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Age at First Dental Visit of Preschool Children Utilizing Public Sector Dental Services in Southeast Queensland, Australia: A Retrospective Cohort Study

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ABSTRACT

Objectives: This retrospective cohort study describes public dental service use among children aged 0–4 years attending public sector oral health services in Metro North and Metro South Hospital and Health Services, Southeast Queensland. This study analyzes age and reason for first dental visits, and whether access pathways, including Lift the Lip (LtL), influence access for key sociodemographic groups.

Methods: We analyzed electronic oral health records for 41,614 children with a first dental visit between January 2014 and December 2022. Age at first visit and reason for attendance were summarized descriptively. Early attendance (≤12 and ≤24 months) was compared across LtL and non-LtL pathways and risk groups using chi-square tests with risk differences and risk ratios.

Results: The mean age at first visit was 37.7 months (SD 17.0). Overall, 11% of children attended by 12 months and 27% by 24 months, and 83% first presented for general care. LtL-referred children were more likely to attend by 12 (27.7% vs. 4.7%) and 24 months (66.7% vs. 12.4%) than non-LtL children. Early attendance remained lower for Indigenous children, those living with greater disadvantage, and Child Dental Benefits Schedule-eligible children, and higher for children from culturally and linguistically diverse backgrounds. Attendance by 12 months increased after 2016, from 5.2% to 12.0%.

Conclusion: Few children accessed public dental care by the recommended age of first visit. While LtL substantially improved early attendance, equity gaps persisted, highlighting the need to strengthen early-referral pathways and parent/carer awareness of the recommended timing for a first dental visit.

1 | Introduction

Early childhood caries (ECC) in children < 6 years of age is a significant worldwide health problem that can profoundly impact the quality of a child's life [1–3]. ECC is largely preventable and often untreated. With an estimated national prevalence of 34%, it is one of Australia's most common childhood diseases [3, 4].

ECC disproportionately affects disadvantaged populations, and socioeconomic inequalities are evident by age 4 [5–9]. Children who are Aboriginal and/or Torres Strait Islander (herein respectfully referred to as Indigenous), from non-English speaking backgrounds, living with socioeconomic disadvantage, or residing in areas of greater disadvantage are more likely to experience dental caries earlier than other children [10]. In Southeast Queensland (SEQ), up to 23% of children aged 2 years have

experienced ECC, rising to 42% by age 5 years [4, 11]. Global studies report a prevalence of 36% in 2-year-olds, but comparisons are constrained by contextual differences and the absence of routinely reported data in Australia for children under 4 years of age [3].

It is recommended that children have a dental visit by age 1. Delayed and irregular preventive visits are associated with higher caries risk and greater disease severity, especially among children at risk of ECC, such as those with special health care needs who may face barriers to timely dental care [7, 8, 12–14]. Regular early dental visits provide opportunities for health professionals to offer anticipatory guidance to parents/carers, detect disease early, assess caries risk and allocate appropriate recall intervals [3]. Improved knowledge of good oral hygiene, early introduction of fluoride toothpaste, regular dental visits and healthy dietary behaviour may reduce caries risk or the need for costly restorative dental treatment or emergency care and improve a child's oral health-related quality of life [2, 5, 14].

However, despite the globally accepted attendance guideline of a child's first birthday, the Australian National Oral Health Plan 2015–2024 (NOHP) recommends a first visit by 2 years of age [2, 15]. This discrepancy may confuse parents/carers and non-dental health professionals and is consistent with findings that dental utilization is more common in children aged 3–5 years [16]. The national consensus statement on oral health messages for the Australian public has recently been updated. It is now concordant with international recommendations that the age at first visit coincides with the eruption of the first tooth and that a first dental check-up occurs by 12 months of age [17]. At the time of writing, this is yet to be reflected in public sector messaging to Queensland parents and caregivers.

In Australia, dental care is delivered through a mixed public–private system [4]. Private services operate on a fee-for-service basis and private health insurance may subsidize some costs for policy holders. The Australian Government allocates funding to all States and Territories to deliver oral health services. In Queensland, children, the State Government utilizes this funding to provide free services to all children from age 4 [18]. While public dental pathways for children 0–3 years vary across jurisdictions, in Queensland, earlier public access for low-income children is facilitated through two separate federally funded means-tested programs. One is concession status (Health Care Card [HCC] or Pensioner Concession Card [PCC]), and the other is the Child Dental Benefits Schedule (CDBS) [19]. Both are means-tested, but concession cards generally broaden access criteria to public services, whereas CDBS is a specific dental funding scheme [18–20].

