Saskatoon Health Region
Young Children's Oral Health Status Report

2006-2015

2015

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Executive Summary

The Young Children's Oral Health Status 2006-2015 in the Saskatoon Health Region is the first screening report conducted by Population and Public Health for children 0-6 year old age. The report provides an extensive evaluation of oral health status of young children, needs-based assessment data for the health region, baseline for future screening and monitors trends in each specific age group. The report also points out disparities in the oral health of children depending on where they live in this region (Urban vs. Rural), and their Neighborhood Income Status.

Dental Assistants/Therapists in Urban areas, and Public Health Nurses/Nurse Practitioners in Rural communities assessed the oral health status of 0-6 year old children by visual examination in Fluoride Varnish clinics in the region.

The oral health status of 23,787 children were analyzed. The age group was categorized into: younger than one, one, two, three, four, five, and six year old children. The mean age and gender distribution of each age group was assessed. The oral of each age group was assessed based on the following oral health indicators: Early Childhood Tooth Decay (ECTD) and S-ECTD; Quadrants; Dental Health Status including NDE, CCC, PCC and NEC; Dental Health Needs (Priority Scores); Untreated Cavities; Cavity Free ; mean "deft+DMFT"; and components of "deft" and "DMFT". Refer to **Appendix-A** for the definition of health indicators. The oral health of six year old children was measured against the oral health objectives outlined in the Canadian Oral Health Framework (COHF) 2013-2018. Currently for children younger than six year old, no baseline target exist, therefore targets were established. In addition, to examine the effect of Child's Residence and Neighborhood Income Status, further analysis was conducted.

The key findings of the report include:

Descriptive Analysis:

- In 2014, the percentage of children with combined ECTD+S-ECTD was as follows: *infants* (3.65%), *one* year old (5.50%), *two* year old (21.04%), *three* year old (33.24%), *four* year old (35.62%), *five* year old (48.68%).

- In 2014, the mean deft/DMFT in different age groups was as follows: *infants* (0.18), *one* year old (0.22), *two* year old (1.05), *three* year old (1.70), *four* year old (2.27), *five* year old (3.12), six year old children (3.43).

- In 2014, the percentage of Cavity Free children was as follows: *infants* (95.62%), *one* year old (94.31%), *two* year old (78.71%), *three* year old (65.93%), *four* year old (62.50%), *five* year old (50.31%), *six* year old children (39.74%).

- In 2014, the percentage of children with Untreated Cavities was as follows: *infants* (3.65%), *one* year old (5.30%), *two* year old (19.06%), *three* year old (29.02%), *four* year old (27.03%), *five* year old (29.74%), *six* year old children (28.82%).

- In 2014, the percentage of children with No Evidence of Care was as follows: *infants* (2.92%), *one* year old (5.01%), *two* year old (19.06%), *three* year old (26.59%), *four* year old (23.13%), *five* year old (20.98%), *six* year old children (16.38%).

- In 2014, the percentage of children who required urgent dental care was as follows: *infants* (0%), *one* year old (0.10%), *two* year old (0.99%), *three* year old (1.94%), *four* year old (2.03%), *five* year old (2.85%), *six* year old children (2.40%).

- In 2014, the percentage of children with at least one decayed (d) teeth in primary dentition was as follows: *infants* (3.65%), *one* year old (5.30%), *two* year old (19.06%), *three* year old (29.09%), *four* year old (26.88%), *five* year old (29.74%), *six* year old children (27.62%).

- In 2014, the percentage of children with at least one filling in primary teeth was as follows: *infants* (0.73%), *one* year old (0.39%), *two* year old (1.49%), *three* year old (5.82%), *four* year old (13.13%), *five* year old (28.11%), *six* year old children (41.92%).

Canadian Oral Health Framework 2013-2018 (COHF) Target and SHR Recommended Target:

- In 2008, the COHF 2013-2018 guideline for 6 year old children which required < 2.5 average "deft/DMFT" was met. However, the other guidelines related to 55% students with "dmft+DMFT"= 0 and d+D<15% was not met in any of the screening years.

- Based on the findings of the report, for children younger than 6 years old, targets were developed. Targets are: 64% of 5 year old, 73% of 4 year old, 82% of 3 year old, 91% of 2 year old, and 100% of ≤1 year old children are Cavity Free.

Trend of Oral Health Status by Age Group:

The data would suggest:

- Oral health of *infants* in 2014 has deteriorated compared to 2013; that is all oral health measures were found to be depreciated. The proportion of children with Early Childhood Caries in 2014 were found to be the second highest (3.65%) in the past 9 years.

- Oral health of *one* year old children in 2014, has improved compared to 2013. The majority of the health indicators had better measurements compared to 2013 as well as the whole period. In 2014, the measurements for No Evidence of Care (5.01%), and Untreated Cavities (5.30%) were found to be the lowest in the past 9 years. Also, the second highest proportion of Cavity Free children (94.31%) was seen in 2014.

- Oral health of *two* year old children in 2014 has remained almost stable compared to 2013. The proportion of Early Childhood Caries, Untreated Cavities, and children with no experience of caries has remained constant since 2012. In 2014, the percentage of children with Complete Caries Care (1.98%) was the highest measure in the past 9 years.

- Oral health of *three* year old children in 2014 has slightly improved compared to 2013. In 2014, the measurement for S-ECTD (19.11%) were found to be the lowest in the past 9 years. In 2014, the proportion of children with No Evidence of Care (26.59%) as well as Priority 1 score (1.94%) was among the best scores in the recent years.

- Oral health of *four* year old children in 2014 has progressed compared to 2013. The majority of the health indicators had better measurements compared to 2013. In 2014, the proportion of combined ECTD+S-ECTD (35.62%) was found to be the lowest in the past 9 years. Similarly, the highest proportion of Cavity Free children was seen in 2014, where it was 62.50% compared to 50.69% in 2010. Also the mean deft/DMFT in the last three years was significantly smaller compared to 2011 (p-value<0.05).

- Oral health of *five* year old children in 2014 has improved compared to 2013. All of the health indicators had better measurements compared to 2013; the proportion of children with combined ECTD+S-ECTD decreased from 54.26% to 48.68%. In 2014, the measurements for No Evidence of Care (20.98%), Untreated Cavities (29.74%), and Cavity Free (50.31%) has been the best scores since 2009.

- Oral health of *six* year old children in 2014 has deteriorated compared to 2013; that is all oral health measures were found to be depreciated. Overall, the best measurements were seen in 2008, where the average deft/DMFT (2.30) was significantly lower than the rest of the screening years (the only screening year that met the COHF guideline).Similarly, the proportion of Cavity Free children in 2008 was found to be the highest over the time period. In recent years, the best scores for all measurements belonged to 2013.

Overall Trend of Early Childhood Tooth Decay and "deft+DMFT"

The data would suggest:

- Over the past nine years, the percentage of ECTD+S-ECTD in *0-2* year old ranged from 9.07% to 13.45% and in *3-5* year old children was 39.34%-49.90%. The proportion of *3-5* year olds who experienced ECTD+S-ECTD has remained stable over time. The breakdown, would suggest that despite the upward trend in ECTD in 3-5 year olds, the severity of disease decreased.

- The mean deft/DMFT in *infants*, *2*, and *3* year old children didn't change significantly over nine years. However, the mean deft/DMFT among *1* year olds in 2012, 2013, and 2014 was significantly lower compared to 2008. Similarly, the mean deft/DMFT measurement in *4* year old children in 2012, 2013, and 2014 was considerably smaller compared to 2011. In contrast, the mean deft/DMFT in *5* year old children in 2009, 2011, and 2013 has significantly increased compared to 2008. With regard to *6* year old children, the mean deft/DMFT was found to be the lowest in 2008 compared to all the past screening years, and was lower in 2013 compared to 2011, 2012, and 2014 (p-value<0.05).

Trend of Oral Health Status by Location/Neighborhood Status:

The data would suggest:

- Since 2008 and 2009, 0-6 year old children in Rural areas generally had better health measurements in oral health. In 2014, mean deft/DMFT of children in all age groups in Rural area was significantly lower than Urban children. The mean deft/DMFT was as follows, in *6* years old 2.62 vs. 3.87 (where the total average was 3.43) ; in *3-5* year old children 1.66 vs. 2.84, and in *0-2* year olds 0.13 vs. 0.57. In 2014, 0-2 year old children in Rural communities were 71% less likely to have dental decay (OR=0.29); 3-5 year olds were 49% less likely (OR=0.51) ; and 6 year old children were 45% less likely to have dental decay (OR=0.55) compared to Urban children (p-value<0.05).

- Overall, the oral health of both districts (Urban and Rural) has improved to some extent over the time period. In Rural areas there was a downward trend for proportion of *0-2, 3-5* year old children with combined ECTD, S-ECTD; and in *3-5* year olds the magnitude of decrease was more profound in severe form of disease (S-ECTD).

- For the majority of the time period, 0-6 year old children in Non- Low Income Neighborhoods generally had better health measurements in oral health compared to Low Income Neighborhoods. In 2014, mean deft/DMFT of children in all age groups in Non- Low Income Neighborhood was significantly lower than those residing in Low Income Neighborhood. The mean deft/DMFT was as follows, in *6* years old 3.20 vs. 4.73 (where the total average was 3.43); in *3-5* year old children 2.09 vs. 4.06, and in *0-2* year olds 0.31 vs. 0.87. Additionally, the epidemiological studies suggested an association between Income status and dental decay. In 2014, *0-2* year old children in Low Income Neighborhood were 2.17 times more likely to have dental decay (OR=2.17); 3-5 year olds were 2.17 more likely (OR=2.17) ; and 6 year old children were 1.57 times more likely to have dental decay (OR=1.57) compared to Non Low Income Neighborhoods (p-value<0.05).

- Overall, the oral health of Non-LIM Neighborhoods showed improvement to some extent over the screening years. However, for the most part, the oral status of children in Non-LIM Neighborhoods remained stable or depreciated.

In summary:

- In general, over the past nine years oral health in *1, 2,3,3,5* year old children has improved to some extent. In contrast, overall oral health in *infants* and *6* year old children has declined over years; which requires more attention in terms of dental care.

- Despite the upward trend in proportion of *3-5* year old children with ECTD, the severe form of childhood caries, S-ECTD, has decreased.

- The majority of the children would start seeking for dental treatment (e.g. filling) from *5-6* year old of age. The main constitute of deft in children younger than 5 year old is decayed tooth (d) vs. filling (f).

- For 6 year old children, in 2008, the Canadian Oral Health Framework 2013-2018 (COHF) guideline which required < 2.5 average *deft/DMFT* was met. However, the other guidelines were not met in any of the screening years.

- For children younger than 6 year olds, targets were developed. Targets are: 64% of 5 year old, 73% of 4 year old, 82% of 3 year old, 91% of 2 year old, and 100% of ≤1 year old children are Cavity Free.
- Young children in Rural areas generally had better health measurements in oral health compared to those reside in Urban areas.

- Young children in Non-Low Income Neighborhoods generally had better health measurements in oral health compared to the children live in Low Income Neighborhoods.

- Overall, the oral health status of both Urban and Rural children has improved to some extent. In general, there were some improvements in oral health in children residing in Non-Low Income Neighborhoods. Regarding Low Income Neighborhoods, for the most part, the oral health indicators has remained stable or even showed unfavorable trend.

Introduction

Oral health is a fundamental component of health and well-being. According to the World Health Organization (WHO), oral health is an important part of overall health, and a determinant of quality of life.[1] The Canadian Dental Association (CDA) defines oral health as "a state that contributes positively to one's physical, mental and social well-being by allowing the individual to speak, eat and socialize unhindered by pain, discomfort or embarrassment".[2] Dental caries is a serious form of oral disease and even though is largely preventable, is the single most common chronic disease of childhood-5 times more common than asthma and 7 times more prevalent than hay fever.[3]

WHO estimates 60-90% of school children worldwide have dental cavities.[4] Early Childhood Tooth Decay (ECTD) affects infants and children younger than 6 years and is considered a public health concern in Canada and internationally.[1]

Tooth decay affects more than one-fourth of U.S. children aged 2–5 years. Recent evidence from the National Health and Examination Surveys (NHANES) in the United States indicates that the prevalence and severity of tooth decay among preschool children have risen significantly over the last two decades. It has increased in U.S. children from 24% in 1988-1994 to 28% in 1999-2004.[5] Due to the change of dietary habits, WHO expects that the incidence of dental caries will increase.[6]

Canadian Health Measures Survey (CHMS) 2007–2009 indicates that 57% of 6–11 years old have or have had a cavity.[7] However, no nation-wide information on the oral health of Canadian younger than 6 years of age exists.The Ontario Association of Public Health Dentistry (OAPHD) reports that during the 2012-2013 school year, 29.2% of Kindergarten (junior and senior) children in Ontario had tooth decay with the weighted mean deft+DMFT[a] of 1.25.[8] *Saskatchewan Dental Health Screening Program Report 2013-2014* shows that the prevalence of tooth decay for deciduous and permanent teeth among Grade One students were 60.69% and 7.02% respectively with the mean deft+DMFT of 3.58.[9] However, the disadvantaged populations such as ethnic minorities, Aboriginal people and the children from low-income families have higher caries

[a] The "deft" is a teeth index which measures the prevalence of dental decay in deciduous teeth , in contrast to "DMFT" which is used for the same measurement in permanent teeth. The "deft+DMFT" index indicates the severity of tooth decay. It is the count of the number of decayed, extracted (due to caries), and filled deciduous teeth of an individual and the number of Decayed, Missing and Filled (due to caries) permanent teeth of an individual.

prevalence and often have difficulty accessing dental care. In some Aboriginal communities, the prevalence of ECTD exceeds 90%, with a mean "deft" of 13.7.[10]

Epidemiologic studies conducted in the last decade shows that Aboriginal children with ages 3 to 5 years have three to five times more the amount of tooth decay comparing to other children with similar ages in Canada.[11] First Nation children living in isolated communities are twice as likely to report ECTD comparing to those living in non-isolated communities.[12]

The consequences of childhood tooth decay can impact the quality of life of the children and their families, and can have significant social and economic consequences beyond the immediate family as well. Since very young children cannot tolerate extensive dental treatments in a regular office environment, they require full mouth rehabilitation under general anesthesia in a hospital setting. Dental surgery accounts for about one-third of all day surgery operation for preschoolers. Saskatchewan has the third highest rate of day surgery for oral health. Canadian Institute for Health Information's (CIHI) report indicates that these day surgery operations cost $21.2 million each year across Canada, excluding Quebec. Approximately $3.4 million is spent annually on the treatment of ECTD for preschool children in Saskatchewan with $1.9 million in Saskatoon Health Region (SHR).[13]

Description, Diagnosis and Consequences of Early Childhood Tooth Decay

Early Childhood Tooth Decay (ECTD), also previously known as "early childhood caries[b]", "baby bottle caries", "nursing caries", and "rampant caries" is generally characterized by any dental caries in the primary dentition[c] occurring before age 6. The advanced form is referred to Severe Early Childhood Tooth Decay (S-ECTD).[14] Refer to **Appendix-A** for more detailed definitions of both terms by According to American Academy of Pediatric Dentistry.

ECTD can begin soon after dental eruption, and typically develops on smooth surfaces and appears as white chalky decalcification. The decay is generally first seen on the primary front teeth, and the four front teeth in upper jaw are often affected simultaneously. Carious lesion progresses

[b] Caries refers to tooth decay.
[c] Primary dentition refers to deciduous teeth.

rapidly as a yellow or brown cavitated area in those who are at high risk.[15] For the appearance of ECTD refer to **Appendix-B**.

Tooth decay impacts several aspects of children's functioning. It keeps many children home from school or distracted from learning. According to *Canadian Health Measures Survey (CHMS) 2007–2009*, an estimated 2.26 million school days lost annually due to dental visits or dental sick-days.[7]

Children with ECTD may experience difficulty in speaking and low self-esteem issues because of the appearance of their mouth. Expansion of dental infections to surrounding tissues (i.e. dental abscess and facial cellulites[d]) may lead to child's hospitalization.[15] Some clinical trials suggest that ECTD may be associated to increased occurrence of infectious diseases such as recurrent pneumonia, tonsillitis and ear infections.[12]

S-ECTD is also linked to reduced physical development/weight due to insufficient food consumption[15]. Children with S-ECTD may have malnutrition such as low serum albumin, ferritin and iron deficiency anemia.[11] ECTD may result in crowded permanent teeth and malocclusion as a result of premature loss of primary teeth. Moreover, children experiencing tooth decay as infants or toddlers are three times more likely to develop caries in their permanent dentitions.[16] On the other hand, delay in diagnosis of ECTD leads to more complicated situation as well as increased treatment costs.[15]

Causes of Tooth Decay

The etiology[e] of dental caries including ECTD is multifactorial and complex. A part from the traditional etiologic triad for caries (i.e., tooth integrity, oral flora and diet), many lifestyle/environmental factors are associated with caries developments[15], as discussed below.

[d] Cellulitis is a spreading bacterial infection just below the skin surface.
[e] Etiology is defined as the causes of a disease.

Microbiological Risk Factors

Dental caries is caused by the interaction of bacteria in the dental plaque[f] adhering to the tooth surface, mainly *Streptococcus Mutans,* and sugary foods on tooth enamel. These bacteria break down sugars for energy, causing an acidic environment in the mouth. During the time that the plaque is acidic, the main minerals of enamel are dissolved out of the enamel into the dental plaque. This process is called demineralization of the enamel. However, once the plaque has been neutralized by saliva, the mineralized area can return to the enamel surface- a process called remineralization. Nonetheless, the capacity for remineralization is limited, and continuous exposure to sugar can lead to net enamel mineral loss and thence cavity formation.[15] Early colonization in an infant's mouth by *S. Mutans* is a major risk factor for ECTD as well as future dental caries. The bacteria involved in dental caries are transmissible. It is well-established that *S. Mutans,* can be acquired and easily transferred through vertical/ horizontal transmission.[17]

Vertical transmission is the transmission of decay-causing bacteria from mother/caregiver to child. Whereas, horizontal transmission occurs from child to child, including unrelated children such as in preschool setting. Decay-causing bacteria are typically spread from mother/caregiver to child by behaviors that directly involve saliva, such as kissing the child on the mouth; sharing a spoon when tasting baby food; sharing straws, cups or utensils; cleaning a dropped pacifier by mouth; or wiping the baby's mouth with a cloth moistened with saliva.[17]

Dietary Habits, Feeding Practices, and Inadequate Oral Hygiene

Fermentable carbohydrates are a risk factor in the development of caries. The evidence indicates that the level of dental caries in countries with lower sugar consumption rate (below 40–55 grams per person per day) is less than the countries with higher consumption. The duration of contact between tooth and sugar is the main factor in the etiology of dental caries; acids produced by bacteria after sugar intake persist for 20 to 40 minutes. Increased sugar consumption, especially in the forms that maintain longer contact with teeth significantly increases caries risk.[15]

A child gets ECTD when: the mouth has not been cleaned daily; a bottle or no-spill training cup[g] that is filled with milk, juice or other sweetened liquid remains in bed with the child; breast is

[f] Dental plaque is the sticky biofilm of bacteria that forms on teeth.
[g] No-spill training cup has a valve under the spout that keeps the liquid from spilling. The sucking action is the same

used as a pacifier; consumes frequent between-meal snacks/drinks containing sugars (e.g. juice, formula, soda).[14]

Although breastfeeding provides the perfect nutrition for infant, prolonged and overnight breastfeeding is associated with an increased risk of ECTD, particularly after the age of 12 months .The liquid pools in the mouth for long periods of time causing repeated acid attacks. These conditions explained by less saliva production at night. Saliva dilutes and neutralizes the acid which causes demineralization. Saliva also provides a reservoir of minerals adjacent to the enamel from which it can demineralize once the acids have been neutralized.[15]

It is also noteworthy that the inherent acids and sugars in soft drinks have both acidogenic[h] and cariogenic[i] potential, resulting in dental caries and enamel erosion.[18] Therefore, even sugar-free soft drinks can lead to enamel erosion and consequently dental caries. Refer to **Appendix-C** for the amount of pH and sugar in popular beverages.

Socioeconomic Factors

Belonging to poor, low education families, and ethnic monitories as well is associated with high rates of dental caries. In these populations due to limited access to dental care, more sugar consumption in children, and probably insufficient exposure to fluoride the children experience increased tooth decay.[15]

Tooth Decay Prevention Strategies

Tooth decay is highly preventable.[17] The general approaches that have been used to prevent dental caries, particularly ECTD will be discussed.

Prevention of Maternal Bacterial Transmission to the Child

Delaying or preventing primary infection by *S. Mutans* reduces the risk for future dental caries. This includes reducing the bacteria in the mouth of pregnant women / mothers of newborn babies and minimizing the transmission of decay-causing bacteria.[17]

motion used when drinking from a baby bottle.

[h] Acidogenic is defined as producing acid.

[i] Cariogenic is defined as causing tooth decay.

Reduce the Bacteria in the Mouth of the Mother/Primary Caregiver

Control of oral diseases in pregnant women has the potential to reduce the transmission of oral bacteria from mothers to their children. However, many women either do not seek dental care or not advised to receive care as part of their prenatal care. Moreover, uncertainty about the risk of radiographs, and bacteremia[j] that can occur following dental treatment, fear of lawsuit, and insufficient evidence-based information has made some dental care professionals hesitant providing treatment to pregnant women.[17]

Treatment of active dental infection during pregnancy has benefits that certainly outweigh the possible risks. The American Academy of Periodontology has urged oral health professionals to provide treatment for acute periodontal infection[k] or sources of sepsis[l] regardless of the stage of pregnancy.[17]

In addition to treatment of dental caries and periodontal disease of mother, preventive oral care should be promoted. Preventive oral care in mothers is achieved with[17]:

- dietary control;
- adequate plaque control (brushing, flossing, Fluoride Toothpastes);
- use of antimicrobial agents such as Xylitol and Chlorhexidine rinses;
    - Xylitol, a sucrose substitute non-fermentable sugar alcohol (is not metabolized by the cariogenic bacteria), reduce *S. Mutans* levels in plaque and saliva, inhibit bacterial transfer and markedly reduce tooth decay. Maternal use of Xylitol chewing gum or lozenges (four to five times a day) has been shown to be effective in reducing *S. Mutans* colonization and caries in infants;
    - 0.12% Chlorhexidine Gluconate (Peridex) kills bacteria by disrupting the cell membrane, reduce the bacterial count and prevents dental plaque formation. However, mothers should be aware of the possible side effects;
- use of fissure sealant on biting surfaces of high risk teeth;
- professional prophylaxis[m] and scaling.

[j] Bacteremia is the presence of bacteria in the blood.
[k] Periodontal infection affects tissues and structures surrounding the teeth (gingiva, bone, etc).
[l] Sepsis is a whole-body inflammatory response to an infection plus positive blood culture.
[m] Professional scaling and prophylaxis is the process of removing the dental plaque, its products, and calculus by dental professionals.

Minimize the Transmission of Bacteria that Causes Tooth Decay

Minimizing saliva-sharing activities between children and parents/caregivers limits bacterial transmission. Examples include avoiding the sharing of utensils, food, and drinks, discouraging a child from putting his/her hand in the caregiver's mouth, not licking a pacifier before giving it to the child, and not sharing toothbrushes.[15]

Oral Health Education

Considering the importance of parental education about dental health (baby's oral heath;infant dieting; feeding habits; avoiding behaviors that share saliva, such as sharing spoons), there is an important opportunity to take advantage of all health professional to deliver this education. While the first dental visit of a most children does not happen until the age of three, children have frequently been seen by health professionals for a well-child visit by this age.[15] For guidelines for oral hygiene/dietary habits of children 0-6 years of age refer to **Appendix-D.**

Establishment of Dental Home

The American Academy of Pediatrics defines the dental home as "the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated, and family-centered way."[19] The dental home covers all aspects of oral health (acute care, preventive care services, dietary counseling, etc.).This results from the interaction between the patient, parents, dentists, dental professionals, as well as non-dental professionals which leads to increased awareness of important issues with respect to the patient's oral health.[19]

Establishment of a dental home is recommended to begin in the first 12 months of age (by the primary care physician or health provider) and referrals made, based on risk assessment. Children who have a dental home are more likely to receive appropriate preventive and routine oral health care. Regular reassessments will provide time-sensitive opportunities to implement preventive health practices and reduce the child's risk of preventable oral disease.[19]

Fluoride Usage

Fluoride interferes with the process of tooth decay in several ways: When teeth are subjected to alternating demineralization and remineralization (as discussed earlier), the presence of fluoride

in the plaque and saliva both encourages remineralization with improved quality crystals, therefore it enhances the strength of the tooth enamel and its ability to resist acid attack. Fluoride also inhibits the function of some enzymes which are essential to the bacteria's ability to produce acid.[20]

The most common side effect of excess fluoride consumption is dental fluorosis. Dental fluorosis is an alteration in the appearance of the teeth caused by a change in enamel formation.[1] This occurs during tooth development stage before 6 years of age (prior to the eruption of the first permanent tooth).The total daily fluoride intake from all sources should not exceed 0.05-0.07 mg F/kg body weight in order to minimize the risk of dental fluorosis. This is particularly important for children younger than six years of age, where exposure to extra fluoride-to prevent dental caries-can cause dental fluorosis.[21]

Fluoride can be used by individuals (toothpastes, rinses); applied by communities (water fluoridation, milk fluoridation, salt fluoridation); and by the dental professionals (gels, foams, and varnishes).

Fluoridated Toothpastes

Fluoridated toothpastes have been widely used for more than five decades and remain the most common intervention for the prevention of dental caries. Their use is associated, on average, with a 24% reduction in decayed, missing and filled tooth surfaces[1]. However, children younger than 6 year old should spit out the toothpaste and not swallow it to reduce the risk of potential fluorosis.[21]

Water Fluoridation

WHO emphasizes the importance of automatic administration of fluoride as part of public health programs. In the vast majority of countries, tooth decay is highly linked to socio-economic status and prevention by automatic administration of fluoride through water, salt, or milk is the most equitable measure.[6]

Water fluoridation has been described by the Canadian Public Health Association as one of the twelve most important public health advances in the past 100 years .Water fluoridation first introduced in 1945 North America. Currently, many countries have water fluoridation program including Canada and the United States. Community water fluoridation is the process of adjusting the natural fluoride concentration of a community's water supply to the level that is ideal to prevent dental caries (0.7 mg/L).[20] The average lifetime cost per person to fluoridate a community can be

less than the cost of one dental filling. It has also been shown to provide the greatest benefits to those at highest risks for dental caries.[1]

Water fluoridation can reduce tooth decay in children's primary teeth by up to 60% and in their permanent teeth by up to 35%. It's the most cost-effective way of providing the benefits of fluoride to all residents in a community.[1]

However, parents should be advised about the most appropriate type of water to use to reconstitute infant formula. While occasional use of water containing optimal levels of fluoride should not significantly increase a child's risk for fluorosis, mixing powdered or liquid infant formula concentrate with fluoridated water on a regular basis for infants primarily fed in this way may increase the chance of a child's developing enamel fluorosis.[17]

Salt Fluoridation

Fluoridation of salt introduced for domestic use in Switzerland in 1955. Since 1986 an increasing number of countries, mainly in Europe and the Americas, have adopted salt fluoridation programs. Positive effects on dental caries occurs with a fluoride concentration at the level of 250 parts per million (ppm).Salt fluoridation can reduce "DMFT" by more than 50%.[22]

Milk Fluoridation

Milk fluoridation was first investigated in the early 1950s in Switzerland. Currently, a large number school children in five countries participating in the international program. This could be particularly appropriate in those areas where it has not been possible to introduce water or salt fluoridation.[6]

Fluoride Varnish

Fluoride Varnish is a preventive intervention for dental caries and was developed in the 1960s. It adheres to the tooth surface for 12 hours or more in a thin layer, thereby prolonging the contact time between fluoride and dental enamel. This enables them to act as a slow-releasing reservoir of fluoride. It has a substantial caries-inhibiting effect in both permanent and primary teeth. The use of Fluoride Varnish twice a year is associated with a 46% reduction in decayed, missing and filled tooth surfaces.[1]

The recommended professionally-applied fluoride treatments for children at risk for ECTD who are younger than six years is 5% Sodium Fluoride Varnish (22,500 ppm fluoride) and for high risk should be applied twice a year.[14]

Fluoride Mouthrinses

Fluoride Mouthrinses have been used extensively for the past 30 years to prevent tooth decay in children. School Fluoride Mouthrinse Programs have been implemented for years in many countries, including Canada and the USA.[20] The use of this intervention is associated, on average, with a 26% reduction in "deft".[1]

Fluoride Supplements

Fluoride Supplements, in the form of chewable tablets, lozenges or drops, are not recommended for the majority of Canadians and it may be unnecessary if the patient is receiving adequate fluoride from other sources.[21]

In order to minimize the risk of dental fluorosis, the use of Fluoride Supplements before the eruption of the first permanent tooth is *generally* not recommended. Following the eruption of the first permanent tooth, Fluoride Supplements in the form of lozenges/chewable tablets *may* be used. Drops might be required for patients with special needs.[21]

Antibacterial Agents Usage

Antibacterial Agents include Xylitol and Povidone Iodine.

Xylitol

A recent randomized, double-blinded, controlled trial showed that Xylitol topical syrup (8 g per day divided into two or three doses) given during primary tooth eruption in children of 15-25 months of age could reduce tooth decay up to 70%.[16]

Povidone Iodine

Povidone Iodine application also can be a good alternative to control EDCT. The slow release of iodine from povidone iodine allows for long term antibacterial effect. Application of 10% Povidone Iodine in double-blind, placebo-controlled clinical trial in 12-19 months children increased the number of caries-free toddlers over one year of study period.[23]

A quasi-experimental study showed that the combination treatment with 10% Povidone Iodine and Fluoride Varnish in children are more effective than Fluoride Varnish treatments alone. The children of 60-83 months in the combined treatment were twice as likely to be caries free in the permanent molars than children in the fluoride alone cohort.[24]

Fissure Sealants Usage

Sealants were introduced in the 1960s. They are resin coatings that are applied by a dental professional to the deep grooves/fissures on the biting surfaces of permanent back teeth[1]. However, the American Dental Association has released evidence based sealant guidelines including a recommendation for sealant placement on both adult teeth and primary teeth at risk for caries.[17] The sealant fills in tooth's grooves and keeps the nutrient away from bacteria, thereby reducing caries formation in the more decay susceptible areas of the tooth. Reduction of caries incidence in children and adolescents after placement of sealants ranges from 86% at one year to 78.6% at two years. However, sealants do not last forever, and need to be monitored on an ongoing basis.[1]

Saskatoon Health Region, Population and Public Health- Oral Health Program Overview

The goal of Oral Health Program is to promote good oral health for all ages within the community. Oral Health Program includes both prevention and clinical components in both Urban and Rural districts. Dental clinic staffs provide preventive and treatment services at no charge to children up to age 18, who need dental treatment and have limited or no dental coverage.

