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Exploring the Relationship Between Socioeconomic Status and Newborn Hearing Screening in Missouri

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**HEALTH &
SENIOR SERVICES**

Pregnancy-Associated Mortality Review

Project Development

Background:

In Missouri, the prevalence of infant hearing loss is roughly 1.83 instances per 1,000 screenings. In 2021, the state of Missouri began participating in the International Early Hearing Detection and Intervention (iEHDI) program. This has created new opportunities for more robust analyses of trends and patterns regarding hearing screenings and diagnostics, which will aid in targeting resources to serve Missouri children and families better dealing with hearing loss. One finding from this improved analysis was differences in screening rates based on socioeconomic status. This relationship warranted further exploration.

Study Question:

What is the relationship between socioeconomic status (SES), hearing screening, and audiological diagnostics?

Methods:

Data came from iEHDI 2017-2019 and 2021. 2020 data was excluded due to abnormalities found within the dataset.

An SES index was created ($\alpha = 0.76$) to account for the infant's SES. This was comprised of maternal WIC participation, maternal education, paternal education and marital status. Maternal race and paternal race, as well as insurance type were evaluated but ultimately dropped to create the strongest index possible. Facilities were also given an SES score based on the mean SES score of infants born there.

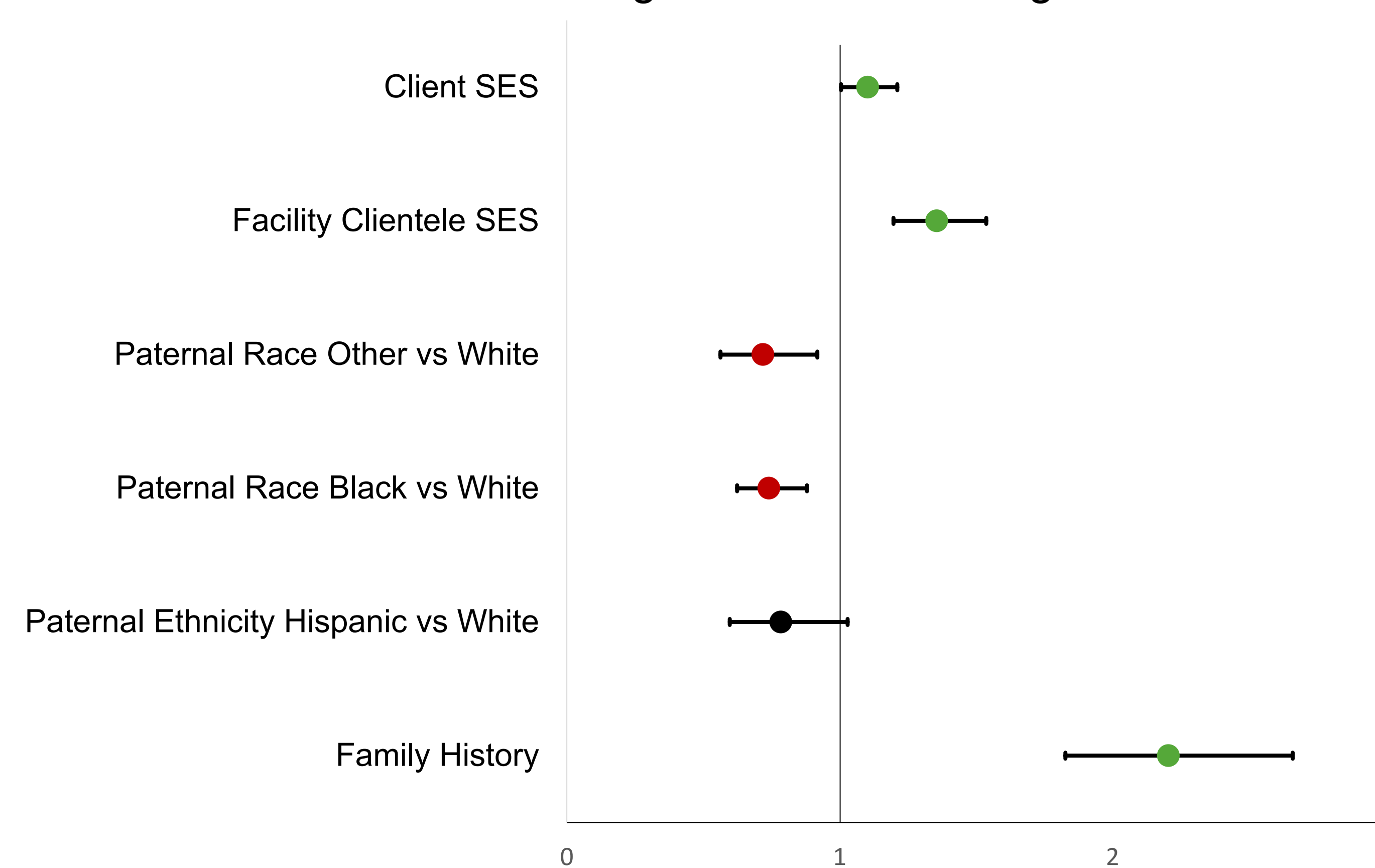
Logistic regression models were constructed utilizing fast backward elimination, retaining client and facility SES. For screening, the interaction of client SES and facility SES was dropped, in addition to maternal race, maternal age, paternal age, population density, infant sex and infant birth weight. For diagnostics, the variables for infant sex, maternal age, paternal race and maternal race were dropped.

Differences in Screening Results

There was a statistically significant relationship between client and facility clientele SES on newborn hearing screening results. Higher SES of both the facility and the individual correlated with improved odds of passing the hearing screening.

