

# Hearing Loss in Urban vs. Rural Dominican Republic Communities

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## Background

- In Latin America and the Caribbean, the estimated hearing loss prevalence in children is 1.5%, three times higher than high income countries like the United States.<sup>1</sup>
- No universal health screenings in the Dominican Republic, and national population data about hearing loss prevalence and otologic disorders does not exist.

## Objective

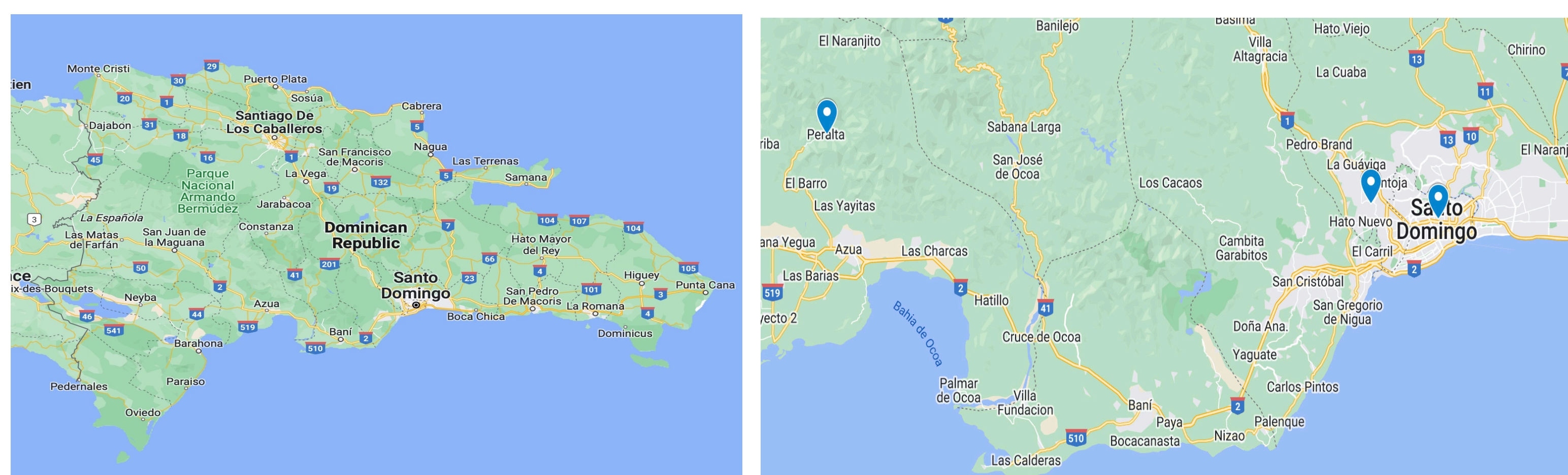
The aim of this study was to report on a pediatric hearing screening program developed with a local NGO in the Dominican Republic, measure otologic health in school-age children and quantify disparities in hearing loss in children who live in the capital Santo Domingo versus less urban surrounding communities, Villa Verde and Peralta.

## Method

A hearing screening was performed on 243 children between the ages of 3 to 17 years old at a K-12 school in Santo Domingo. IRB approval was obtained from a local university and informed consent was obtained from parents.

The screening included otoscopy, tympanometry, audiometry, and an otoacoustic emissions (OAE) test. Audiometry was used to confirm screening thresholds at 25dB at 500Hz, 1000 Hz, 2000 Hz and 4000 Hz. Tympanometry recorded normal, negative, or flat pressure.

Results were compared with ongoing hearing screening missions rural communities west of Santo Domingo, Villa Verde and Peralta. Villa Verde is located on the northwestern outskirts of Santo Domingo 10km from the city center and Peralta is a small town 100km west of the capital.



## Results

Table 1. Hearing Screening Test Results by Site (n=559)

Region	Pass on Both Ears	Patients Referred	Not Tested	Total
Santo Domingo	231 (95.1%)	3 (1.2%)	8 (3.3%)	243 (100%)
Villa Verde	187 (92.1%)	10 (4.9%)	6 (3.0%)	203 (100%)
Peralta	86 (76.1%)	21 (18.3%)	6 (5.2%)	113 (100%)
Total	504 (90.2%)	34 (6.1%)	20 (3.6%)	559 (100%)

Figure 1. Patients with Failed Hearing Screening by Site (n=559)