The prevention component for children has several programs and services and will be discussed in this section.

Fluoride Program

The following information reflects the status of fluoride programming in the Saskatoon Health Region (SHR).

Community Water Fluoridation

This consists of:

- Promotion of community water fluoridation to communities that are non-fluoridated (86% of Saskatoon Health Region population has access to community water fluoridation).[20]

- Support services for fluoridated communities.[25]
- Collection and monitoring of community fluoride status of water supplies.[25]

Fluoride Mouthrinse Programs

Students (Grades 1 to 6; some up to Grade 12) in non-fluoridated communities, who are at high risk of tooth decay, rinse once a week under supervision, with a 0.2% neutral Sodium Fluoride Mouthrinse. The solution is spit and not swallowed. This occurs 36 to 40 weeks during the school year.[20] In 2014-2015 Fluoride Mouthrinse Programs were replaced with School-Based Fluoride Vanish Programs.

Fluoride Varnish Programs

Fluoride Varnish Programs initially started in only two Fluoride Varnish Clinics in Urban areas in the mid 1990's. Over years, additional Fluoride Varnish Clinics, with dental screening and referral for treatment have been implemented in core Neighborhoods of SHR. Currently, Paint-a-Smile Fluoride Varnish Clinics are held throughout the SHR with 13 locations (8 in Saskatoon, 5 in Rural areas) over a variety of set days per week/month. Refer to **Appendix-E** for the location of Fluoride Varnish Clinics in SHR. The Fluoride Varnish Program has been expanded to High School Daycares/Childcare sites, and School-based Fluoride Varnish Clinics.

Dental Assistants and Dental Therapists in Urban area deliver the Fluoride Varnish Program. Typically parents of children who attend child health clinic appointments are encouraged by the Most Responsible Nurse (MRN) to visit the dental health professional in the same clinic for Dental Screening/Fluoride Varnish application. In Daycare/School-based settings, parents became aware of the program by the school staff.

In 2008-2009 Public Health Nurses in Rural areas were trained and involved with the Fluoride Varnish Pilot Project. Ever Since, Public Health Nurses/ Nurse Practitioners in Rural areas provide Fluoride Varnish services in Rural clinics.

Early Childhood and Family Program

This program includes[25]:

- Public Health Nurses/Nurse Practitioners deliver post-natal oral health packages to new parents.

- Public Health Nurses/ Nurse Practitioners provide anticipatory guidance and oral health tools to parents and children at 6-month, 12-month, 18-month and 4-year Child Health Clinic appointments.
- Preschool oral health teaching kits are circulated to preschools and daycares.
- Tooth brushing programs at selected preschools and daycares.
- Visual dental screening are provided to pre-Kindergarten children (ages 3 and 4) in high risk schools and preschools/pre-Kindergartens with referrals to the Population and Public Health Dental Clinics when treatment is required.

Moreover, improving access to dental treatment by establishing dental home is one of the objectives of *Population and Public Health Strategies 2013-2016*.

School Programs

This program includes:

- Dental screenings of children in selected grades in all the schools every 5 years. When the Saskatchewan Children's Dental Plan program ended in 1993, the Saskatchewan Health Dental Health Education Program mandated a dental screening component for every Health Region to be repeated at 5 year intervals.[26] This program in SHR includes:
  - 1993-1994: Targeting Kindergarten and Grade 1 Children;
  - 1998-1999: Targeting Kindergarten and Grade 1 Children;
  - 2003-2004: Targeting Kindergarten and Grade 1 Children;
  - 2008-2009: Targeting Grade 1 and Grade 7 Children;
  - 2013-2014: Targeting Grade 1 and Grade 7 Children.
- Annual dental screenings of children at high risk for tooth decay in selected grades and schools with referrals to the Population and Public Health Dental Clinics when treatment is required.[25]
- School oral health teaching kits are circulated to school staff in elementary schools. Free toothbrushes, floss for certain grades and print information is included for children and parents.[25]
- Tooth brushing programs at selected schools.[25]
- Dental sealant programs for Grades 1, 2, 7, and 8 in selected schools.[25]

Current Report:

This report analyzes the health measures of children 0-6 years of age from 2006 to 2015. The purpose of this report is to identify children with unmet dental needs, determine communities that are at high risk for tooth decay, to monitor the trends of oral health status, to provide baseline for future screening/analysis. Moreover, since the *Canadian Oral Health Framework 2013-2018 (COHF)* does not have goals for age group 0-5 years of age, one of the objectives of the current report is to establish oral health indicators/benchmarks for this groups (as recommended by *Saskatchewan Dental Health Screening Program Report 2013-2014*).

Methods

Population and Public Health, conducted oral health screening of children 0-6 years of age in the Saskatoon Health Region between April 2006 and March 2015. Dental health professionals (licensed Saskatchewan Dental Assistants/Therapists) in Urban area and Public Health Nurses/ Nurse Practitioners in Rural communities assessed the child's oral health by a visual examination, using a mouth mirror and LED flashlights in SHR Fluoride Varnish Clinics. The examiners were calibrated by dental health educators.

The examinations were carried out with the child in upright sitting position, or on the lap of the parent/caregiver, if the child was too young/uncooperative to sit on the chair. The oral health indicators were collected, including untreated tooth decay (represents barrier to dental care), filled teeth, and extracted teeth due to tooth decay (represents barrier to dental care) in both primary and permanent dentition. In addition, data on child's demographics, dental history, oral hygiene, use of modes of fluoride delivery, signs and symptoms of dental problems, and results of risk assessment for ECTD were recorded. The recordings were then entered in to the database where further oral health measures (e.g. ECTD, dental health status/needs) were automatically calculated by the Microsoft Access software.

Each of the parents/caregivers were counseled by the examiners and received oral hygiene pamphlets/packages (including toothbrush and dental floss) for the whole family.

After consent was obtained, Fluoride Varnish was used for children one or two times a year based on their risk for ECTD. Refer to **Appendix-F** for consent form and risk assessment. Fluoride Varnish (in single-dose packages) was applied using a standard method to all surfaces of fully/partially erupted primary and permanent dentition, whether they were carious or not. The parents/caregivers received a pamphlet with post fluoride instructions and asked to return within 6 to 12 months for the next Fluoride Varnish application.

After entering in to the Access database, the screening data was exported to Excel for analysis. The study initially enrolled 25,358 children 0-6 year old. Then, the data was filtered, cleaned and the errors were resolved. In cases where erroneous values were not identified, they were excluded from the analysis. For each patient, only the first visit of each fiscal year was considered for the analysis to ensure that each child would fall in one age group in a given year. As a result, we included 23787 children for the final analysis.

Data analysis was performed using Excel and SPSS (IBM version 22.0).We used One-Way ANOVA to test the differences in deft+DMFT scores among the different time periods (in case of equal variances).Otherwise,Welch's Robust test was used, followed by the Games-Howell Post-hoc test to account for multiple comparisons between pairs of groups. Evaluation of differences in deft+DMFT between two groups (e.g. Urban and Rural) in a given year was performed using independent two sample T-test. To test the association between two variables (e.g. Child's Residence and oral health measures) we used Chi-square test and Fisher's exact test. Odds Ratio was calculated using Logistic Regression Analysis. The Significance Level $\alpha = 0.05$ was used for the statistical analysis.

Results

The oral health status of 23,787 children of 0-6 years of age (mean age 47.92 months±25.98) in Saskatoon Health Region from April 2006 to March 2015 were analyzed. There were 11,786 male (49.5%), 11,679 female (49.1%), and 1.4% with missing gender information.

The children were stratified into 7 age groups based on birthdate.

- <1 Year Old children (0-11 months) (n=1,236);
- 1 Year Old children (12-23months) (n=5,331);
- 2 Year Old children (24-35months) (n=2,347);
- 3 Year Old children (36-47months) (n=2,047);
- 4 Year Old children (48-59months) (n=2,957);
- 5 Year Old children (60-71months) (n=2,311);
- 6 Year Old children (72-83 months) (n=7,558).

For every age groups, except 6 Year Old children the data was analyzed over the time period 2006-2015. Regarding the age group of 6 years of age, the data of 2008-2015 was analyzed. Each analysis was conducted for individual age group in a given fiscal year that is 1 April to 31 March.

Demographic Information

Tables 1 to 7 and Figures 1 to 7 further elaborate on the demographics of children of different age groups. Overall, the gender had approximately similar distribution in each age group in a given year.

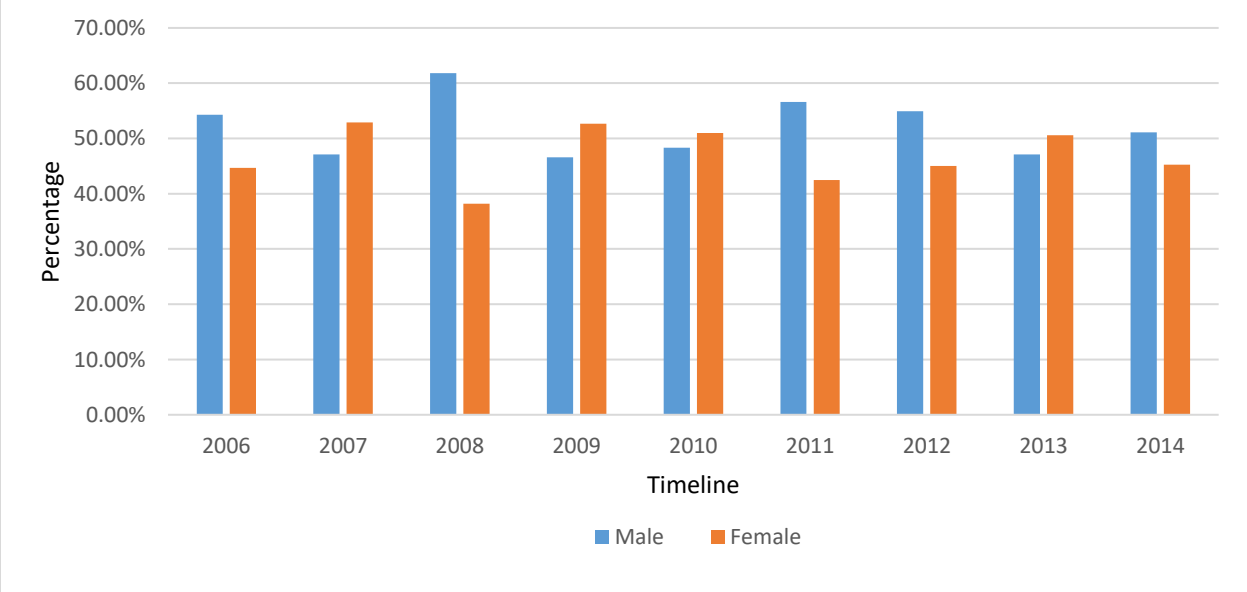
Demographics: <1 Year Old Children

Table-1: Demographics: <1 Year Old Children

Year	Demographics: <1 Year Old Children				
	Total numbers	Gender			Age in months (mean±SD)
		Male	Female	Missing	
2006	94	51 (54.26%)	42 (44.68%)	1 (1.06%)	6.70±3.12
2007	138	65 (47.10%)	73 (52.90%)	0	5.92±2.70
2008	123	76 (61.79%)	47 (38.21%)	0	5.60±3.03
2009	131	61 (46.56%)	69 (52.67%)	1 (0.76%)	6.30±3.19
2010	151	73 (48.34%)	77 (50.99%)	1 (0.66%)	7.18±2.67
2011	106	60 (56.60%)	45 (42.45%)	1 (0.94%)	7.49±2.93
2012	182	100 (54.95%)	82 (45.05%)	0	7.50±2.66
2013	174	82 (47.13%)	88 (50.57%)	4 (2.30%)	7.79±2.56
2014	137	70 (51.09%)	62 (45.26%)	5 (3.65%)	7.83±2.59

SD: Standard Deviation

Figure-1: Gender Distribution: <1 Year Old Children



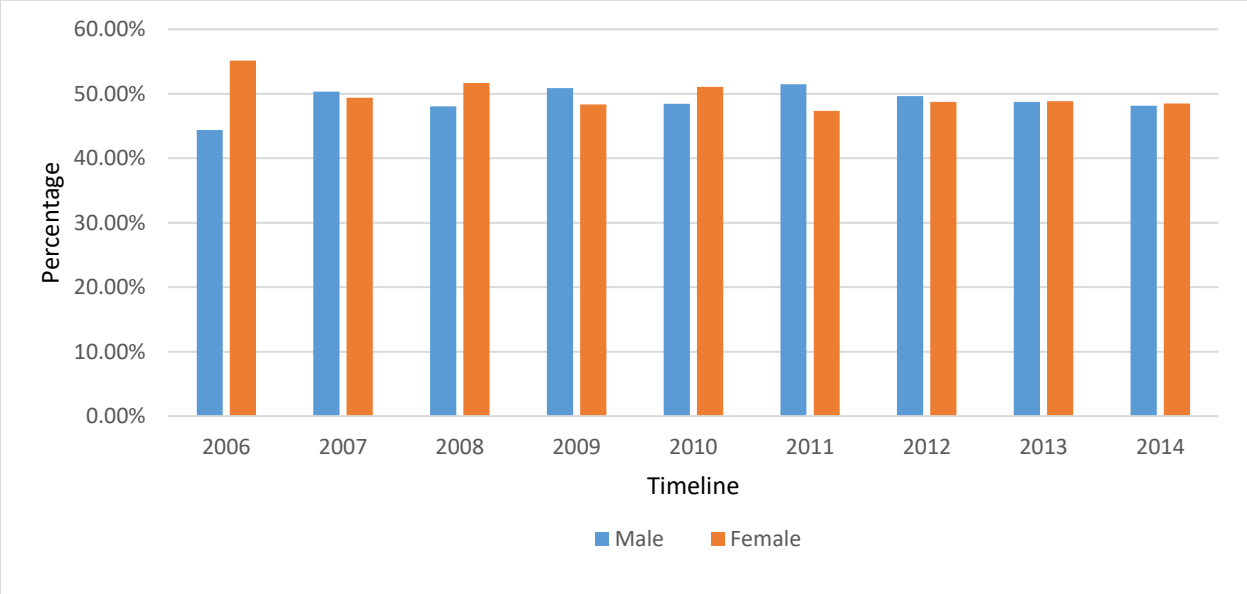
Demographics: 1 Year Old Children

Table-2: Demographics: 1 Year Old Children

Year	Demographics: 1 Year Old Children				
	Total numbers	Gender			Age in months (mean±SD)
		Male	Female	Missing	
2006	205	91 (44.39%)	113 (55.12%)	1 (0.49%)	16.82±3.43
2007	330	166 (50.31%)	163 (49.39%)	1 (0.30%)	16.35±3.52
2008	331	159 (48.04%)	171 (51.66%)	1 (0.30%)	16.58±3.33
2009	397	202 (50.88%)	192 (48.36%)	3 (0.76%)	16.38±3.55
2010	423	205 (48.46%)	216 (51.06%)	2 (0.48%)	16.72±3.60
2011	505	260 (51.49%)	239 (47.33%)	6 (1.18%)	16.49±3.57
2012	997	495 (49.65%)	486 (48.75%)	16 (1.60%)	16.18±3.50
2013	1106	539 (48.73%)	540 (48.82%)	27 (2.45%)	15.88±3.54
2014	1037	499 (48.12%)	503 (48.51%)	35 (3.37%)	16.00±3.42

SD: Standard Deviation

Figure-2: Gender Distribution: 1 Year Old Children



Demographics: 2 Year Old Children

Table-3: Demographics: 2 Year Old Children

Year	Demographics: 2 Year Old Children				
	Total numbers	Gender			Age in months (mean±SD)
		Male	Female	Missing	
2006	110	69 (62.73%)	40 (36.36%)	1 (0.91%)	29.17± 3.57
2007	162	77 (47.53%)	82 (50.62%)	3 (1.85%)	29.56± 3.54
2008	162	76 (46.91%)	86 (53.09%)	0	29±3.46
2009	206	98 (47.76%)	105 (50.98%)	3 (1.46%)	29.23±3.62
2010	233	118 (50.64%)	112 (48.07%)	3 (1.29%)	29.32±3.46
2011	230	111 (48.26%)	118 (51.31%)	1 (0.43%)	29.45±3.48
2012	389	187 (47.08%)	198 (50.90%)	4 (1.02%)	28.85±3.61
2013	451	239 (52.99%)	204 (45.23%)	8 (1.78%)	28.62±3.52
2014	404	209 (51.73%)	187 (46.29%)	8 (1.98%)	28.34±3.54

SD: Standard Deviation

Figure-3: Gender Distribution: 2 Year Old Children

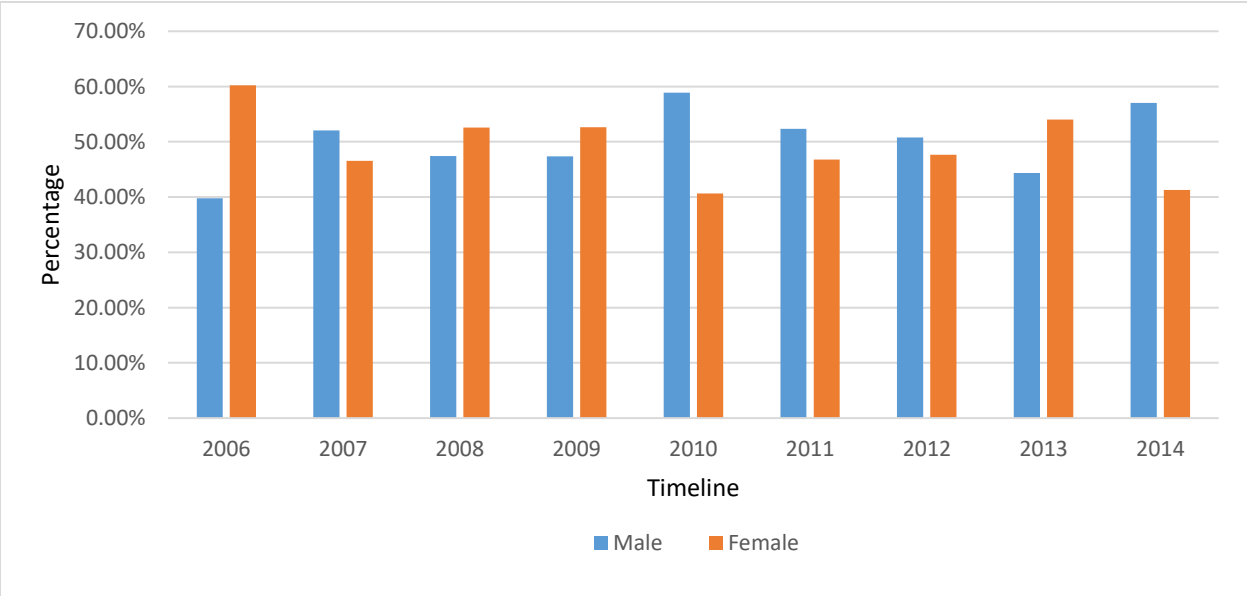
Demographics: 3 Year Old Children

Table-4: Demographics: 3 Year Old Children

Year	Demographics: 3 Year Old Children				
	Total numbers	Gender			Age in months (mean±SD)
		Male	Female	Missing	
2006	83	33 (39.76%)	50 (60.24%)	0	40.96±3.35
2007	146	76 (52.05%)	68 (46.58%)	2 (1.37%)	41.90±3.53
2008	156	74 (47.44%)	82 (52.56%)	0	41.81±3.48
2009	152	72 (47.37%)	80 (52.63%)	0	40.86±3.26
2010	219	129 (58.90%)	89 (40.64%)	1 (0.46%)	41.02±3.46
2011	235	123 (52.34%)	110 (46.81%)	2 (0.85%)	41.37±3.51
2012	323	164 (50.77%)	154 (47.68%)	5 (1.55%)	41.33±3.49
2013	372	165 (44.35%)	201 (54.03%)	6 (1.61%)	41.21±3.33
2014	361	206 (57.06%)	149 (41.27%)	6 (1.67%)	41.32±3.55

SD: Standard Deviation

Figure-4: Gender Distribution: 3 Year Old Children



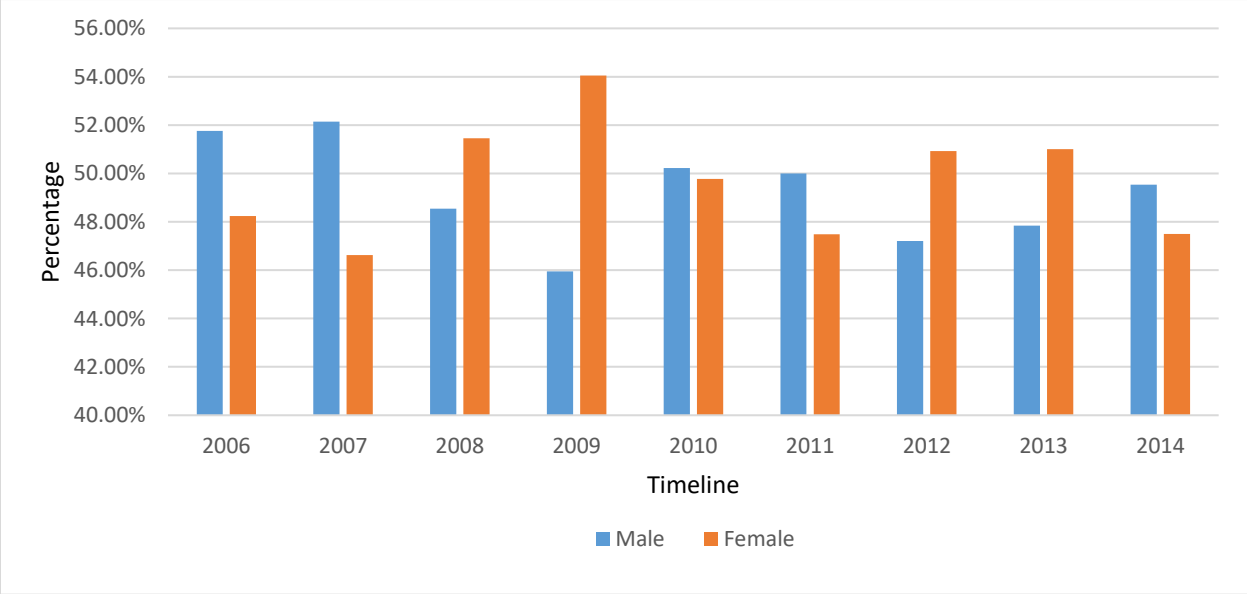
Demographics: 4 Year Old Children

Table-5: Demographics: 4 Year Old Children

Year	Demographics: 4 Year Old Children				
	Total numbers	Gender			Age in months (mean±SD)
		Male	Female	Missing	
2006	85	44 (51.76%)	41 (48.24%)	0	52.67±3.46
2007	163	85 (52.15%)	76 (46.63%)	2 (1.22%)	52.72±3.44
2008	171	83 (48.54%)	88 (51.46%)	0	52.94±3.41
2009	185	85 (45.95%)	100 (54.05%)	0	52.22±3.44
2010	217	109 (50.23%)	108 (49.77%)	0	51.94±3.49
2011	356	178 (50%)	169 (47.48%)	9 (2.52%)	52.42±3.71
2012	538	254 (47.21%)	274 (50.93%)	10 (1.86%)	51.78±3.60
2013	602	288 (47.84%)	307 (51%)	7 (1.16%)	51.31±3.41
2014	640	317 (49.53%)	304 (47.50%)	19 (2.97%)	51.77±3.65

SD: Standard Deviation

Figure-5: Gender Distribution: 4 Year Old Children



Demographics: 5 Year Old Children

Table-6: Demographics: 5 Year Old Children

Year	Demographics: 5 Year Old Children				
	Total numbers	Gender			Age in months (mean±SD)
		Male	Female	Missing	
2006	51	29 (56.86%)	22 (43.14%)	0	64.41±3.12
2007	58	27 (46.55%)	31 (53.45%)	0	63.95±3.33
2008	274	127 (46.35%)	146 (53.28%)	1 (0.35%)	68.40±3.18
2009	136	67 (49.26%)	68 (50%)	1 (0.74%)	65.40±3.36
2010	118	60 (50.85%)	57 (48.31%)	1 (0.84%)	65.50±3.51
2011	363	176 (48.48%)	173 (47.66%)	14 (3.86%)	65.40±3.49
2012	374	186 (49.73%)	179 (47.86%)	9 (2.41%)	65.71±3.40
2013	446	221 (49.55%)	218 (48.88%)	7 (1.57%)	67.27±3.82
2014	491	241 (49.08%)	243 (49.49%)	7 (1.43%)	65.27±3.45

SD: Standard Deviation

Figure-6: Gender Distribution: 5 Year Old Children

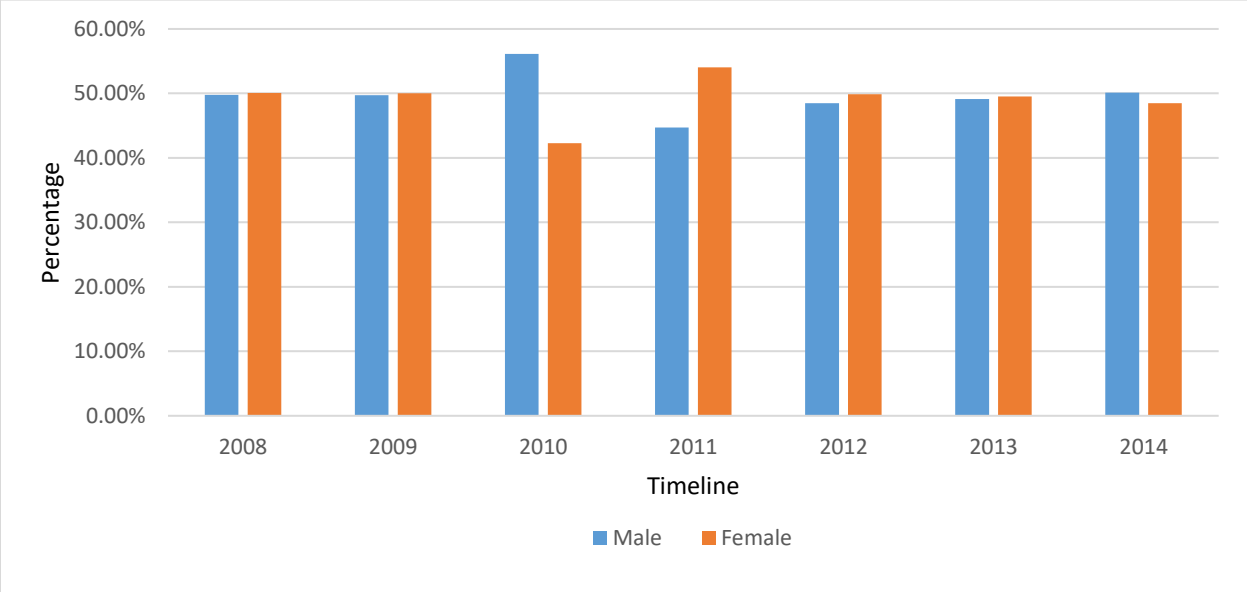
Demographics: 6 Year Old Children

Table-7: Demographics: 6 Year Old Children

Year	Demographics: 6 Year Old Children				
	Total numbers	Gender			Age in months (mean±SD)
		Male	Female	Missing	
2008	1916	954 (49.79%)	959 (50.05%)	3 (0.16%)	77.37±3.20
2009	386	192 (49.74%)	193 (50%)	1 (0.26%)	78.75±3.03
2010	253	142 (56.13%)	107 (42.29%)	4 (1.58%)	77.13±3.28
2011	483	216 (44.72%)	261 (54.04%)	6 (1.24%)	77.38±3.33
2012	712	345 (48.46%)	355 (49.86%)	12 (1.69%)	77.46±3.20
2013	2892	1421 (49.14%)	1433 (49.55%)	38 (1.31%)	77.45±3.19
2014	916	459 (50.11%)	444 (48.47%)	13 (1.42%)	77.65±3.18

SD: Standard Deviation

Figure-7: Gender Distribution: 6 Year Old Children



Early Childhood Tooth Decay (ECTD)

ECTD is a rapid form of tooth decay affecting primary dentition which was previously measured as Early Childhood Caries (ECC).According to American Academy of Pediatric Dentistry, ECTD is any dental decay in the primary teeth of children of ≤71 months.[14] Refer to **Appendix-A** for detailed definition.

The children of >71months (e.g. 6 years old) were excluded from the ECTD/S-ECTD analysis, because they did not fit into the definition of ECDT. This is unlike the *Saskatoon Health Region Dental Health Screening Program Report 2013-2014*, where Grade One students were considered for this analysis.

The Dental Screening Database has the formula set to calculate Early Childhood Tooth Decay (ECTD) and Severe Early Childhood Tooth Decay (S-ECTD) automatically.

Tables 8-14, Figures 8-11 illustrate the extent of Early Child Tooth Decay for different age groups.

Early Childhood Tooth Decay : <1 Year Old Children

Early Childhood Tooth Decay data in children younger than one year old is shown in **Table-8** and **Figure-8**.

Table-8: Early Childhood Tooth Decay: <1 Year Old Children

Year	Early Childhood Tooth Decay: <1 Year Old Children		
	ECTD	S-ECTD	Non-ECTD
2006	0	3 (3.19%)	91 (96.81%)
2007	0	4 (2.90%)	134 (97.10%)
2008	0	3 (2.44%)	120 (97.56%)
2009	0	4 (3.05%)	127 (96.95%)
2010	0	2 (1.32%)	149 (98.68%)
2011	0	3 (2.83%)	103 (97.17%)
2012	0	8 (4.40%)	174 (95.60%)
2013	0	4 (2.30%)	170 (97.70%)
2014	0	5 (3.65%)	132 (96.35%)

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

The percentage of infants with S-ECTD fluctuated in a 9 year period from April 2006 to March 2015. The proportion of infants who experienced S-ECTD ranged from 1.32% in 2010 to 4.40% in 2012. In 2014, the percentage of infants with S-ECTD increased compared to 2013 (3.65% vs.2.30%).

Early Childhood Tooth Decay: 1 Year Old Children

Early Childhood Tooth Decay data in 1 year old children is shown in **Table-9** and **Figure-8**.

