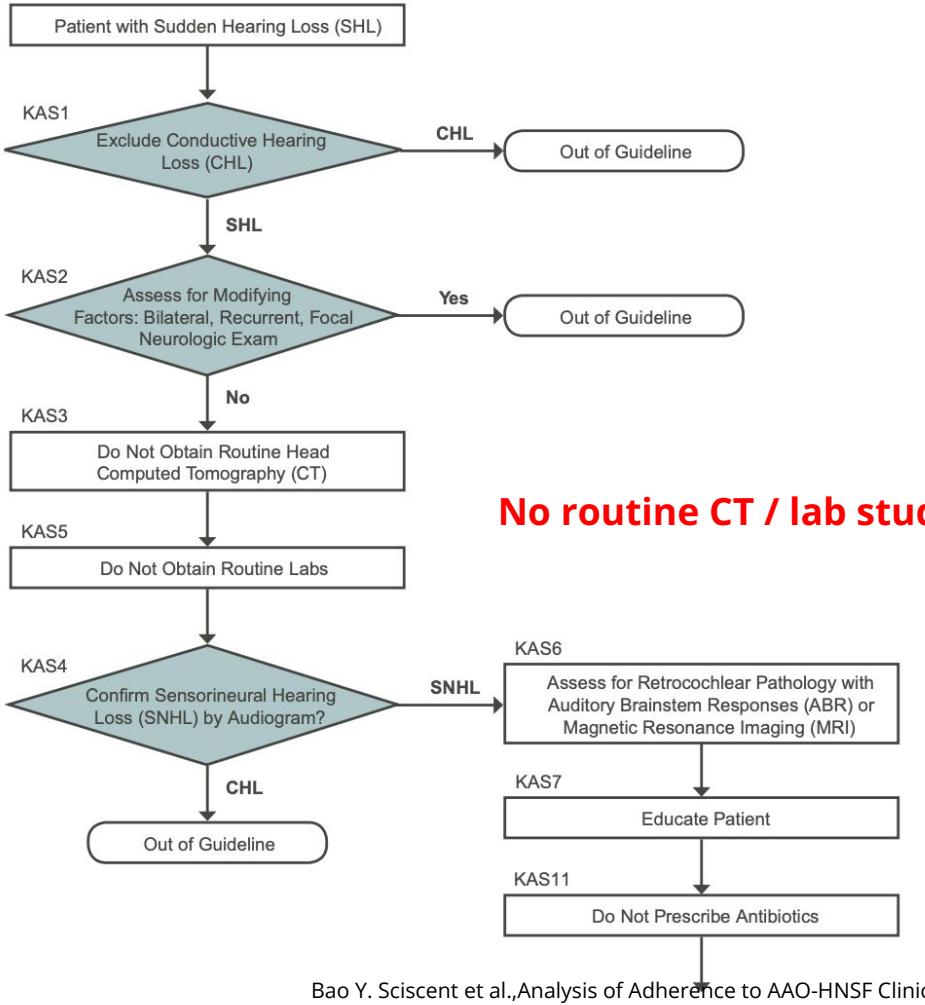
Methods

KAS = Key Action Statement



No routine CT / lab study

MRI/ABR

Education

No Abx use

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Methods

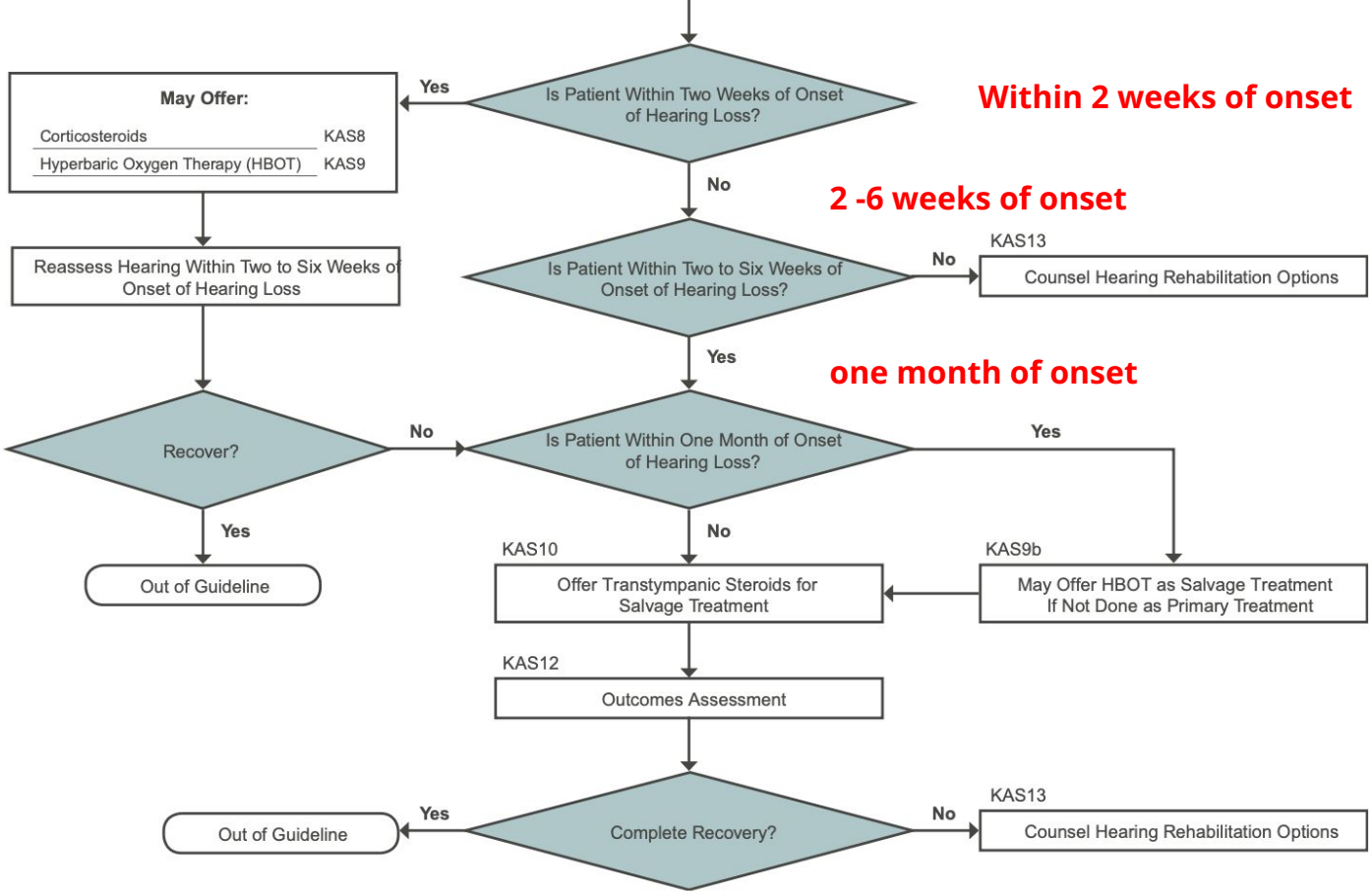

Figure 1. Sudden hearing loss clinical practice guideline algorithm.

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24,203 patients with unilateral sudden hearing loss (SHL)

