

Age at Dental Home Establishment and Caries Onset Time

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Introduction

One of the most common chronic childhood diseases is dental caries, or tooth decay.¹ Early childhood caries (ECC) is defined as “the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger”.² The prevalence of caries in children ages 2-5 years was 21.4% between 2015 and 2016.³ Many factors can increase a child's risk of early childhood caries including low socioeconomic status.^{4,5}

To combat ECC, the American Academy of Pediatric Dentistry (AAPD) recommends that a dental home be established no later than 1 year of age to help with early prevention and recognition of ECC.^{6,7} However, there is little scientific evidence to support this age recommendation.

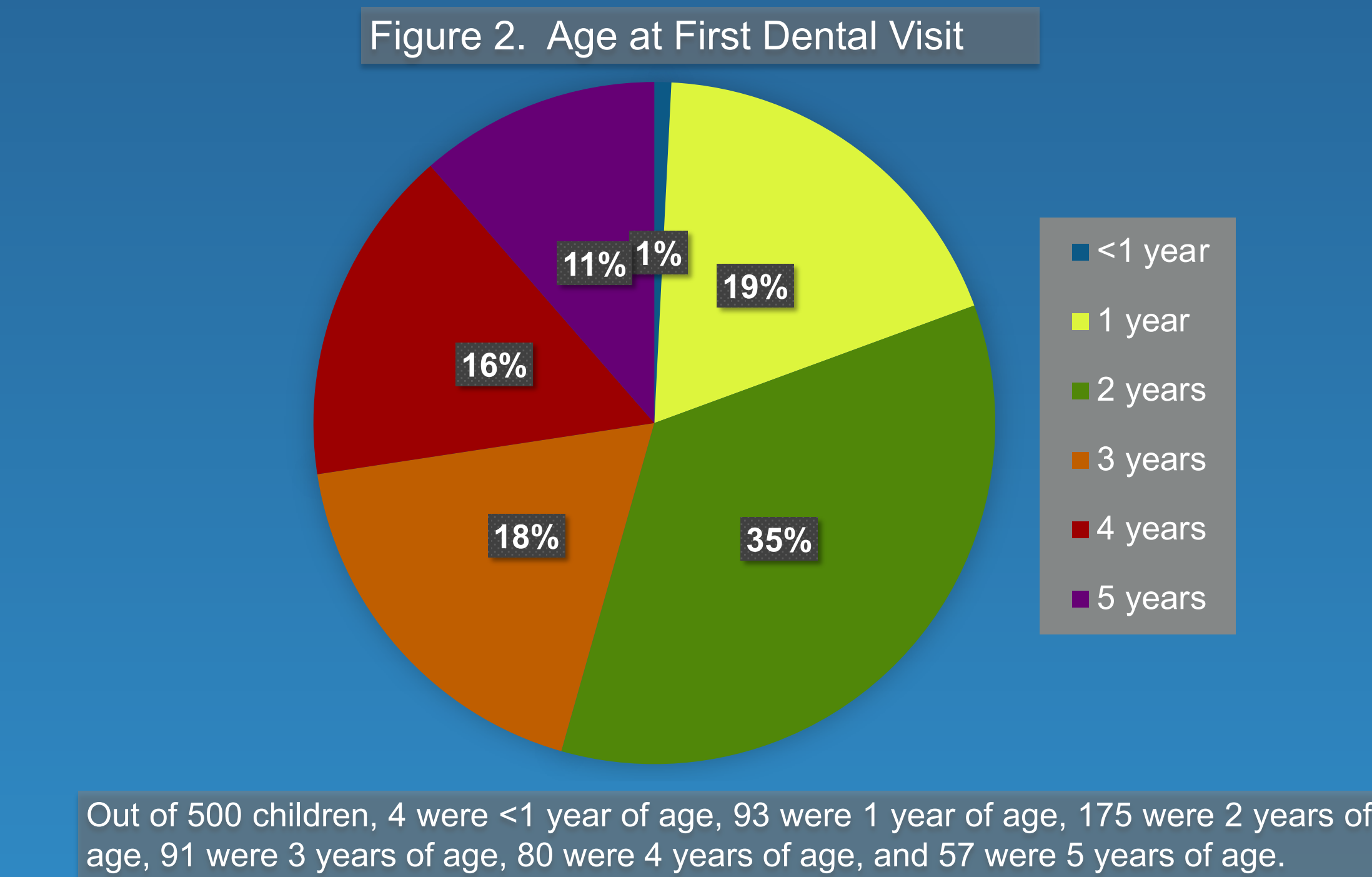
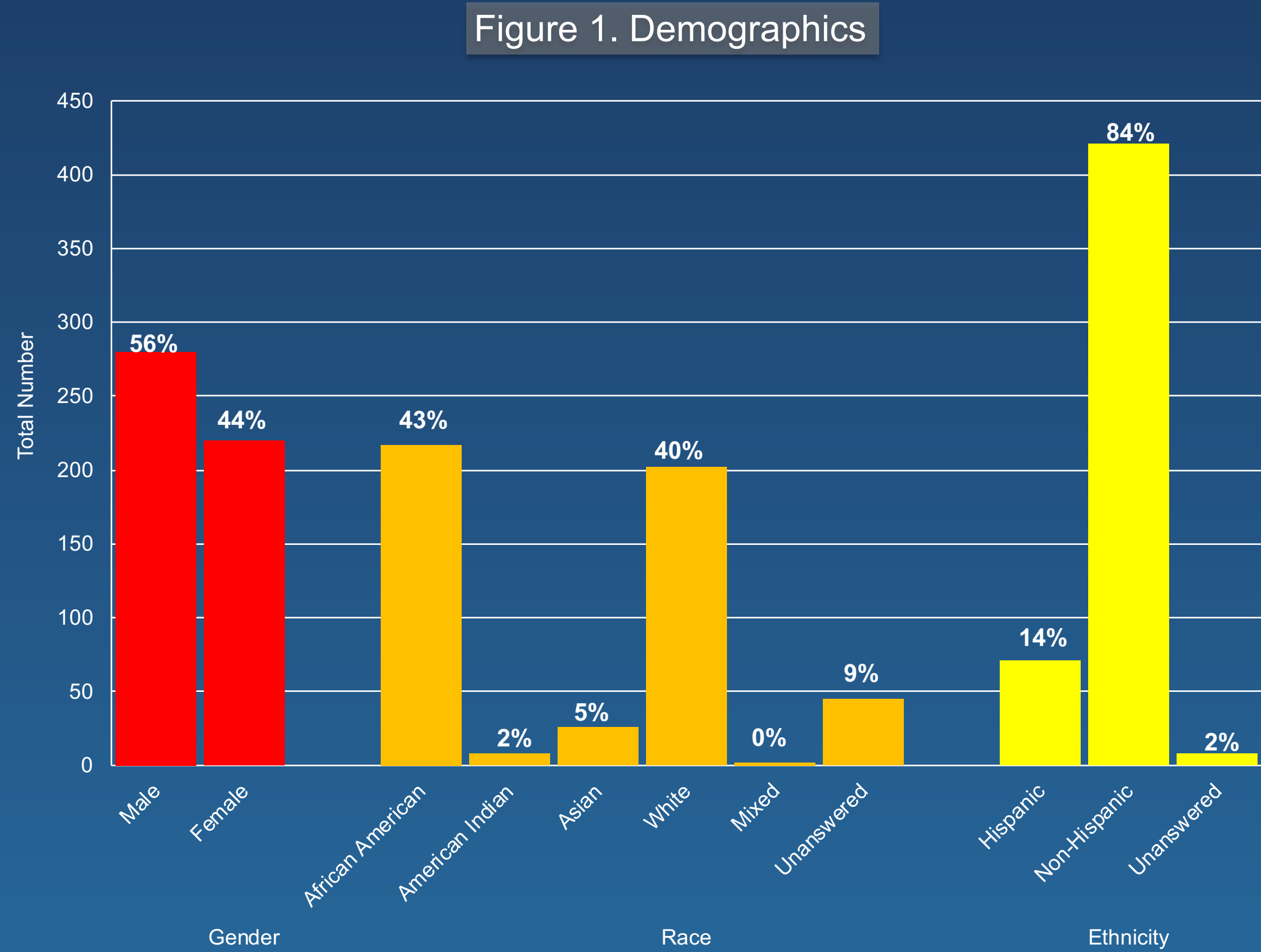
The purpose of this retrospective pilot study (chart review) is to explore the relationship between the age of dental home establishment and caries experience. We hypothesize that the later the age of dental home establishment, the earlier the patient would experience dental caries, and the patient's caries extent would likely require advanced behavior management such as nitrous oxide inhalation, oral conscious sedation, or general anesthesia.

Methods

Study Design: 4549 charts were identified and the first 500 charts that met the inclusion criteria were included for analysis. All 500 charts were followed-up for 4 years to determine when the first caries were detected and subsequently all data obtained was de-identified.

