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Claire Elson

*Children's Mercy Hospital*

Christopher M. Oermann

*Children's Mercy Hospital*

Michelle Weltman

*Children's Mercy Hospital*

Ellen Meier

*Children's Mercy Hospital*

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# Sustainability and Outcomes of a Standardized Aminoglycoside Induced Ototoxicity Monitoring Algorithm

E. Claire Elson, PharmD, BCPPS; Christopher Oermann, MD; Michelle Weltman, DNP, RN, CPN; Ellen Meier, CPNP, APRN

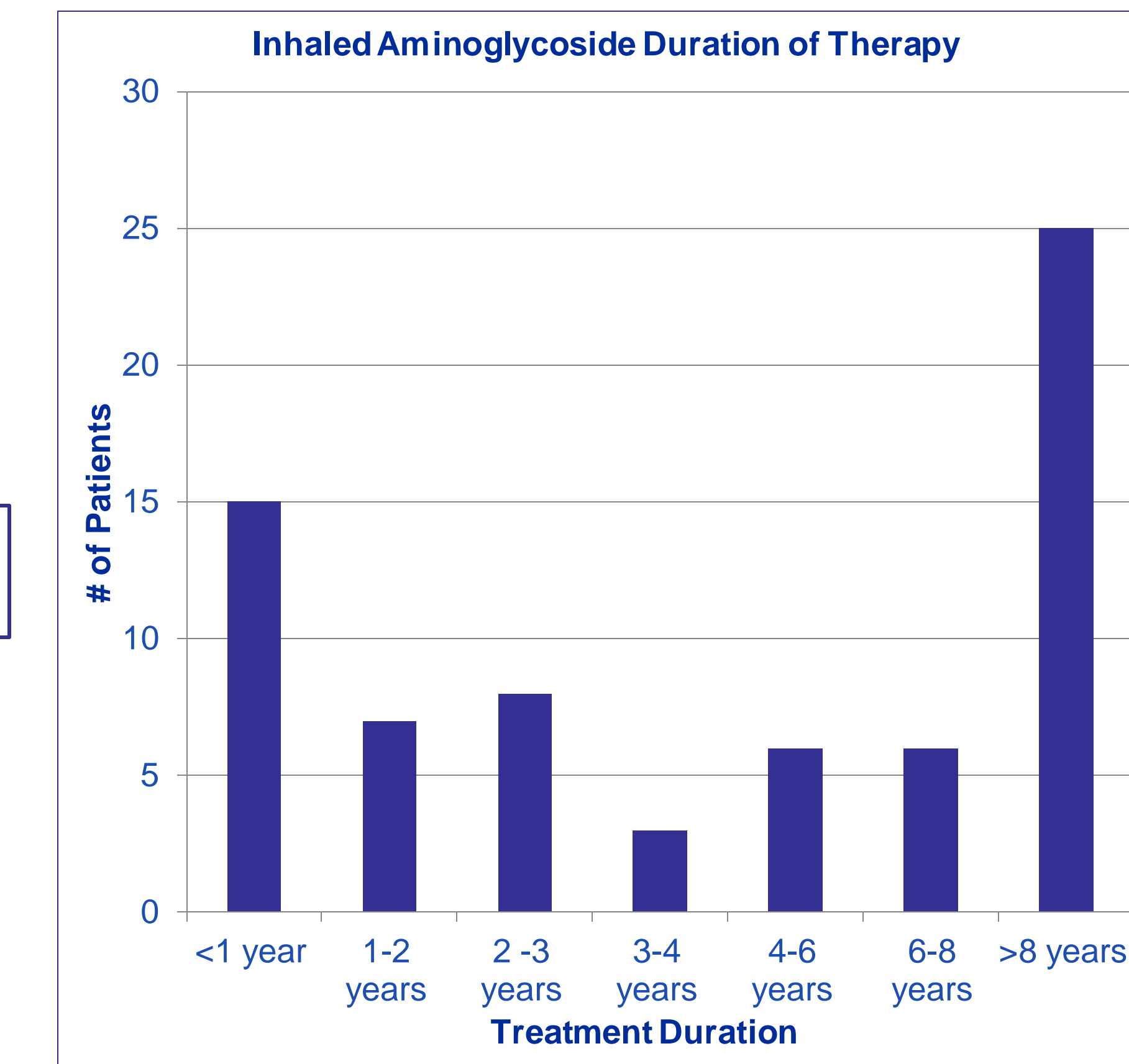
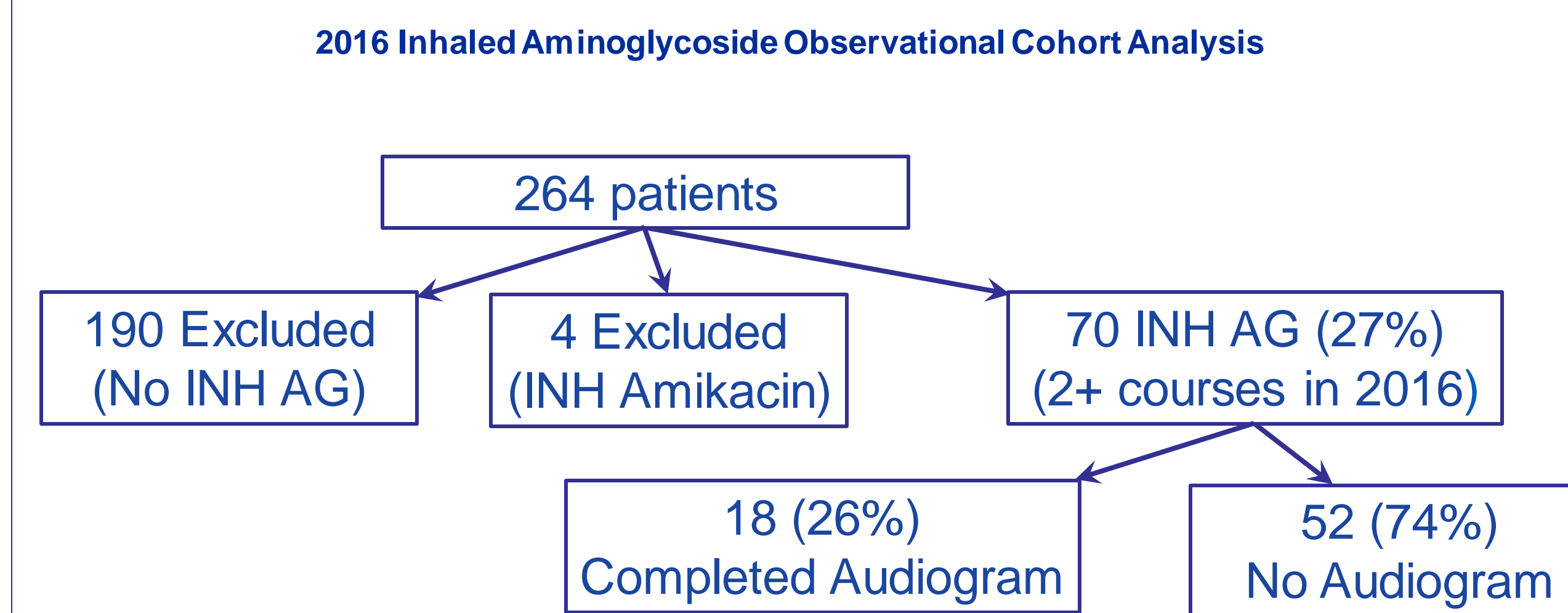
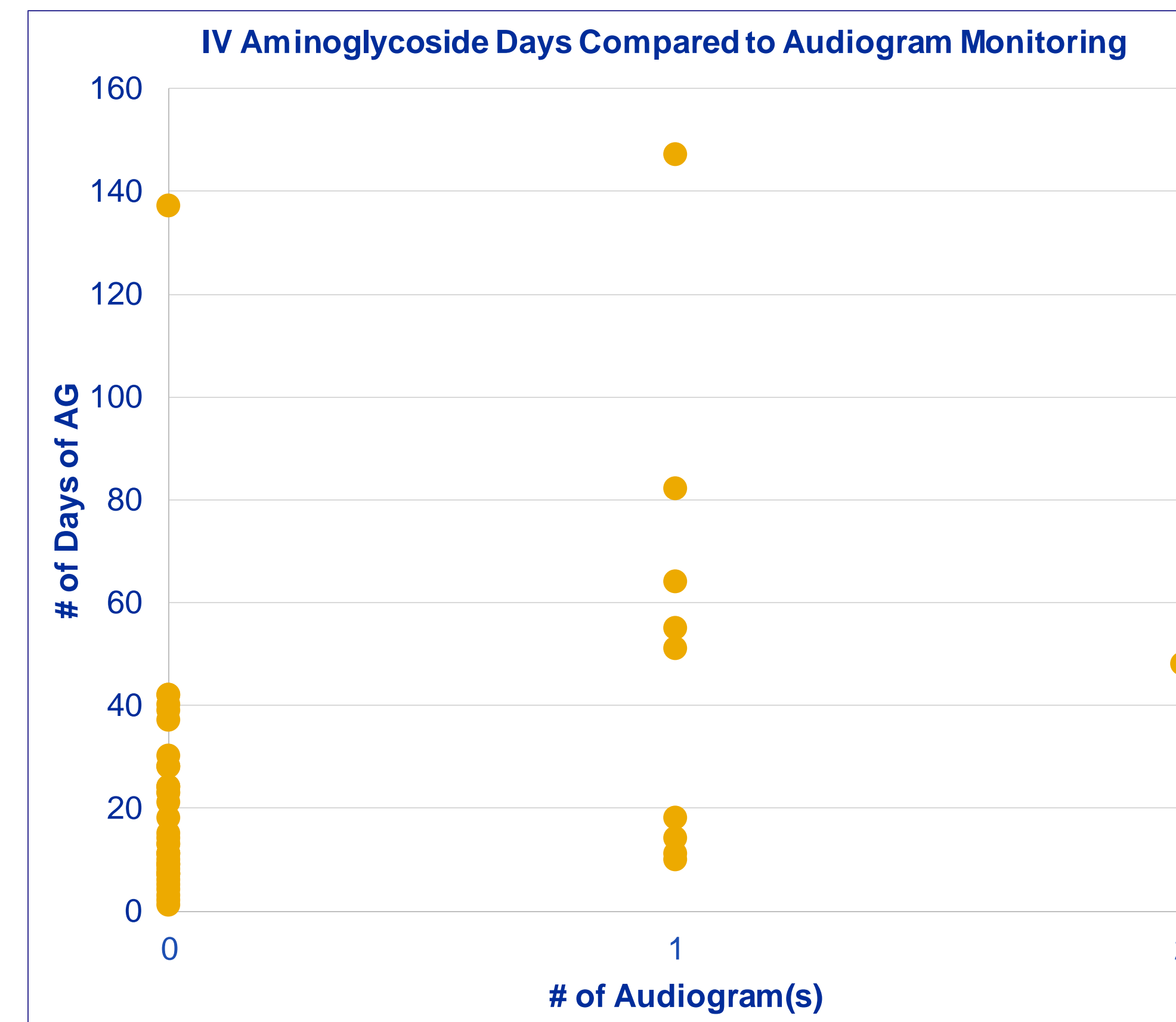
Children's Mercy – Kansas City, Kansas City, MO, United States