Table-9: Early Childhood Tooth Decay: 1 Year Old Children

Year	Early Childhood Tooth Decay: 1 Year Old Children		
	ECTD	S-ECTD	Non-ECTD
2006	0	20 (9.76%)	185 (90.24%)
2007	0	28 (8.48%)	302 (91.52%)
2008	0	40 (12.08%)	291 (87.92%)
2009	0	46 (11.59%)	351 (88.41%)
2010	0	45 (10.64%)	378 (89.36%)
2011	0	41 (8.12%)	464 (91.88%)
2012	0	67 (6.72%)	930 (93.28%)
2013	0	60 (5.42%)	1046 (94.58%)
2014	0	57 (5.50%)	980 (94.50%)

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

The results showed an overall decline in the proportion of one year old children with S-ECTD in a time period. The proportion of one year old children who experienced S-ECTD ranged from 5.42% in 2013 to 12.08% in 2008. In 2014, the percentage of children with S-ECTD approximately remained stable compared to 2013.

Early childhood Tooth Decay: 2 Year Old Children

Early Childhood Tooth Decay data in 2 year old children is shown in **Table-10** and **Figure-8**.

Table-10: Early Childhood Tooth Decay: 2 Year Old Children

Year	Early Childhood Tooth Decay: 2 Year Old Children		
	ECTD	S-ECTD	Non-ECTD
2006	0	32 (29.02%)	78 (70.91%)
2007	0	35 (21.60%)	127 (78.40%)
2008	0	26 (16.05%)	136 (83.95%)
2009	0	61 (29.61%)	145 (70.39%)
2010	0	39 (16.74%)	194 (83.26%)
2011	0	51 (21.17%)	179 (77.83%)
2012	0	81 (20.82%)	308 (79.18%)
2013	0	93 (20.62%)	358 (79.38%)
2014	0	85 (21.04%)	319 (78.96%)

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

The results showed an overall decline in the proportion of two year old children with S-ECTD in a time period. The proportion of two year old children who experienced S-ECTD ranged from 16.05% in 2008 to 29.61% in 2009. In 2014, the percentage of children with S-ECTD increased slightly compared to 2013 (21.04% vs 20.62%).

Early Childhood Tooth Decay: 3 Year Old Children

Early Childhood Tooth Decay data in 3 year old children is shown in **Table-11** and **Figures 8** to **11**.

Table-11: Early Childhood Tooth Decay: 3 Year Old Children

Year	Early Childhood Tooth Decay: 3 Year Old Children		
	ECTD	S-ECTD	Non-ECTD
2006	8 (9.64%)	21 (25.30%)	54 (65.06%)
2007	19 (13.02%)	29 (19.86%)	98 (67.12%)
2008	13 (8.33%)	43 (27.56%)	100 (64.10%)
2009	12 (7.90%)	47 (30.92%)	93 (61.18%)
2010	22 (10.05%)	71 (32.42%)	126 (57.53%)
2011	22 (9.36%)	61 (25.96%)	152 (64.68%)
2012	41 (12.70%)	63 (19.50%)	219 (67.80%)
2013	49 (13.17%)	83 (22.31%)	240 (64.52%)
2014	51 (14.13%)	69 (19.11%)	241 (66.76%)

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

The highest percentage 3 year old children with combined ECTD and S-ECTD was seen in 2010. In contrast in 2012, the smaller proportion of children had tooth decay compared to other screening years. However, the severity of the caries was least in 2014, where 19.11% of children experienced S-ECTD.

Early Childhood Tooth Decay: 4 Year Old Children

Early Childhood Tooth Decay data in 4 year old children is illustrated in **Table-12** and **Figures 8** to **11**.

Table-12: Early Childhood Tooth Decay: 4 Year Old Children

Year	Early Childhood Tooth Decay: 4 Year Old Children		
	ECTD	S-ECTD	Non-ECTD
2006	14 (16.47%)	27 (31.76%)	44 (51.76%)
2007	28 (17.18%)	43 (26.38%)	92 (56.44%)
2008	22 (12.87%)	53 (30.99%)	96 (56.14%)
2009	19 (10.27%)	69 (37.30%)	97 (52.43%)
2010	32 (14.75%)	75 (34.56%)	110 (50.69%)
2011	53 (14.89%)	115 (32.30%)	188 (52.81%)
2012	88 (16.36%)	116 (21.56%)	334 (62.08%)
2013	127 (21.10%)	108 (17.94%)	367 (60.96%)
2014	101 (15.78%)	127 (19.84%)	412 (64.38%)

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

Overall, the proportion of 4 year old children with combined ECTD and S-ECTD has slightly decreased over 9 years. It reached a peak in 2010, where 49.31% of children experienced decay. The smallest ECTD+S-ECTD belonged to children in 2014 (35.62%).

Early Childhood Tooth Decay: 5 Year Old Children

Early Childhood Tooth Decay data in 4 year old children is shown in **Table-13** and **Figures 8** to **11**.

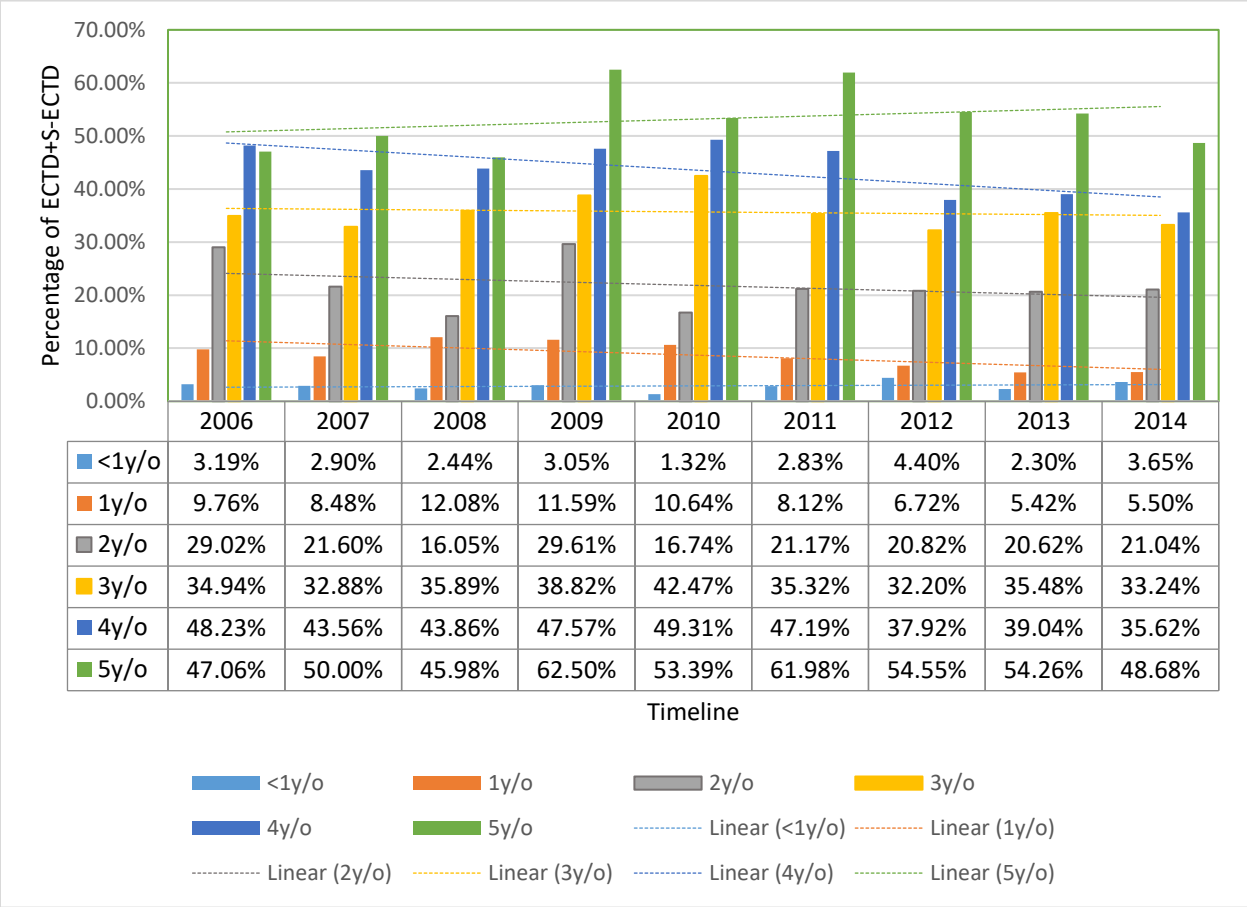
Table-13: Early Childhood Tooth Decay: 5 Year Old Children

Year	Early Childhood Tooth Decay: 5 Year Old Children		
	ECTD	S-ECTD	Non-ECTD
2006	10 (19.61%)	14 (27.45%)	27 (52.94%)
2007	15 (25.86%)	14 (24.14%)	29 (50%)
2008	75 (27.37%)	51 (18.61%)	148 (54.01%)
2009	46 (33.82%)	39 (28.68%)	51 (37.50%)
2010	34 (28.81%)	29 (24.58%)	55 (46.61%)
2011	113 (31.13%)	112 (30.85%)	138 (38.02%)
2012	107 (28.61%)	97 (25.94%)	170 (45.45%)
2013	116 (26.01%)	126 (28.25%)	204 (45.74%)
2014	117 (23.83%)	122 (24.85%)	252 (51.32%)

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

Overall, the proportion of 5 year old children with combined ECTD and S-ECTD has fluctuated over 9 years. Overall, the proportion of 5 year old children with combined ECTD and S-ECTD has slightly increased over 9 years. The smallest percentage was found in 2008 (45.99%). However, the severity of the caries was lowest in 2014 (19.11%).

Figure-8: Percentage of ECTD+S-ECTD: 0-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
<1y/o	3.19%	2.90%	2.44%	3.05%	1.32%	2.83%	4.40%	2.30%	3.65%
1y/o	9.76%	8.48%	12.08%	11.59%	10.64%	8.12%	6.72%	5.42%	5.50%
2y/o	29.02%	21.60%	16.05%	29.61%	16.74%	21.17%	20.82%	20.62%	21.04%
3y/o	34.94%	32.88%	35.89%	38.82%	42.47%	35.32%	32.20%	35.48%	33.24%
4y/o	48.23%	43.56%	43.86%	47.57%	49.31%	47.19%	37.92%	39.04%	35.62%
5y/o	47.06%	50.00%	45.98%	62.50%	53.39%	61.98%	54.55%	54.26%	48.68%

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay; ECTD+S-E-ECTD: combined ECTD, S-ECTD; y/o: year old

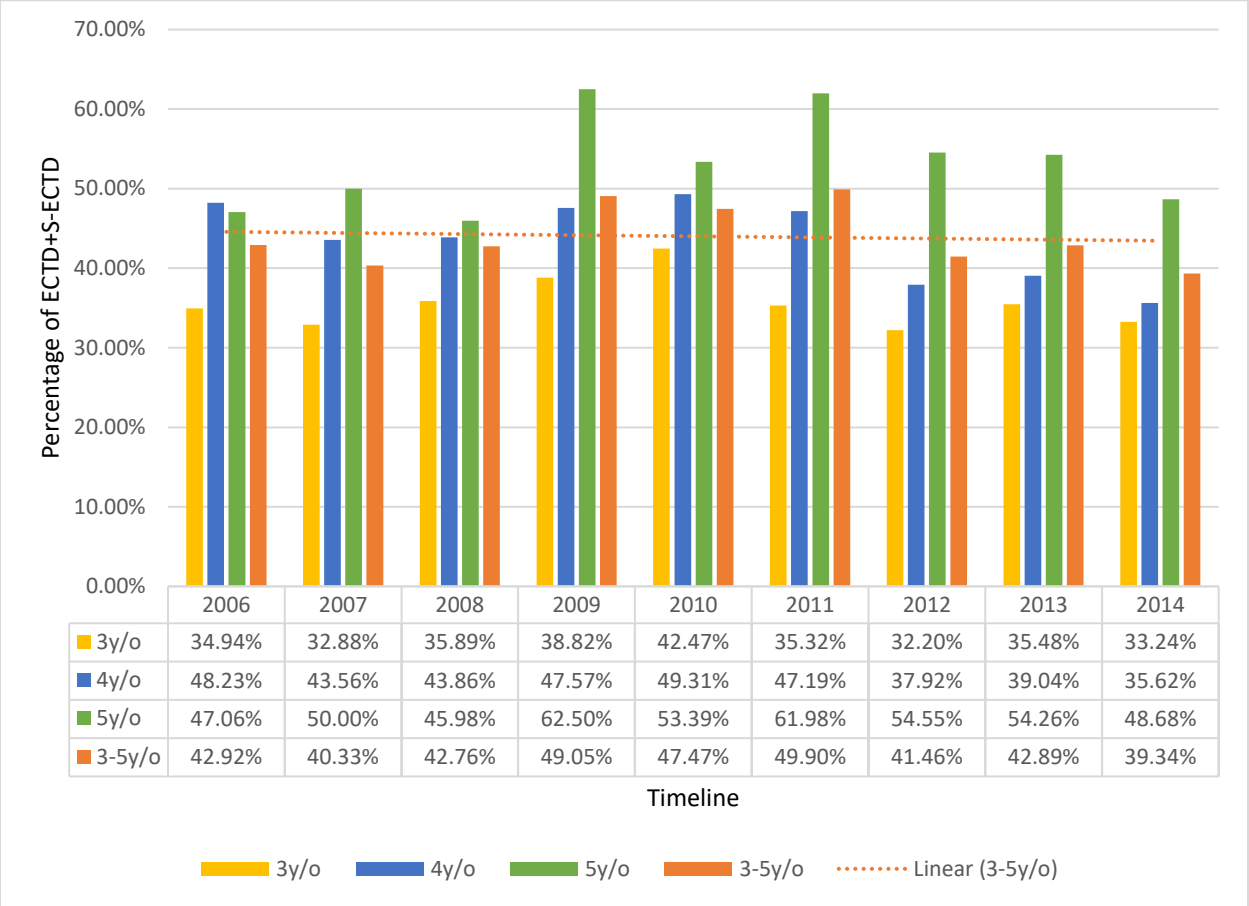
For the most part of the study the percentage of combined ECTD, S-ECTD in different age groups is as follows:

5 year old > 4 year old >3 year old >2 year old >1 year old > younger than 1 year old children.

Overall the percentage of combined ECTD, S-ECTD would suggest a downward trend for 1, 2, and 4 year old children; a stable trend for <1 and 3 year olds; an upward trend in 5 year old children. Comparing the last two years, showed that the percentage of combined ECTD, S-ECTD, in:

- infants increased from 2.30% to 3.65%;
- one year old children slightly increased from 5.42% to 5.50%;
- two year old children went up from 20.62% to 21.04%;
- three year old children decreased from 35.48% to 33.24%;
- four year old children reduced from 39.04% to 35.62%;
- five year old children decreased form 54.26% to 48.68%.

Figure-9: Percentage of ECTD+S-ECTD: 3-5 Year Old Children

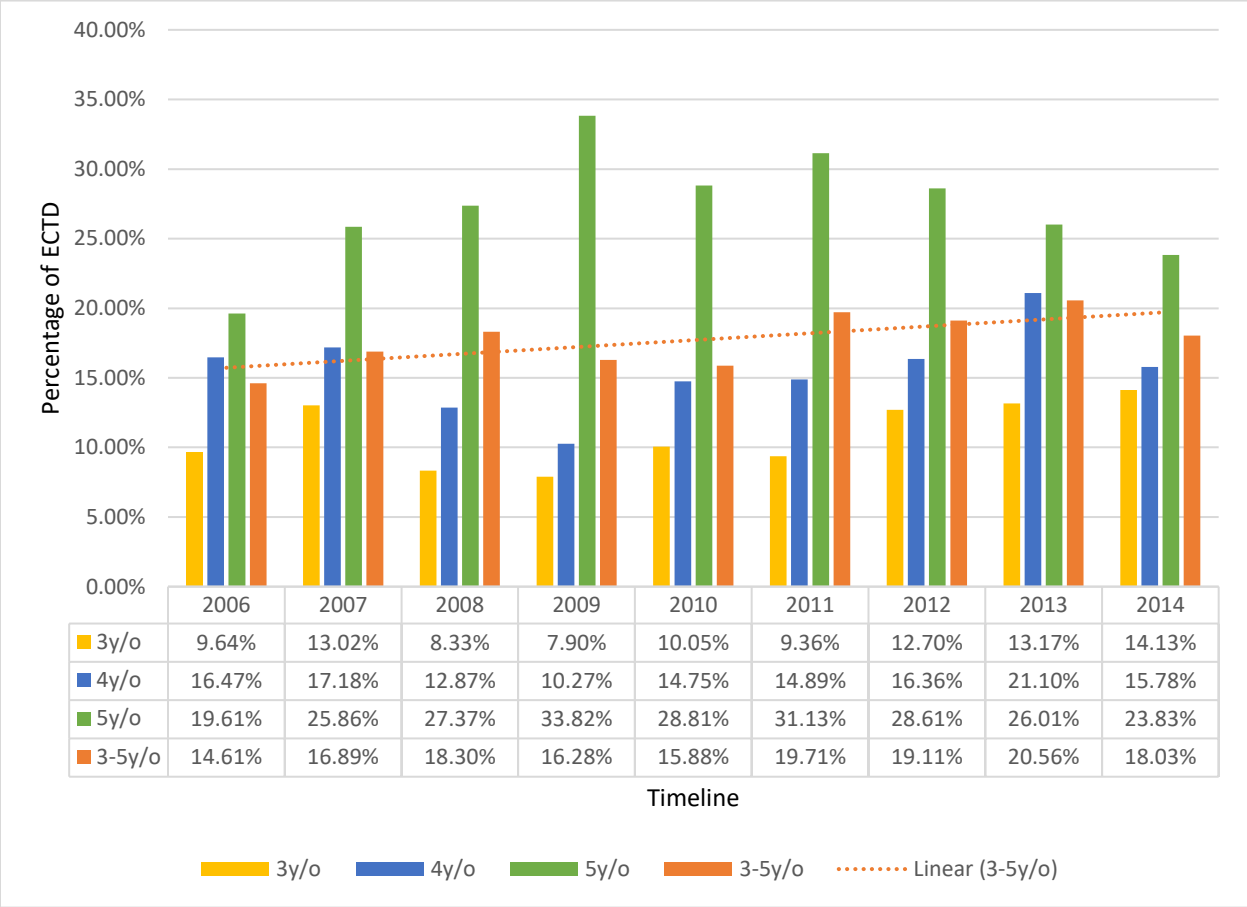


	2006	2007	2008	2009	2010	2011	2012	2013	2014
3y/o	34.94%	32.88%	35.89%	38.82%	42.47%	35.32%	32.20%	35.48%	33.24%
4y/o	48.23%	43.56%	43.86%	47.57%	49.31%	47.19%	37.92%	39.04%	35.62%
5y/o	47.06%	50.00%	45.98%	62.50%	53.39%	61.98%	54.55%	54.26%	48.68%
3-5y/o	42.92%	40.33%	42.76%	49.05%	47.47%	49.90%	41.46%	42.89%	39.34%

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay; ECTD+S-E-ECTD: combined ECTD, S-ECTD; y/o: year old

The graphs suggest that the percentage of ECTD+S-ECTD in 3-5 year old children (orange bars) has almost remained stable over the study period. From 2013 to 2014, the percentage of combined ECTD, S-ECTD in 3-5 year old children has decreased from 42.89% to 39.34%.

Figure-10: Percentage of ECTD: 3-5 Year Old Children

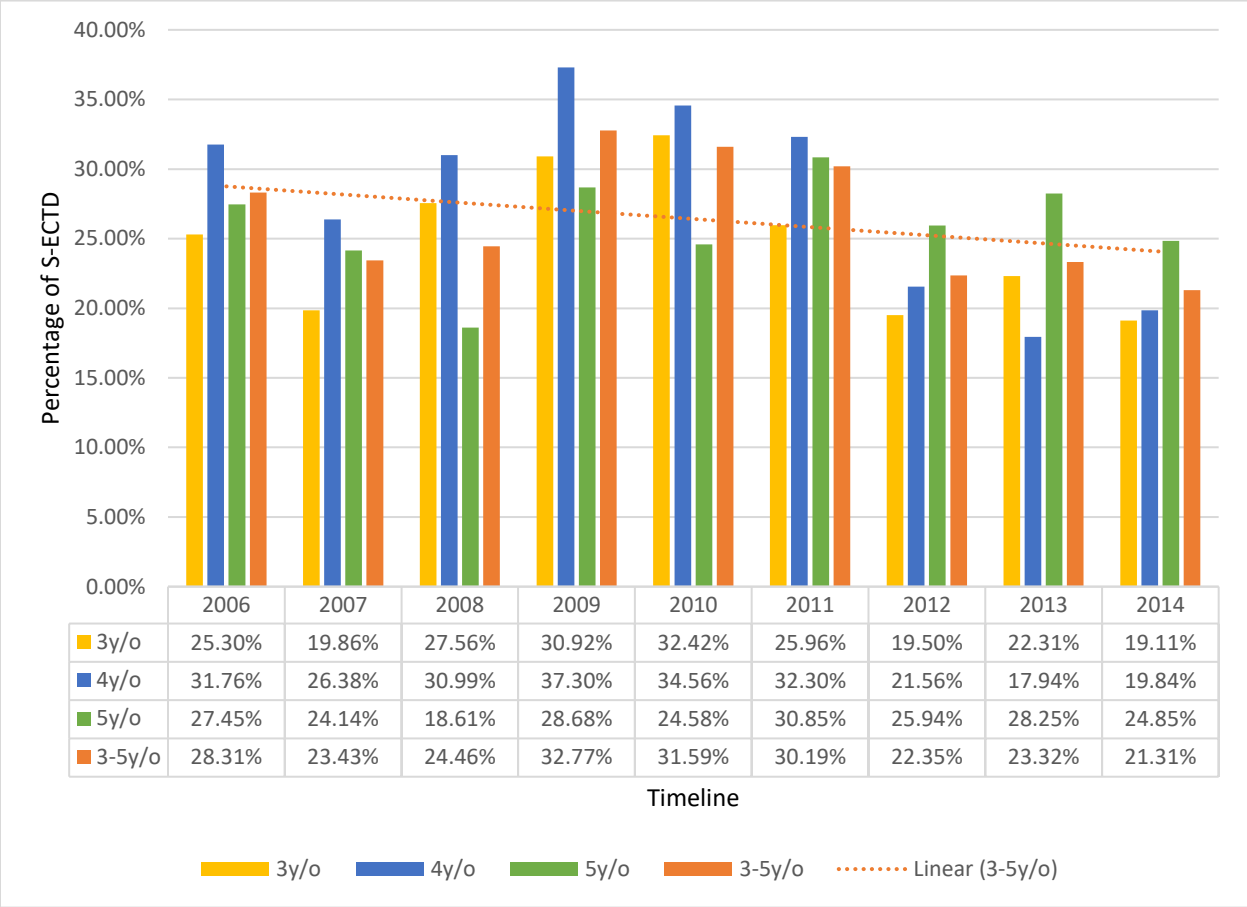


	2006	2007	2008	2009	2010	2011	2012	2013	2014
3y/o	9.64%	13.02%	8.33%	7.90%	10.05%	9.36%	12.70%	13.17%	14.13%
4y/o	16.47%	17.18%	12.87%	10.27%	14.75%	14.89%	16.36%	21.10%	15.78%
5y/o	19.61%	25.86%	27.37%	33.82%	28.81%	31.13%	28.61%	26.01%	23.83%
3-5y/o	14.61%	16.89%	18.30%	16.28%	15.88%	19.71%	19.11%	20.56%	18.03%

ECTD: Early Childhood Tooth Decay; y/o: year old

The data suggest that overall the proportion 3-5 year old children (orange bars) with ECTD has increased over 9 years. However, from 2013 to 2014, the percentage of ECTD in 3-5 year old children decreased from 20.56% to 18.03%.

Figure-11: Percentage of S-ECTD: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
3y/o	25.30%	19.86%	27.56%	30.92%	32.42%	25.96%	19.50%	22.31%	19.11%
4y/o	31.76%	26.38%	30.99%	37.30%	34.56%	32.30%	21.56%	17.94%	19.84%
5y/o	27.45%	24.14%	18.61%	28.68%	24.58%	30.85%	25.94%	28.25%	24.85%
3-5y/o	28.31%	23.43%	24.46%	32.77%	31.59%	30.19%	22.35%	23.32%	21.31%

S- ECTD: Severe Early Childhood Tooth Decay; y/o: year old

The data suggest that overall the proportion 3-5 year old children (orange bars) with S- ECTD has decreased over 9 years. From 2013 to 2014, the percentage of ECTD in 3-5 year old children went down from 20.09% to 17.91%.

To summarize, **Figures 9-11** suggest that the proportion of combined ECTD, S-ECTD in 3-5 year old children almost remained stable over the study period. The breakdown, showed despite the upward trend in ECTD, the severe form of childhood caries, S-ECTD, has decreased.

Quadrants

The dental arches were divided into four quadrants; upper right, upper left, lower right and lower left. To determine the burden of tooth decay, the number of quadrants affected by the decay were recorded.

Tables 14-20 present the quadrants involved in decay for different age groups.

Table-14: Quadrants Involved in Decay: <1 Year Old Children

Year	Quadrants Involved in Decay: < 1 Year Old Children				
	No Quadrant	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
2006	91 (96.81%)	0	3 (3.19%)	0	0
2007	135 (97.83%)	1 (0.72%)	2 (1.45%)	0	0
2008	122 (99.19%)	1 (0.81%)	0	0	0
2009	126 (96.18%)	2 (1.53%)	3 (2.29%)	0	0
2010	149 (98.68%)	1 (0.66%)	1 (0.66%)	0	0
2011	102 (96.23%)	1 (0.94%)	2 (1.89%)	0	1 (0.94%)
2012	176 (96.70%)	5 (2.75%)	0	0	1 (0.55%)
2013	172 (98.85%)	2 (1.15%)	0	0	0
2014	133 (97.08%)	3 (2.19%)	1 (0.73%)	0	0

There was fluctuations in the percentage of quadrants involved in caries .In each year, among the infants with tooth decay, most of them had one or two quadrants involved. In the early years, majority of caries was seen in two quadrants. Whereas, in the most recent years, it has diminished to only one quadrant.

Table-15: Quadrants Involved in Decay: 1 Year Old Children

Year	Quadrants Involved in Decay: 1 Year Old Children				
	No Quadrant	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
2006	147 (91.22%)	4 (1.95%)	14 (6.83%)	0	0
2007	306 (92.73%)	1 (0.30%)	19 (5.76%)	0	4 (1.21%)
2008	294 (88.82%)	0	32 (9.67%)	0	5 (1.51%)
2009	354 (89.17%)	8 (2.02%)	30 (7.56%)	0	5 (1.26%)
2010	381 (90.07%)	4 (0.95%)	34 (8.04%)	1 (0.24%)	3 (0.71%)
2011	466 (92.28%)	5 (0.99%)	28 (5.54%)	1 (0.20%)	5 (0.99%)
2012	940 (94.28%)	14 (1.40%)	38 (3.81%)	3 (0.30%)	2 (0.20%)
2013	1061 (95.93%)	7 (0.63%)	34 (3.07%)	0	4 (0.36%)
2014	990 (95.47%)	6 (0.58%)	32 (3.09%)	1 (0.10%)	8 (0.77%)

There was fluctuations in the percentage of quadrants involved in caries .In each year, among 1 year old children with caries, the majority had two quadrants involved. In most recent years, fewer children had tooth decay in two quadrants compared to the previous years.

Table-16: Quadrants Involved in Decay: 2 Year Old Children

Year	Quadrants Involved in Decay: 2 Year Old Children				
	No Quadrant	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
2006	83 (75.45%)	5 (4.55%)	17 (15.45%)	1 (0.91%)	3 (3.64%)
2007	133 (82.10%)	0	19 (11.73%)	5 (3.09%)	5 (3.09%)
2008	141 (87.04%)	4 (2.47%)	12 (7.41%)	2 (1.23%)	3 (1.85%)
2009	150 (72.82%)	10 (4.85%)	30 (14.56%)	14 (1.94%)	12 (5.83%)
2010	197 (84.55%)	5 (2.15%)	19 (8.15%)	3 (1.29%)	9 (3.86%)
2011	181 (78.70%)	10 (4.35%)	27 (11.74%)	4 (1.74%)	8 (3.48%)
2012	318 (81.75%)	13 (3.34%)	37 (9.51%)	5 (1.29%)	16 (4.11%)
2013	379 (84.04%)	12 (2.66%)	35 (7.76%)	9 (2.00%)	16 (3.55%)
2014	335 (82.92%)	8 (1.98%)	40 (9.90%)	9 (2.23%)	12 (2.97%)

There was fluctuations in the percentage of quadrants involved in caries .In each year, the majority of caries in 2 year old children was seen in two quadrants.

Table-17: Quadrants Involved in Decay: 3 Year Old Children

Year	Quadrants Involved in Decay: 3 Year Old Children				
	No Quadrant	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
2006	59 (71.08%)	5 (6.02%)	10 (12.05%)	1 (1.20%)	8 (9.64%)
2007	116 (79.45%)	4 (2.74%)	14 (9.59%)	3 (2.05%)	9 (6.16%)
2008	115 (73.72%)	8 (5.13%)	11 (7.05%)	5 (3.21%)	17 (10.90%)
2009	98 (64.47%)	9 (5.92%)	19 (12.50%)	6 (3.95%)	20 (13.16%)
2010	140 (69.93%)	13 (5.94%)	40 (18.26%)	6 (2.74%)	20 (9.13%)
2011	166 (70.64%)	13 (5.53%)	22 (9.36%)	8 (3.40%)	26 (11.06%)
2012	241 (74.61%)	17 (5.26%)	22 (6.81%)	13 (4.02%)	30 (9.29%)
2013	286 (76.88%)	14 (3.76%)	29 (7.80%)	14 (3.76%)	29 (7.80%)
2014	274 (75.90%)	21 (5.82%)	30 (8.31%)	6 (1.66%)	30 (8.31%)

There was fluctuations in the percentage of quadrants involved in caries. In each year, the majority of 3 year old children with tooth decay had 2 and 4 quadrants involved.

Table-18: Quadrants Involved in Decay: 4 Year Old Children

Year	Quadrants Involved in Decay: 4 Year Old Children				
	No Quadrant	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
2006	56 (65.88%)	8 (9.41%)	9 (10.59%)	3 (3.53%)	9 (10.59%)
2007	122 (74.85%)	13 (7.98%)	15 (9.20%)	6 (3.68%)	7 (4.29%)
2008	119 (69.59%)	10 (5.85%)	20 (11.70%)	7 (4.09%)	15 (8.77%)
2009	121 (65.41%)	11 (5.95%)	25 (13.51%)	8 (4.32%)	20 (10.81%)
2010	137 (63.13%)	10 (4.61%)	30 (13.82%)	8 (3.69%)	32 (14.75%)
2011	252 (70.79%)	20 (5.62%)	40 (11.24%)	11 (3.09%)	33 (9.27%)
2012	410 (76.21%)	27 (5.02%)	45 (8.36%)	10 (1.86%)	46 (8.55%)
2013	441 (73.26%)	35 (5.81%)	51 (8.47%)	21 (3.49%)	54 (8.97%)
2014	489 (76.41%)	37 (5.78%)	45 (7.03%)	14 (2.19%)	55 (8.59%)

There was fluctuations in the percentage of quadrants involved in caries. In each year, the majority of 4 year old children with tooth decay had 2 and 4 quadrants involved.