The Queensland Government provides oral health services through a network of 15 Hospital and Health Services (HHS) [18]. This study was conducted at Metro North Health (MNH) and Metro South Health (MSH), the state's two most populous public sector HHSs [21, 22]. These two services are comparable in scope and catchment profile. Both provide a similar range of services across urban and rural areas centered on Greater Brisbane, the metropolitan capital of Queensland, and serve demographically similar communities. Combined, they serve over 2 million people (approximately 44% of the Queensland population) [21, 22]. Communities across both catchments are diverse, with almost 20% from culturally and linguistically diverse (CALD) backgrounds and 3% identifying as Indigenous [22]. 6%–8% of residents are children under 5 years of age, and across the HHSs, there are pockets of social and economic disadvantage (15.2% living in the most disadvantaged areas) [21–23].

In 2016, a new access pathway was implemented utilizing existing resources. MNH and MSH partnered with Children's Health Queensland Hospital and Health Service to trial early access to free dental care from birth for children referred by Child Health Nurses (CHNs) using the Lift the Lip (LtL) screening tool as a routine component of Well Child Checks [24]. The tool supports CHNs to assess oral health, identify protective and risk factors for ECC and provide brief anticipatory guidance. Children referred via LtL were accepted for public dental care regardless of usual eligibility, with clinics initially prioritized in socioeconomically disadvantaged areas. The program aimed to improve oral health outcomes and provide access to dental services as early as possible for children living with disadvantage. It has replication potential, subject to governance-approved variations in eligibility.

There is a gap in the evidence regarding dental utilization patterns of young Queensland children. Reducing the need for subsequent costly or painful restorative or emergency dental care provides the rationale for this study. Reviewing routinely recorded administrative data of all children less than 5 years of age who utilized public sector oral health services in MNH and MSH will (1) describe the age at first dental visit, reasons for attendance and patterns of early access to care across different eligibility and access pathways, and (2) describe whether children with risk factors for ECC are attending public dental services by the recommended ages for an initial oral health assessment.

2 | Methods

2.1 | Study Design

This retrospective cohort study of SEQ children attending public sector oral health services complies with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cohort studies. Quantitative clinical and demographic data were extracted by the data custodian, Queensland Health's Office of the Chief Dental Officer, from the Information System for Oral Health (ISOH) for the period January 1, 2014 to December 31, 2022.

2.2 | Ethics Approval

Ethics approval was received from the Children's Health Queensland Hospital and Health Service Human Research Ethics Committee in Brisbane (HREC/23/QCHQ/97094) and the University of Queensland (No. 2023/HE000790).

2.3 | Study Setting

This study was conducted in MNH and MSH, involving public sector child health and oral health staff and facilities. Over 41,000 children accessed oral health services during the study period, entering via standard care pathways (universal eligibility, concession status or CDBS) or through the LtL program.

2.4 | Participants

The records of children meeting inclusion criteria were retrieved from the patient management system. Children were born between 2009 and 2022 (inclusive) and attended a public dental facility in MNH or MSH at least once by the age of 4 years (0–59 months). We describe characteristics of individuals residing in the MNH and MSH catchment areas and included those who received care episodes in MNH or MSH, but not children who received care episodes solely in other HHSs ($n = 261$). Access pathways are shown in Figure 1.

2.5 | Data Sources and Variables

All data were retrieved at the individual level and de-identified by the data custodian. Information was collected from administrative records on service utilization, including age and reason of first visit and sociodemographic characteristics, including socioeconomic status.

2.5.1 | Sociodemographic Characteristics

Distributions of sociodemographic characteristics were described by sex, age, birth year, Indigenous status, area of residence, socioeconomic status (SES), and CALD backgrounds. To protect confidentiality postcode of residence was not requested and area of residence was inferred from the health service of first visit. Attendance patterns for subgroups of interest were reported using binary variables for Indigenous status, CALD background, CDBS eligibility, and concession card holder (CCH) status. Individuals were assigned a CALD background based on country of birth (Australia/other), language spoken at home (English/other), interpreter use (yes/no), and refugee or asylum seeker status (yes/no).