14,309 underwent subsequent audiogram testing

3,107 patients diagnosed unilateral SSNHL

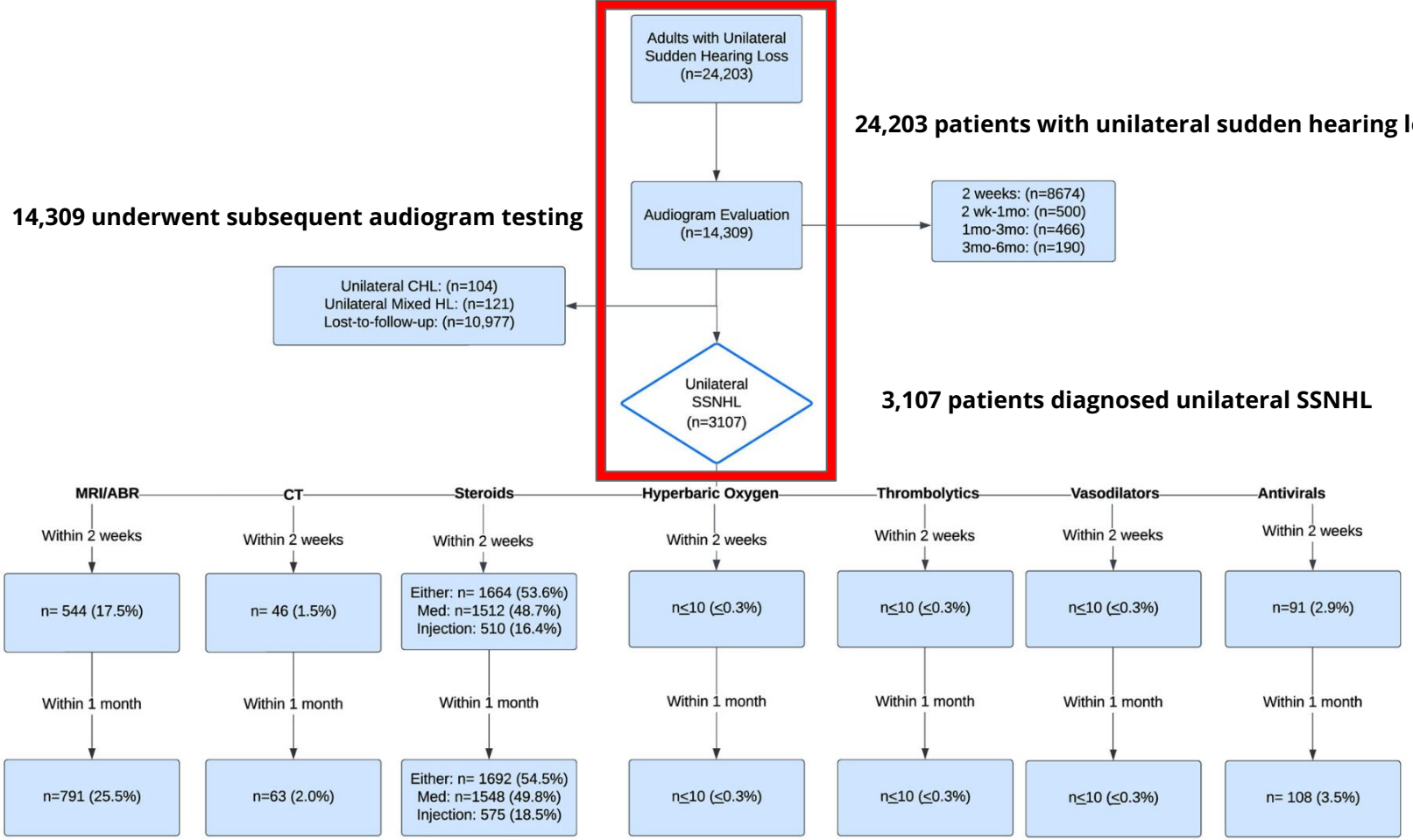
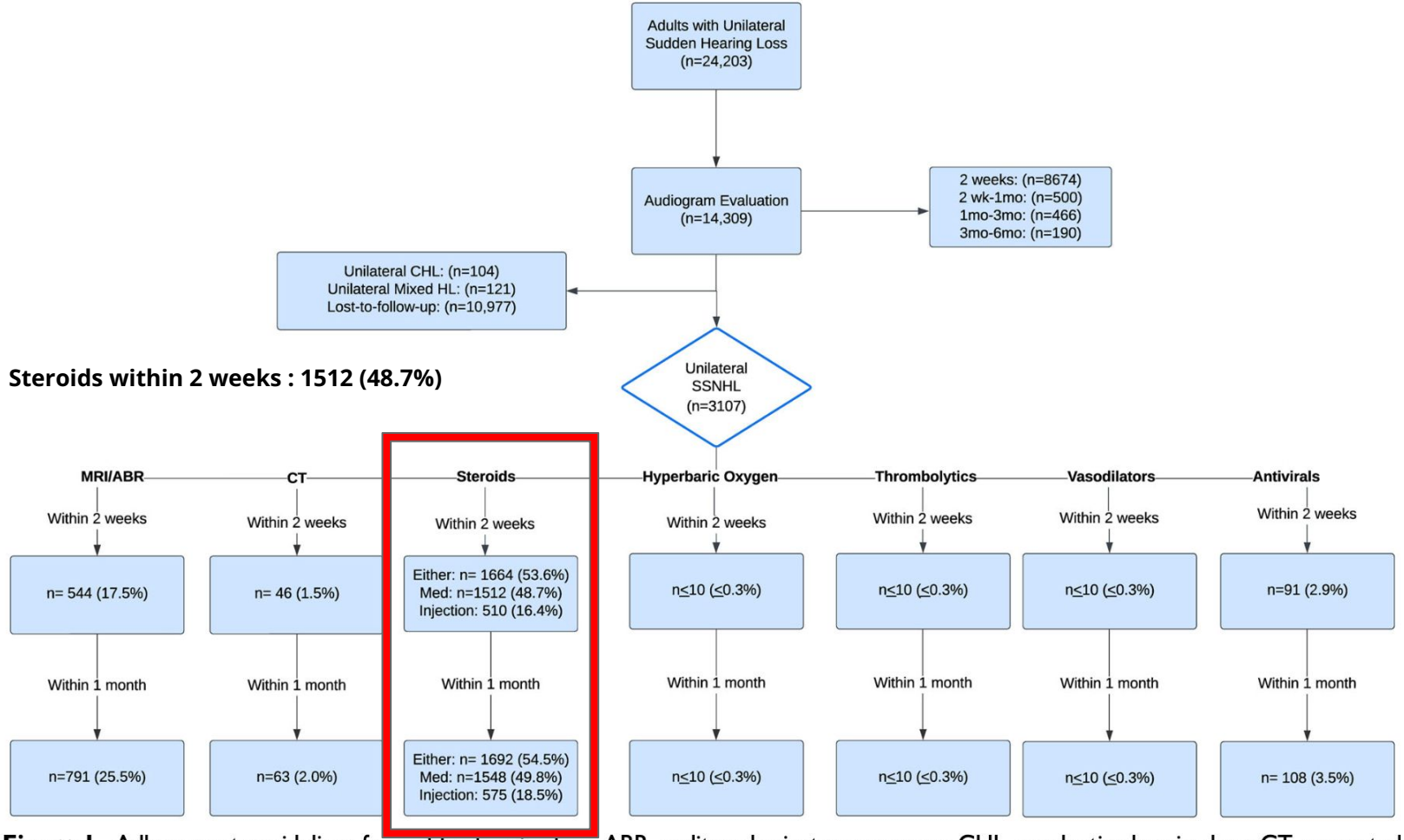


Figure 1. Adherence to guidelines for sudden hearing loss. ABR, auditory brainstem response; CHL, conductive hearing loss; CT, computed tomography; injection, intratympanic steroid injection; Med, steroid medication; Mo, months; MRI, magnetic resonance imaging; SSNHL, sudden sensorineural hearing loss; Wk, week.