Inclusion Criteria	Exclusion Criteria
1. Patients ages 0-71 months with state-funded insurance	1. Privately-insured or un-insured patients
2. Patients with state-funded insurance	2. Children ages 72 months or older
3. Patients having 1st dental visit from January 1, 2013 to January 1, 2015 at URMC EIOH Division of Pediatric Dentistry Clinic	3. Children who have previously been seen by a dentist outside of URMC EIOH Division of Pediatric Dentistry
	4. Children being referred for dental treatment by another dental or medical provider outside of URMC EIOH Division of Pediatric Dentistry

Statistical Analyses: Kaplan-Meier survival curves were plotted with the survival time to new caries as the outcome for each age group. Ethnicity, race, number of recall visits, and number of fluoride varnish applications were controlled for in the analysis. Hazard ratios and 95% confidence interval were estimated. Additional analyses were performed to evaluate the association between age at dental home establishment and advanced behavior management requirement (nitrous oxide inhalation, oral conscious sedation or general anesthesia).



Out of 500 children, 4 were <1 year of age, 93 were 1 year of age, 175 were 2 years of age, 91 were 3 years of age, 80 were 4 years of age, and 57 were 5 years of age.

Figure 3. Descriptive Statistics

Average Age at First Dental Visit	37 months
Average Time from First Dental Visit to Primary Teeth Caries Detection	21 months
Number of Children with Primary Teeth Caries at First Visit	235 (47%)
Number of Children with No Caries at First Visit	265 (53%)
Number of Initially Caries-Free Children with New Caries on Primary Teeth at End of Follow-up	134 (27%)
Number of Children who Remained Caries-Free at End of Follow-up	131 (26%)
Number of Children with Caries Detected at First Visit Requiring Advanced Behavior Guidance	64 (13%)
Number of Children with No Caries at First Visit Requiring Advanced Behavior Guidance	47 (9%)

Results

Table 1. Survival Analysis of All Dental Caries with Age at First Dental Visit for all 500 Patients During the 4-Year Study Period

	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
Age at First Dental Visit	-0.10252	0.04358	5.5343	0.0186	0.903
Ethnicity					
Hispanic	0.27345	0.47951	0.3252	0.5685	1.314
Non-Hispanic	0.29583	0.47413	0.3893	0.5327	1.344
Gender					
Female	0.13896	0.10642	1.705	0.1916	1.149
Race					
Black	-0.27193	0.1176	5.3468	0.0208	0.762
Other	0.22455	0.16308	1.8961	0.1685	1.252
Number of Recall Visits	0.22083	0.05943	13.8085	0.0002	1.247
Number of Fluoride Varnish Applications	-0.13963	0.04056	11.8494	0.0006	0.87

References: unanswered (ethnicity), white (race), male (gender)

Table 2. Survival Analysis of New Dental Caries with Age at First Dental Visit for 265 Initially Caries-Free Patients

	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
Age					
12-23 months	0.88227	0.60008	2.1617	0.1415	2.416
24-35 months	0.92066	0.59548	2.3904	0.1221	2.511
36-47 months	1.02493	0.63555	2.6007	0.1068	2.787
>48 months	0.83932	0.64427	1.6971	0.1927	2.315
Ethnicity					
Hispanic	12.93134	480.01205	0.0007	0.9785	413057.8
Non-Hispanic	13.01059	480.01203	0.0007	0.9784	447121.7
Gender					
Female	0.1425	0.17627	0.6535	0.4189	1.153
Race					
Black	0.08858	0.19594	0.2044	0.6512	1.093
Other	0.40493	0.32115	1.5899	0.2073	1.499
Number of Recall Visits	0.20579	0.08422	5.9713	0.0145	1.228
Number of Fluoride Varnish Applications	-0.05562	0.05307	1.0987	0.2946	0.946

References: unanswered (ethnicity), white (race), male (gender)

Table 3. Advanced behavior guidance technique descriptive statistics

Age at 1st Dental Visit	Number of Children Needing ABGT with Caries at 1st Dental Visit	% Children Needing ABGT with Caries at 1st Dental Visit
<1 year	0	0
1 year	7	50
2 years	13	21
3 years	17	31
4 years or older	27	26

Figure 4. Kaplan-Meier Survival Analysis of All Dental Caries with Age at First Dental Visit for all 500 Patients

