Patient Proximity to a Dental Clinic and Caries Rate on Permanent First Molars of Pediatric Patients at a Federally Qualified Health Center (FQHC)

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INTRODUCTION

- Dental caries, if left untreated, can cause widespread damage, oral infections, and problems with eating, speaking, and learning [1]. The first permanent molar is highly vulnerable due to its long eruption time, plaque build-up, posterior positioning, and proximity to decaying primary teeth [2]. A Romanian study found that the mesial surface of the first molar had the highest caries prevalence (36.8%), followed by the occlusal surface (33.3%) [3].
- Social determinants of health can influence a patient's ability to seek dental care. Transportation and proximity to the nearest dental provider can affect a family's ability to bring their child to the dentist. A study conducted by Wehby, et al. found that longer commutes to the dental office were considered a barrier for comprehensive dental exams [4].
- Zip codes can be useful patient information related to geographic variation. Zip codes allow researchers to analyze neighborhoods and communities with similar economic statuses and cultural beliefs. A previous 2012 study on rural and urban differences in dental service use among children enrolled in Delta Dental of Wisconsin found that, "ZIP code poverty is an independent predictor of dental care patterns even in this privately insured population" [5].
- Examining the distance between a patient's residence and their dental clinic has not yet been investigated in a federally qualified health center (FQHC) in Tucson, Arizona. AHCCCS is Arizona's Medicaid plan for children[6].

PURPOSE

This retrospective study aims to determine if patient proximity to a dental clinic is a risk factor for permanent first molar caries in children ages 8-10. There is a potential assumption that patients who live farther from the clinic may have more caries. This research can help dentists become more aware about the social determinants of oral health and improve treatment planning methods and decisions based on the caries rate on permanent first molars. Similarly, this study can help FQHC administrators find better resources for families where transportation or distance to a pediatric clinic is a challenge.

METHODS

- A total of 1,132 charts were reviewed from January 2022 to December 2023 to identify caries present on permanent first molars during comprehensive and periodic appointments.
- Electronic dental records of patients at El Rio Community Health Center Southwest location were obtained from El Rio's IT department.
- Inclusion criteria included patients ages 8-10 with at least one erupted first permanent molar. Additionally, patients must have had a comprehensive exam (code D0150) and periodic exam (code D0120) or have had at least two periodic exams (code D0120) from 1/1/2022-12/26/2023.
- Diagnostic codes for caries and CDT codes for one and two surface posterior fillings (codes D2391 and D2392) on tooth #3, #14, #19, #30 were obtained along with zip codes.
- The designations of "near," "moderately near," and "far" were used as categorical distances to the FQHC and compared to the presence of caries on permanent first molars. Other data retrieved included patients' sex and ethnicity.
- A Kruskal Wallis test, Pearson chi-squared test, and Fisher's exact test were performed to interpret the data.

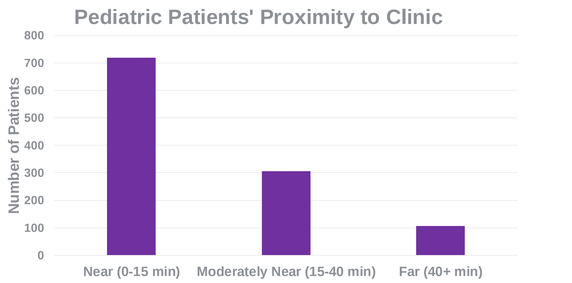

Figure 1. Shows the number of patients in each proximity group to El Rio SW dental clinic

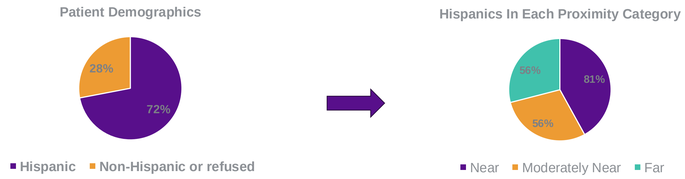

Figure 2. Shows the patient demographics in the study with majority being Hispanic. The breakdown of Hispanics in each proximity group is shown in the second pie chart

# of Patients Per Proximity	719	306	107	P-value
Proximity to Clinic	Near	Moderately Near	Far	
Tooth #3 with caries	32 (4.5%)	19 (6.2%)	6 (5.6%)	0.5
Tooth #14 with caries	24 (3.3%)	14 (4.6%)	7 (6.5%)	0.2
Tooth #19 with caries	51 (7.1%)	22 (7.2%)	11 (10%)	0.5
Tooth #30 with caries	62 (8.6%)	21 (6.9%)	13 (12%)	0.2
Number of caries in general	0.24 (0.64%)	0.25 (0.68%)	0.35 (0.87%)	0.6

Table 1. Shows the percentage of caries on each permanent molar and the percentage of caries in general on all permanent molars for each proximity group with their p-values.

RESULTS

- 72% of patients were Hispanic (812 patients) while 28% (320 patients) were non-Hispanic or refused to report demographics. The proportion of Hispanic patients was greater in the "near" proximity group (81%) compared to "moderately near" and "far" groups which were both 56%. This difference was statistically significant ($p<.001$).
- The mean pediatric age was 8.98 years old, with 51% being female and 49% male.
- Approximately 85% of patients in the study do not have any caries on their permanent first molars.
- The majority of pediatric patients studied (64%) live "near" the clinic, 27% live "moderately near," and 9.5% live "far" from the clinic.
- Caries on teeth #14 and #19 and the overall prevalence of caries showed an increasing trend the farther the individual lived from clinic, although it was not statistically significant. Overall, there was no statistically significant difference across caries prevalence among zip code groups for any of the permanent first molar teeth.

CONCLUSIONS

- There was no significant difference between patients' distance to the clinic and the number of caries present.
- Although not statistically significant, there was an increasing trend in presence of caries on tooth #14 and tooth #19 as well as the overall proportion of caries relative to increased patient distance from the clinic.
- El Rio continues to expand as a FQHC with a heavy focus on providing comprehensive, affordable, and compassionate dental care. By increasing the number of El Rio facilities in Tucson, El Rio is making strides in providing access to dental care for its pediatric population.

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