

OBJECTIVE

1. To identify if parent/teacher concern is related to a child's screening outcome.
2. To better understand high risk factors in early childhood screening outcome.
3. Learn about the importance of early childhood screenings.

BACKGROUND

It is recommended that all babies receive a newborn hearing screening (NHS) before being discharged from the hospital. Following NHS guidelines, the American Academy of Pediatrics recommends that children have additional hearing screened at 4, 5, 6, 8, and 10 years old. In addition, they recommend screenings between ages 11-14, 15-17, and 18-21 (Hecht, 2023). This leaves a gap between the time a child receives their NHS to when they receive a hearing screening at age 4. About 1.7 per 1000 babies screened are born with hearing loss (CDC, 2023). This number increases as children age due to factors such as genetics and various congenital conditions. Approximately 15% of children aged 6-19 years old have hearing loss in at least one ear. (Zappi, 2023). Late identification can cause delayed language development and poorer academic performance. Preschool hearing screenings help address this gap and identify kids with hearing loss before they start school.

The Marion Downs Center is a non-profit health clinic that provides audiology, speech, and language services in both a clinic and community setting. The providers strive to provide service using best practices and by educating patients and families about the impact of hearing and speech challenges. One of the community programs at the Marion Downs Center is called Kid Screen, which is a screening program for hearing, speech, language, vision, and development. The Kid Screen team provides on-site screenings to several Head Start, Private, and Public schools in the Denver metro area for kids ages 0-18.

Early Head Start and Head Start programs provide services for low-income families to promote the development of children. These programs must complete or obtain a developmental screening within 45 days of when the child starts. If the program is 90 days or less, the screening must be done within 30 days (Head Start).

POPULATION

We performed a retrospective review of the existing Kid Screen dataset. We specifically analyzed hearing, vision, and speech screening records of children ages 0 months to 5 years 0 months who were screened through the Kid Screen program under the Marion Downs Center between August 1, 2022, through November 31, 2023.

METHODS

Inclusion/Exclusion Criteria:

Inclusion:

1. Children ages 0 months to 5 years 0 months that were screened through Kid Screen between July 1, 2022, through November 31, 2023.
2. Children who received a screening for any or all of the following: hearing, speech, and vision.
3. Children who were rescreened after their initial screening to obtain a complete screening record. Possible reasons for a rescreen include refusal to participate in the task, unable to complete the task, sleeping at time of screening, or absent.
4. Children who were rescreened due to a refer result on the initial screening.

Exclusion:

1. Children older than 5 years 0 months at time of screening.
2. Children seen before August 1, 2022, or after November 31, 2023.
3. Children with an incomplete screening record (i.e., missing a hearing screen result).

TESTS

Otoacoustic Emissions (OAE):

Applicable for any age, determines inner ear function; automated screening device which does not require in-depth interpretation by examiner.

Pure Tones:

Appropriate for ages 4 years and older; frequency specific information, requires the ability to condition to a specific task.

Tympanometry:

Can be used for all ages, useful for early childhood; screens outer and middle ear status.

Bower, 2023

PROTOCOL

0 months – 3 years 11 months

- OAEs are completed using an automated screening protocol
- Tympanometry is to be completed after referring on OAEs

Children 4 years +

- Pure Tones are completed at 1000Hz, 2000Hz and 4000Hz, with 20dBHL being a pass.
- Tympanometry is to be completed after referring on Pure Tones at any frequency.
- If conditioning to Pure Tones cannot be completed the protocol for 3-year-olds will be used.