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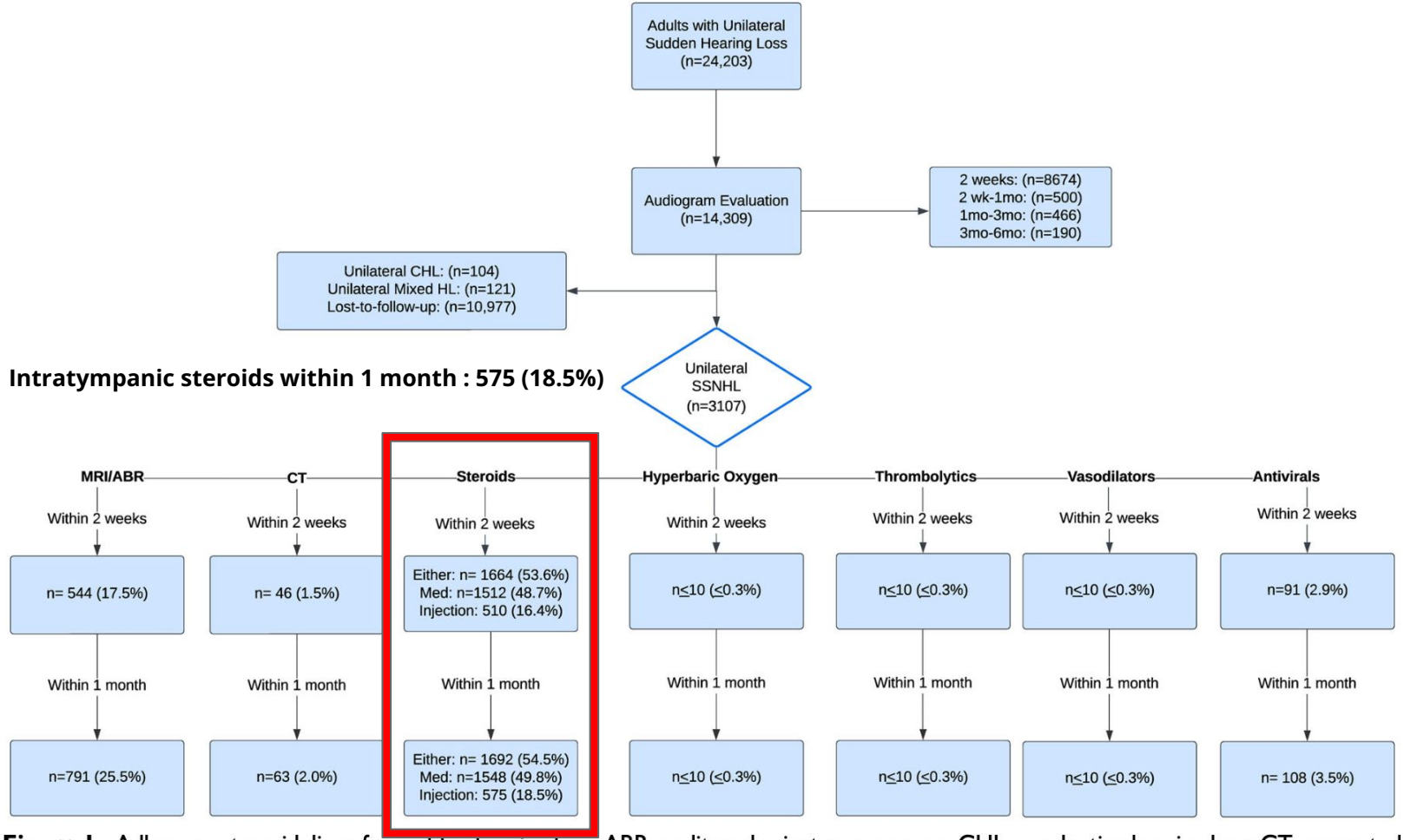

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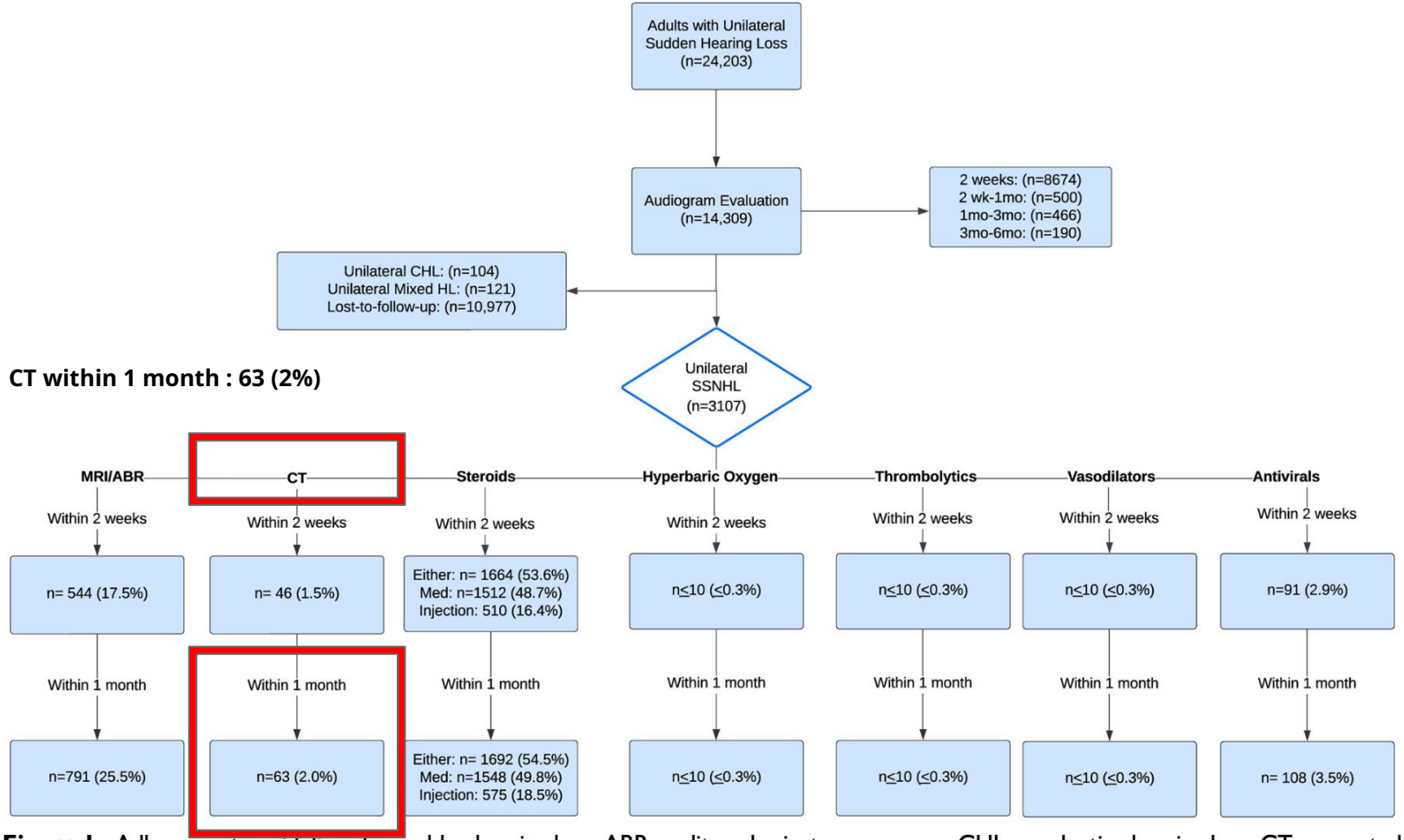