## Background

- Aminoglycoside (AG) antibiotics are essential for the treatment of cystic fibrosis (CF) lung infections.
  - *Pseudomonas aeruginosa*
  - Nontuberculous mycobacteria
- Monitoring is critical secondary to potential nephrotoxicity and ototoxicity.
- Children's Mercy – Kansas City (CMKC)
  - Standardized nephrotoxicity monitoring
  - Variable ototoxicity monitoring practices
- Prevalence of ototoxicity
  - 2016 CFF Patient Registry
    - 1.1% pediatric patients ( $\leq 18$  years)
    - 2.2% overall population
  - National Institute of Deafness and Other Communication Disorders
    - 13% total US population  $\geq 12$  years old
- A standardized AG induced ototoxicity monitoring algorithm (AIOA) was developed and implemented at CMKC in 2017.

## Pre-Implementation Results

- 12 of 50 patients (24%) treated with IV AG in 2 years had a lifetime audiogram.
- 18 of 70 patients (26%) treated with 2+ courses of INH AG in 2016 had a lifetime audiogram.



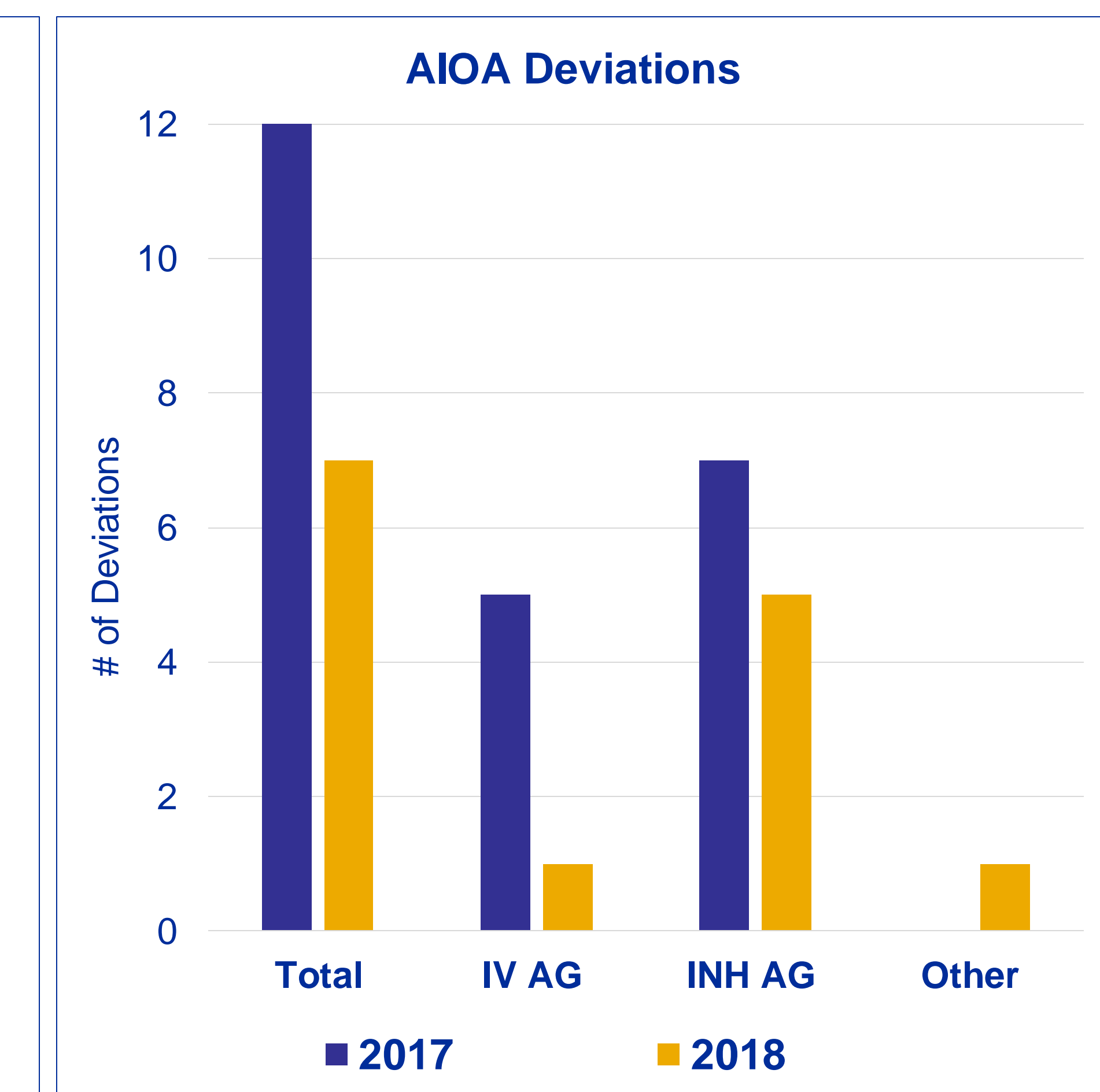
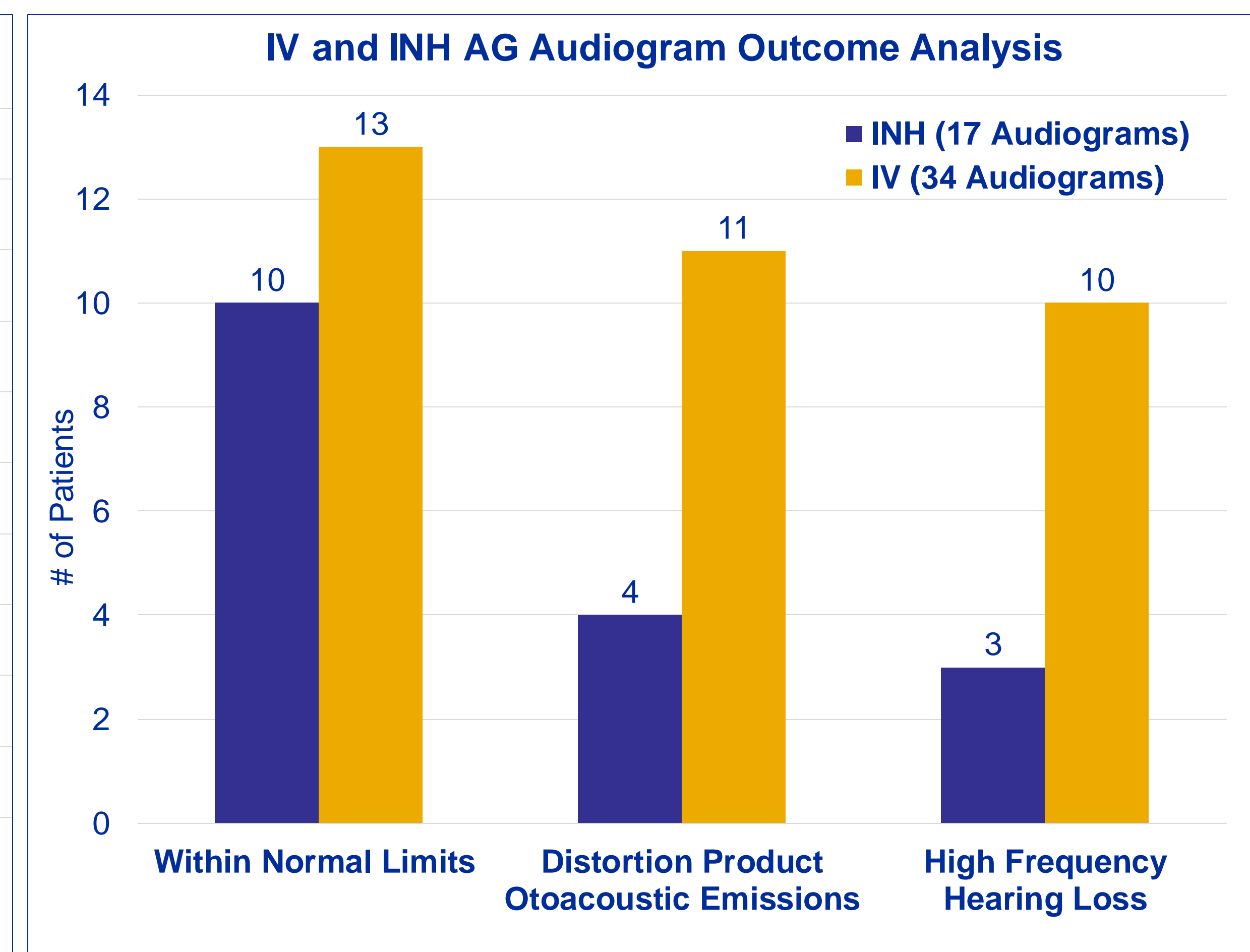
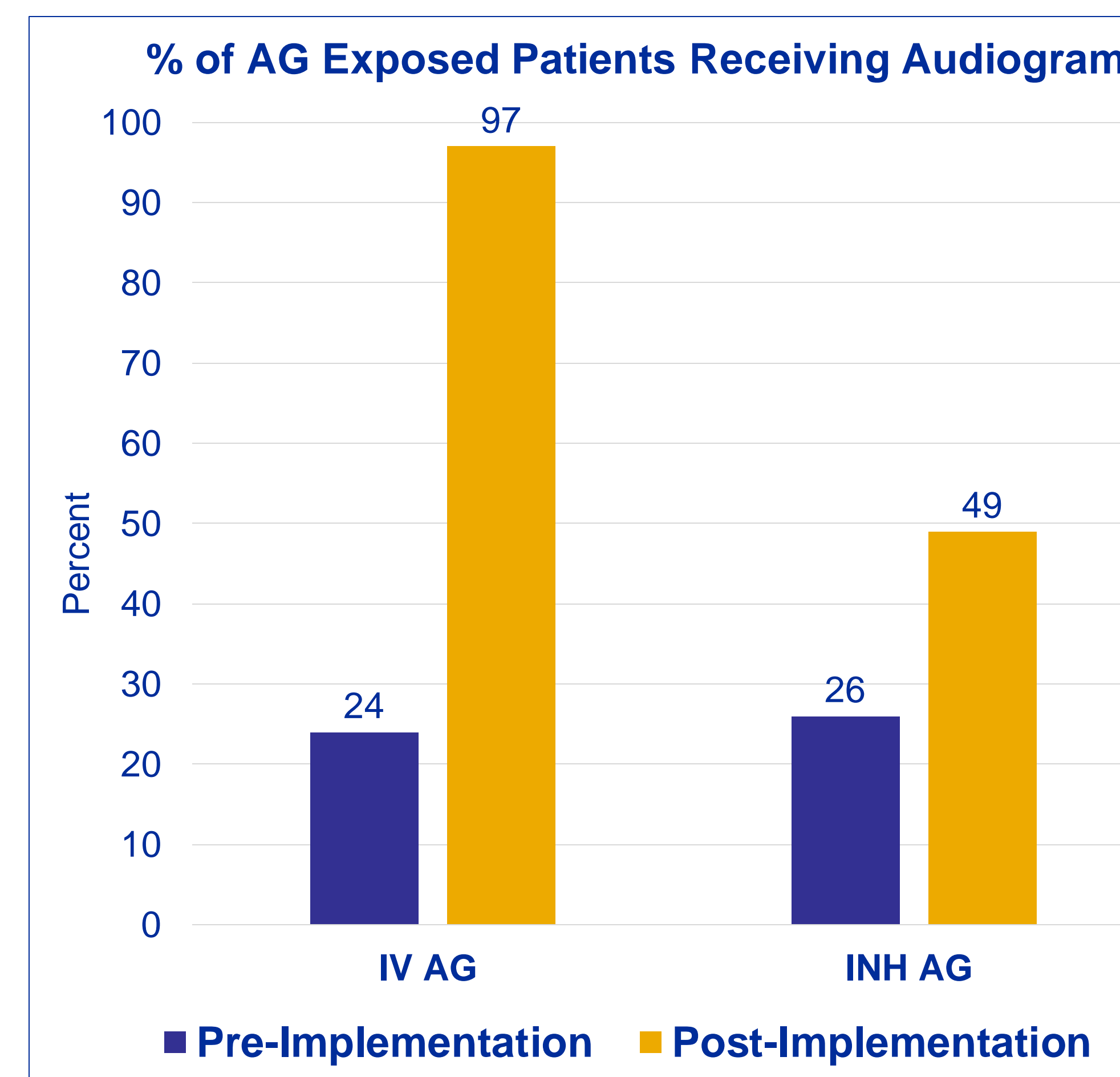
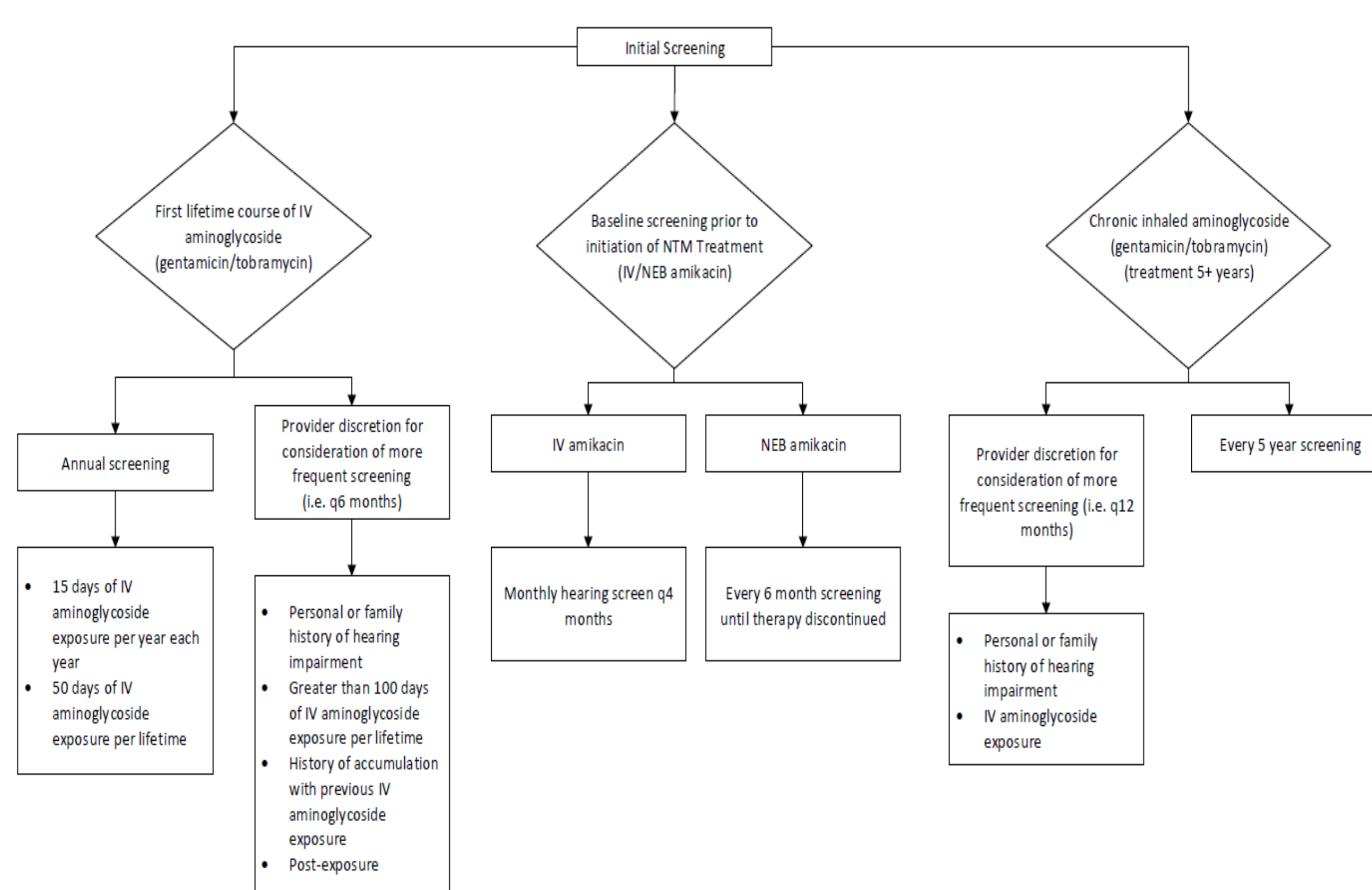
## Methods