The Australian Bureau of Statistics uses census data to create summary measures of a broad range of social and economic aspects of the Australian population within geographic areas. In this study, the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) was used, and ranks for Brisbane areas were drawn from the Queensland 2018 Statistical Area Level 2 and linked to individual children by using the most recent residential address recorded in the ISOH [25]. Ranks were categorized by decile. Additionally, proxy measures that reflect low income were used. Measures relevant to this study include CCH and CDBS eligibility status. Concession card status (refugee status, HCC, and PCC) was coded as a binary variable (CCH, yes/no).

2.5.2 | Service Utilization

The outcome variable of interest was age at first dental visit. Age at first visit was calculated to the nearest month and recoded into a categorical variable representing the following five groups: ≤12, 13–24, 25–36, 37–48, and 49–59 months. Service access timing was described by age group at first visit and year of birth. Type of care required (emergency care, general care or a visit to a dental specialist) was used to describe the reason for attendance at an individual's first visit.

2.6 | Statistical Analyses

Analyses were conducted in IBM SPSS (version 29.0.2.0, IBM Corporation, Armonk, NY, USA). Dental utilization by age at first visit, type of treatment at first visit, and sociodemographic characteristics were assessed. Proportions were calculated to summarize age at first visit across IRSAD deciles and population subgroups defined by Indigenous, CALD, and SES status, LtL participants and general eligibility at age 4 years. Descriptive characteristics of the study population and subgroups were presented as frequencies and percentages overall and by HHS, with the mean age at first visit in months.

For inferential comparisons, early attendance by 12 and 24 months was summarized as a binary outcome and compared across access pathways (LtL referral versus non-LtL) and risk groups (Indigenous, IRSAD decile 1 vs. deciles 2–10, CCH, CDBS-eligible and CALD) using χ^2 tests. For each 2×2 comparison, we reported risk differences (RDs) in percentage

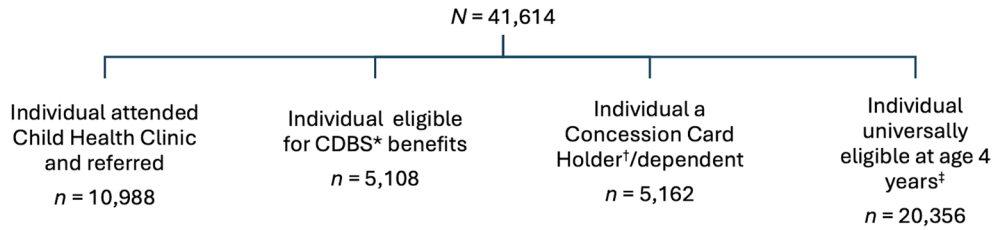

FIGURE 1 | Total children born 2009–2022 aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022. *Child Dental Benefits Schedule. †Australian Concession Cards include Health Care Card (HCC), Pensioner Concession Card (PCC). ‡The age at which all Queensland children are formally eligible for public sector dental care is 4 years if they are residents and are eligible to hold an Australian Medicare Card regardless of any other eligibility status. [Color figure can be viewed at wileyonlinelibrary.com]

points (pp) and risk ratios (RRs) with Katz 95% confidence intervals. For broader system-level context we contrasted pre-2016 and post-2016 service periods (the LtL program was implemented in 2016) and a pre-specified sensitivity analysis excluded 2020–2022 (COVID-19 pandemic years). Socioeconomic gradients were assessed using the Linear-by-Linear Association test for ordered SES categories (IRSAD deciles) by five-level age category (1y, 2y, 3y, 4y, 4 but not 5y) and by early attendance at 12 and 24 months. All tests were two-sided ($\alpha = 0.05$), with interpretation emphasizing effect sizes over *p* values.

3 | Results

3.1 | Demographic Characteristics

The pattern of sociodemographic characteristics between children from MNH and MSH was similar (Table 1). Among the study population, males and females were equally represented, and children were predominantly Australian-born, English-speaking, and non-Indigenous.

3.2 | Socioeconomic Characteristics

Eligibility status was recorded for 12,892 (31%) children who attended public sector oral health services during the study period. Children recorded as eligible for CCH or CDBS benefits accounted for less than a quarter of children receiving services (Table 1). Children across all IRSAD deciles received free dental care, with the largest percentage residing in areas of greatest relative disadvantage (Figure 2). Detailed IRSAD results are presented in Tables S3 and S4 and Figure S1.

3.3 | Age at First Visit and Service Utilization

The mean age of children at the first visit was 37.7 months (SD = 17.0), with no difference between male and female

TABLE 1 | Sociodemographic characteristics among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022.