Table-19: Quadrants Involved in Decay: 5 Year Old Children

Year	Quadrants Involved in Decay: 5 Year Old Children				
	No Quadrant	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
2006	36 (70.59%)	6 (11.76%)	2 (3.92%)	2 (3.92%)	5 (9.80%)
2007	47 (81.03%)	3 (5.17%)	5 (8.62%)	1 (1.72%)	2 (3.45%)
2008	209 (76.28%)	31 (11.31%)	9 (3.28%)	10 (3.65%)	15 (5.47%)
2009	72 (52.94%)	12 (8.82%)	21 (15.44%)	7 (5.15%)	24 (17.65%)
2010	76 (64.41%)	9 (7.63%)	12 (10.17%)	2 (1.69%)	19 (16.10%)
2011	223 (61.43%)	35 (9.37%)	50 (13.77%)	14 (3.86%)	42 (11.57%)
2012	252 (67.38%)	34 (9.09%)	40 (10.70%)	14 (3.74%)	34 (9.09%)
2013	229 (67.04%)	38 (8.52%)	49 (10.99%)	11 (2.47%)	49 (10.99%)
2014	353 (71.89%)	32 (6.52%)	49 (9.98%)	17 (3.46%)	40 (8.15%)

There was fluctuations in the percentage of quadrants involved in caries. In each year, the majority of 5 year old children with tooth decay had 1, 2 and 4 quadrants involved.

Table-20: Quadrants Involved in Decay: 6 Year Old Children

Year	Quadrants Involved in Decay: 6 Year Old Children				
	No Quadrant	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
2008	1601 (83.65%)	163 (8.51%)	82 (4.28%)	28 (1.47%)	42 (2.19%)
2009	279 (72.28%)	42 (10.88%)	30 (7.77%)	20 (5.18%)	15 (3.89%)
2010	177 (69.96%)	26 (10.28%)	24 (9.49%)	9 (3.56%)	17 (6.71%)
2011	319 (66.05%)	53 (10.97%)	47 (9.73%)	19 (3.93%)	45 (9.32%)
2012	502 (70.51%)	67 (9.41%)	67 (9.41%)	26 (3.65%)	50 (7.02%)
2013	2291 (79.22%)	218 (7.54%)	202 (6.98%)	77 (2.66%)	104 (3.60%)
2014	667 (78.82%)	86 (9.39%)	67 (7.31%)	36 (3.93%)	60 (6.55%)

There was fluctuations in the percentage of quadrants involved in caries. In each year, the majority of 6 year old children with tooth decay had 1, 2 and 4 quadrants involved.

Dental Health Status

Dental Health Status was categorized as NDE, CCC, PCC and NEC.

No Decay Experience (NDE) indicates that no decay, fillings or extractions are evident.

Complete Caries Care (CCC) indicates that all decayed teeth appear to have been treated.

Partial Caries Care (PCC) indicates that some teeth have been treated, but decay is still evident.

No Evidence of Care/Neglect (NEC) indicates that there is decay but no evidence of past or present dental treatment.

The Database automatically calculated the status from the “deft” and “DMFT” indices”.

Tables 21-27 illustrate the dental health status for different age groups.

Table-21: Dental Health Status: < 1 Year Old Children

Year	Dental Health Status: < 1 Year Old Children			
	NDE	CCC	PCC	NEC
2006	91 (96.81%)	0	0	3 (3.19%)
2007	134 (97.10%)	0	0	4 (2.90%)
2008	120 (97.56%)	1 (0.81%)	0	2 (1.63%)
2009	126 (96.18%)	0	1 (0.76%)	4 (3.05%)
2010	149 (98.68%)	0	0	2 (1.32%)
2011	102 (96.23%)	0	1 (0.94%)	3 (2.83%)
2012	174 (95.60%)	1 (0.55%)	3 (1.65%)	4 (2.20%)
2013	170 (97.70%)	1 (0.57%)	1 (0.57%)	2 (1.15%)
2014	132 (96.35%)	1 (0.73%)	0	4 (2.92%)

NDE: No Decay Experience; CCC: Complete Caries Care; PCC: Partial Caries Care; NEC: No Evidence of Care

In 2006, no decay, fillings or extractions (NDE) were found in 96.81% of infants. However, 3.19% were found to have no evidence of care (NEC) although decay was evident in these cases. The NEC percentage has decreased over the time period, where in 2013, 1.15% of children had No Evidence of Care.

In the early years 0% were categorized as Complete Caries Care (CCC) which has increased compared to the most recent dental screening years (0.73%). This indicates that decayed teeth have been restored.

Table-22: Dental Health Status: 1 Year Old Children

Year	Dental Health Status: 1 Year Old Children			
	NDE	CCC	PCC	NEC
2006	186 (90.73%)	0	0	19 (9.27%)
2007	302 (91.52%)	3 (0.91%)	0	25 (7.58%)
2008	291 (87.92%)	1 (0.30%)	1 (0.30%)	38 (11.48%)
2009	353 (88.92%)	3 (0.76%)	0	41 (10.33%)
2010	377 (89.13%)	0	0	46 (10.87%)
2011	464 (91.88%)	0	1 (0.20%)	40 (7.92%)
2012	930 (93.28%)	1 (0.10%)	0	66 (6.52%)
2013	1046 (94.58%)	2 (0.18%)	0	58 (5.24%)
2014	981 (94.60%)	4 (0.39%)	0	52 (5.01%)

NDE: No Decay Experience; CCC: Complete Caries Care; PCC: Partial Caries Care; NEC: No Evidence of Care

In 2006, 9.27% of one year old children were shown to have No Evidence of Care (NEC) and 0% categorized as Complete Caries Care (CCC).The percentage of children with No Evidence of Care was the highest in 2008 (11.48%). The situation improved in the most recent years, where 5.01% of children in 2014 were measured with No Evidence of Care. This indicates that decayed teeth have been restored. Complete Caries Care (CCC) increased from 0.18% in 2013 to 0.39% in 2014.

Table-23: Dental Health Status: 2 Year Old Children

Year	Dental Health Status: 2 Year Old Children			
	NDE	CCC	PCC	NEC
2006	78 (70.91%)	0	1 (0.90 %)	31 (28.19%)
2007	131 (80.86%)	2 (1.23%)	0	29 (17.90%)
2008	137 (84.57%)	3 (1.85%)	0	22 (13.58%)
2009	146 (70.87%)	5 (2.43%)	1 (0.49%)	54 (26.21%)
2010	194 (83.26%)	3 (1.29%)	0	36 (15.45%)
2011	181 (78.70%)	1 (0.43%)	1 (0.43%)	47 (20.43%)
2012	309 (79.43%)	2 (0.51%)	1 (0.26%)	77 (19.79%)
2013	357 (79.16%)	6 (1.33%)	2 (0.44%)	86 (19.07%)
2014	319 (78.96%)	8 (1.98%)	0	77 (19.06%)

NDE: No Decay Experience; CCC: Complete Caries Care; PCC: Partial Caries Care; NEC: No Evidence of Care

In 2006, 28.19% of two year old children were shown to have No Evidence of Care (NEC). The percentage of children with No Evidence of Care decreased to 19.07% in the most recent years. Compared to the past years, Complete Caries Care (CCC) increased, where in 2014, 1.98% of children received Complete Caries Care.

Table-24: Dental Health Status: 3 Year Old Children

Year	Dental Health Status: 3 Year Old Children			
	NDE	CCC	PCC	NEC
2006	54 (65.06%)	5 (6.02%)	3 (3.62%)	21 (25.30%)
2007	101 (69.18%)	9 (6.16%)	6 (4.11%)	30 (20.55%)
2008	101 (64.74%)	7 (4.49%)	2 (1.28%)	46 (29.49%)
2009	94 (61.84%)	4 (2.63%)	3 (1.98%)	51 (33.55%)
2010	127 (57.99%)	13 (5.94%)	4 (1.82%)	75 (34.25%)
2011	154 (65.53%)	10 (4.26%)	2 (0.85%)	69 (29.36%)
2012	220 (68.11%)	12 (3.72%)	4 (1.24%)	87 (26.93%)
2013	241 (64.78%)	22 (5.91%)	4 (1.07%)	105 (28.23%)
2014	241 (66.76%)	19 (5.26%)	5 (1.39%)	96 (26.59%)

NDE: No Decay Experience; CCC: Complete Caries Care; PCC: Partial Caries Care; NEC: No Evidence of Care

There was fluctuation in dental health status of 3 year old children during 9 year period. In 2010 higher percentage of children (34.25%) were shown to have No Evidence of Care (NEC) compared to other screening years. This situation has been improved in recent years, where in 2014, 26.59% of children had No Evidence of Care (NEC).

Table-25: Dental Health Status: 4 Year Old Children

Year	Dental Health Status: 4 Year Old Children			
	NDE	CCC	PCC	NEC
2006	46 (54.12%)	13 (15.29%)	5 (5.88%)	21 (24.71%)
2007	98 (60.12%)	22 (13.50%)	7 (4.29%)	36 (22.09%)
2008	97 (56.73%)	19 (11.11%)	4 (2.34%)	51 (29.82%)
2009	100 (54.05%)	19 (10.27%)	6 (3.24%)	60 (32.43%)
2010	112 (51.61%)	24 (11.06%)	6 (2.76%)	75 (34.56%)
2011	188 (52.81%)	60 (16.85%)	16 (4.49%)	92 (25.84%)
2012	332 (61.71%)	67 (12.45%)	18 (3.35%)	121 (22.49%)
2013	367 (60.96%)	57 (9.47%)	32 (5.32%)	146 (24.25%)
2014	411 (64.22%)	60 (9.38%)	21 (3.28%)	148 (23.13%)

NDE: No Decay Experience; CCC: Complete Caries Care; PCC: Partial Caries Care; NEC: No Evidence of Care

There was fluctuation in dental health status of 4 year old children over time. In 2010 higher percentage of children (34.56%) were measured to have No Evidence of Care (NEC). This situation has been improved in the following years, where the percentage of children with No Evidence of Care (NEC) significantly reduced in recent years; in 2012, 22.49% of children had No Evidence of Care (NEC) which is the least percentage in recent years.

Overall, with regard to oral health status the best result for recent years was seen in 2014, where 64.22% of the children had No Decay Experience, 9.38% received Complete Caries Care, and 23.13% had No Evidence of Care.

Table-26: Dental Health Status: 5 Year Old Children

Year	Dental Health Status: 5 Year Old Children			
	NDE	CCC	PCC	NEC
2006	32 (69.75%)	8 (15.69%)	3 (5.88%)	8 (15.69%)
2007	34 (58.62%)	11 (18.98%)	4 (6.90%)	9 (15.52%)
2008	149 (54.38%)	54 (19.71%)	26 (9.49%)	45 (16.42%)
2009	51 (37.5%)	20 (14.71%)	16 (11.76%)	49 (36.03%)
2010	57 (48.30%)	17 (14.40%)	9 (7.62%)	35 (29.68%)
2011	135 (37.19%)	69 (19.01%)	50 (13.77%)	109 (30.03%)
2012	170 (45.45%)	75 (20.05%)	32 (8.56%)	97 (25.94%)
2013	196 (43.95%)	94 (21.08%)	47 (10.54%)	109 (24.24%)
2014	252 (51.32%)	94 (19.14%)	42 (8.55%)	103 (20.98%)

NDE: No Decay Experience; CCC: Complete Caries Care; PCC: Partial Caries Care; NEC: No Evidence of Care

Dental health status of 5 year old children fluctuated over time. In 2009 higher percentage of children (34.56%) were found to have No Evidence of Care (NEC) as opposed to other screening years. This situation has been improved in the following years; in 2014 it dropped to 20.98%, which is the least percentage in recent years.

Overall, with regard to oral health status the best result for the recent years was seen in 2014, where 51.32% of the children had No Decay Experience,19.41% received Complete Caries Care, and 20.98% had No Evidence of Care.

Table-27: Dental Health Status: 6 Year Old Children

Year	Dental Health Status: 6 Year Old Children			
	NDE	CCC	PCC	NEC
2008	1012 (52.82%)	564 (29.44%)	179 (9.34%)	161 (8.40%)
2009	149 (38.60%)	125 (32.38%)	50 (12.96%)	62 (16.06%)
2010	112 (44.27%)	56 (21.13%)	36 (14.23%)	49 (19.37%)
2011	187 (38.72%)	127 (26.29%)	72 (14.91%)	97 (20.08%)
2012	316 (44.38%)	175 (24.58%)	84 (11.80%)	137 (19.24%)
2013	1403 (48.51%)	844 (29.18%)	301 (10.42%)	344 (11.89%)
2014	382 (41.70%)	276 (30.13%)	108 (11.79%)	150 (16.38%)

NDE: No Decay Experience; CCC: Complete Caries Care; PCC: Partial Caries Care; NEC: No Evidence of Care

Dental health status of 6 year old children fluctuated over the time period. Overall, the best result was observed in 2008, where the majority of the children had No Dental Experience (52.82%), one third of the children received Complete Caries Care. Also, the smaller percentage of children had No Evidence of Care compared to other screening years. In the most recent years, the best dental health status was seen in 2013, with 48.51% No Dental Experience (NDE) and 11.89% No Evidence of Care (NEC).

Dental Health Needs- Priority Scores

Children were also assigned scores based on the Treatment Priority with regard to their dental health needs. The Database automatically calculated this score for every child. The Priority Scores were assigned based on 3 categories which are as follows;

Priority 1 = Urgent (pain or infection) requiring immediate treatment.

Priority 2 = Treatment required as soon as possible.

Priority 3 = No immediate treatment required.

Tables 28-34 exhibit the priority score distribution amongst different age groups.

Table-28: Dental Health Needs: < 1 Year Old Children

Year	Dental Health Needs: < 1 Year Old Children		
	Priority score 1	Priority score 2	Priority score 3
2006	0	3 (3.19%)	91 (96.81%)
2007	1 (0.72%)	3 (2.17%)	134 (97.10%)
2008	0	1 (0.81%)	122 (99.19%)
2009	0	5 (3.82%)	126 (96.18%)
2010	0	2 (1.32%)	149 (98.68%)
2011	0	4 (3.77%)	102 (96.23%)
2012	0	7 (3.85%)	175 (96.15%)
2013	1 (0.57%)	3 (1.72%)	170 (97.70%)
2014	0	4 (2.92%)	133 (97.08%)

Over most of the time period, none of the infants required immediate treatment. However, in 2007 and 2013, 0.72% and 0.57% of children needed immediate oral treatment respectively.

Table-29: Dental Health Needs: 1 Year Old Children

Year	Dental Health Needs: 1 Year Old Children		
	Priority score 1	Priority score 2	Priority score 3
2006	0	17 (8.29%)	188 (91.71%)
2007	0	25 (7.58%)	305 (92.42%)
2008	0	39 (11.78%)	292 (88.22%)
2009	1 (0.25%)	41 (10.33%)	355 (89.42%)
2010	1 (0.24%)	44 (10.40%)	378 (89.36%)
2011	2 (0.40%)	39 (7.72%)	464 (91.88%)
2012	4 (0.40%)	63 (6.32%)	930 (93.28%)
2013	2 (0.18%)	56 (5.06%)	1048 (94.76%)
2014	1 (0.10%)	51 (4.92%)	985 (94.99%)

From 2006 to 2008, none of the one year old children required immediate treatment. But later on, the need for immediate treatment increased to some extent. In 2014, immediate treatment was required for 0.10% of children.

Table-30: Dental Health Needs: 2 Year Old Children

Year	Dental Health Needs: 2 Year Old Children		
	Priority score 1	Priority score 2	Priority score 3
2006	1 (0.91%)	29 (26.36%)	80 (72.73%)
2007	1 (0.62%)	28 (17.28%)	133 (82.10%)
2008	4 (2.47%)	20 (12.35%)	128 (85.19%)
2009	1 (0.49%)	54 (26.21%)	151 (73.30%)
2010	3 (1.29%)	34 (14.59%)	196 (84.12%)
2011	2 (0.87%)	46 (20.00%)	182 (79.13%)
2012	6 (1.54%)	74 (19.02%)	309 (79.43%)
2013	5 (1.11%)	83 (18.40%)	363 (80.49%)
2014	4 (0.99%)	73 (18.07%)	327 (80.94%)

The trend for the Priority 1 in 2 year old children showed slight variation over years (0.62% to 2.47%). In 2014, immediate treatment was required for 0.99% of children.

Table-31: Dental Health Needs: 3 Year Old Children

Year	Dental Health Needs: 3 Year Old Children		
	Priority score 1	Priority score 2	Priority score 3
2006	1 (1.20%)	24 (28.92%)	58 (69.88%)
2007	1 (0.68%)	30 (20.55%)	115 (78.77%)
2008	3 (1.92%)	42 (26.92%)	111 (71.15%)
2009	8 (5.26%)	46 (30.26%)	98 (64.47%)
2010	4 (1.83%)	76 (34.70%)	139 (63.47%)
2011	8 (3.40%)	61 (25.96%)	166 (70.64%)
2012	9 (2.79%)	83 (25.70%)	231 (71.52%)
2013	8 (2.15%)	101 (27.15%)	263 (70.70%)
2014	7 (1.94%)	95 (26.32%)	259 (71.75%)

The trend for the Priority 1 in 2 year old children showed variation over years (0.68% to 5.26%). In 2014, immediate treatment was required for 1.94% of children.

Table-32: Dental Health Needs: 4 Year Old Children

Year	Dental Health Needs: 4 Year Old Children		
	Priority score 1	Priority score 2	Priority score 3
2006	2 (2.35%)	26 (30.59%)	57 (67.06%)
2007	4 (2.45%)	37 (22.70%)	122 (74.85%)
2008	5 (2.92%)	49 (28.65%)	117 (68.42%)
2009	6 (3.24%)	59 (31.89%)	120 (64.86%)
2010	10 (4.61%)	70 (32.26%)	137 (63.13%)
2011	16 (4.49%)	114 (32.02%)	226 (63.48%)
2012	14 (2.60%)	148 (27.51%)	376 (69.89%)
2013	15 (2.49%)	164 (27.24%)	423 (70.27%)
2014	13 (2.03%)	156 (24.38%)	471 (73.59%)

From 2006 to 2010, the percentage of Priority 1 in 4 year old children would suggest an upward trend until its pick at 4.61% in 2010. It started to diminish through the rest of the study where in 2014 it reached to the minimum (2.03%).

Table-33: Dental Health Needs: 5 Year Old Children

Year	Dental Health Needs: 5 Year Old Children		
	Priority score 1	Priority score 2	Priority score 3
2006	1 (1.96%)	15(29.41%)	35(68.63%)
2007	1 (1.72%)	13 (22.41%)	44 (75.86%)
2008	13 (4.74%)	56 (20.44%)	205 (74.82%)
2009	10 (7.35%)	56 (41.18%)	70 (51.47%)
2010	6 (5.08%)	38 (32.20%)	74 (62.71%)
2011	34 (9.37%)	177 (48.76)	152 (41.87%)
2012	13 (3.48%)	140 (37.43%)	221 (59.09%)
2013	19 (4.26%)	141 (31.61%)	286 (64.13%)
2014	14 (2.85%)	132 (26.88%)	345 (70.26%)

The trend for the Priority 1 in 5 year old children showed variation over years (from 1.72% in 2007 to 9.37% in 2011). In 2014, immediate treatment was required for 2.85% of children which was the smallest figure in the recent years.

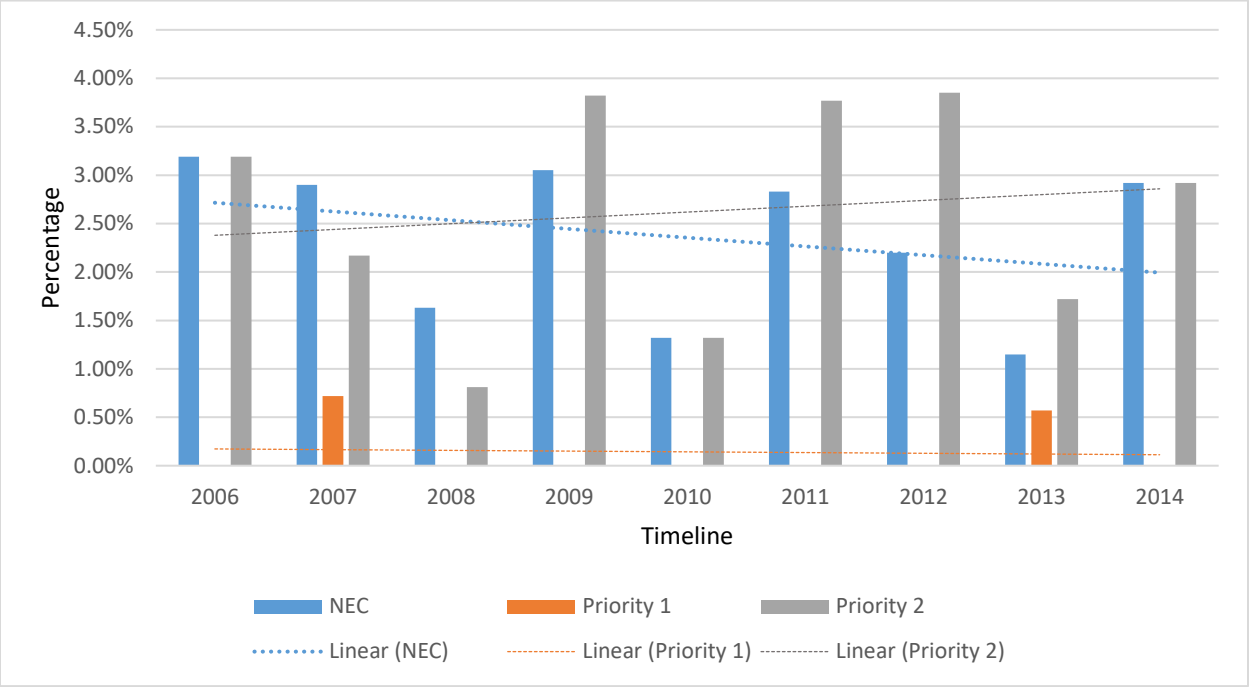
Table-34: Dental Health Needs: 6 Year Old Children

Year	Dental Health Needs: 6 Year Old Children		
	Priority score 1	Priority score 2	Priority score 3
2008	70 (3.65%)	275 (14.35%)	1571 (81.99%)
2009	13 (3.37%)	101 (26.17%)	272 (70.47%)
2010	7 (2.77%)	77 (30.43%)	169 (66.80%)
2011	25 (5.18%)	140 (28.99%)	318 (65.84%)
2012	32 (4.49%)	182 (25.66%)	498 (69.95%)
2013	50 (1.73%)	553 (19.12%)	2289 (79.15%)
2014	22 (2.40%)	224 (24.45%)	670 (73.15%)

The trend for the Priority 1 in 6 year old children showed variation over years (1.73% -5.18%). In 2013 and 2014, the percentage of children who required immediate action was smaller than other screening years (1.73% and 2.40% respectively.)

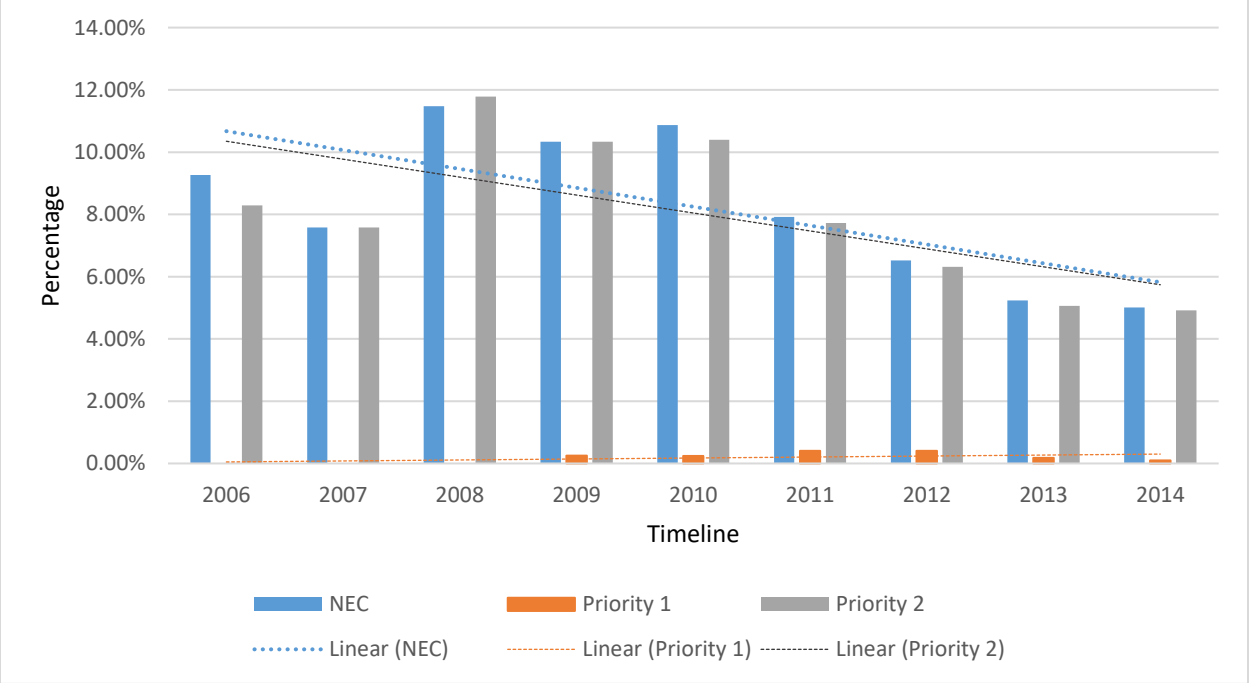
Figures 12-18 further elaborate on the percentage of children of different ages who experienced No Evidence of Care, Priority 1, and Priority 2.