- Pre-Implementation
  - Provider Survey
  - Retrospective Chart Review
  - Observational Cohort Analysis
  - Review of Published Literature
- AIOA implementation: 1/1/2017
- Eligible patients identified during pre-clinic huddles and hospitalizations by PharmD and CF Center Coordinator
- Monthly retrospective review of AG prescriptions and inpatient AG orders
- Database developed to track audiograms, therapy modifications, and adherence to algorithm
- Data collected through: 6/30/2018

## Post-Implementation Results

- 18 months post-implementation, 34 of 35 patients (97%) treated with an IV AG had an audiogram.
- In 2018, 35 patients had received an INH AG  $\geq 5$  years. Audiograms were obtained in 17 patients (49%).
- Based on audiogram results 7 interventions have been made including: 2 referrals to otolaryngology, 2 dose modifications, 2 changes in IV antibiotic selection, and 1 adjunct otoprotective medication utilized

## AIO Algorithm



## Conclusions

- Implementation of an AIOA increased the frequency of audiograms obtained among patients treated with IV and INH AG.
- The prevalence of hearing abnormalities at CMKC is higher than that reported in the CFF Patient Registry as well as the overall US population.
- In 51 audiograms obtained over 18 months, 28 (55%) had some degree of abnormality in either distortion product otoacoustic emissions or varying degrees of high frequency hearing loss. Among the patients with abnormalities, an intervention was made in 7 (25%) patients.
- The frequent use of AG among CF patients and the probability of AG induced hearing loss suggest a need to establish an AIOA nationally.

The authors of have no relevant disclosures.