Sociodemographic characteristics	Total *N* (%)	Metro North Health	Metro South Health
Hospital and health service of residence	41,614	14,701 (35.3)	26,652 (64.0)
Sex			
Female	20,015 (48.1)	7040 (47.9)	12,850 (48.2)
Male	21,483 (51.6)	7614 (51.8)	13,733 (51.5)
Intersex/indeterminate	3 (< 0.1)	3 (< 0.1)	~
Missing	114 (0.3)	44 (0.3)	69 (0.3)
Indigenous status			
Indigenous	2465 (5.9)	969 (6.6)	1459 (5.5)
Non-Indigenous	39,149 (94.1)	13,732 (93.4)	25,193 (94.5)
Culturally and linguistically diverse background			
Language other than English spoken at home	7668 (18.4)	2654 (18.1)	5002 (18.8)
Interpreter required	1978 (4.8)	261 (1.8)	1713 (6.4)
Refugee and asylum seeker	105 (0.3)	78 (0.5)	27 (0.1)
Country of birth			
Australia	33,968 (81.6)	11,497 (78.2)	22,238 (83.4)
Overseas	7646 (18.4)	3204 (21.8)	4414 (16.6)
Eligibility status			
Child dental benefits schedule	5108 (12.3)	2254 (15.3)	2829 (10.6)
Health Care Card	3022 (7.3)	1135 (7.7)	1845 (6.9)
Pensioner concession card	2132 (5.1)	702 (4.8)	1377 (5.2)
Universally eligible at 4 years/eligibility not recorded	32,146 (77.3)	10,937 (74.4)	21,209 (79.6)

Note: The Health Care Card category includes refugee and asylum seeker children, who are automatically eligible for a Health Care Card. Counts within eligibility rows will not add up to *n* as some children meet more than one type of eligibility criteria or eligibility status was not recorded. For example, some may be eligible for Child Dental Benefits Schedule, and hold a Health Care Card and a Pensioner Concession Card. Percentages in the Total *N* column use all children as the denominator, and percentages in the Metro North Health and Metro South Health columns use the Hospital and Health Service-specific denominators. The symbol "~" indicates cell counts not included because there was no recorded data.