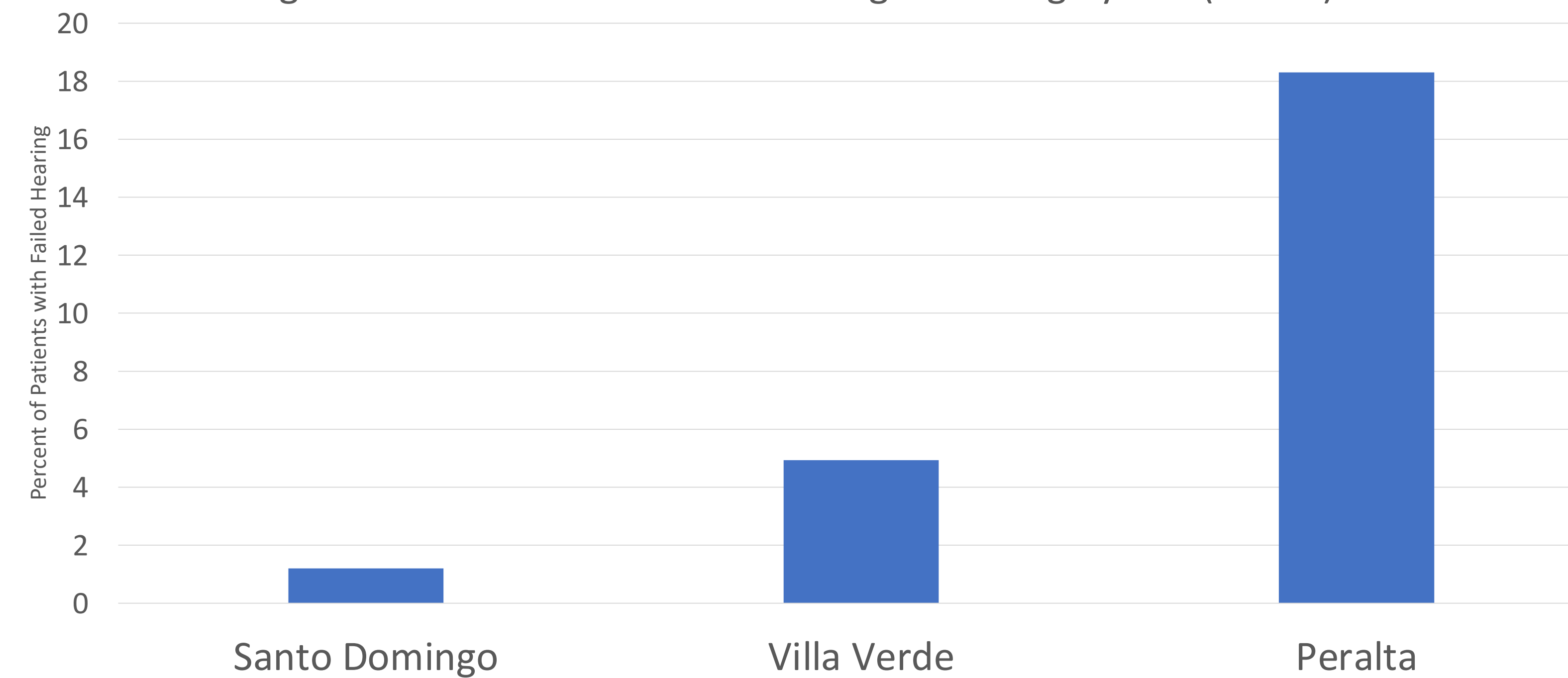
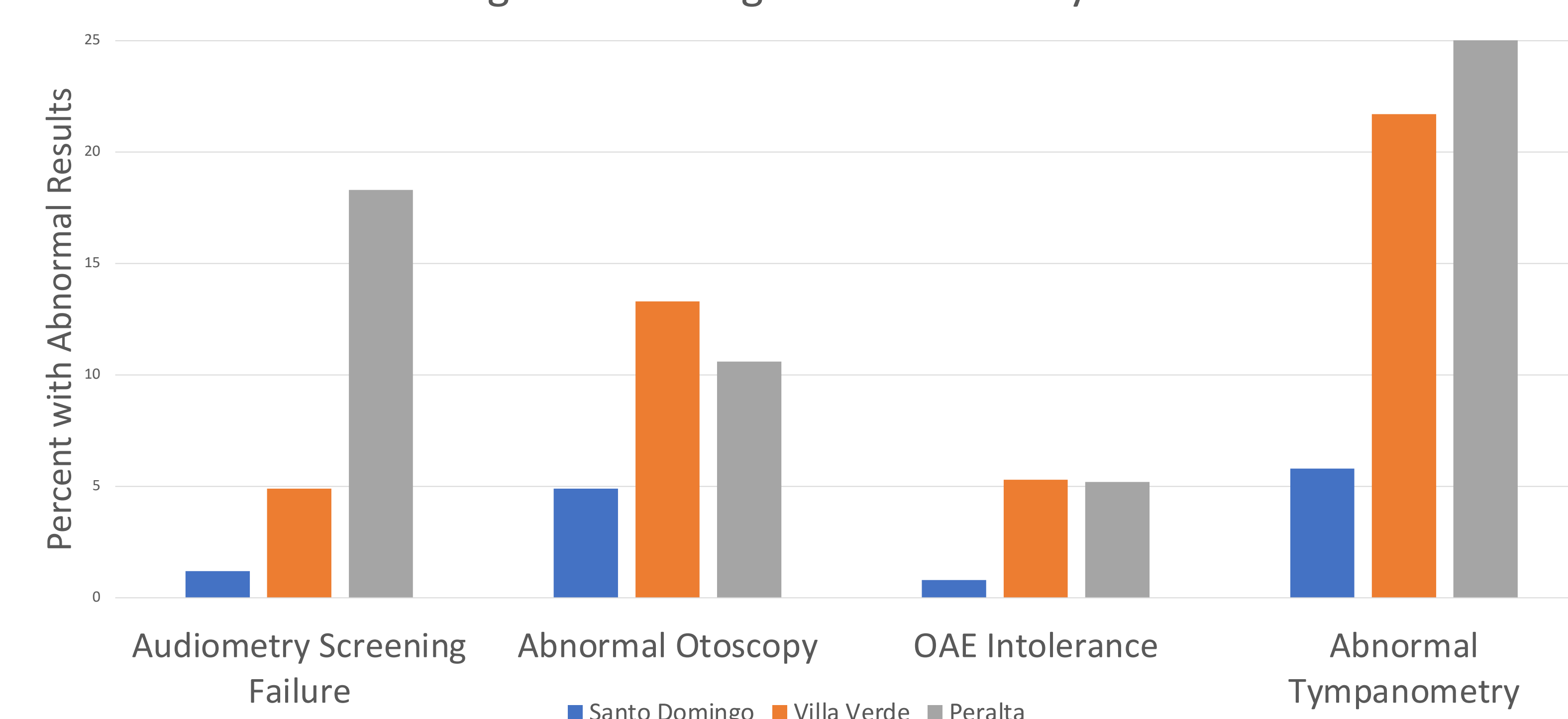