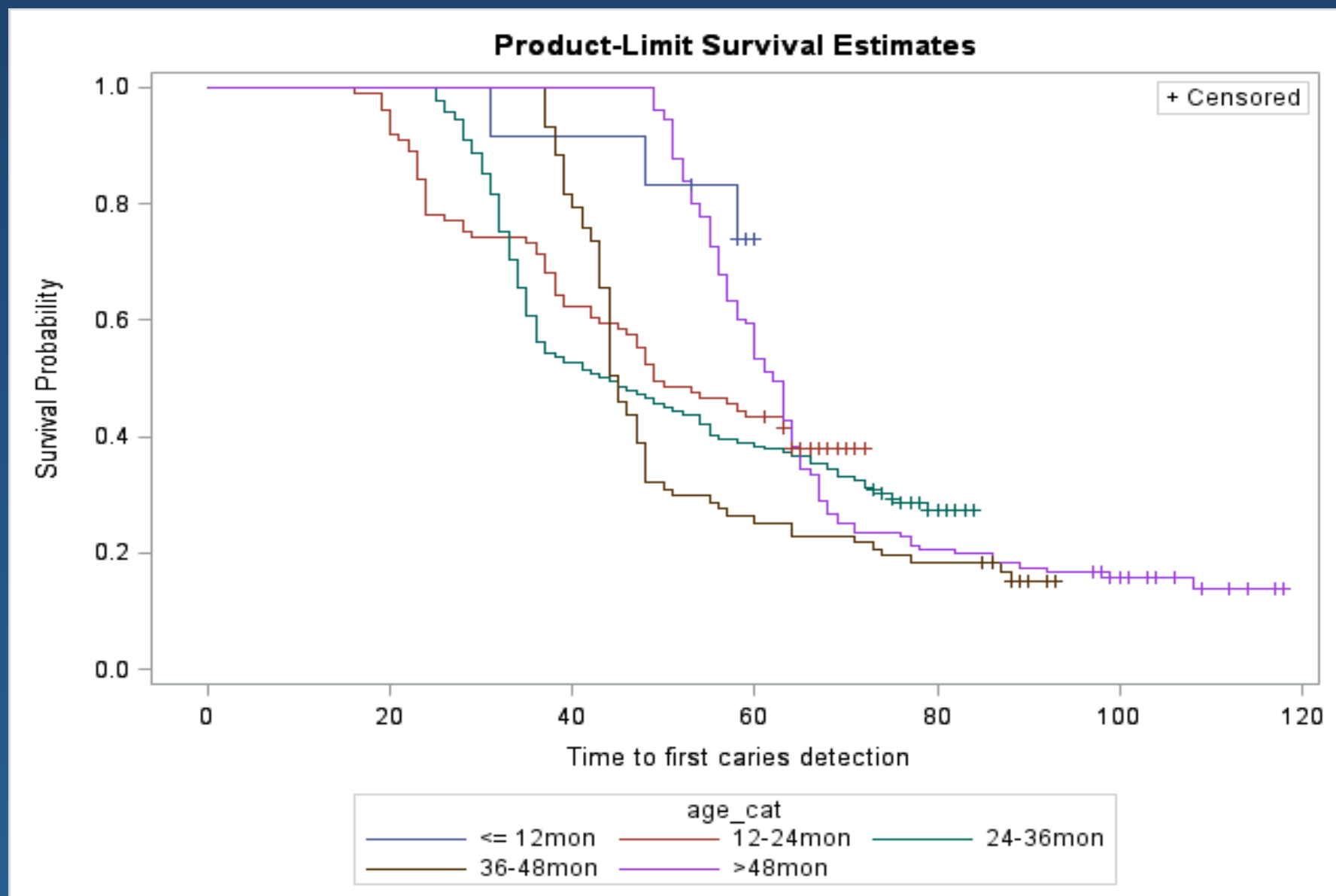


Figure 5. Kaplan-Meier Survival Analysis of New Dental Caries with Age at First Dental Visit for 265 Initially Caries-Free Patients