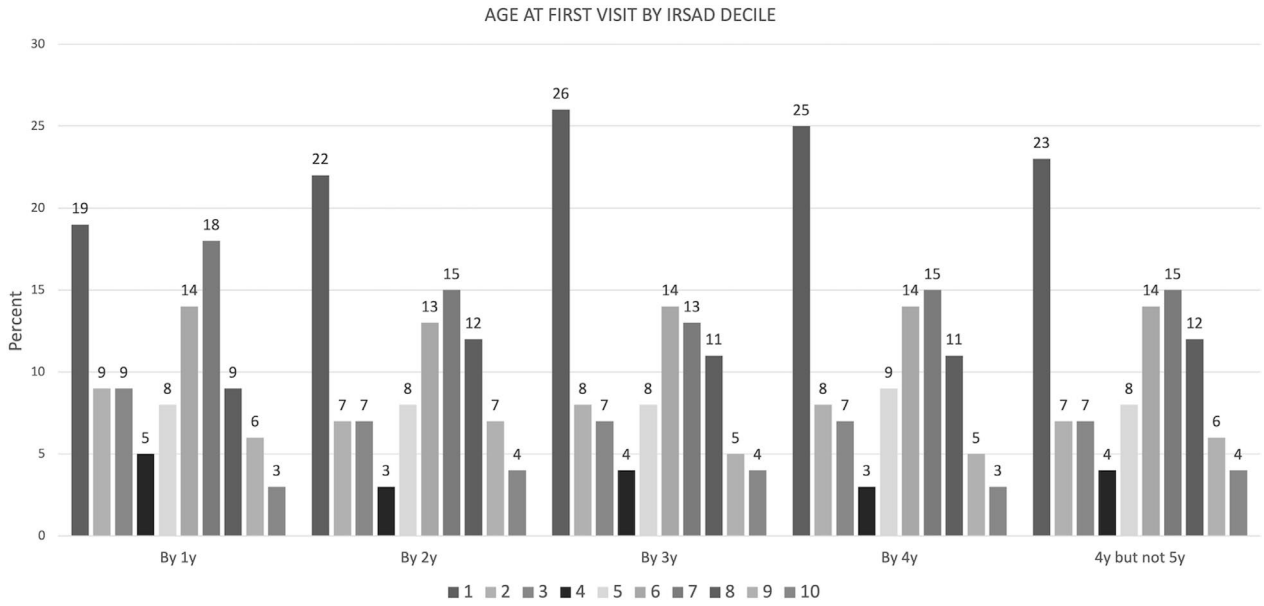

FIGURE 2 | Age at first dental visit, by area-level socioeconomic status (IRSAD decile) among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022. Age at first visit refers to the child's age in completed months at their first recorded visit during the study period. Clusters of bars show the percentage of children whose first public dental visit occurred by each age threshold ("By 1y," "By 2y," "By 3y," "By 4y," and "4y but not 5y") according to the IRSAD decile of their area of residence (1 = most disadvantaged, 10 = most advantaged). Percentages are calculated out of all children residing in each IRSAD decile who attended public dental services before their 5th birthday. By age 1 year is the internationally recommended age of first dental visit, and by age 2 years is the Australian recommended age of first visit (National Oral Health Plan guideline at the time of the study).

TABLE 2 | Age group and reason of first visit among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022.

	Total *N* (%), 41,614	Metro North Health, 14,701	Metro South Health, 26,652
Age at first visit (by age group)			
0–12 months	4486 (10.8)	2521 (17.1)	1945 (7.3)
13–24 months	6656 (16.0)	2173 (14.8)	4408 (16.5)
25–36 months	6026 (14.5)	2214 (15.1)	3726 (14.0)
37–48 months	8732 (21.0)	2885 (19.6)	5789 (21.7)
49–59 months	15,713 (37.8)	4908 (33.4)	10,784 (40.5)
Missing	1 (< 0.1)		
Type of care at first visit (reason)			
Emergency care	4415 (10.6)	1836 (12.5)	2467 (9.3)
General care (exam, preventive, etc.)	34,670 (83.3)	10,542 (71.7)	23,985 (90.0)
Specialist care	2528 (6.1)	2323 (15.8)	199 (0.7)

Note: Age at first visit refers to the child's age in completed months at their first recorded visit during the study period. Type of care at first visit classifies the main reason for that visit as emergency care, general care (routine examination, preventive care or other non-urgent care) or specialist care (appointment booked with a dental specialist). Percentages in the Total *N* column use all children as the denominator, and percentages in the Metro North Health and Metro South Health columns use the Hospital and Health Service-specific denominators. Categories for type of care are mutually exclusive.

attendance. About a quarter of children (27%) attended by their second birthday, 11% of whom had attended by age 1 year (Table 2). Most children had their first recorded dental visit for general care (83%), with 11% first presenting for emergency care and 6% for specialist care. Children residing in Metro North were more likely than those in Metro South to have their first visit recorded as emergency care (12% vs. 9%) or specialist care (16% vs. < 1%), consistent with the concentration of specialist dental services in Metro North (Table 2).

The highest percentage of children across all subgroups except CCHs and children participating in the early intervention program

utilized dental services for the first time after turning 4 years old. A low percentage of children who were formally eligible to access services earlier (CDBS and CCHs groups) did so by the recommended age of 1 year (2% and 5% respectively) compared with 15% of children from CALD backgrounds and 28% of children referred through the LtL targeted referral program (Figure 3).

When comparing early attendance across pathways and risk groups, children referred via LtL were substantially more likely to attend by 12 months (27.7% vs 4.7%, RD +23.0 pp; RR 5.89, 95% CI 5.55–6.23) and 24 months (66.7% vs 12.4%, RD +54.3 pp.; RR 5.36, 95% CI 5.19–5.54) than children entering through other pathways (Table 3). Differences across risk groups were smaller. Early attendance was a few pp for Indigenous children, those living in the most disadvantaged areas (IRSAD decile 1), and CCH and CDBS-eligible children. Early attendance was a few pp higher for children from CALD backgrounds (Table 3). Full estimates and corresponding 2×2 counts are available in Tables 3 and S1.

When attendance by 12 months was assessed across IRSAD deciles, early attenders were spread fairly evenly across SES strata and there was no clear pattern by decile. By 24 months, attendance ranged from around 24% to 30% across deciles. These results indicate only small SES differences (Tables S3 and S4, Figure S1). Formal tests for ordered trends confirmed that any SES gradient in early attendance was weak.

Early attendance by 12 months increased from 5.2% before 2016 to 12.0% after 2016 (RD +6.8 pp.; RR 2.33, 95% CI 2.10–2.57). Patterns of early attendance by pathway and risk group were similar when COVID-19 pandemic years (2020–2022) were excluded, indicating that the main findings were robust to pandemic-related service disruptions (Table S2).