Table 2. Otologic Test Results by Site (n=559)

Region	Audiometric Screening Failure	Abnormal Otoscopy	OAE Intolerance	Abnormal Tympanometry
Santo Domingo (n=243)	1.2%	4.9%	0.8%	5.8%
Villa Verde (n=203)	4.9%	13.3%	5.3%	21.7%
Peralta (n=113)	18.6%	10.6%	5.3%	26.5%

Figure 2. Otologic Test Results by Site



## Results

Of 243 patients screened in Santo Domingo, 12 children (4.9%) presented with abnormal otoscopic results. This included impacted cerumen, tympanic perforations, otitis media, and ear canal foreign objects (see Table 2).

Tympanometric testing revealed 14 children (5.76%) with abnormal results, 2 children (0.8%) who not tolerate OAEs (otoacoustic emissions), and 3 children (1.2%) who failed audiometric screening (see Table 2).

In Villa Verde, 13.3% of the 203 children screened presented with abnormal otoscopy, 21.7% with abnormal tympanometry, 5.3% did not tolerate OAEs, and 4.9% failed audiometric screening (see Table 2).

In Peralta, 10.6% of the 113 children screened presented with abnormal otoscopy, 26.5% with abnormal tympanometry, 5.3% did not tolerate OAEs, and 18.6% failed audiometric screening (see Table 2).

Chi-squared tests and subsequent post-hoc analyses revealed that the Peralta group significantly differed from the Villa Verde and Santo Domingo groups in hearing screening, tympanometry, and otoscopy results (p<0.05).

## Discussion

Hearing loss and abnormal otologic presentations were significantly higher in children in the rural Villa Verde and Peralta sites compared to the urban site in Santo Domingo. Patients in the two rural sites were more likely to present with audiometric screening failures, abnormal otoscopic presentations, OAE intolerances, and abnormal tympanometry.

Between Villa Verde and Peralta, patients from Peralta presented with significantly higher numbers of audiometric screening failures and abnormal tympanometry. Therefore, as the site became more distant from Santo Domingo and more rural, the otologic health of the patient population decreased.

## Conclusion

The study highlights significant variations in screening, tympanometry, and otoscopy results among the three groups. Particularly, the Peralta group stood out with significant differences compared to the other two groups, suggesting distinct clinical outcomes.

Expansion of the hearing screening program, especially to more rural communities, will better clarify regional disparities in hearing loss in school-age children in the Dominican Republic.

Further studies should focus on identifying factors that contribute to these differences.

## References

- WHO. (2013). *Multi-Country Assessment of National Capacity To Provide Hearing Care*. [https://www.who.int/pbd/publications/WHOReportHearingCare\\_Englishweb.pdf](https://www.who.int/pbd/publications/WHOReportHearingCare_Englishweb.pdf)
- Urban, Matthew J et al. "Incorporating hearing screening to an otolaryngology surgical mission in the rural Dominican Republic." *International journal of pediatric otorhinolaryngology* vol. 160 (2022): 111222. doi:10.1016/j.ijporl.2022.111222