Marion Downs Center (MDC)

RESULTS

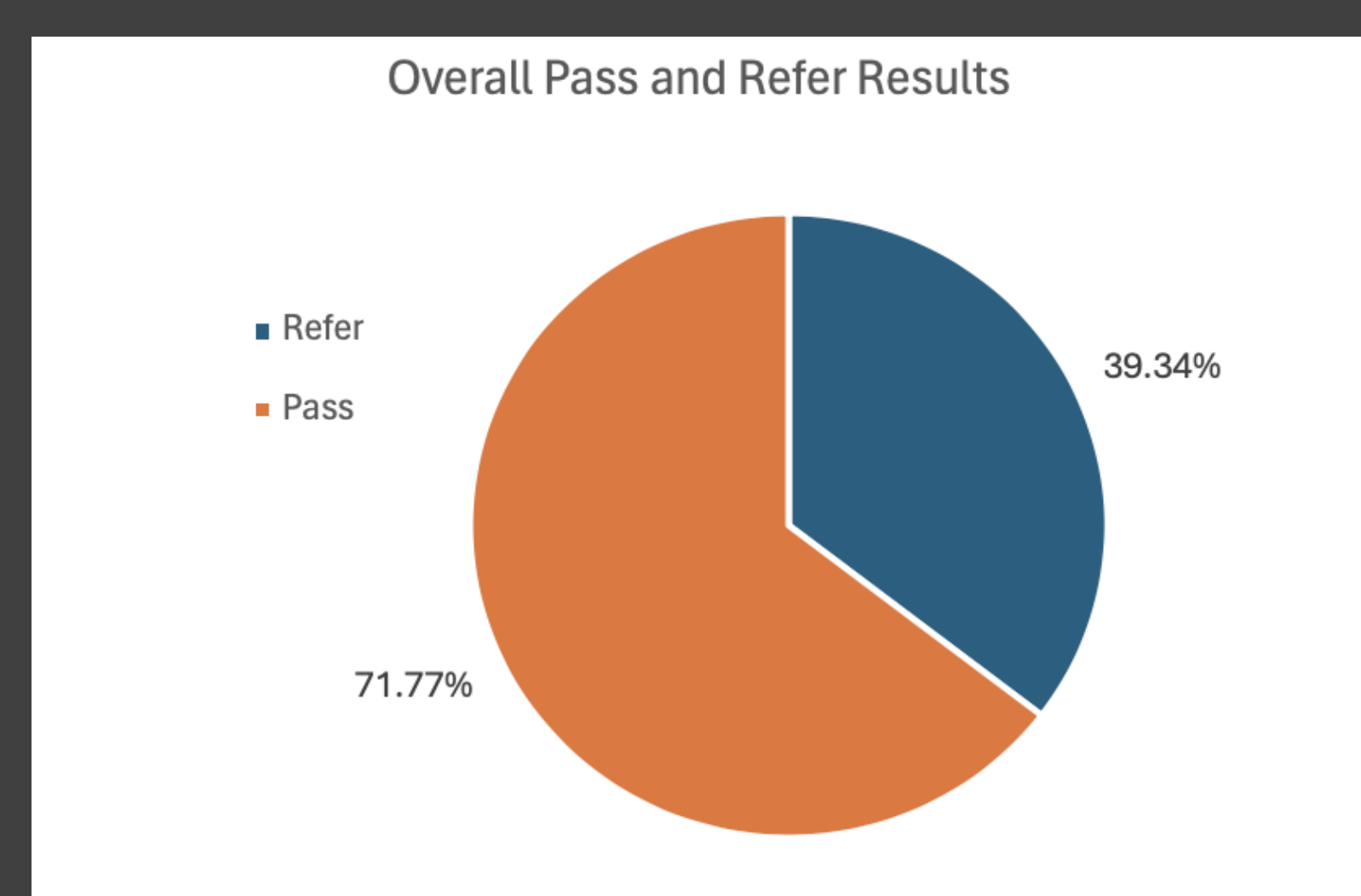


Table 1. depicts the results of the overall referral rate including children who were unable to complete the screening on and had to be referred.