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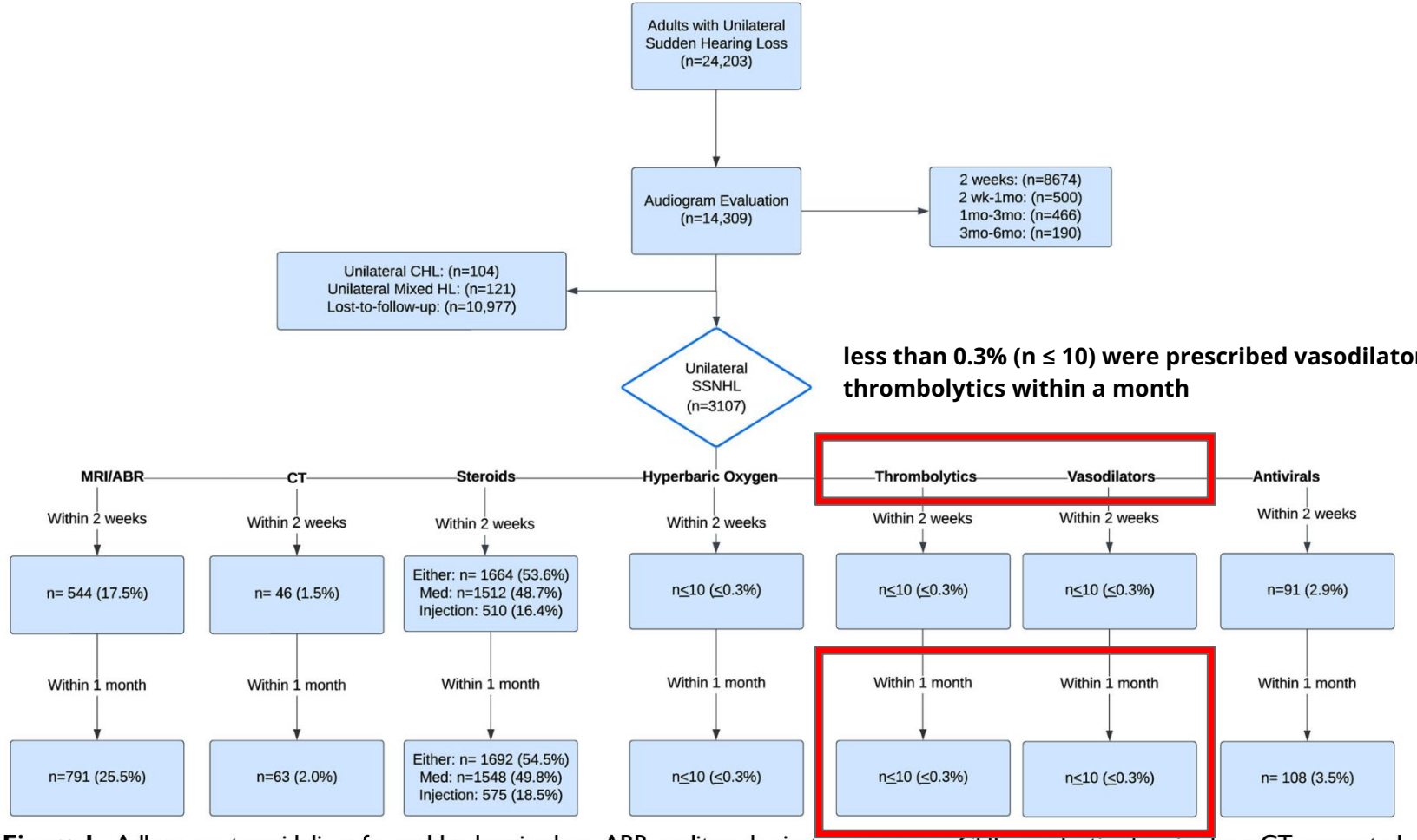

less than 0.3% (n ≤ 10) were prescribed vasodilators or thrombolytics within a month