Figure-12: % NEC, Priority 1, and Priority 2: <1 Year Old Children



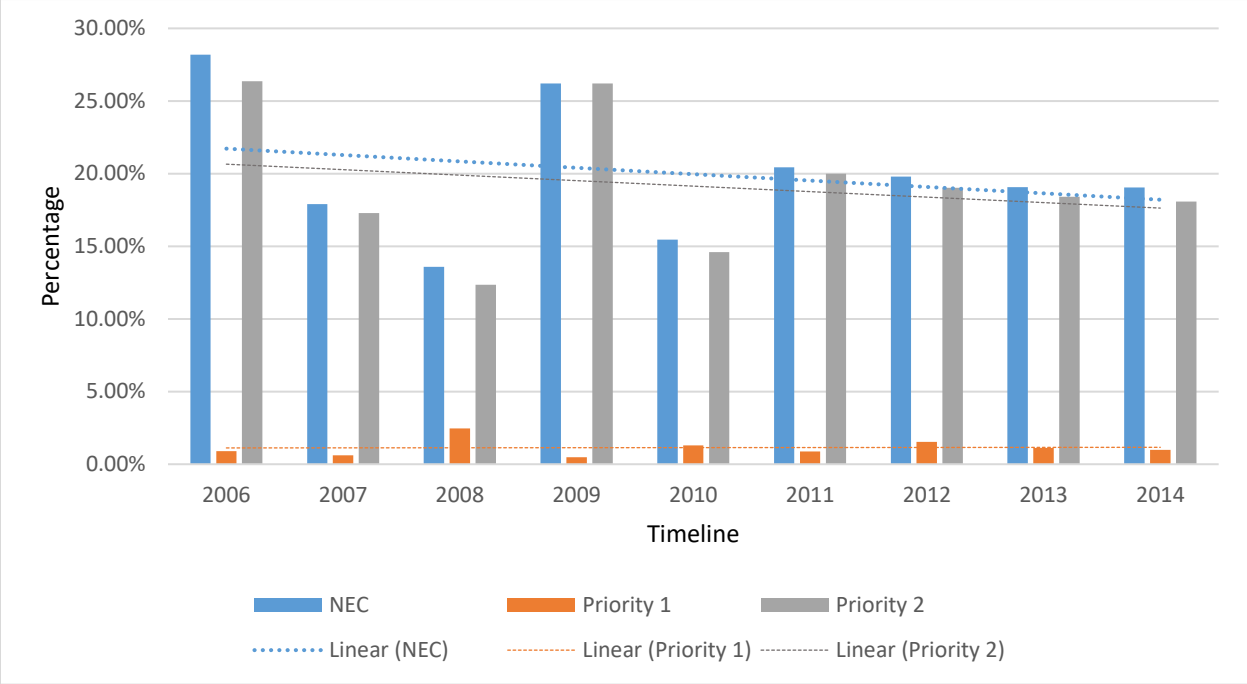
NEC: No Evidence of Care

Figure-13: % NEC, Priority 1, and Priority 2: 1 Year Old Children



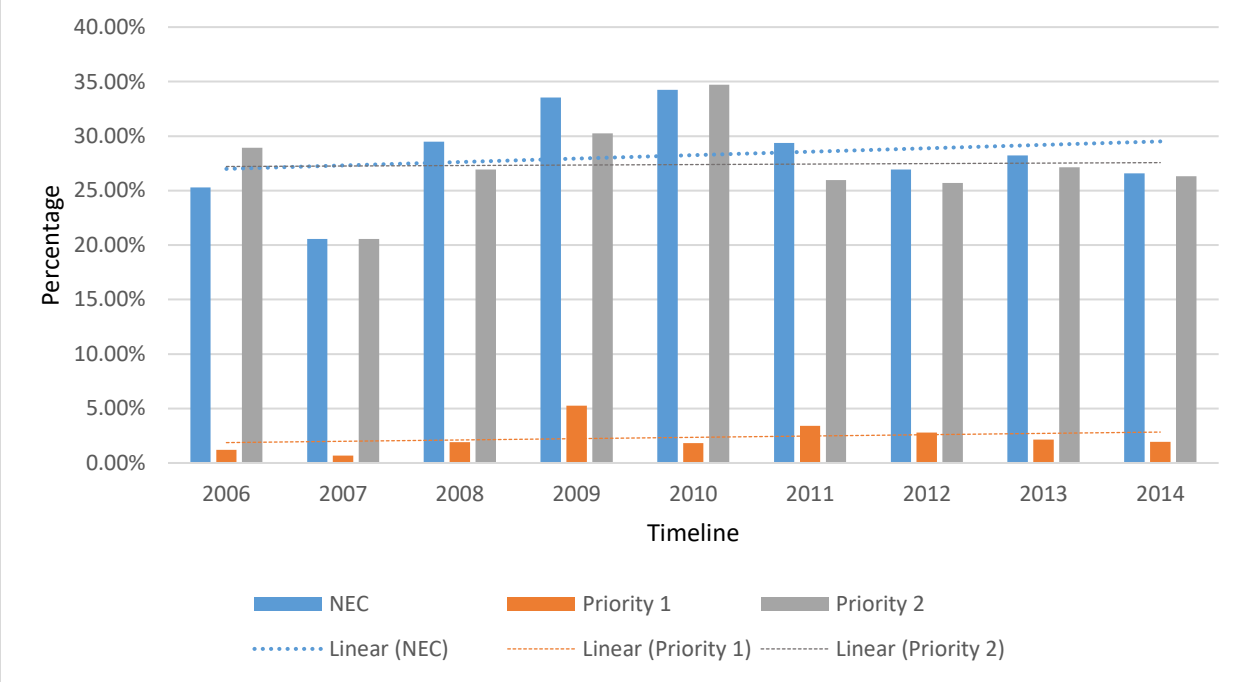
NEC: No Evidence of Care

Figure-14: % NEC, Priority 1, and Priority 2: 2 Year Old Children



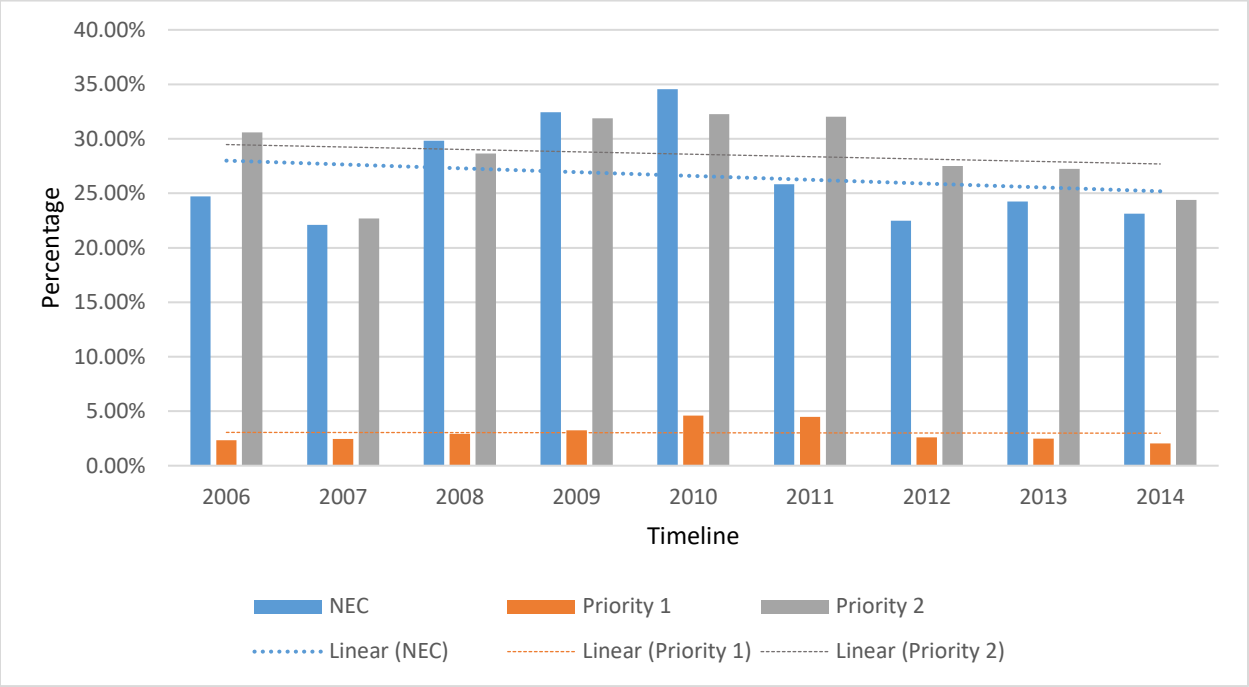
NEC: No Evidence of Care

Figure-15: % NEC, Priority 1, and Priority 2: 3 Year Old Children



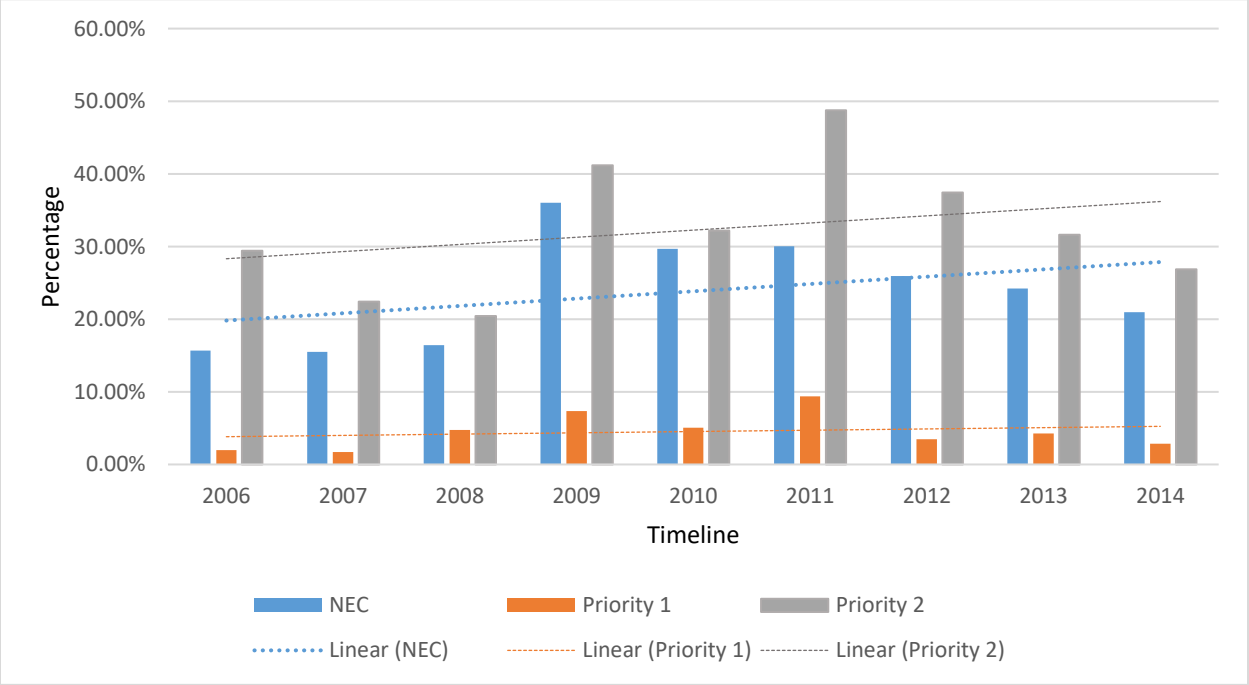
NEC: No Evidence of Care

Figure-16: % NEC, Priority 1, and Priority 2: 4 Year Old Children



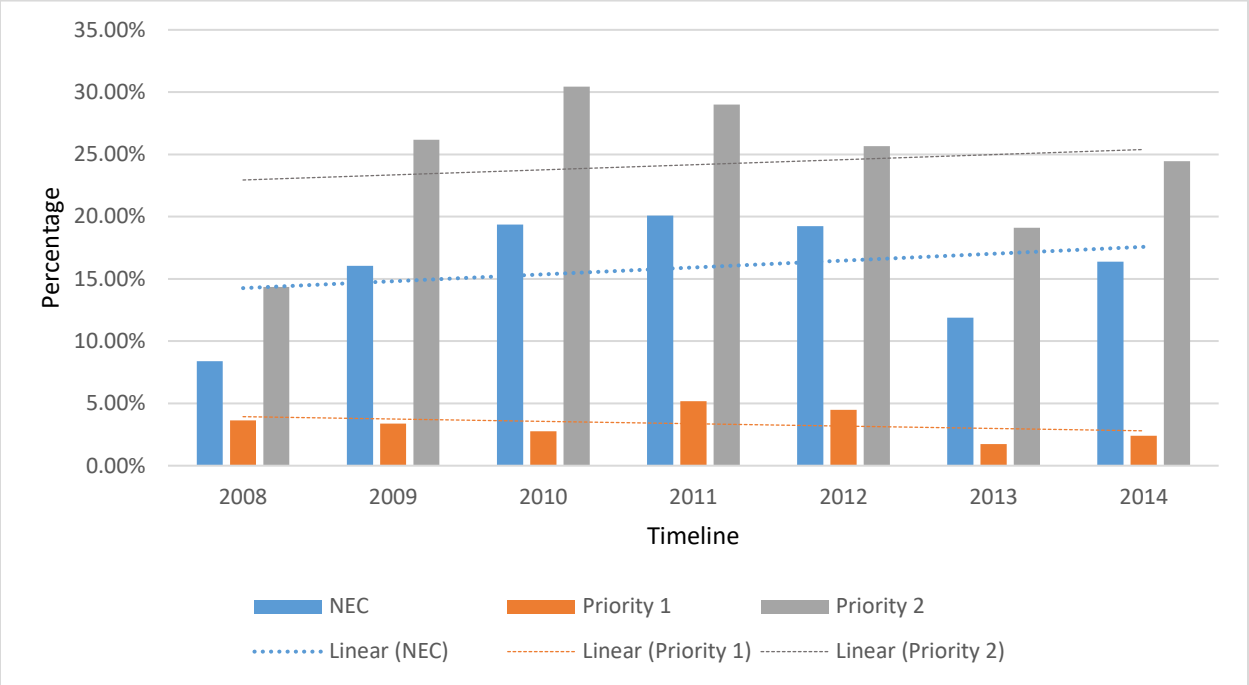
NEC: No Evidence of Care

Figure-17: % NEC, Priority 1, and Priority 2: 5 Year Old Children



NEC: No Evidence of Care

Figure-18: % NEC, Priority 1, and Priority 2: 6 Year Old Children



NEC: No Evidence of Care

Dental Health Markers

Dental health markers including “deft” Index, “DMFT” Index, “deft+DMFT” Index, Untreated Cavities, and Cavity Free were analyzed.

“deft” Index

“deft” is an Dental Index which measures the prevalence of dental decay in the primary dentition. It is a count of the number of decayed **(d)**, extracted **(e)** [due to caries] and filled **(f)** teeth. It measures not just current dental disease, but a history of tooth decay in primary teeth evidenced by fillings and extraction[26]**.**

“DMFT” Index

“DMFT” is another commonly used Dental Index to measure the prevalence of dental decay in the Permanent Dentition. It is total number of Decayed **(D)**, Missing **(M)** (due to caries) and Filled **(F)** Permanent teeth. “It measures not just current dental disease, but a history of tooth decay in Permanent teeth evidenced by Filled and Missing teeth[26].

“deft+DMFT” Index

“deft+DMFT” measures the average number of “deft” and “DMFT” and indicates the severity of tooth decay[8]. Refer to **Appendix-A** for "The Dental Screening Program Definitions".

Untreated Cavities

Untreated Cavities refers to d (decay in primary teeth) + D (Decay in Permanent Teeth) > 0.

Cavity Free

Cavity Free refers to deft + DMFT = 0.

Dental health markers for different age groups are mentioned below. The detailed information are illustrated in **Tables-35** to **45**, **Figures-19** to **33**.

Dental Health Markers: <1 Year Old Children

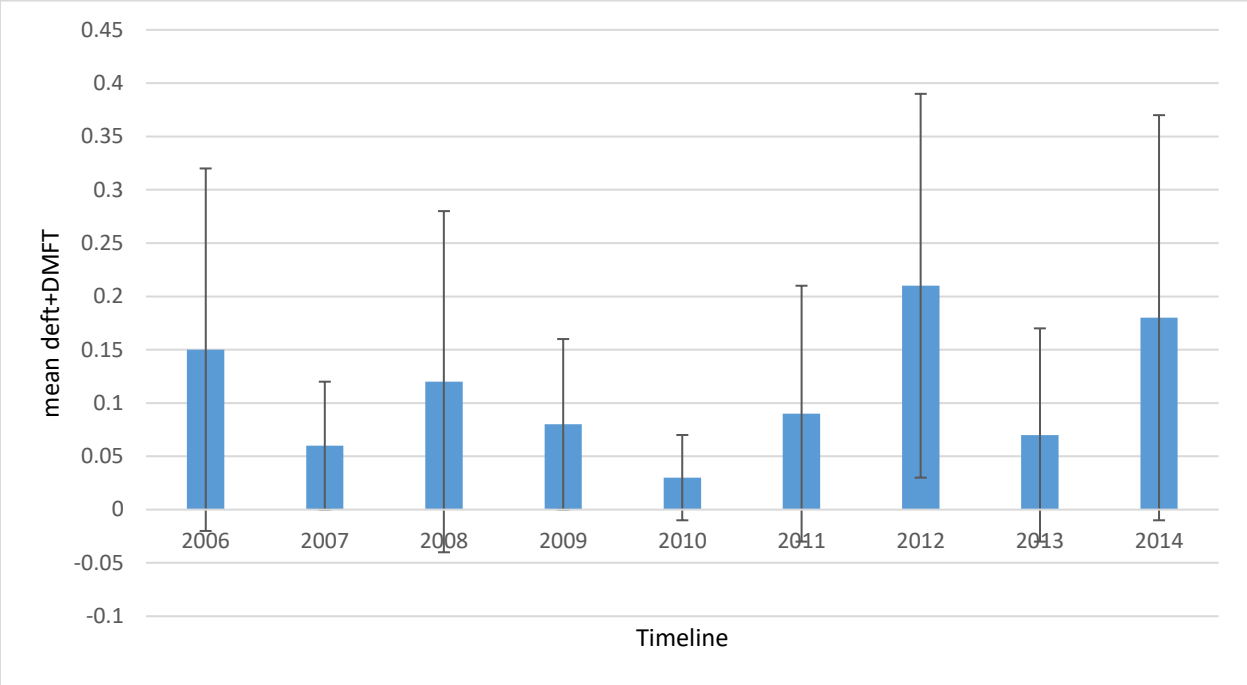
Dental health markers for infants are shown in **Table-35**, **Figure-19**, and **Figure-20**.

Table-35: Dental Health Markers: < 1 Year Old Children

Year	Dental Health Markers: < 1 Year Old Children				
	Total number	deft+DMFT mean±SD	(range)	Untreated Cavities	Cavity Free
2006	94	0.15±0.84	(0,6)	3 (3.19%)	91 (96.81%)
2007	138	0.06±0.39	(0,4)	4 (2.90%)	134 (97.10%)
2008	123	0.12±0.90	(0,8)	2 (1.63%)	120 (97.56%)
2009	131	0.08±0.46	(0,4)	5 (3.82%)	126 (96.18%)
2010	151	0.03±0.24	(0,2)	2 (1.32 %)	148 (98.01%)
2011	106	0.09±0.64	(0,6)	3 (2.83%)	103 (97.17%)
2012	182	0.21±1.21	(0,9)	6 (3.30%)	175 (96.15%)
2013	174	0.07±0.61	(0,7)	3 (1.72%)	170 (97.70%)
2014	137	0.18±1.09	(0,8)	5 (3.65%)	131 (95.62%)

SD: Standard Deviation
Untreated Cavities = d (decay in primary teeth) + D (Decay in Permanent teeth) > 0.
Cavity Free = deft + DMFT = 0.

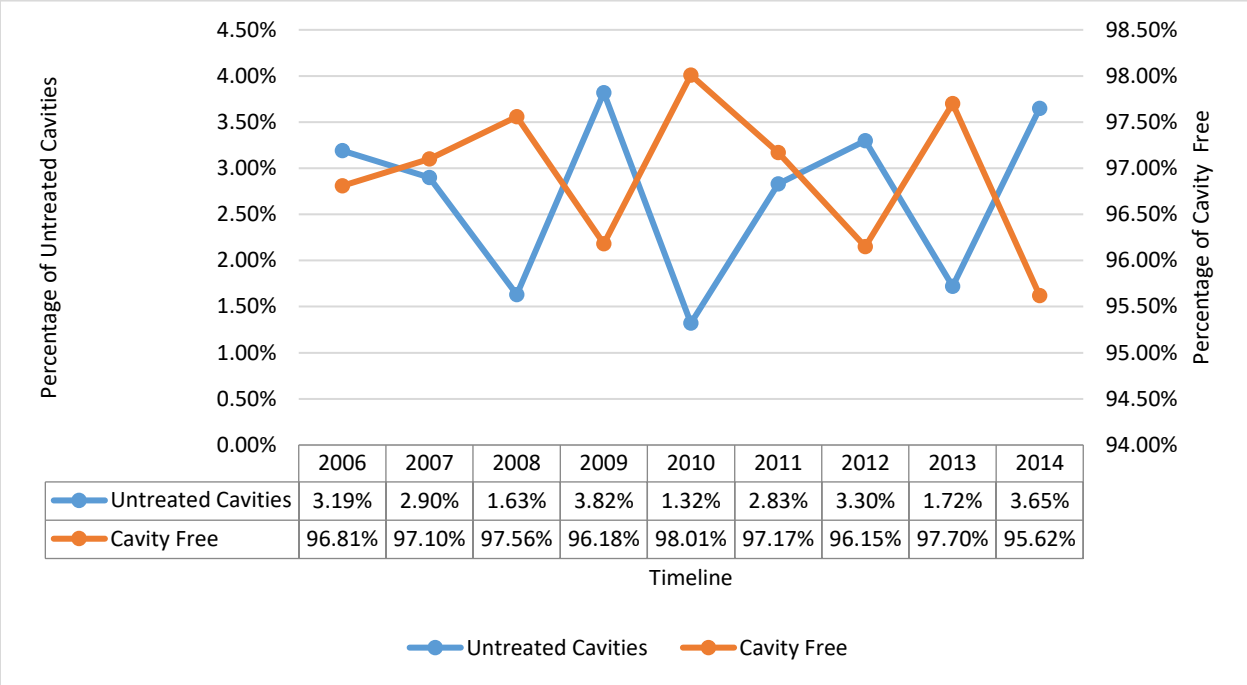
Figure-19: deft+DMFT: <1 Year Old Children



Error bars indicate 95% Confidence Interval

Welch Robust test showed there was no statistically significant difference in average deft/DMFT in infants in different screening years (p-value=0.382).

Figure-20: % Untreated Cavities and % Cavity Free : <1 Year Old Children



Percentage of Untreated Cavities and Cavity Free infants fluctuated over the time period. With regard to these two parameters, the results seemed to be better in 2010 compared to other years (1.32 % Untreated Cavities, 98.01% Cavity Free).

Dental Health Markers: 1 Year Old Children

Dental health markers for one year old children are shown in **Table-36**, **37**, **Figure-21**, and **22**.

Table-36: Dental Health Markers: 1 Year Old Children

Year	Dental Health Markers: 1 Year Old Children				
	Total number	deft+DMFT mean±SD	(range)	Untreated Cavities	Cavity Free
2006	205	0.36±1.25	(0,10)	20 (9.76%)	185 (90.24%)
2007	330	0.32±1.16	(0,8)	25 (7.58%)	302 (91.52%)
2008	331	0.45±1.33	(0,8)	39 (11.78%)	291 (87.92%)
2009	397	0.40±1.29	(0,12)	44 (11.08%)	350 (88.16%)
2010	423	0.35±1.18	(0,12)	45 (10.64%)	378 (89.36%)
2011	505	0.30±1.21	(0,12)	42 (8.32%)	463 (91.68%)
2012	997	0.19±0.81	(0,9)	66 (6.62%)	930 (93.28%)
2013	1106	0.16±0.76	(0,8)	59 (5.33%)	1045 (94.48%)
2014	1037	0.22±1.13	(0,16)	55 (5.30%)	978 (94.31%)

SD: Standard Deviation
Untreated Cavities: d (decay in primary teeth) + D (Decay in Permanent teeth) > 0.
Cavity Free: deft + DMFT = 0.

The results of Welch's Robust test showed that at the level of 0.05 level of significance, with a p-value<0.001, we have evidence to conclude that the true mean deft/DMFT for at least two screening years differ. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Only the statistically significant results of Post-hoc are presented in **Table-37**.

Table-37: deft+DMFT (Post-hoc Test): 1 Year Old Children

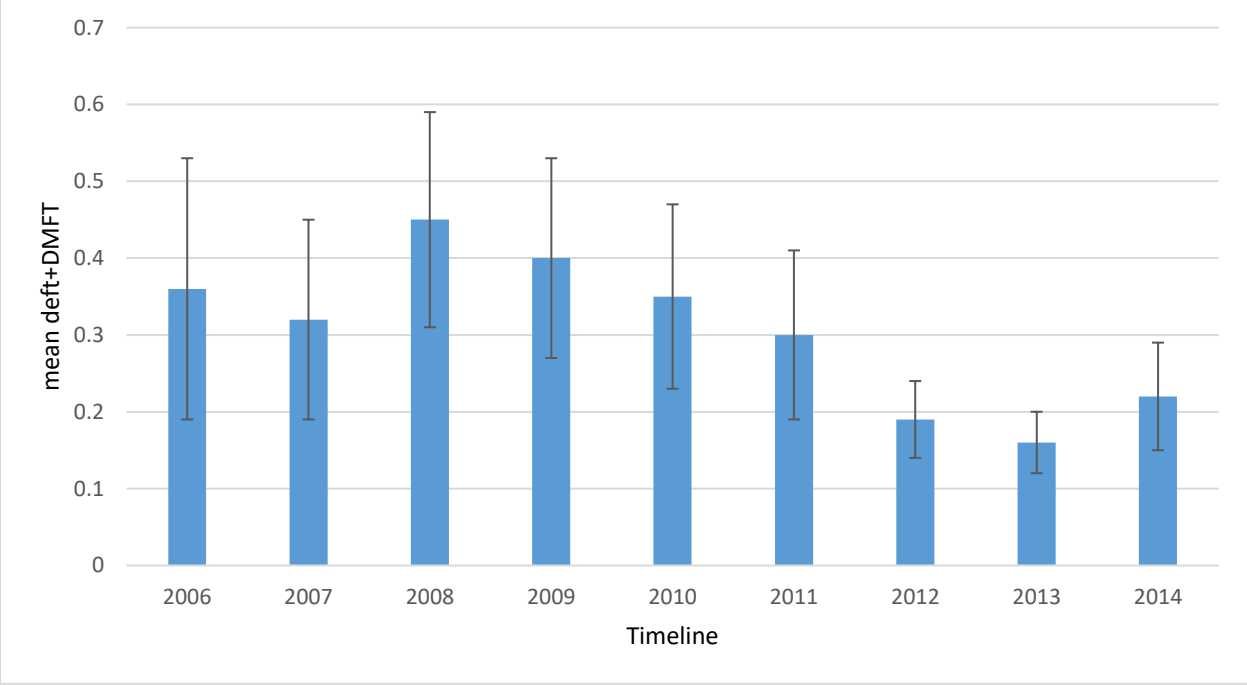
Table-38: deft+DMFT (Post-hoc Test): 1 Year Old Children

Pairwise Comparison Between the Screening Years	deft+DMFT: 1 Year Old Children	
	Difference in Mean deft+DMFT (95% Confidence Interval)	p-value
2008 and 2012	0.264 (0.02,0.51)	0.022
2008 and 2013	0.290 (0.05,0.53)	0.006
2008 and 2014	0.238 (0.02,0.45)	0.018

In each row, positive figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is larger than the following year.

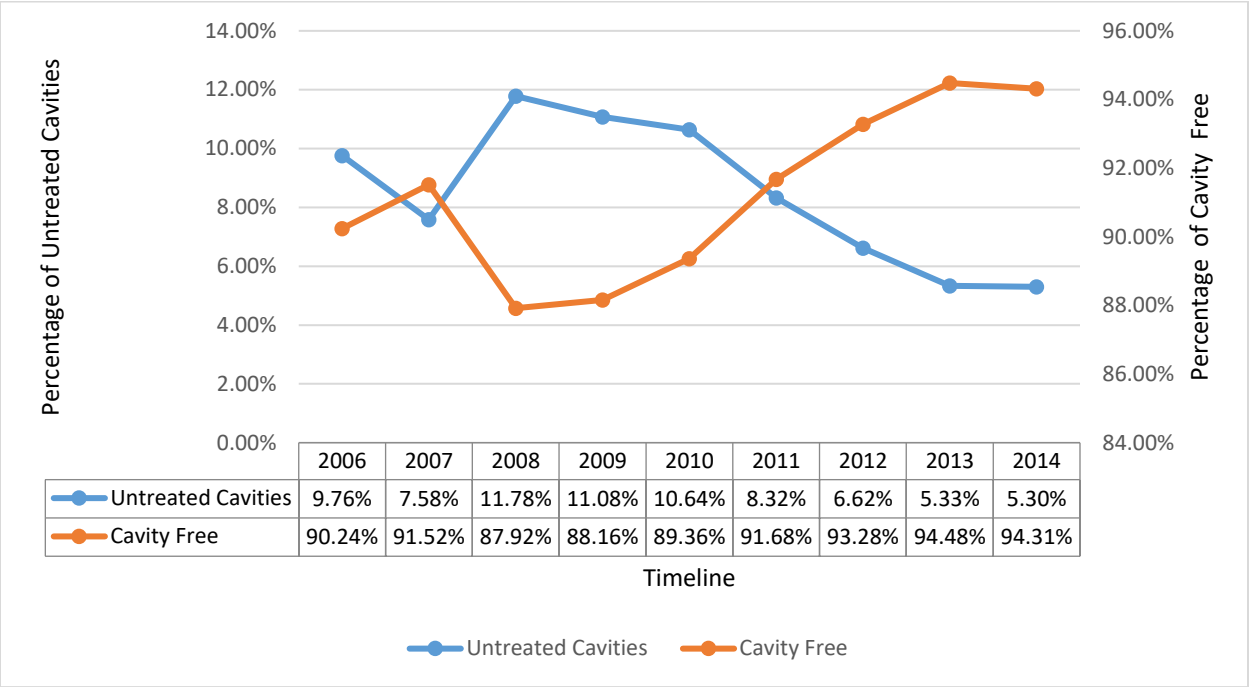
At 0.05 level of significance, we have evidence to conclude that true mean deft/DMFT in one year old children in 2008 is different from 2012, 2013, and 2014. The average deft/DMFT in most recent years (2012, 2013 and 2014) is significantly smaller than of 2008.

Figure-21: deft+DMFT: 1 Year Old Children



Error bars indicate 95% Confidence Interval

Figure-22: % Untreated Cavities and % Cavity Free: 1 Year Old Children



Percentage of one year old children with Untreated Cavities (blue curve) showed steady decrease starting at 2008 up to 2013 and remained constant afterwards. From 2008 to 2013, percentage of Cavity Free children (orange curve) constantly increased and then it remained stable.

Dental Health Markers: 2 Year Old Children

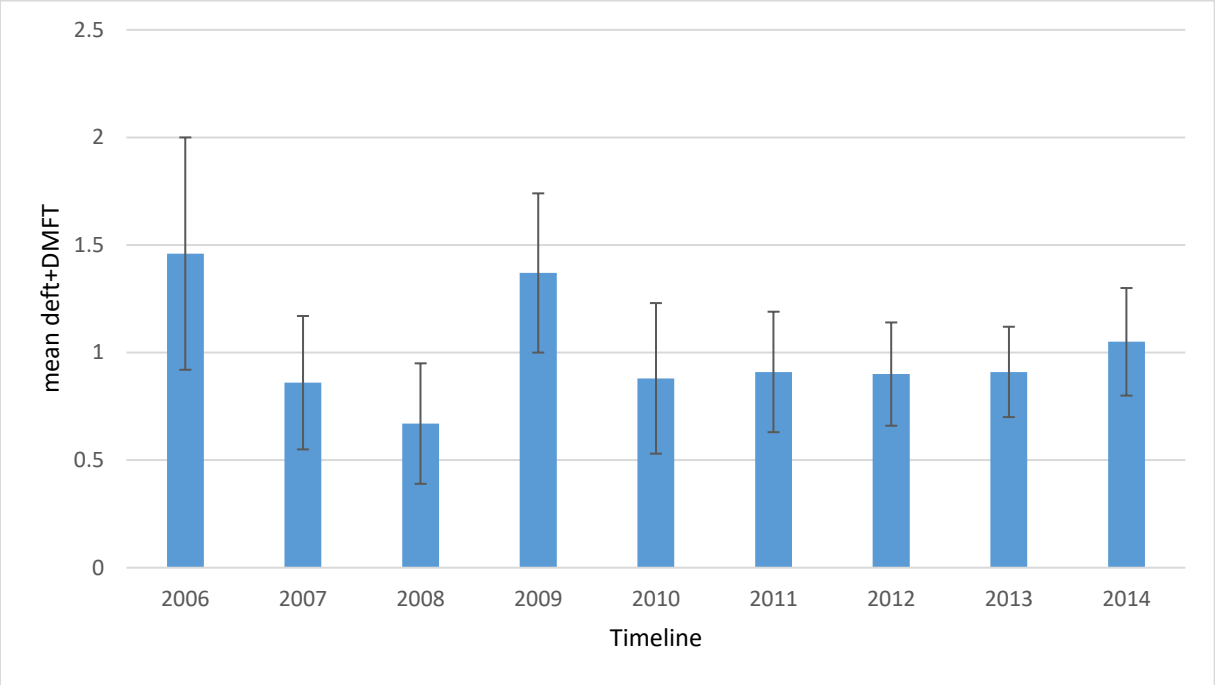
Dental health markers for two year old children are shown in **Table-38**, **Figure-23**, and **24**.

Table-39: Dental Health Markers: 2 Year Old Children

Year	Dental Health Markers: 2 Year Old Children				
	Total number	deft+DMFT mean±SD	(range)	Untreated Cavities	Cavity Free
2006	110	1.46±2.86	(0,14)	32 (29.09%)	78 (70.91%)
2007	162	0.86±1.96	(0,14)	33 (20.37%)	127(78.40%)
2008	162	0.67±1.82	(0,12)	23 (14.20%)	135(83.33%)
2009	206	1.37±2.71	(0,14)	56 (27.18%)	144(69.90%)
2010	233	0.88±2.66	(0,19)	36 (15.45%)	194(83.26%)
2011	230	0.91±2.11	(0,14)	52 (22.61%)	177(76.96%)
2012	389	0.90±2.41	(0,20)	80 (20.57%)	307(78.92%)
2013	451	0.91±2.24	(0,13)	88 (19.51%)	357(79.16%)
2014	404	1.05±2.57	(0,16)	77 (19.06%)	318(78.71%)

SD: Standard Deviation
Untreated Cavities: d (decay in primary teeth) + D (Decay in Permanent teeth) > 0.
Cavity Free: deft + DMFT = 0.