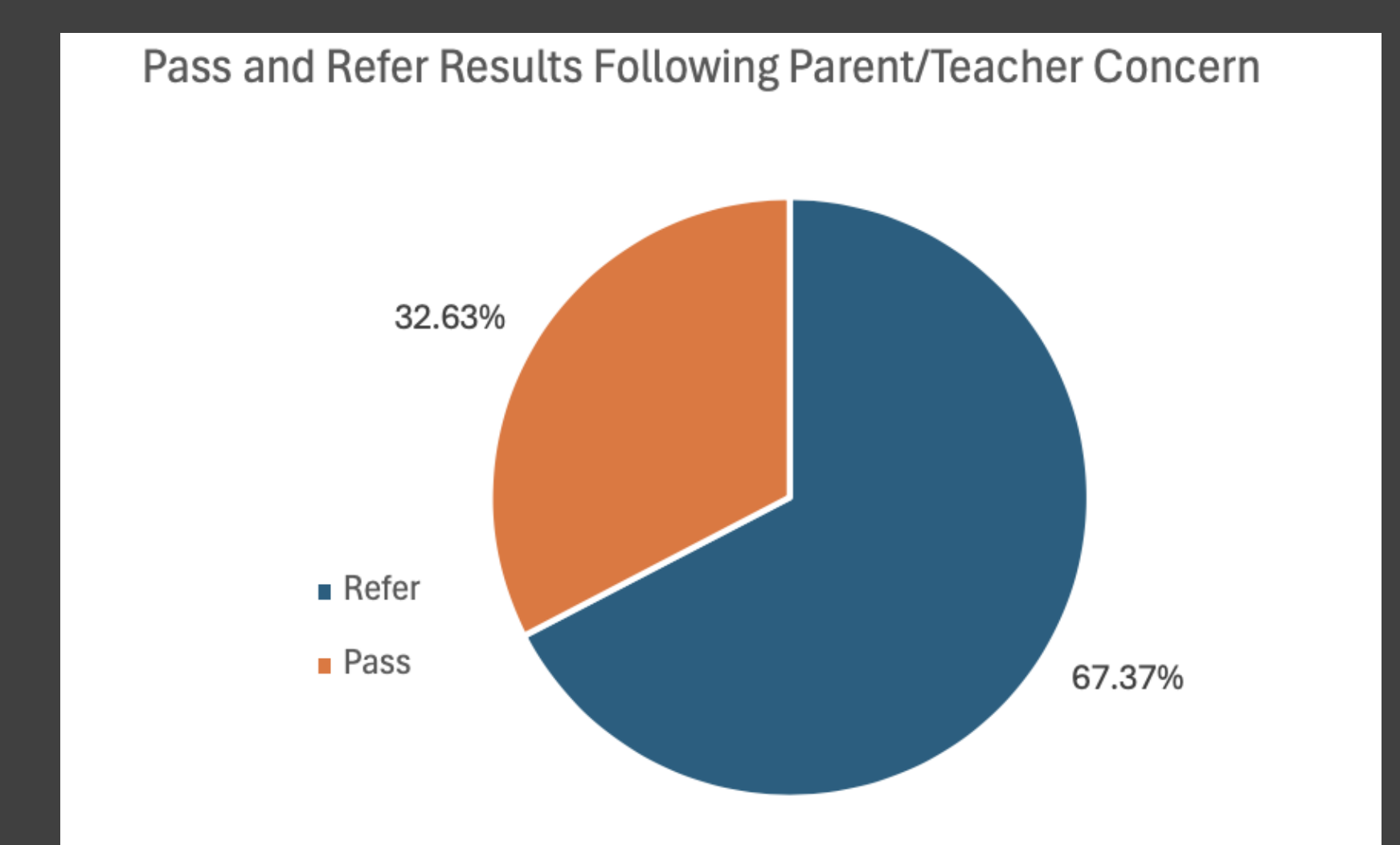


Table 2. depicts the results of hearing, speech, or vision referrals with a parent/teacher concern, including children who were unable to complete the screening on and had to be referred.