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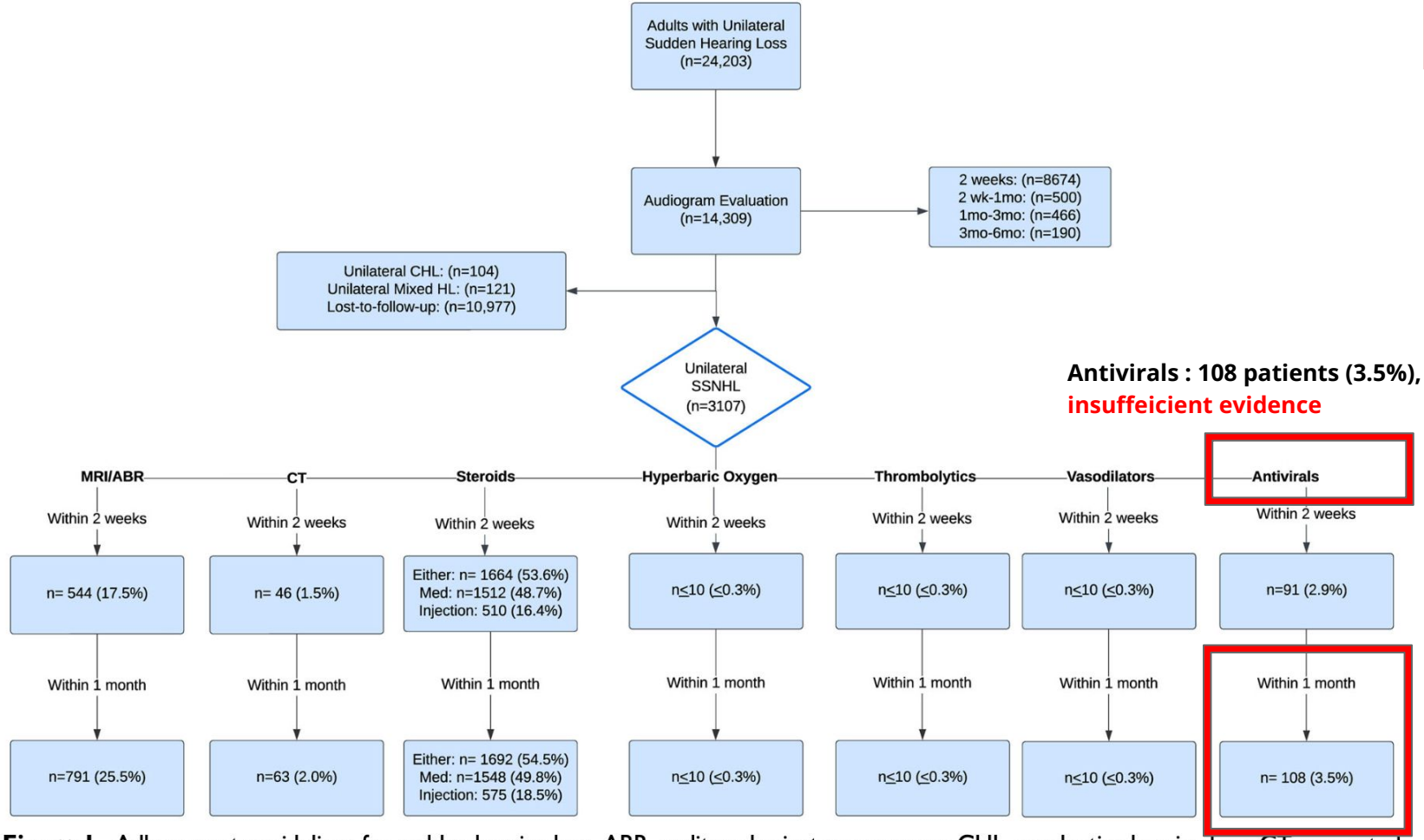