4 | Discussion

This is the first study to report dental utilization patterns and key sociodemographic characteristics of children aged 0–4 years attending public sector oral health services in Metro North and Metro South Hospital and Health Services (2014–2022). The mean age at the first dental visit for this cohort was approximately 3 years, and they usually attended for a general dental examination. Individuals attending services during the study period were predominantly English-speaking Australian-born (82%), non-Indigenous children (94%), and approximately 50% resided in areas within the 5 lowest-ranked IRSAD deciles. Only a small proportion attended by the recommended ages of 12 months (11%) and 24 months (around 27%). Most children first attended for general care (83%) rather than emergency or specialist care. Overall, these findings reflect delayed first visits in the public sector. While many children did not access care until after commencing school, children referred through LtL attended substantially earlier than those entering through standard pathways.

These findings are important given the strong influence of socioeconomic and demographic determinants on health inequalities and the well-established association between socioeconomic disadvantage and ECC. Infant oral health promotion

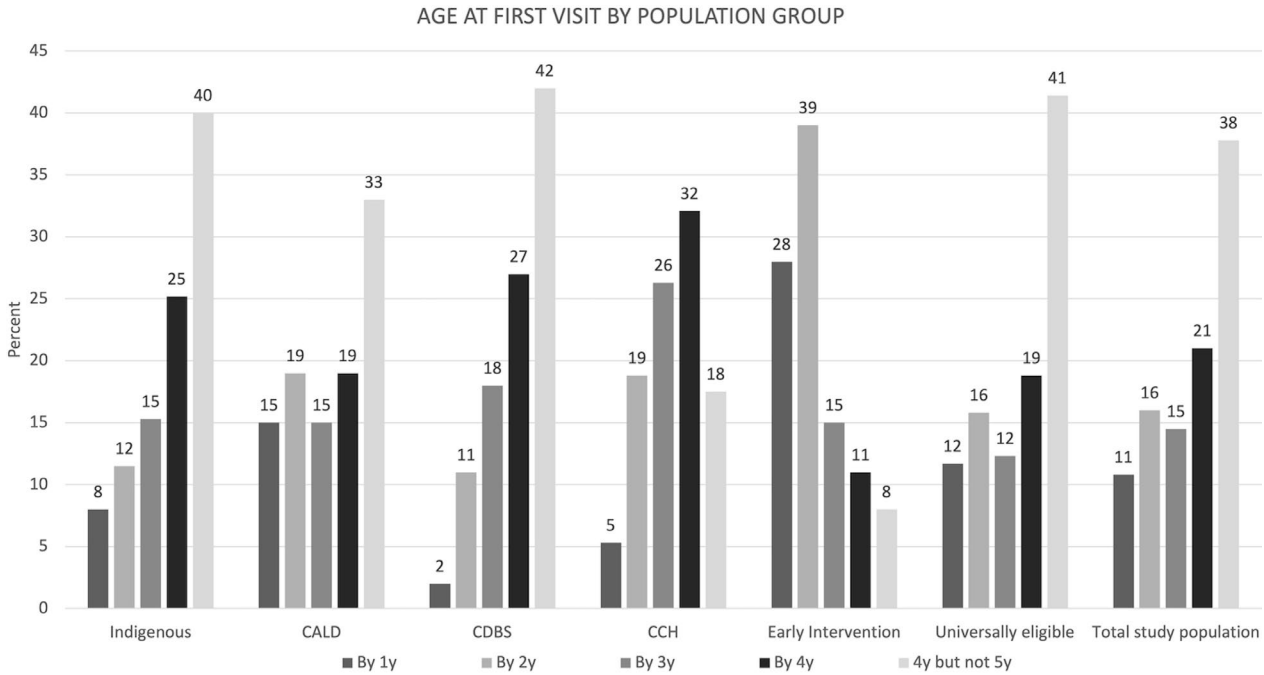

FIGURE 3 | Percentage of children attending their first dental visit by population subgroup, among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022. Bars show the percentage of children in each subgroup whose first dental visit occurred by each age threshold ("By 1y," "By 2y," "By 3y," "By 4y," and "4y but not 5y"). Subgroups are not mutually exclusive and are defined using recorded sociodemographic variables: Aboriginal and/or Torres Strait Islander status (Indigenous), culturally and linguistically diverse (CALD), Child Dental Benefits Schedule (CDBS) eligibility, concession card holder (CCH), early intervention (Lift the Lip referrals from Child Health Nurses regardless of recorded demographic information or eligibility status), and "Universally eligible" (general eligibility—children not included in any other group).