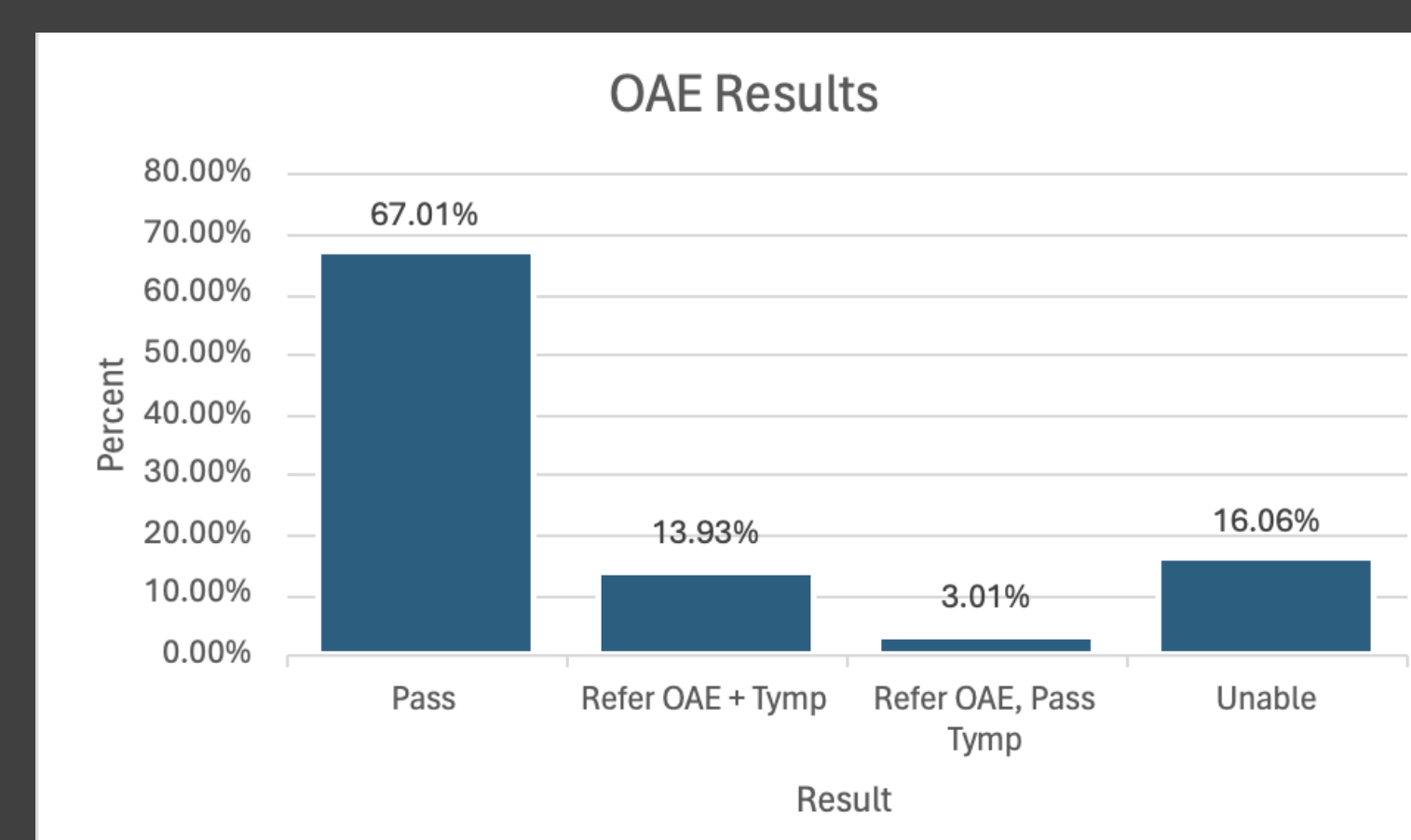


Table 3. depicts the results of on OAE screenings on children aged 0m- 3 years, 11 months.