Antivirals : 108 patients (3.5%), despite insuffeicient evidence

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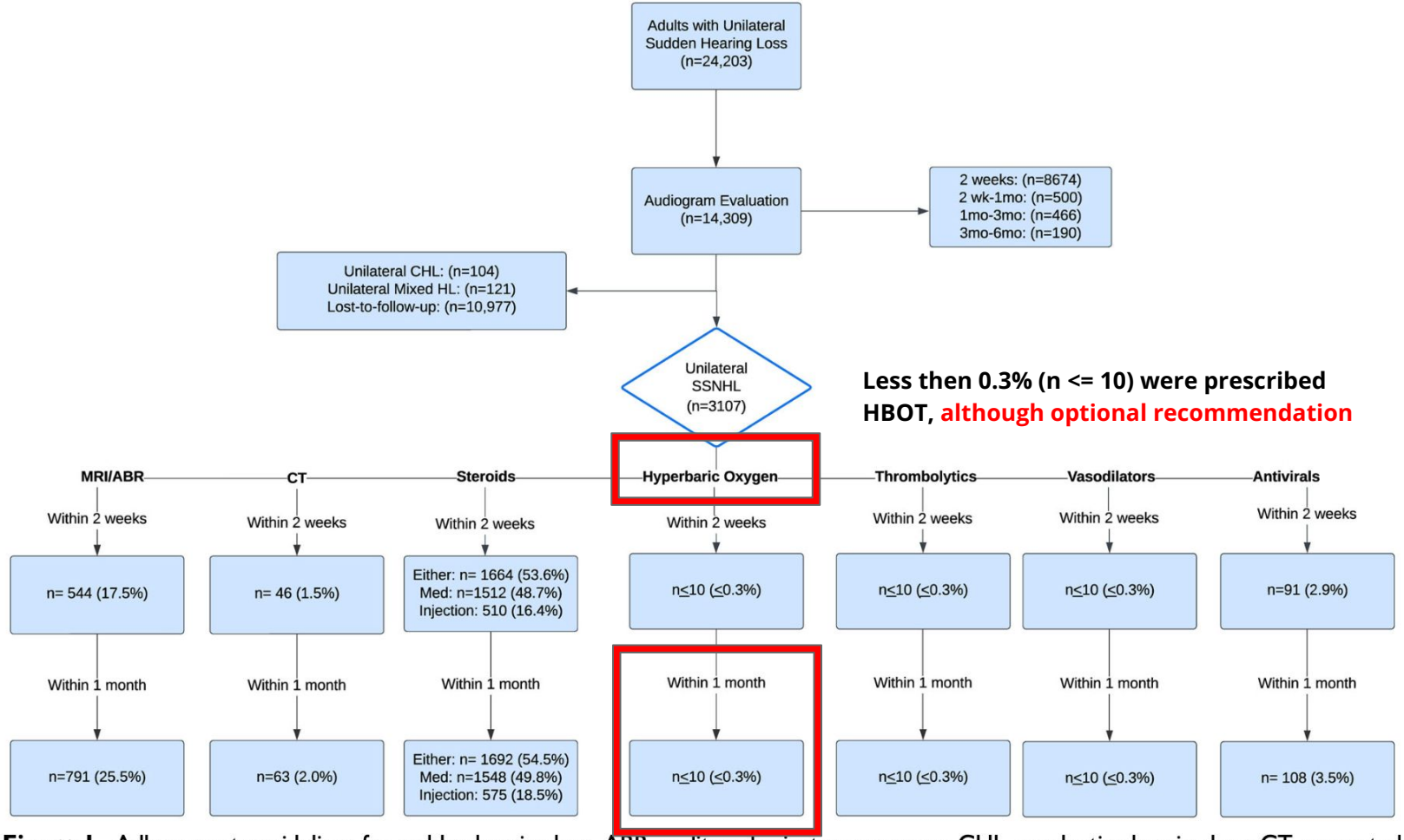

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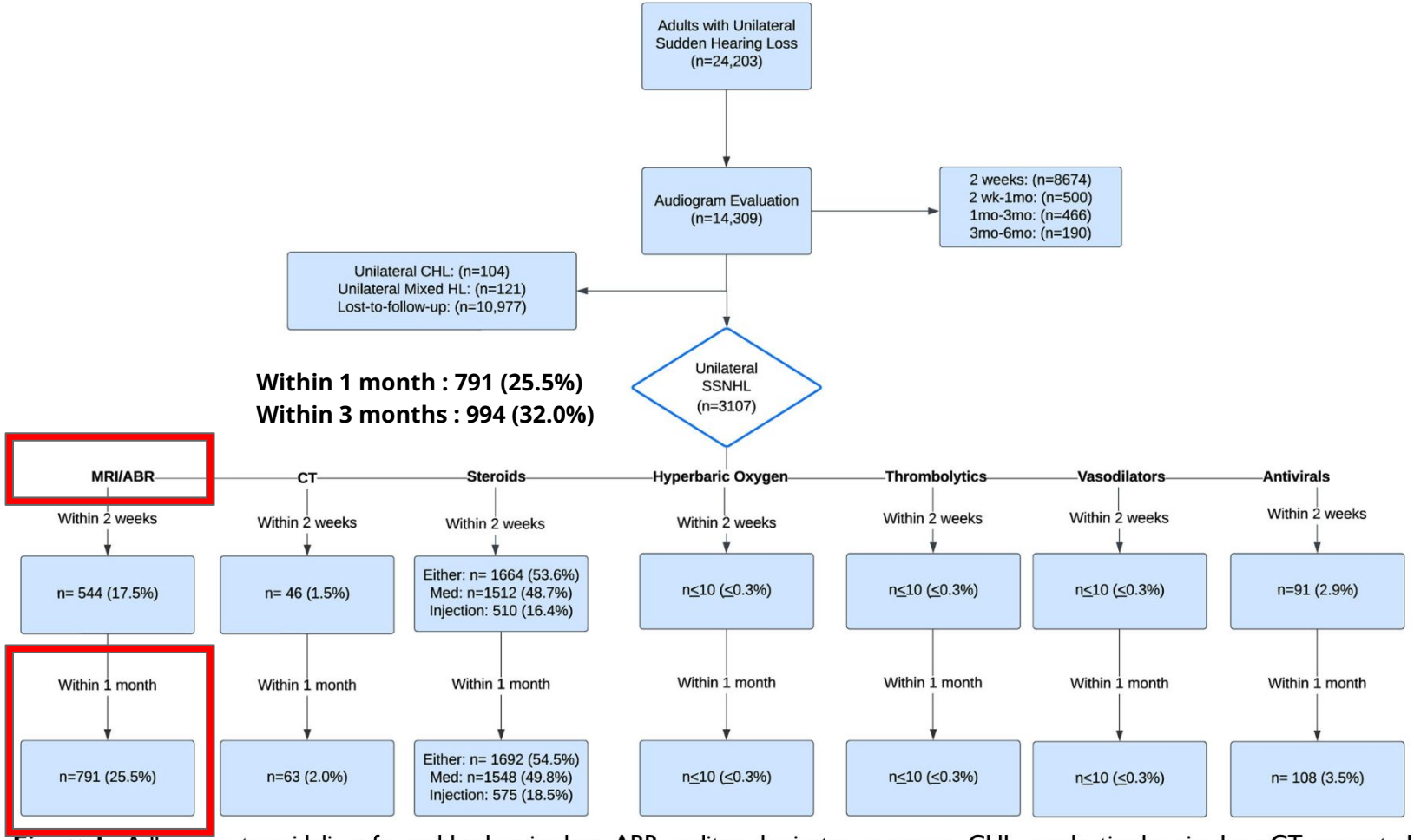