TABLE 3 | Early attendance (≤12 and ≤24 months) by access pathway and risk group among children aged 0–4 years, Metro North and Metro South Hospital and Health Services, 2014–2022.

Comparison	Outcome	% Yes (Group 1)	% Yes (Group 0)	RD (pp) [95% CI]	RR [95% CI]	$\chi^2(1)$, p
Lift the Lip (LtL) vs. non-LtL	≤12 months	27.7	4.7	+23.0 [22.1–23.9]	5.89 [5.55–6.23]	4455.0, <0.001
LtL vs. non-LtL	≤24 months	66.7	12.4	+54.3 [53.3–55.2]	5.36 [5.19–5.54]	12144.0, <0.001
Indigenous vs. non-Indigenous	≤12 months	8	11	−3.0 [−4.1 to −1.9]	0.73 [0.64–0.84]	21.18, <0.001
Indigenous vs. non-Indigenous	≤24 months	19.5	27.2	−7.7 [−9.4 to −6.1]	0.72 [0.66–0.78]	70.481, <0.001
IRSAD decile 1 vs. deciles 2–10	≤12 months	8.9	11.3	−2.4 [−3.1 to −1.7]	0.79 [0.74–0.85]	43.745, <0.001
IRSAD decile 1 vs. deciles 2–10	≤24 months	24.3	27.4	−3.2 [−4.2 to −2.2]	0.88 [0.85–0.92]	38.033, <0.001
CCH vs. non-CCH	≤12 months	5.3	11.6	−6.3 [−7.0 to −5.6]	0.46 [0.41–0.51]	186.084, <0.001
CCH vs. non-CCH	≤24 months	24	27.2	−3.1 [−4.4 to −1.9]	0.89 [0.84–0.93]	22.470, <0.001
CDBS vs. non-CDBS (exc. NR)	≤12 months	2	7.6	−5.7 [−6.4 to −5.0]	0.26 [0.21–0.32]	194.278, <0.001
CDBS vs. non-CDBS (exc. NR)	≤24 months	13	25.6	−12.5 [−13.9 to −11.2]	0.51 [0.47–0.55]	295.347, <0.001
CALD vs. non-CALD	≤12 months	14.9	9.7	+5.1 [4.3–6.0]	1.53 [1.44–1.62]	184.988, <0.001
CALD vs. non-CALD	≤24 months	33.4	25.1	+8.3 [7.2–9.5]	1.33 [1.29–1.38]	239.042, <0.001

Note: Group 1 is the exposure/risk group in the "Comparison" column (e.g., LtL, Indigenous, CCH, CDBS, CALD, and for IRSAD the group1 category is decile 1). RD in percentage points (Group 1 − Group 0). NR categories excluded. All tests two-sided; $\alpha = 0.05$.
Abbreviations: NR = not recorded, RD = risk difference, RR = risk ratio.

and early engagement with parents/caregivers can lower caries experience, reduce caries prevalence, and lower treatment costs [2, 3, 13, 14, 26]. Australian and international studies demonstrate that children who access care earlier in life are more likely to have less caries experience or disease severity than those who visit later [7, 11, 13, 14]. A validated predictive model has identified age at first dental visit, breastfeeding, language other than English, and high appointment non-attendance as key predictors of ECC at first visit, with an estimated 83% likelihood of caries among children who do not access care until 4 years of age [12].

Within the study population, a clear, but modest degree of equity is observed. Children in both HHSs referred through the LtL pathway were much more likely to attend by 12 and 24 months than children accessing care through standard care pathways, with absolute differences in early attendance exceeding 20 pp by 12 months and 50 pp by 24 months. In comparison, early attendance was consistently lower among Indigenous children, children living in the most disadvantaged areas (Decile 1), and CDBS-eligible children. However, children from CALD backgrounds were more likely to attend early. Given the large sample size, many comparisons were statistically significant, so we focused on the magnitude of differences. The very large and consistent early-attendance advantage for LtL strongly suggests that the LtL pathway played an important role in bringing children into care earlier. However, because these are observational service data, unmeasured differences between families and local level Child Health and Oral Health service practices and processes may also have contributed, so findings should be interpreted as associations rather than definitive causal effects. This highlights the need for ongoing targeted referral pathways to address persistent inequities.