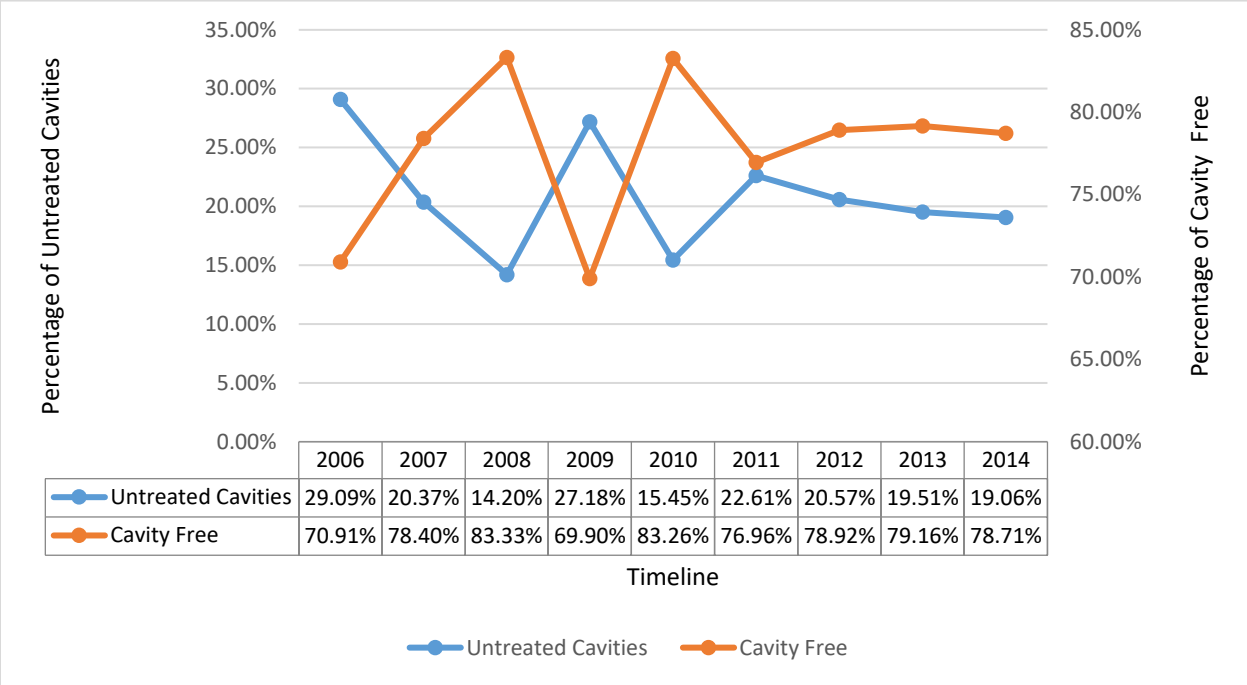
Figure-23: deft+DMFT: 2 Year Old Children



Error bars indicate 95% Confidence Interval.

Welch Robust test showed no significant change in average deft/DMFT in two year old children between screening years (p-value=0.096).

Figure-24: % Untreated Cavities and % Cavity Free: 2 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Untreated Cavities	29.09%	20.37%	14.20%	27.18%	15.45%	22.61%	20.57%	19.51%	19.06%
Cavity Free	70.91%	78.40%	83.33%	69.90%	83.26%	76.96%	78.92%	79.16%	78.71%

Percentage of Untreated Cavities and Cavity Free two year old children fluctuated over the time period. With regard to these two parameters, the results seemed to be better in 2008 and 2010 compared to other years. The graphs suggest that from 2011 onwards, there was a slight downward trend in % Untreated Cavities, and upward trend in % Cavity Free.

Dental Health Markers: 3 Year Old Children

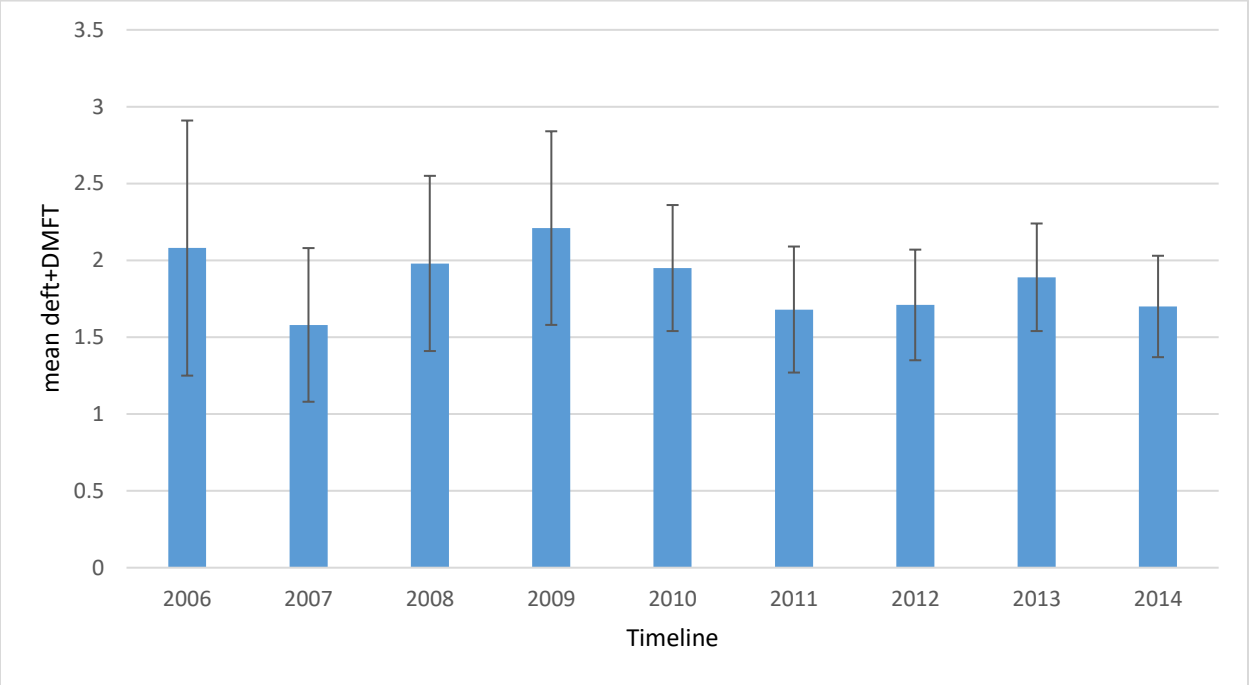
Dental health markers for three year old children are shown in **Table-39**, **Figure-25**, and **26**.

Table-40: Dental Health Markers: 3 Year Old Children

Year	Dental Health Markers: 3 Year Old Children				
	Total number	deft+DMFT mean±SD	(range)	Untreated Cavities	Cavity Free
2006	83	2.08±3.78	(0,19)	24 (28.92%)	54 (65.06%)
2007	146	1.58±3.09	(0,14)	38 (26.03%)	98 (67.12%)
2008	156	1.98±3.58	(0,15)	48 (30.77%)	101(64.74%)
2009	152	2.21±3.92	(0,17)	54 (35.53%)	93 (61.18%)
2010	219	1.95±3.07	(0,16)	80 (36.53%)	126 (57.53%)
2011	235	1.68±3.22	(0,20)	73 (31.06%)	152 (64.68%)
2012	323	1.71±3.25	(0,16)	93 (28.79%)	217 (67.18%)
2013	372	1.89±3.44	(0,16)	109 (29.30%)	241 (64.78%)
2014	361	1.70±3.26	(0,17)	105 (29.02%)	238 (65.93%)

SD: Standard Deviation
Untreated Cavities: d (decay in primary teeth) + D (Decay in Permanent teeth) > 0.
Cavity Free: deft + DMFT = 0.

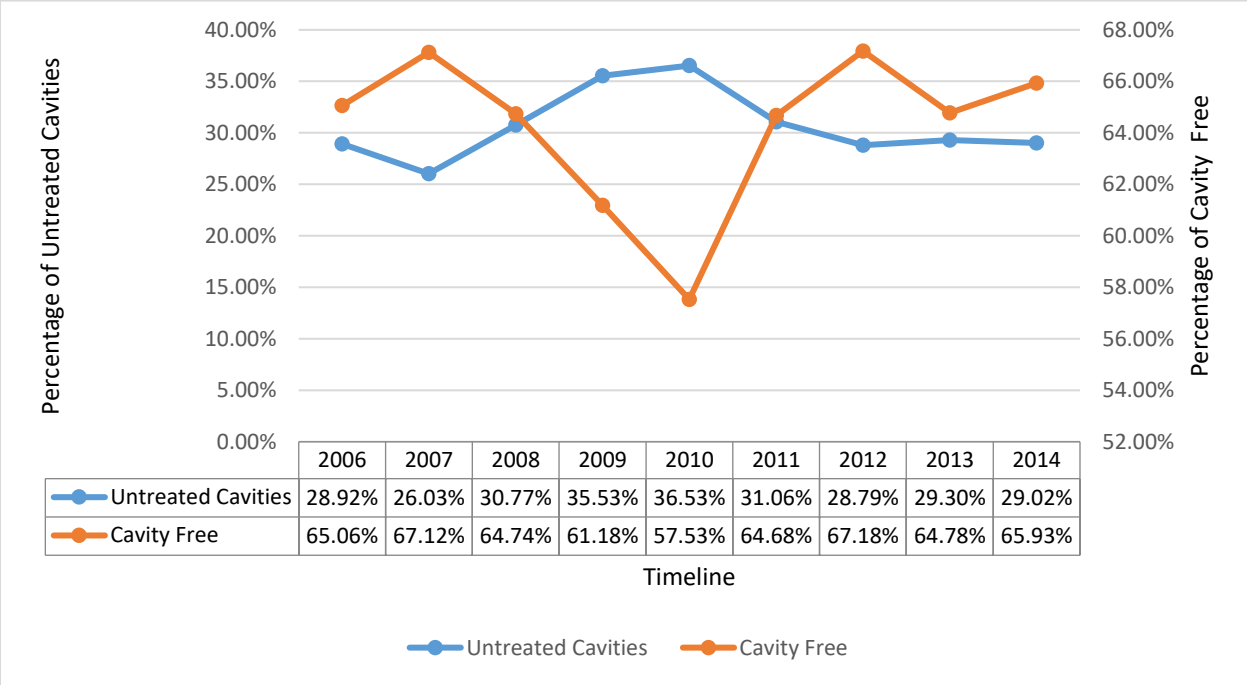
Figure-25: deft+DMFT: 3 Year Old Children



Error bars indicate 95% Confidence Interval.

Based on One-Way ANOVA for independent samples, there was no significant difference in average deft/DMFT in three year old children between screening years (p-value=0.73).

Figure-26: % Untreated Cavities and % Cavity Free: 3 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Untreated Cavities	28.92%	26.03%	30.77%	35.53%	36.53%	31.06%	28.79%	29.30%	29.02%
Cavity Free	65.06%	67.12%	64.74%	61.18%	57.53%	64.68%	67.18%	64.78%	65.93%

Percentage of Untreated Cavities and Cavity Free three old children fluctuated over the time period. The graphs would suggest that from 2010 onwards, there was a slight downward trend in % Untreated Cavities, where in 2014, 29.02% of children had Untreated Cavities.

Dental Health Markers: 4 Year Old Children

Dental health markers for four year old children are shown in **Table-40**, **41**, **Figure-27**, and **28**.

Table-41: Dental Health Markers: 4 Year Old Children

Year	Dental Health Markers: 4 Year Old Children				
	Total number	deft+DMFT mean±SD	(range)	Untreated Cavities	Cavity Free
2006	85	2.78±3.91	(0,14)	29 (34.12%)	44 (51.76%)
2007	163	2.19±3.35	(0,13)	45 (27.61%)	92 (56.44%)
2008	171	2.62±4.14	(0,20)	55 (32.16%)	96 (56.14%)
2009	185	2.95±4.32	(0,20)	66 (35.68%)	97 (52.43%)
2010	217	2.79±4.12	(0,20)	82 (37.79%)	110 (50.69%)
2011	356	2.98±4.49	(0,20)	111 (31.18%)	188 (52.81%)
2012	538	2.23±3.85	(0,16)	140 (26.02%)	331 (61.52%)
2013	602	2.18±3.77	(0,20)	178 (29.57%)	366 (60.80%)
2014	640	2.27±3.84	(0,20)	173 (27.03%)	400 (62.50%)

SD: Standard Deviation
Untreated Cavities: d (decay in primary teeth) + D (Decay in Permanent teeth) > 0.
Cavity Free: deft + DMFT = 0.

The results of Welch's Robust test showed that at 0.05 level of significance, with a p-value=0.037, the true mean deft/DMFT for at least two screening years differed. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Only the statistically significant results of Post-hoc test are presented in **Table-41**.

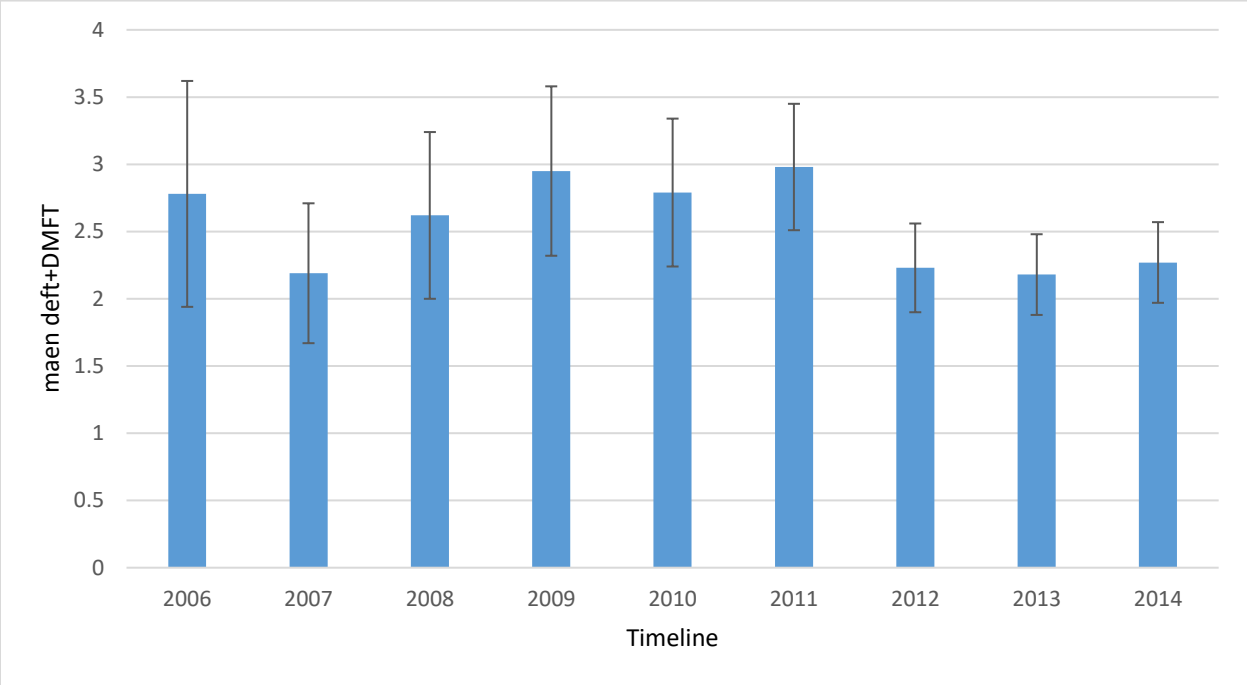
Table-42: deft+DMFT (Post-hoc Test): 4 Year Old Children

Pairwise Comparison Between the Screening Years	Mean deft+DMFT: 4 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2007 and 2011	-0.78 (-1.48, 0.09)	0.027
2009 and 2012	0.72 (-0.005, 1.43)	0.048
2009 and 2013	0.77 (-0.06, 1.47)	0.032
2011 and 2012	0.74 (0.17, 1.32)	0.010
2011 and 2013	0.80 (0.24, 1.35)	0.005
2011 and 2014	0.71 (0.16, 1.27)	0.012

In each row, positive figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is larger than the following year and vice versa if the figure is negative.

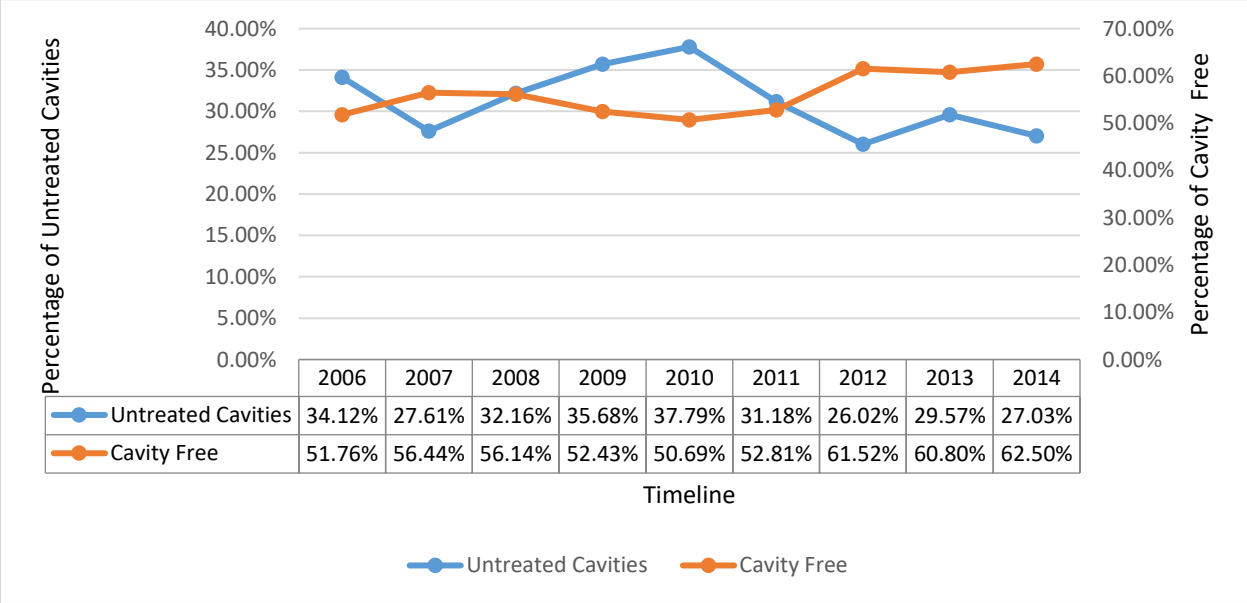
At 0.05 level of significance, mean deft/DMFT in four year old children in 2007 was different from 2011; the mean of deft/DMFT in 2011 was significantly larger than 2007 (p-value=0.027). The average deft/DMFT in 2012 and 2013 was smaller than 2009 (p-value=0.048 and 0.032 respectively). Also the mean deft/DMFT in children in the last three years was significantly smaller than 2011. Refer to **Table-41** for the p-values.

Figure-27: deft+DMFT: 4 Year Old Children



Error bars indicate 95% Confidence Interval

Figure-28: % Untreated Cavities and % Cavity Free: 4 Year Old Children



Percentage of Untreated Cavities and Cavity Free four year old children fluctuated over the time period. In 2014, 27.03% of children had Untreated Cavities and 62.50% of them were Cavity Free.

Dental Health Markers: 5 Year Old Children

Dental health markers for five year old children are shown in **Table-42**, **43**, **Figure-29**, and **30**.

Table-43: Dental Health Markers: 5 Year Old Children

Year	Dental Health Markers: 5 Year Old Children				
	Total number	deft+DMFT mean±SD	(range)	Untreated Cavities	Cavity Free
2006	51	3.00±4.16	(0,13)	15 (29.41%)	27 (52.94%)
2007	58	3.12±4.12	(0,14)	13 (22.41%)	29 (50%)
2008	274	2.30±3.65	(0,20)	72 (26.28%)	147 (53.65%)
2009	136	4.05±4.63	(0,20)	66 (48.53%)	50 (36.76%)
2010	118	3.45±4.80	(0,20)	44 (37.29%)	55 (46.61%)
2011	363	4.02±4.61	(0,20)	158 (43.53%)	134 (36.91%)
2012	374	3.19±4.08	(0,17)	131 (35.03%)	168 (44.92%)
2013	446	3.61±4.66	(0,21)	157 (35.20%)	194 (43.50%)
2014	491	3.12±4.20	(0,20)	146 (29.74%)	247 (50.31%)

SD: Standard Deviation
Untreated Cavities: d (decay in primary teeth) + D (Decay in permanent teeth) > 0.
Cavity Free: deft + DMFT = 0.

The results of Welch's Robust test showed that at 0.05 level of significance, with a p-value<0.001, the mean deft/DMFT for at least two screening years were different. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Only the statistically significant results of Post-hoc are presented in **Table-43**.

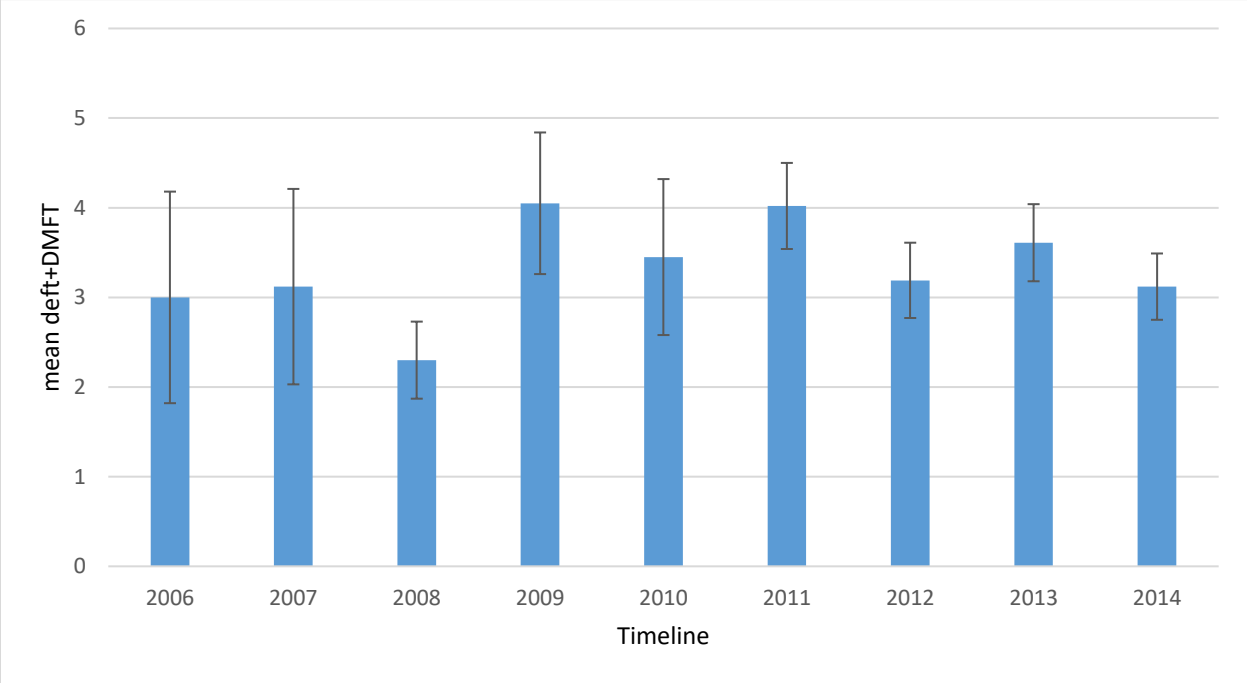
Table-44: deft+DMFT (Post-hoc Test): 5-Year Old Children

Pairwise Comparison Between the Screening Years	Mean deft+DMFT: 5 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2008 and 2009	-1.74 (-3.16,-0.32)	0.005
2008 and 2011	-1.71 (2.73,-0.69)	<0.001
2008 and 2013	-1.30 (-2.27,-0.33)	0.001

In each row, if the mean difference is negative, indicates the mean of deft+DMFT in the corresponding first year is smaller than the following year.

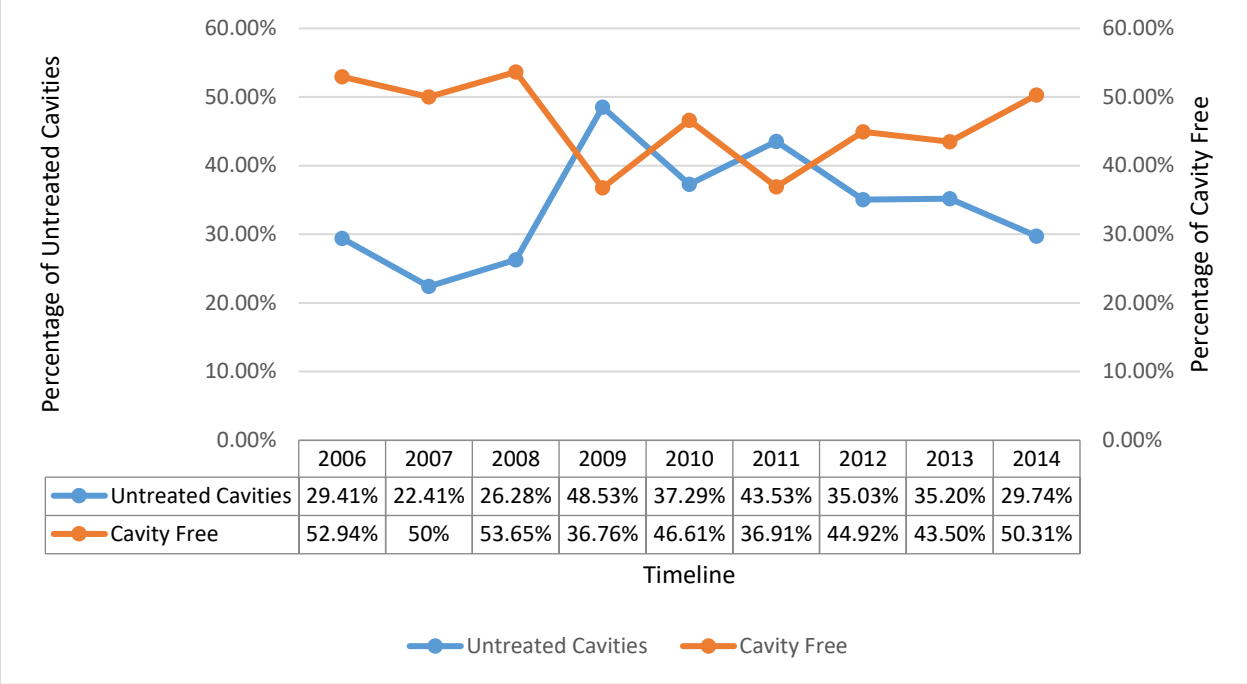
At 0.05 level of significance, true mean deft/DMFT in five year old children in 2008 was different from 2009, 2011 and 2013; the mean of deft/DMFT in 2009, 2011, and 2013 has significantly increased compared to 2008. Refer to **Table-43** for the p-values.

Figure-29: deft+DMFT: 5 Year Old Children



Error bars indicate 95% Confidence Interval

Figure-30: % Untreated Cavities and % Cavity Free: 5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Untreated Cavities	29.41%	22.41%	26.28%	48.53%	37.29%	43.53%	35.03%	35.20%	29.74%
Cavity Free	52.94%	50%	53.65%	36.76%	46.61%	36.91%	44.92%	43.50%	50.31%

Percentage of Untreated Cavities and Cavity Free five year old children fluctuated over the time period. Over the past recent years, in 2014 the percentage of Untreated Cavities was the lowest (29.74%) and the percentage of Cavity Free children was the highest (50.31%).

Dental Health Markers: 6 Year Old Children

Dental health markers for four year old children are shown in **Table-44**, **45**, **Figure-31**, and **32**.

Table-45: Dental Health Markers: 6 Year Old Children

Year	Dental Health Markers: 6 Year Old Children				
	Total number	deft+DMFT mean±SD	(range)	Untreated Cavities	Cavity Free
2008	1916	2.30±3.23	(0,16)	341 (17.80%)	1007 (52.56%)
2009	386	3.02±3.33	(0,14)	112 (29.02%)	149 (38.60%)
2010	253	3.21±3.90	(0,18)	85 (33.60%)	110 (43.48%)
2011	483	3.77±4.36	(0,18)	174 (36.02%)	179 (37.06%)
2012	712	3.55±4.42	(0,20)	222 (31.18%)	303 (42.56%)
2013	2892	2.79±3.65	(0,23)	649 (22.22%)	1387 (47.96%)
2014	916	3.43±3.90	(0,18)	264 (28.82%)	364 (39.74%)

SD: Standard Deviation
Untreated Cavities: d (decay in primary teeth) + D (Decay in Permanent teeth) > 0.
Cavity Free: deft + DMFT = 0.

The results of Welch's Robust test showed that at 0.05 level of significance, with a p-value<0.001, true mean deft/DMFT for at least two screening years differed. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Only the statistically significant results of Post-hoc are presented in **Table-45**.