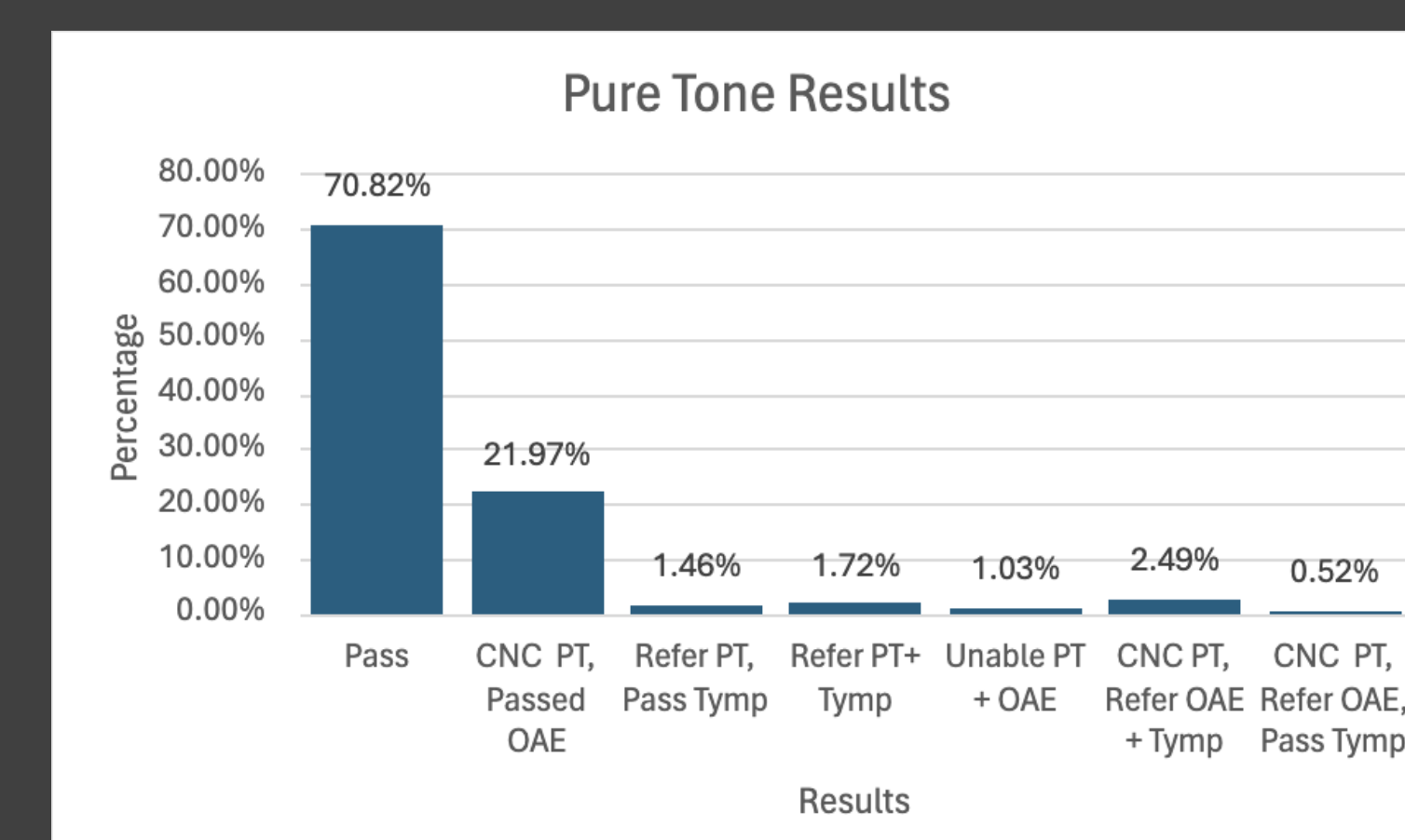


Table 4. depicts the results of Pure Tone Results on children who are 4 years old.