Among children using public dental services, we found no clear socioeconomic gradient in age at first visit. Mean age at first visit varied little across IRSAD deciles (around 36–38 months), and median age was 41–44 months. Very early attendance by 12 months showed no consistent pattern by IRSAD decile. By 24 months, attendance ranged from approximately 24% to 30% across deciles, indicating only small SES differences. These findings suggest that, once families have utilized public dental services, the timing of first visit is broadly similar across SES groups, although modest SES-related gaps in early attendance remain.

The descriptive system-level comparison showed that early attendance by 12 months doubled after 2016 (from 5.2% to 12.0%), coinciding with the implementation of LtL and ongoing implementation of the CDBS. This pattern is encouraging from a service-planning perspective and, together with the very large LtL versus non-LtL differences, strongly suggests that enhanced early-referral pathways have contributed to earlier entry into care. However, these pre/post contrasts are observational and were not designed to separate the effects of LtL from other access pathways that also facilitate utilization. Importantly, findings from the main analysis and the pre/post comparison remained consistent when COVID-19 pandemic years (2020–2022) were excluded. This suggests that the patterns we observed are reasonably robust to pandemic-related disruptions in service delivery.

Even in a publicly funded system where dental care for young children is free at the point of use, utilization depends on more than eligibility. Access is determined not only by availability but also by approachability, acceptability, affordability, and

appropriateness of services, and by individual-level factors such as preferences, competing priorities and awareness of services [27]. Our data illustrate this gap between potential and realized access. Although around half of Queensland children are CDBS-eligible, only a minority of preschool children use public dental services in any given year, and within our cohort, only a small proportion of CDBS-eligible children attended by 24 months. Compared with the broader SEQ population, a higher proportion of children in our study lived in the most disadvantaged areas or identified as Indigenous, suggesting that targeted initiatives such as LtL may be partially reaching priority groups [22, 23]. Strengthening early-referral pathways through non-dental pediatric providers and improving parent/carer awareness of entitlements and recommended timing are key priorities.

4.1 | Strengths and Limitations

A key strength of this paper is the inclusion of all children aged 0–4 years who attended public sector oral health services in Brisbane over a 14-year period and using routinely collected administrative data to report age at first visit and sociodemographic characteristics at the individual level. The large sample allowed us to describe dental utilization patterns across multiple subgroups and avoided recall bias inherent in parental self-report.

Use of administrative data also contributes to limitations. Although this design is appropriate for describing the study population, it relies on accurate clinical coding and demographic records and misclassification or missing information is inevitable. Other issues inherent in descriptive studies were not applicable as we were not seeking to infer causal pathways, analyze associations or account for confounders [28]. The latter part of the study period coincided with the COVID-19 pandemic when provision of public sector child oral health services was limited. A sensitivity analysis excluding 2020–2022 showed similar patterns of attendance by age 12 months, but pandemic-related issues may still have influenced attendance. Finally, our data capture only utilizers of public dental services, and attendance patterns of children solely attending private dental providers, or not using any dental service, are unknown.

5 | Conclusion

A small proportion of eligible children in SEQ utilizing public dental services attended for their first visit by 12 months, and on average most did not attend until after their third birthday. Children referred through the LtL were substantially more likely to attend by 12 and 24 months. However, early attendance remained lower among Indigenous children, children living in the most disadvantaged areas, and CDBS-eligible children. These descriptive findings highlight both the potential of integrated early-referral pathways and the persistence of inequities in timely access. Strengthening collaboration between child health services and dental providers and promoting awareness and uptake of publicly funded dental care from infancy will be critical to improving early, preventive engagement for young children in Queensland.

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The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Table S1:** Two-by-two counts supporting early-attendance estimates (≤12 and ≤24 months) by access pathway and risk group, children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022. **Table S2:** Sensitivity analysis excluding COVID-19 years (2020–2022): Early attendance (≤12 and ≤24 months) by access pathway and risk group among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014 2019. **Table S3:** Early attendance by IRSAD decile (1–10) with ordered trend test, ≤12 and ≤24 months among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022. **Table S4:** Age at first dental visit (months) by socioeconomic decile (IRSAD) among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022. **Figure S1:** Attendance by age at first dental visit and area-level socioeconomic status among children aged 0–4 years attending public sector oral health services, Metro North and Metro South Hospital and Health Services, 2014–2022.