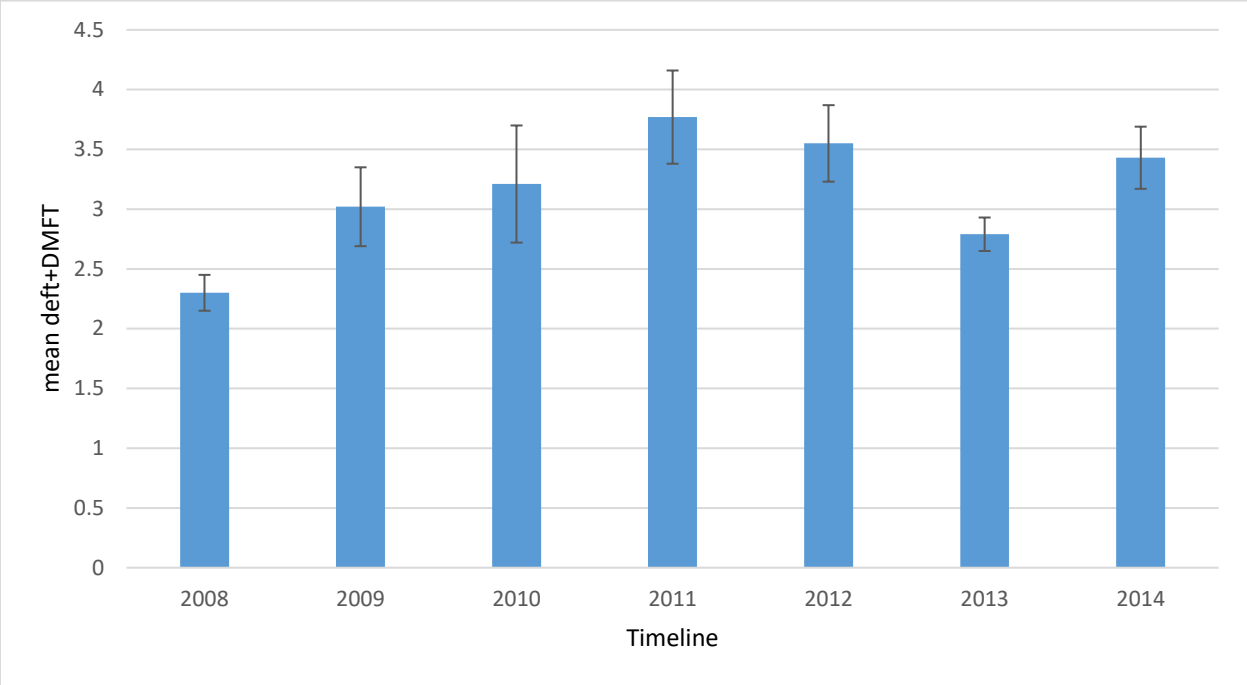
Table-46: deft+DMFT (Post-hoc Test): 6 Year Old Children

Pairwise Comparison Between the Screening Years	Mean deft+DMFT: 6 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2008 and 2009	-0.72 (-1.27,-0.17)	0.002
2008 and 2010	-0.90 (-1.67,-0.14)	0.008
2008 and 2011	-1.47 (-2.10,-0.84)	<0.001
2008 and 2012	-1.25 (-1.79,-0.72)	<0.001
2008 and 2013	-0.49 (-0.78, -1.95)	<0.001
2008 and 2014	-1.12 (-1.56,-0.69)	<0.001
2011 and 2013	0.98 (0.36, 1.60)	<0.001
2012 and 2013	0.76 (0.23, 1.29)	<0.001
2013 and 2014	-0.63 (-1.06,-0.20)	<0.001

In each row, positive figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is larger than the following year and vice versa if the figure is negative.

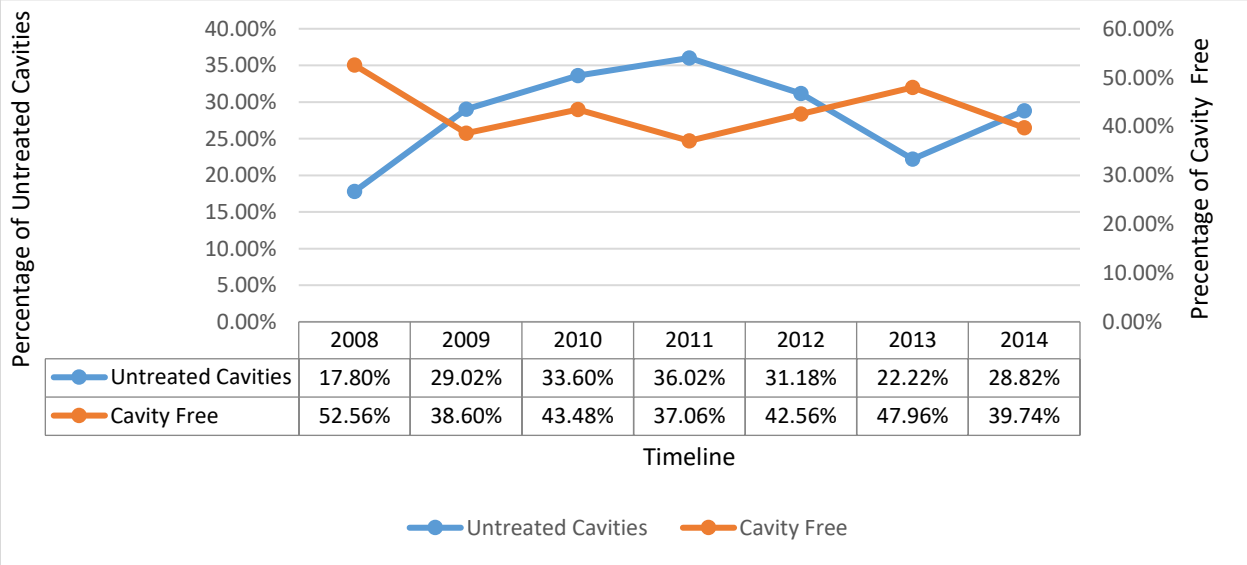
At 0.05 level of significance, mean deft/DMFT in six year old children in 2008 was significantly lower than all the other years. Refer to **Table-45** for the p-values. The average deft/DMFT in 2013 was significantly smaller compared to 2011, 2012 and 2014 (p-value<0.001).

Figure-31: deft+DMFT: 6 Year Old Children



Error bars indicate 95% Confidence Interval.

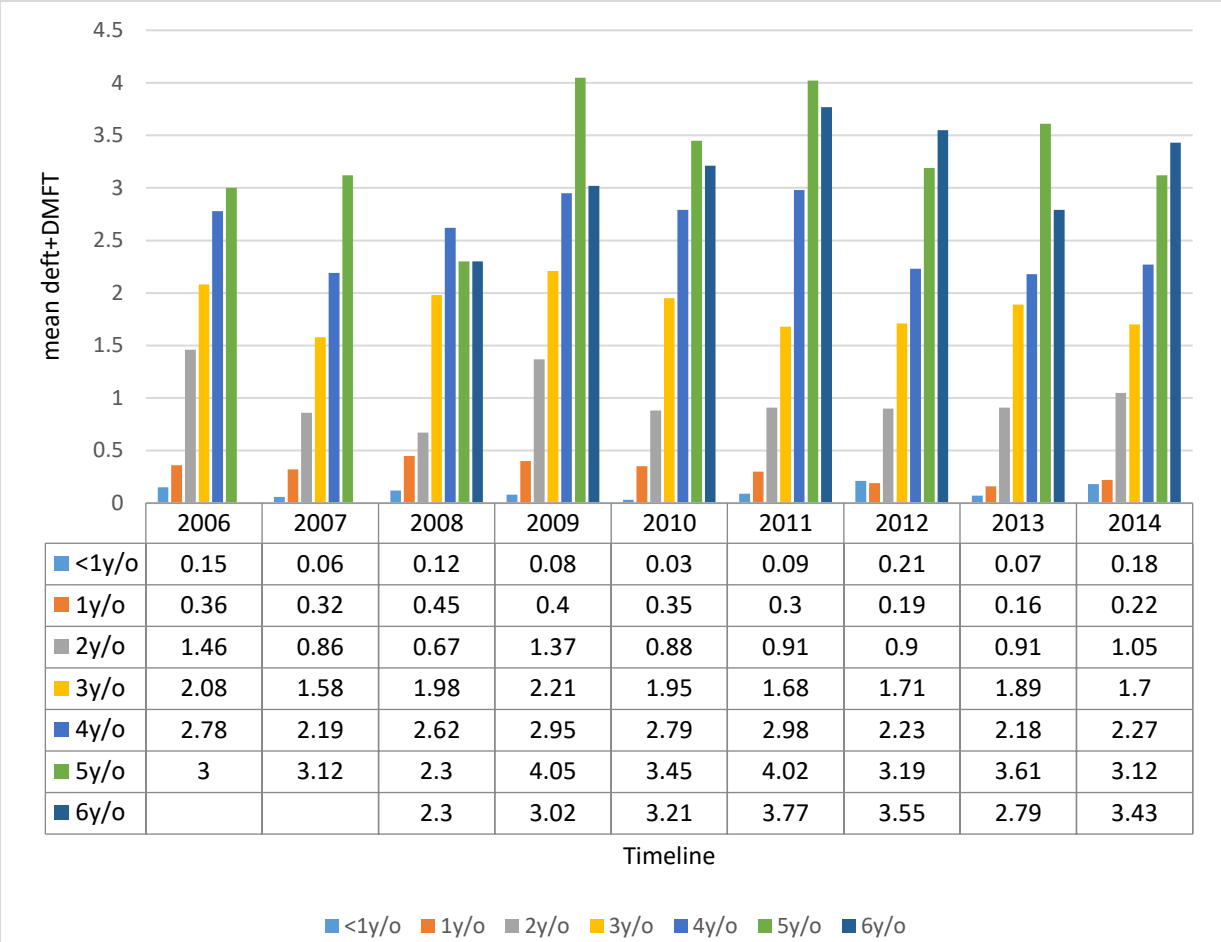
Figure-32: % Untreated Cavities and % Cavity Free: 6 Year Old Children



Percentage of Untreated Cavities and Cavity Free six year old children fluctuated over the time period. Over the past recent years, in 2013 the percentage of Untreated Cavities was the lowest (22.22%) and the percentage of Cavity Free children was the highest (47.96%).

Figure-33 shows a snapshot of mean deft+DMFT in different age groups.

Figure-33: deft+DMFT: 0-6 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
<1y/o	0.15	0.06	0.12	0.08	0.03	0.09	0.21	0.07	0.18
1y/o	0.36	0.32	0.45	0.4	0.35	0.3	0.19	0.16	0.22
2y/o	1.46	0.86	0.67	1.37	0.88	0.91	0.9	0.91	1.05
3y/o	2.08	1.58	1.98	2.21	1.95	1.68	1.71	1.89	1.7
4y/o	2.78	2.19	2.62	2.95	2.79	2.98	2.23	2.18	2.27
5y/o	3	3.12	2.3	4.05	3.45	4.02	3.19	3.61	3.12
6y/o			2.3	3.02	3.21	3.77	3.55	2.79	3.43

y/o: year old

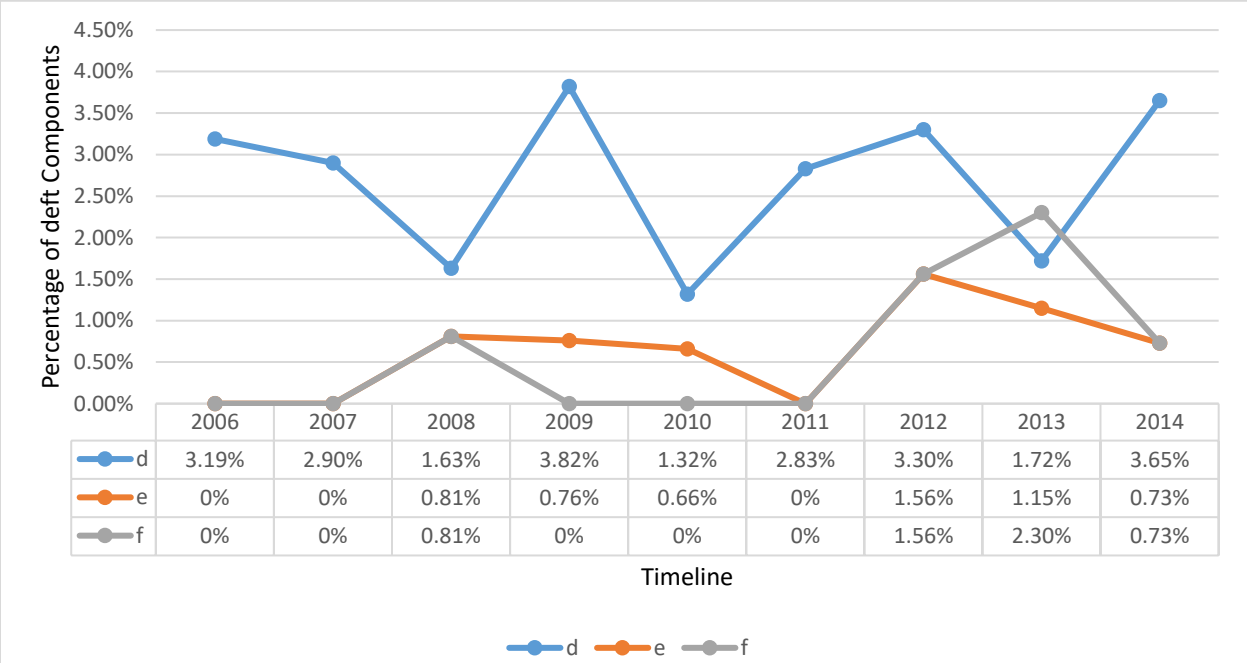
The bar graph shows the average deft/DMFT in different age groups is as follows:

4 year old >3 year old >2 year old >1 year old > younger than 1 year old children.

"deft" Components

The burden of individual components of "deft" for different age groups is illustrated in **Figures-34** to **39.**

Figure-34: Burden of deft Components: <1 Year Old Children



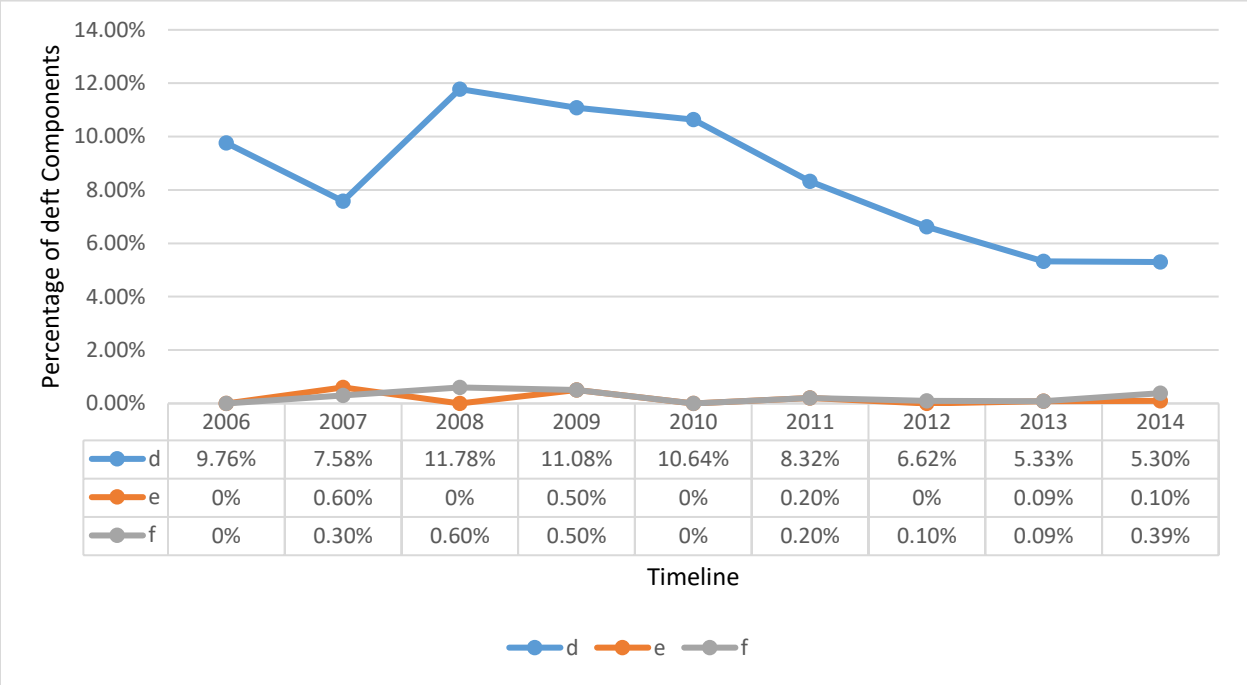
	2006	2007	2008	2009	2010	2011	2012	2013	2014
d	3.19%	2.90%	1.63%	3.82%	1.32%	2.83%	3.30%	1.72%	3.65%
e	0%	0%	0.81%	0.76%	0.66%	0%	1.56%	1.15%	0.73%
f	0%	0%	0.81%	0%	0%	0%	1.56%	2.30%	0.73%

d:decay; e:extracted; f:filled (primary teeth)

In 2014, 3.65% of infants had at least one or more decayed (d), 0.73% had one or more filled (f) deciduous teeth, and 0.73% had at least one deciduous tooth extracted as a consequence of dental caries which is the tooth fatality rate of this specific group.

The chart shows for the most part of the study period, the highest numbers recorded in decayed (d) teeth followed by filled (f)/ extracted (e) deciduous teeth in infants.

Figure-35: Burden of deft Components: 1 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
d	9.76%	7.58%	11.78%	11.08%	10.64%	8.32%	6.62%	5.33%	5.30%
e	0%	0.60%	0%	0.50%	0%	0.20%	0%	0.09%	0.10%
f	0%	0.30%	0.60%	0.50%	0%	0.20%	0.10%	0.09%	0.39%

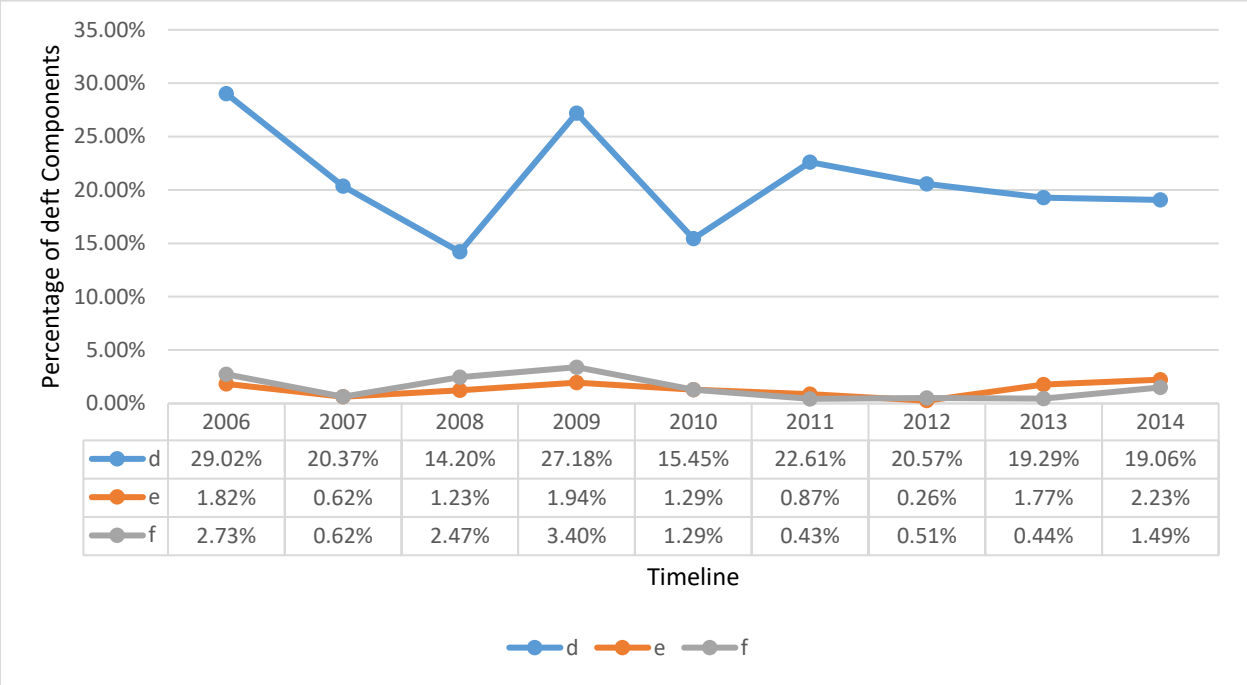
d:decay; e:extracted; f:filled (primary teeth)

The line chart (blue curve) shows constant decrease in the decay (d) rate in primary teeth of one year old children from 2008 to 2014 (11.78% and 5.30% respectively).

The chart shows throughout the study period, the highest numbers recorded in decayed (d) teeth followed by filled (f) / extracted (e) deciduous teeth in this age group.

In 2014, of the one year old children, 5.30% had at least one decayed primary tooth. 0.10% had at least one primary tooth extracted as a consequence of dental caries and the proportion with at least one primary tooth filled was 0.39%.

Figure-36: Burden of deft Components: 2 Year Old Children

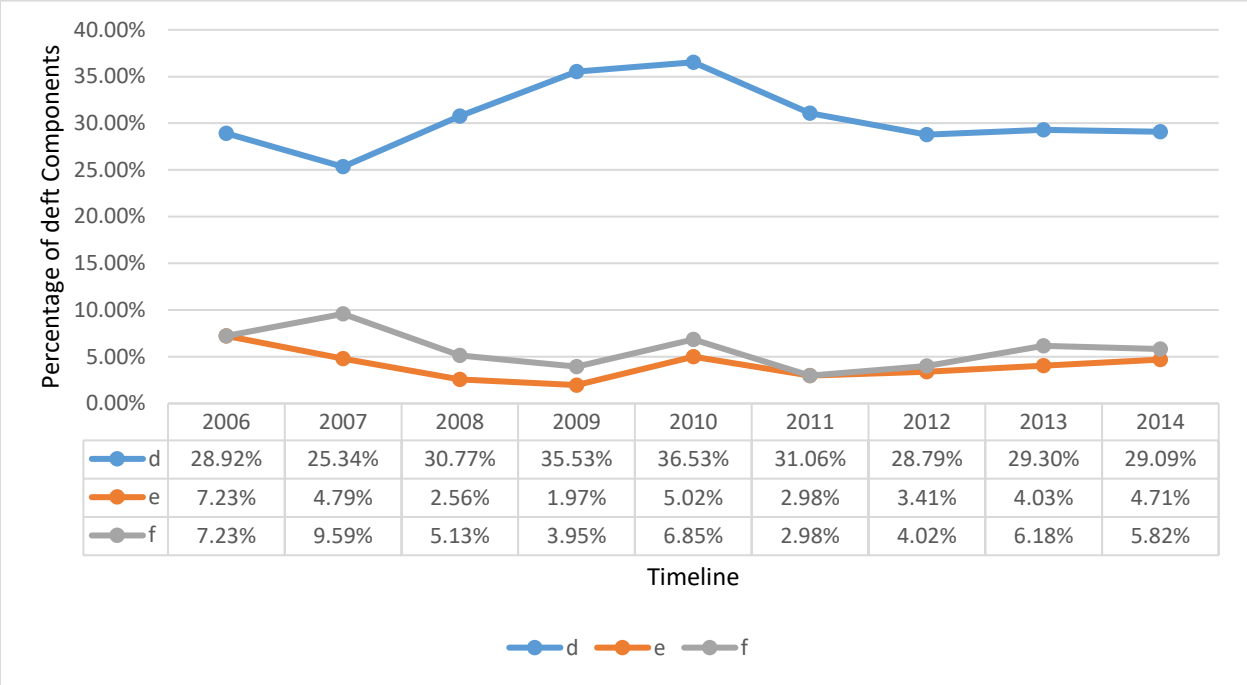


	2006	2007	2008	2009	2010	2011	2012	2013	2014
d	29.02%	20.37%	14.20%	27.18%	15.45%	22.61%	20.57%	19.29%	19.06%
e	1.82%	0.62%	1.23%	1.94%	1.29%	0.87%	0.26%	1.77%	2.23%
f	2.73%	0.62%	2.47%	3.40%	1.29%	0.43%	0.51%	0.44%	1.49%

d:decay; e:extracted; f:filled (primary teeth)

The percentage of two year old children with at least one decay (d) in primary teeth has slightly decreased from 2011 to 2014. In 2014, 19.06% of two year old children had at least one decayed primary tooth; 2.23% had at least one primary tooth extracted as a consequence of dental caries and the proportion with at least one primary tooth filled was 1.49%. In all the screening years the major component of deft was decayed (d) teeth.

Figure-37: Burden of deft Components: 3 Year Old Children

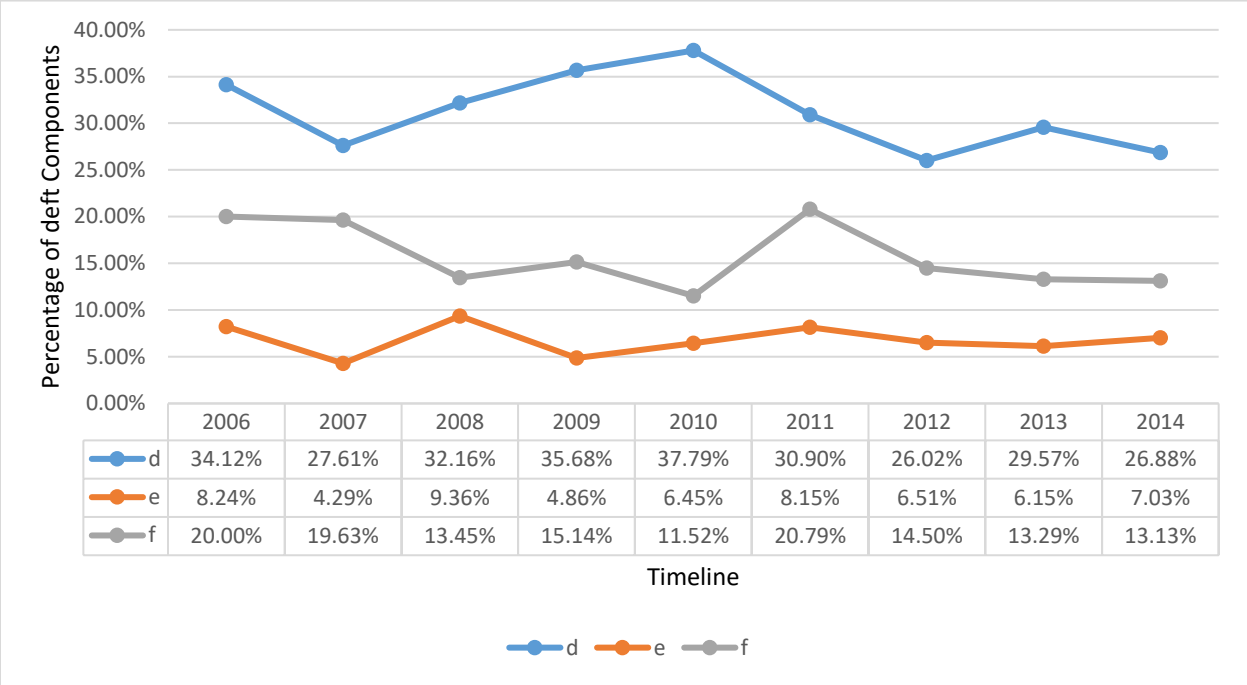


	2006	2007	2008	2009	2010	2011	2012	2013	2014
d	28.92%	25.34%	30.77%	35.53%	36.53%	31.06%	28.79%	29.30%	29.09%
e	7.23%	4.79%	2.56%	1.97%	5.02%	2.98%	3.41%	4.03%	4.71%
f	7.23%	9.59%	5.13%	3.95%	6.85%	2.98%	4.02%	6.18%	5.82%

d:decay; e:extracted; f:filled (primary teeth)

The percentage of three year old children with at least one decay (d) in primary teeth was highest in 2010 and 2011. In recent years it remained stable at approximately 29%. In all the screening years the major component of deft was decayed (d) teeth.

Figure-38: Burden of deft Components: 4 Year Old Children

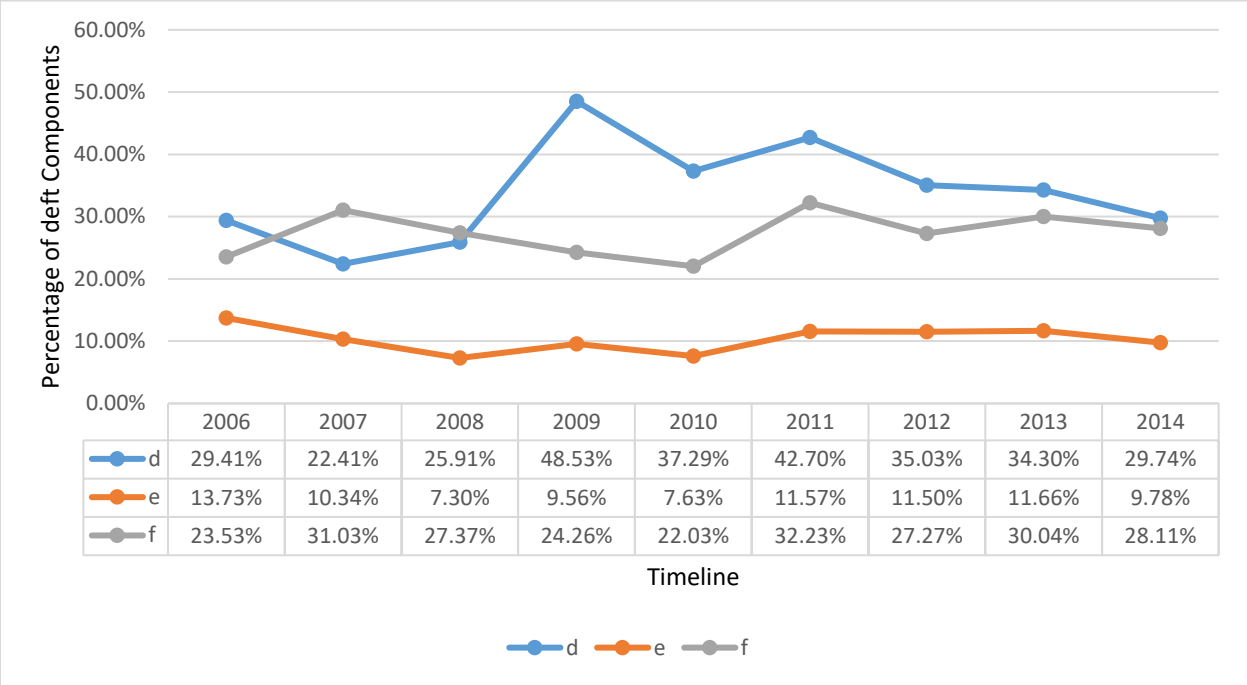


	2006	2007	2008	2009	2010	2011	2012	2013	2014
d	34.12%	27.61%	32.16%	35.68%	37.79%	30.90%	26.02%	29.57%	26.88%
e	8.24%	4.29%	9.36%	4.86%	6.45%	8.15%	6.51%	6.15%	7.03%
f	20.00%	19.63%	13.45%	15.14%	11.52%	20.79%	14.50%	13.29%	13.13%

d:decay; e:extracted; f:filled (primary teeth)

The percentage of 4 year old children who had at least one primary tooth filled gradually decreased from 2011 to 2014 (20.79% to 13.13%).In all years the major constitute of deft was decayed (d) teeth.