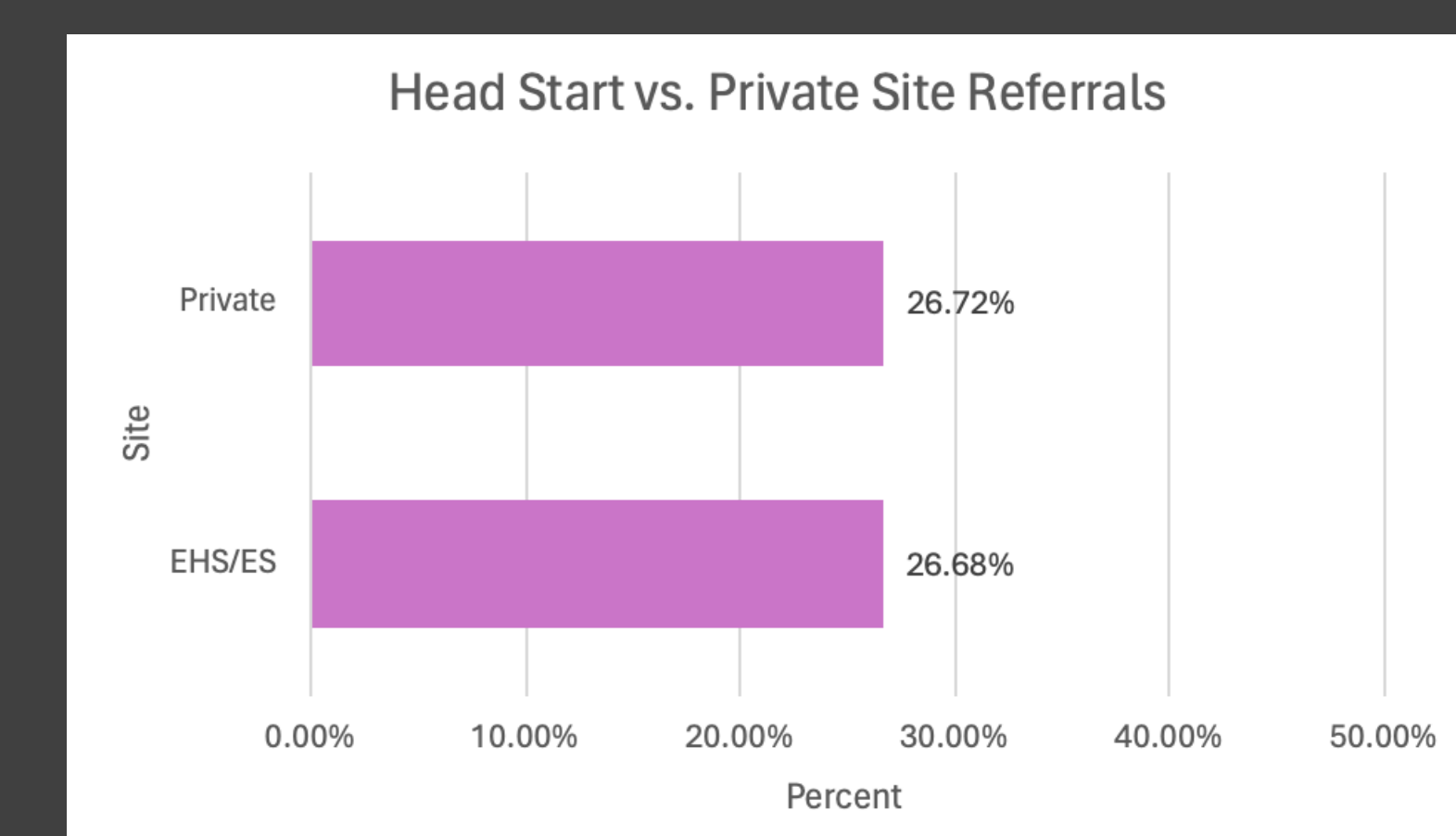


Table 5. depicts the percent of early head start and head start kids that referred vs the percent of private site kids that referred on at least one screening.