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Imaging for SSNHL - MRI/ABR

- **MRI/ABR within 1 month:** 25.5% (n = 791)
- **MRI/ABR within 3 months:** 32.0% (n = 994)
    - Most underwent **MRI** (n = 790), and <10 patients had **ABR**
- **Vestibular Schwannoma (VS) detected: 3.5% (n = 28)** among those who underwent MRI

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Keypoints

- **Adherence to guidelines remains low** — only about 1/3 received timely audiograms or recommended imaging, highlighting a major gap in national practice patterns.

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Urgency and Clinical Context

- **SHL requires immediate evaluation** and referral to an otolaryngologist since **early treatment improves recovery**
- Many patients present **48–96 hrs after onset**, delaying optimal care.
- Physicians must **differentiate SSNHL from conductive hearing loss (CHL)** through proper audiologic testing.

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Adherence Findings

- **Poor adherence** to the 2019 **AAO-HNSF guidelines** for SHL/SSNHL.
- Only **59.1%** of patients received **audiograms** : just **35.8%** had within 2 weeks

America Department of defence (Dod)

average time from onset to audiological evaluation and evaluation by an otolaryngologist was 14.16 and 15.26 days

- **Who performed** the hearing loss evaluations ? → couldn't determine

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Adherence Findings

- **MRI/ABR adherence low** (<33% within 3 months) → may lead to **missed vestibular schwannoma (VS)** or other inner ear pathologies
- → **3.5%** had VS ,higher than general population rate (1–2/100,000) supporting **MRI's importance**

- Didn't determine number of patients who obtained a head/brain MRI **any time** after diagnosis of SSNHL
- → avoid potentially including patients with other MRI indications.

- **CT scans** used in only 2%, aligning with guidelines against their use (possible exceptions: MRI contraindication).

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Treatment Patterns

- **Steroids** commonly prescribed; **HBOT** rarely used.
- → can't determine **whether intratympanic steroids were initial or salvage therapy**

Steroids within 2 weeks	Salvage intratympanic therapy	Delayed beyond 4 weeks
Recovery most likely	Still beneficial	Diminished effect

- Adherence high (93.7%) for avoiding **vasodilators and thrombolytics**

- → Delays could be related to patients being directed to multiple physicians after the initial diagnosis

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Barriers to Guideline Adherence

Ryan MA et.al

Systematic review of adherence to all AAO-HNSF guidelines
→ mean adherence of 56%

- **Multi-level barriers:**
  - **Patient:** delayed presentation, cost, insurance or poor follow-up.
  - **Physician:** lack of awareness of guidelines, especially among **non-ENTs** (<45% compliance).
  - **System:** referral delays, scheduling constraints, fragmented care
- Only **~2% of primary care physicians** use AAO-HNS guidelines; many unaware of them.
- Suggested solutions:
  - **Integrate reminders and care pathways** into electronic medical records (EMR).
  - **Educate non-ENT providers** to improve early diagnosis and referral.

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Comparison and Implications

- **Shared decision-making** and **individualized care** remain important but should align with evidence-based standards.
- Missed or delayed SSNHL diagnosis can worsen communication difficulties, **increase risk of depression**, and lower quality of life.

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Limitations

- Reliance on **ICD-10 coding** → possible misclassification.
- **Incomplete data** for patients treated outside TriNetX network.
- **No patient-level details :** hearing loss severity, exam findings, or medication dosage unavailable.

- **Strength: Large, diverse national dataset** → increases generalizability despite limitations.

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Future Directions

- Compare **pre- vs. post-2019 guideline adherence** as more data accumulates.
- Investigate **physician factors** (e.g., age, specialty) affecting adherence — younger otolaryngologists may follow guidelines more closely.

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Overall conclusion

- Despite clear national guidelines, adherence to SHL/SSNHL management remains **suboptimal**, emphasizing the need for **better provider education, system-level integration, and timely patient care**
- →ensuring timely audiogram evaluation to distinguish SSNHL from CHL, greater standardized use of steroids, proper evaluation with MRI/ABR

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Thank’s for attention !