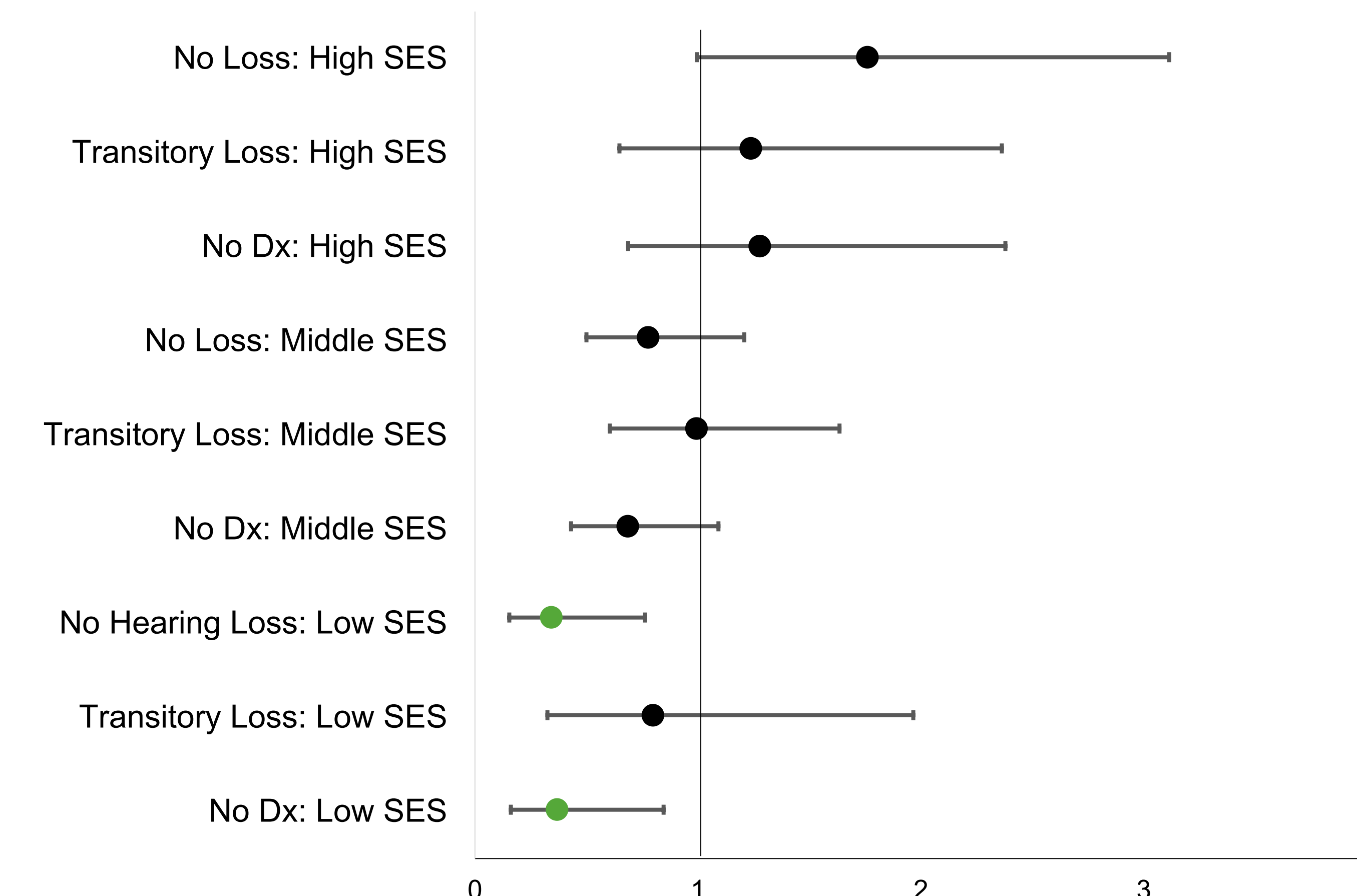
- The odds of passing a hearing screening increased as client SES increased (1.1).
- The odds of passing a hearing screening increased as facility clientele SES increased (1.4).
- The odds of an infant passing a hearing screening when there was no family history of hearing loss compared to when there was a family history increased (2.2).
- Compared to children with Non-Hispanic White fathers, those with Non-Hispanic Black (0.7) fathers and those with other non-Hispanic races (0.7) were less likely to have a "pass" screening result.

Odds Ratio of Having a "Pass" Screening Result



Differences in Diagnostic Results

Odds of Having a Diagnosis other than Permanent Hearing Loss after a "Not Pass" Screening Result, Interaction of Facility Clientele & Client SES



When examining diagnostic results, there was also a statistically significant interaction between client and facility SES. This indicated that as facility SES increased, lower SES clients were more likely to have a not-pass screening result with permanent hearing loss than a not-pass screening with no hearing loss.

- The odds of having "no screening," compared with having a diagnosis of permanent hearing loss, decreased for lower SES clients as facility SES increased (0.4).
- The odds of having a diagnosis of no hearing loss, compared with having a diagnosis of permanent hearing loss, for lower SES clients decreased as facility SES increases (0.4).
- The odds of having a diagnosis of no hearing loss, compared with having a diagnosis of permanent hearing loss, decreased as parental age increased (0.968).

Conclusion

Lower SES clients and facilities that serve lower SES clientele are more likely to have failed hearing screenings than their higher SES counterparts. In addition, at the diagnostic level, lower SES clients are less likely to have a "not pass" screening result with no permanent hearing loss when they give birth in higher SES facilities.

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Public Health

These findings highlight the importance of looking at data through various lenses. By examining newborn hearing screening results and audiological diagnostic results through the lens of socioeconomic status, it was highlighted that healthcare systems may be able to serve those who are already struggling better through improvements to their hearing screening process and procedures. In a data-to-action moment, this study highlighted one system in particular that the program may now reach out to and aid in better serving the population.

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