SUMMARY & DISCUSSION

1. It is clear that reported parent/teacher concern is related to a child's screenings outcomes. Table 2 shows that 67.37% of children who had reported parent/teacher concern referred on at least one screening. Of the overall children screened, table 1 shows that 39.24% referred on at least one screening. This supports that children who have a reported parent/teacher concern are more likely to refer on a screening. It is important to note that some referrals are due to things such as not being able to condition, crying, or behavior.
2. Table 5 indicates that children in Early/Head Start programs are just as likely to refer on at least one screening as those that are in a private site program. This suggests that socioeconomic status does not play a role in screening outcomes. Mandated developmental screenings in Early/Head Start programs may help reduce barriers.
3. Table 3 indicates that 13.93% of children screened referred on both OAEs and tympanometry, which suggests the presence of a middle ear pathology. A common middle ear pathology, Otitis Media, can be a leading cause for hearing screening referrals. Children who refer on a hearing screening should be closely monitored until they either pass a hearing rescreen, have received medical intervention, or followed up with an audiologist. It is also important to note that 16% of children were unable to be screened due to Behavior. Table 4 indicates that approximately 22% of children, four years and older, could not condition to the pure tone testing. This is a significant number and should be considered when reviewing current screening protocols.

ACKNOWLEDGEMENTS

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REFERENCES

- Brodie, K. D., David, A. P., Kriss, H., & Chan, D. K. (2022). Outcomes of an early childhood hearing screening program in a low-income setting. *JAMA Otolaryngology-Head & Neck Surgery*, 148(4), 326. <https://doi.org/10.1001/jamaoto.2021.4430>
- Bower, C., Reilly, B. K., Richerson, J., & Hecht, J. L. (2023, August 28). *Hearing assessment in infants, children, and adolescents: Recommendations beyond neonatal screening*. American Academy of Pediatrics. <https://publications.aap.org/pediatrics/article/152/3/e2023063288/193755/Hearing-Assessment-in-Infants-Children-and-Adolescents?fulltext=redirected>
- Centers for Disease Control and Prevention. (2023, August 4). *Data and statistics about hearing loss in children*. Centers for Disease Control and Prevention. <https://www.cdc.gov/nchddd/hearingloss/data.html>
- Colorado Department of Education. (2017, June). *Guidelines for childhood & youth hearing screening programs*. Retrieved February 27, 2023, from https://www.cde.state.co.us/cdesped/guidelines_childhoodyouth_hearingscreening_2017
- EHDI Legislation: Overview. EHDV/ Newborn Hearing Screening Legislation: Overview | NCHAM. (n.d.). <https://www.infanthearing.org/legislation/>
- Head Start. (2018, December 24). *1302.33 child screenings and assessments*. ECLKC. <https://eclkc.ohs.acf.hhs.gov/policy/45-cfr-chap-xiii/1302-33-child-screenings-assessments#:~:text=The%20AAP%20recommends%20that%20all,have%20the%20greatest%20positive%20impact>
- Hecht, J. L. (2023). *Hearing screening for newborns, Children & Adolescents: Aap Policy explained*. HealthyChildren.org. <https://www.healthychildren.org/English/ages-stages/baby/Pages/Purpose-of-Newborn-Hearing-Screening.aspx#:~:text=The%20AAP%20recommends%20that%20all,have%20the%20greatest%20positive%20impact>
- Zappi, R. E. (2023). *Helping children with hearing loss succeed in the classroom*. *ASHA LeaderLive*. <https://doi.org/10.1044/2023-0524-blsm-auds-schools>