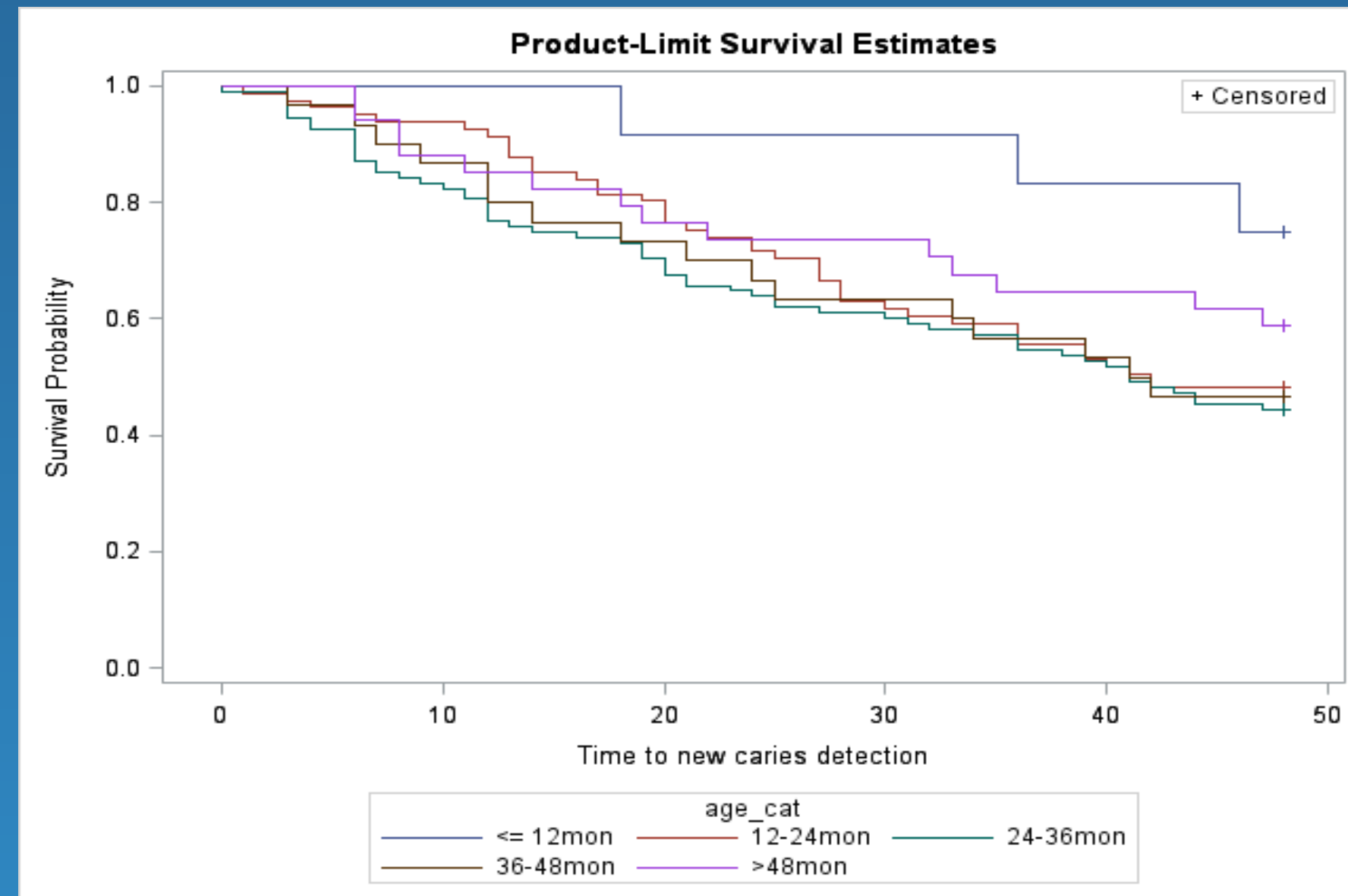


Figure 6. Spearman Correlation between Age at First Dental Visit and a List of Clinical Measures

Clinical Measure	Age at 1st Dental Visit
Number of Fluoride Varnish Applications	-0.43203
Number of Primary Teeth with Caries	0.34543
Number of Recall Visits	-0.30174

Conclusions

- The average age at dental home establishment was 37 months, which is consistent with the current literature.⁸
- No children in the study warranted general anesthesia for dental treatment. However, as age at the first dental visit increased, the number of children needing advanced behavior guidance techniques increased. This is consistent with cohort studies that have found that early preventive dental visits, including establishing a dental home, have led to decreased costs for dental treatment.^{9,10}
- About half of the children who did not have caries at the first dental visit developed caries on primary teeth within the 4 year follow-up period, and the average time to new caries detection was 21 months. This time to new caries detection was consistent with previous literature.^{11,12}
- Children who established their dental home at <1 year of age (1% of patients in study) remained caries-free for the entire 4 year follow-up period and exhibited better survival time to first caries detection. This supports current literature and supports the AAPD's recommendation of establishing a dental home by one year of age.^{6,13}
- There was a potential protective relationship between number of fluoride varnish applications and age at first dental visit, indicating a protective effect.¹⁴

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