Figure-39: Burden of deft Components: 5 Year Old Children



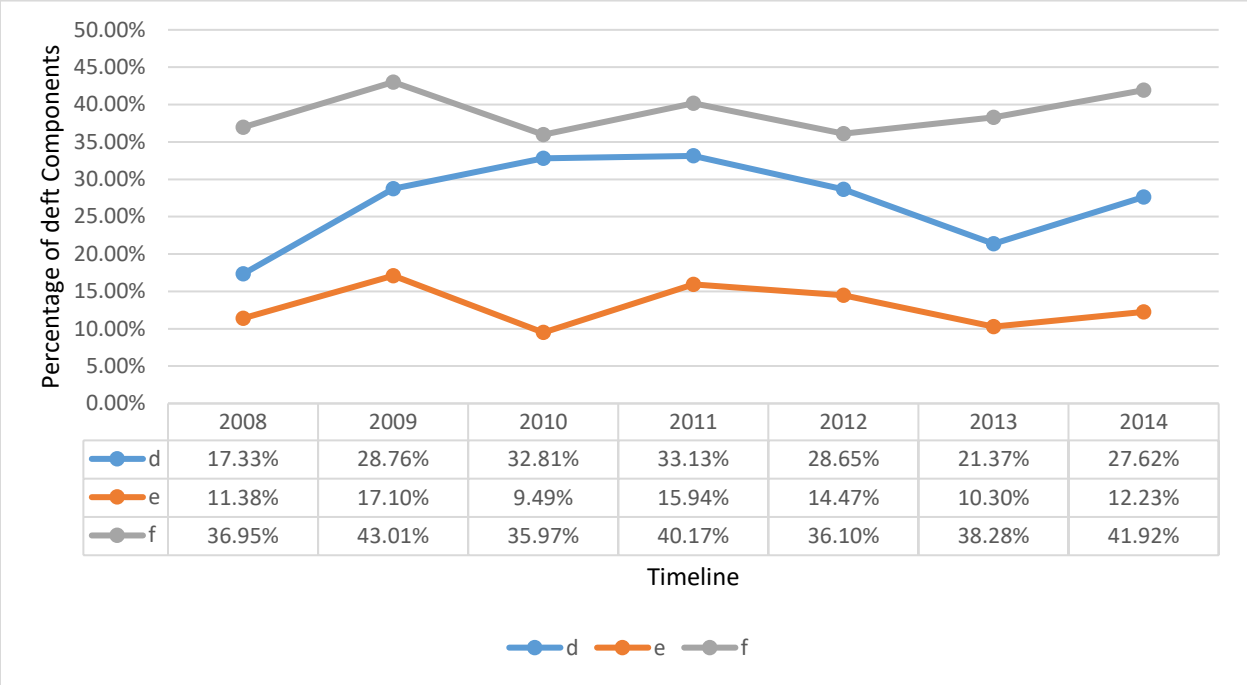
	2006	2007	2008	2009	2010	2011	2012	2013	2014
d	29.41%	22.41%	25.91%	48.53%	37.29%	42.70%	35.03%	34.30%	29.74%
e	13.73%	10.34%	7.30%	9.56%	7.63%	11.57%	11.50%	11.66%	9.78%
f	23.53%	31.03%	27.37%	24.26%	22.03%	32.23%	27.27%	30.04%	28.11%

d:decay; e:extracted; f:filled (primary teeth)

The percentage of 5 year old children with at least one decayed primary tooth gradually decreased from 2011 to 2014 (42.70% to 29.74%).

The chart shows throughout the study period, the highest numbers recorded in decayed (d) teeth followed by filled (f)/extracted (e) deciduous teeth in this age group. However, in 2014 the percentage of children with at least one decayed primary tooth was almost equal to the proportion of those who had at least one tooth filled.

Figure-40: Burden of deft Components: 6 Year Old Children



	2008	2009	2010	2011	2012	2013	2014
d	17.33%	28.76%	32.81%	33.13%	28.65%	21.37%	27.62%
e	11.38%	17.10%	9.49%	15.94%	14.47%	10.30%	12.23%
f	36.95%	43.01%	35.97%	40.17%	36.10%	38.28%	41.92%

d: decay; e: extracted; f: filled (primary teeth)

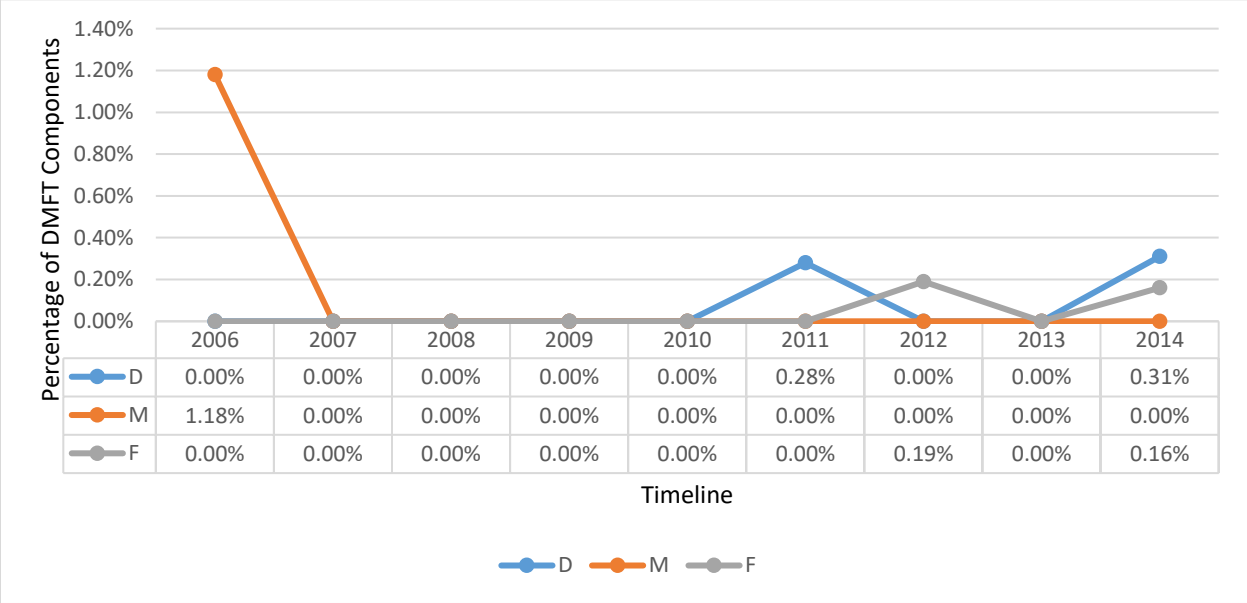
There was a slight fluctuation in all three deft components over years. In 2014, 27.62% of 6 year old children had at least one decayed primary tooth. A large portion of them (41.92%) had at least one primary tooth filled. On the other hand, 12.23%% of children had at least one deciduous tooth extracted which is the tooth fatality rate of this specific group.

In all the screening years, the major contributory factor to deft was filled (f) primary teeth. The lower percentage of decayed (d) and higher percentage of filled (f) is a positive indication of access to dental treatment for 6 year old children.

"DMFT" Components

"DMFT" of 0, 1, 2, 3 year old children was recorded as zero. The burden of individual components of "DMFT" for 4 to 6 year old children is illustrated in **Figures-41** to **43.**

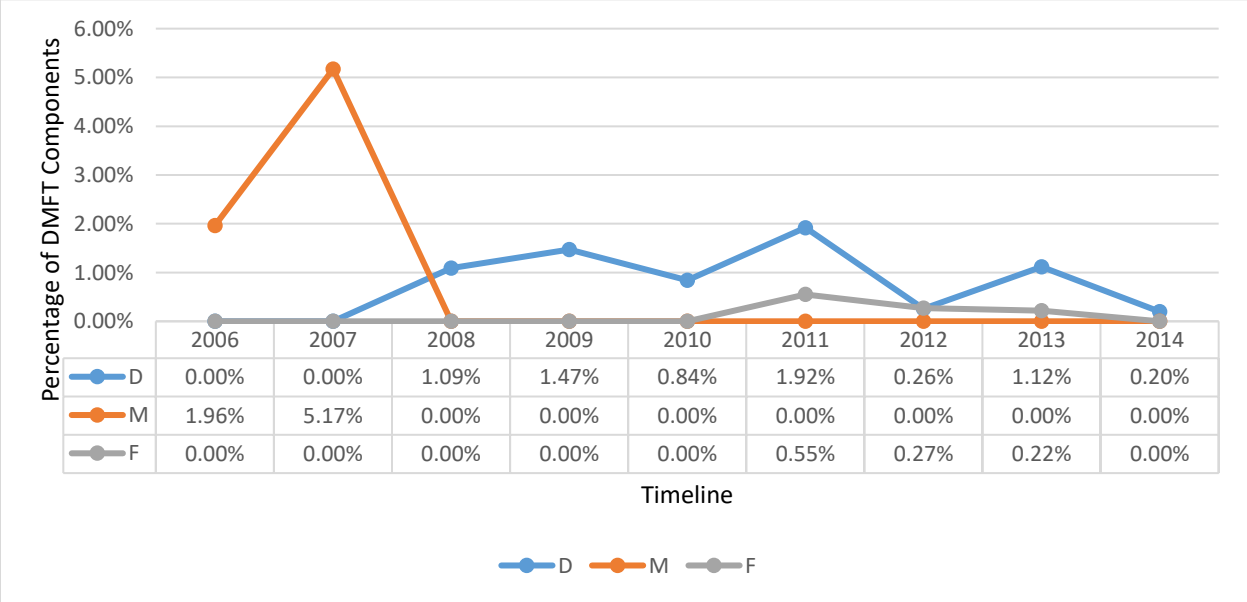
Figure-41: Burden of DMFT Components: 4 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
D	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%	0.00%	0.31%
M	1.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
F	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%	0.16%

D: Decay; M: Missing; F: Filled (Permanent Teeth)

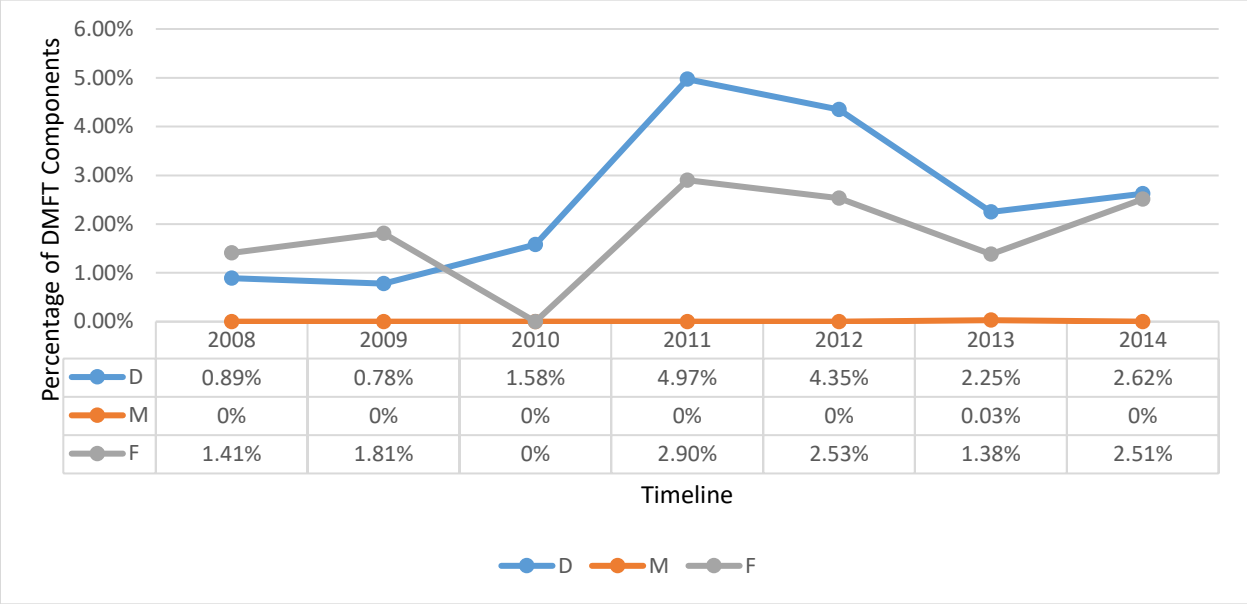
Figure-42: Burden of DMFT Components: 5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
D	0.00%	0.00%	1.09%	1.47%	0.84%	1.92%	0.26%	1.12%	0.20%
M	1.96%	5.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
F	0.00%	0.00%	0.00%	0.00%	0.00%	0.55%	0.27%	0.22%	0.00%

D: Decay; M: Missing; F: Filled (Permanent Teeth)

Figure-43: Burden of DMFT Components: 6 Year Old Children



	2008	2009	2010	2011	2012	2013	2014
D	0.89%	0.78%	1.58%	4.97%	4.35%	2.25%	2.62%
M	0%	0%	0%	0%	0%	0.03%	0%
F	1.41%	1.81%	0%	2.90%	2.53%	1.38%	2.51%

D: Decay; M: Missing; F: Filled (Permanent Teeth)

From 2010 to 2013, the proportion of 6 year old children with at least one decay in permanent tooth was higher than percentage of those who had at least one tooth filled. Whereas, in 2014 the percentage of children with at least one decay reached to the proportion of those with at least one filling in permanent teeth.

Canadian Oral health Framework (COHF) Target for 6 Year Old Children:

The *Canadian Oral Health Framework 2013-2018 (COHF),* is the second national oral health framework produced by the Federal, Provincial and Territorial Dental Directors .[27] It follows the *Canadian Oral Health Strategy 2005-2010 (COHS),*and identifies the challenges existing in different categories of oral health care of children. The first goal of COHF is to improve the oral health of children which has three different objectives for 6 year old children.

Table-46 shows the details regarding COHF 2013-2018 guidelines for 6 year old children.

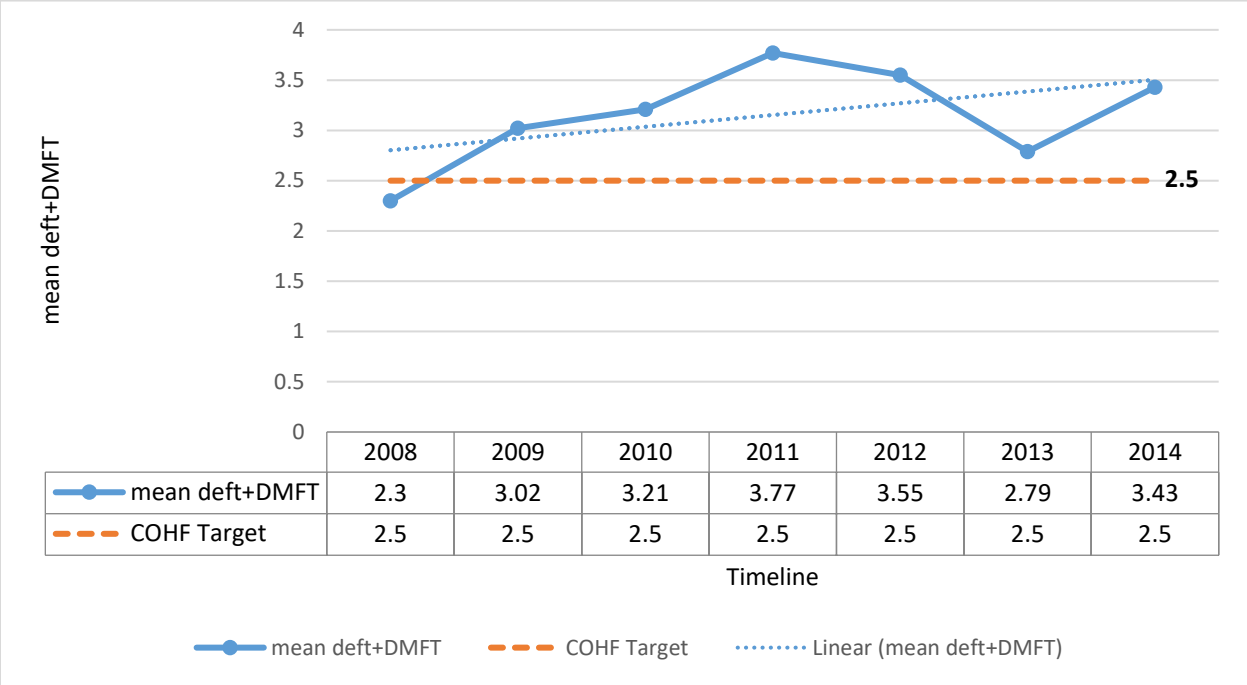
Table-47: COHF 2013-2018 Guidelines: 6 Year Old Children

COHF 2013-2018: 6 Year Old Children		
#	Objective	Indicator
1.a	Reduce the number of teeth affected by cavities in 6-Year Olds	deft +DMFT of <2.5
1.b	Reduce the percentage of 6 year old children who experienced cavities	55% of 6 year old children have deft +DMFT=0
1.c	Reduce the percentage of 6 year old children with untreated cavities	<15% of 6 year old children have d+D>0

Saskatoon Health Region Dental Health Screening Program Report 2013-2014 assessed the oral health of 6 year old children on the basis of both COHF and COHF guidelines. However, in the present report we analyzed the oral health of 6 year old children in accordance with the newest framework (COHF, 2013-2018).

Figures 44 to 46 shows screening results of 6 year old children in comparison to COHF Target.

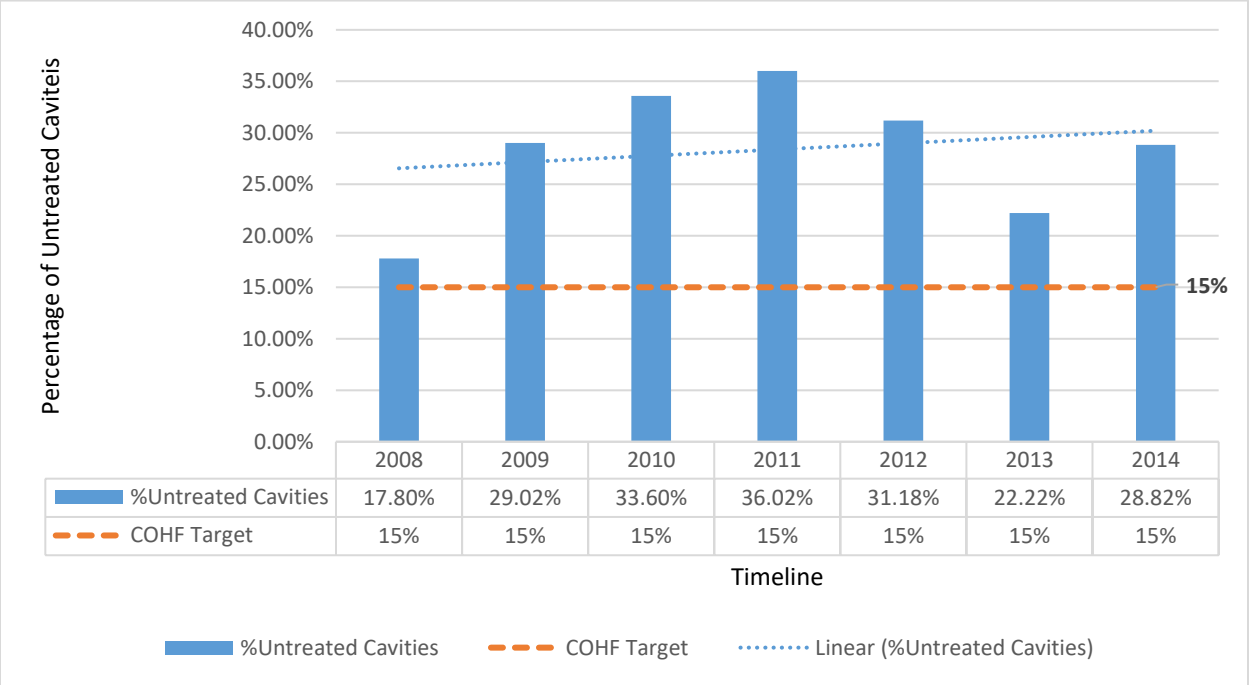
Figure-44: deft+DMFT and COHF Target: 6 Old Year Children



	2008	2009	2010	2011	2012	2013	2014
mean deft+DMFT	2.3	3.02	3.21	3.77	3.55	2.79	3.43
COHF Target	2.5	2.5	2.5	2.5	2.5	2.5	2.5

With regard to deft+DMFT, only in 2008 the COHF target (<2.5) was met. It seems the best results for recent years belongs to 2013 (2.79). deft+DMFT in 2014 was far behind the COHF target (3.43).

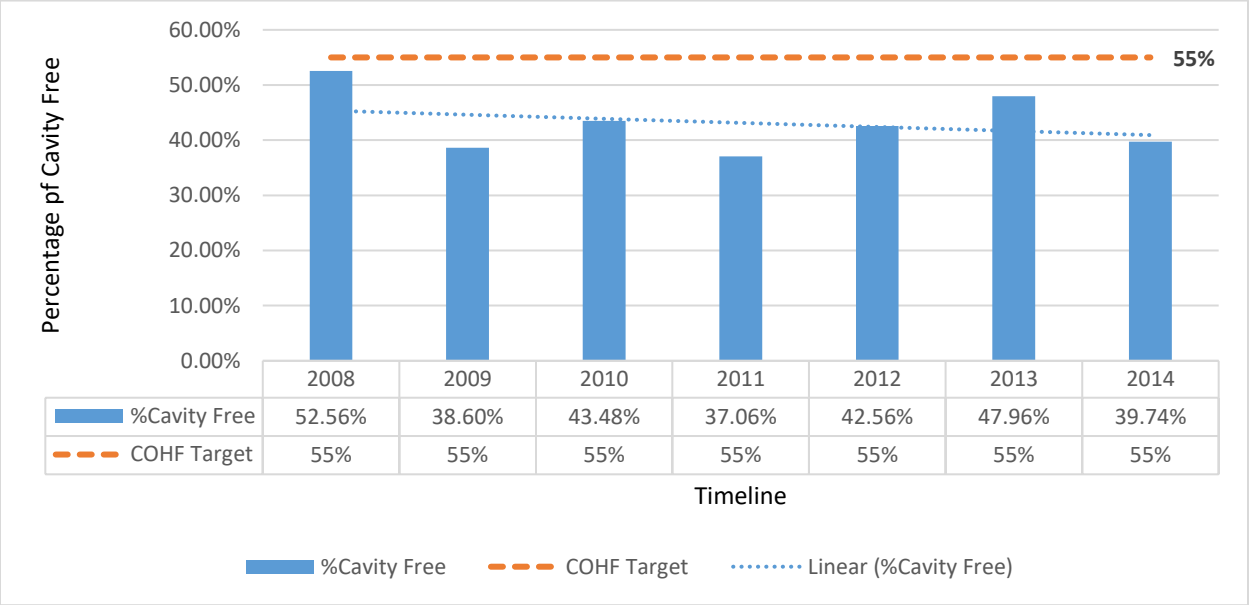
Figure-45: % Untreated Cavities and COHF Target: 6 Year Old Children



95% Confidence Interval for the proportion of Untreated Cavities are as follows: (2008): 16.08%-19.51%; (2009): 24.49%-33.54%; (2010): 27.78%-39.42%; (2011): 32.44%-41.13%; (2012): 27.78%-34.58%; (2013): 20.92%-23.96%; (2014): 25.92%-31.79%.

Regarding the percentage of children with Untreated Cavities, the COHF target (<15%) was not met in any screening years. In 2014, 28.22% of 6 year old children had Untreated Cavities.

Figure-46: % Cavity Free and COHF Target: 6 Year Old Children



95% Confidence Interval for the proportion of Cavity Free are as follows: (2008): 50.32%-54.79% ;(2009): 43.98%-53.95%; (2010): 37.37%-49.59%; (2011): 33.47%-42.21%; (2012): 38.92%-46-19%; (2013): 46.14%-49.78%; (2014): 36.61%-42.95%.

Regarding the percentage of Cavity Free children, the COHF target (55%) was not met in any screening years. In 2014, 39.74% of 6 year old children were Cavity Free.

Target for Children Younger than 6 Year Old Children

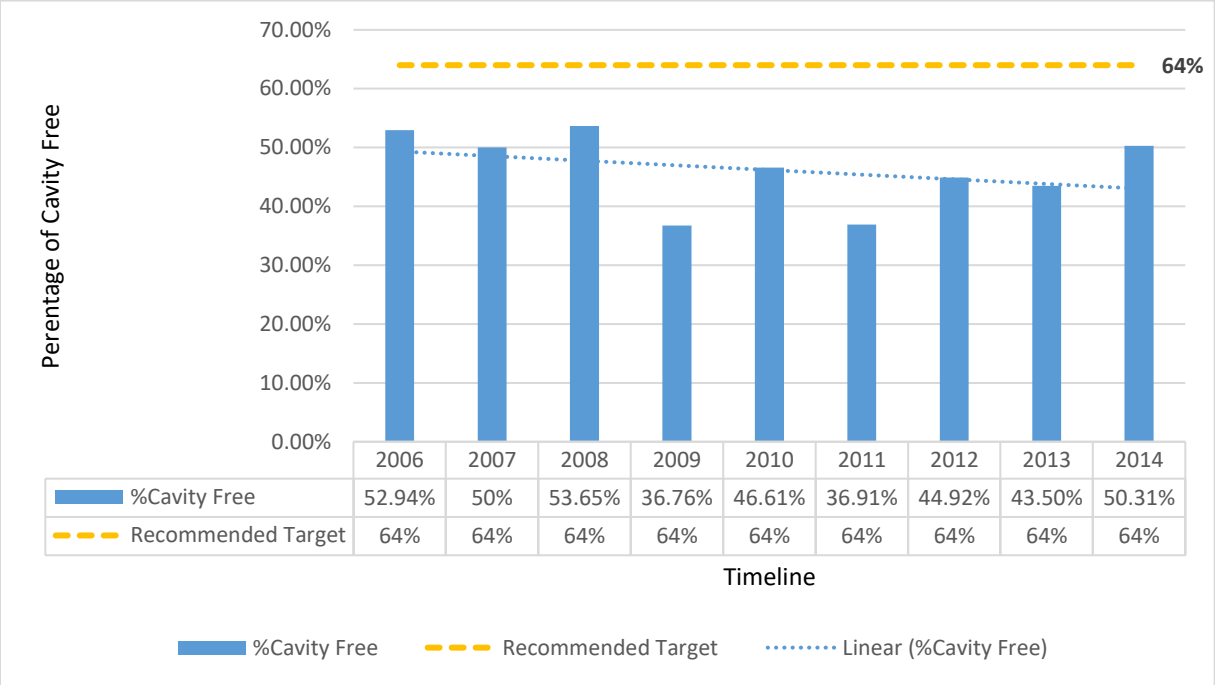
For children younger than 6 years old, COHF did not set a target, therefore we developed a benchmark. We considered target of 100% Cavity Free for ≤1 year old and target of 55% for 6 year old children (as per COHF).Then for the age groups between, we split the differences. **Table-47** shows the Recommended Target for 0-5 year old children.

Table-48: SHR Recommended Target: 0-5 Year Old Children

Recommended Target for 0-5 Year Old Children		
#	Objective	Indicator
1.a	Reduce the percentage of 5 Year Olds who experienced cavities.	64% of 5 Year Olds have deft +DMFT=0
1.b	Reduce the percentage of 4 Year Olds who experienced cavities.	73% of 4 Year Olds have deft +DMFT=0
1.c	Reduce the percentage of 3 Year Olds who experienced cavities.	82% of 3 Year Olds have deft +DMFT=0
1.d	Reduce the percentage of 2 Year Olds who experienced cavities.	91% of 2 Year Olds have deft +DMFT=0
1.e	Reduce the percentage of ≤1 Year Olds who experienced cavities.	100% of ≤1 Year Olds have deft +DMFT=0

Figures 47 to 52 illustrate screening results of 0-5 year old children in comparison to the recommended target.

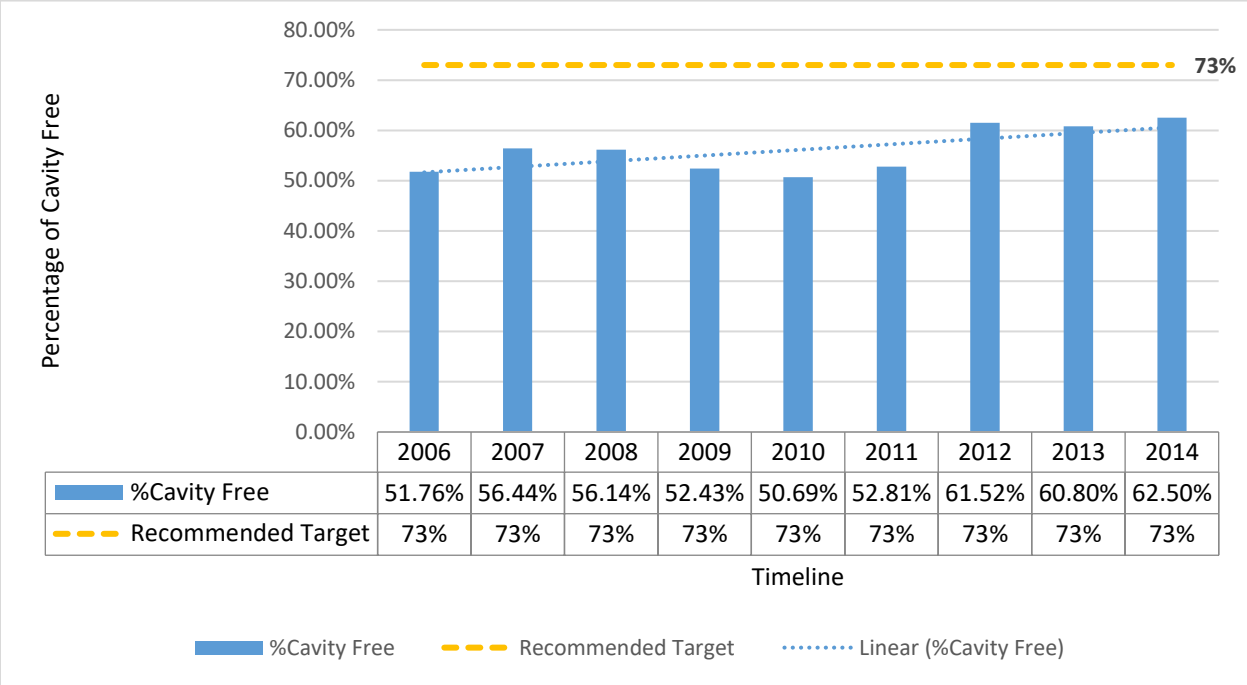
Figure-47: % Cavity Free and Recommended Target: 5 Year Old Children



95% Confidence Interval for the proportion of Cavity Free are as follows: (2006):39.24%-66.64% ; (2007): 37.13%-62.87% ;(2008): 47.75%-59.55%;(2009): 28.66%-44.87%; (2010): 37.61%-55.61% ;(2011): 31.95%-41.88%; (2012): 39.88%-49.96% ;(2013): 38.90%-48.10% ;(2014): 45.88%-54.73%.

In every screening year, the percentage of 5 year old children who were Cavity Free was smaller than the recommended target (64%).

Figure-48: % Cavity Free and Recommended Target: 4 Year Old Children

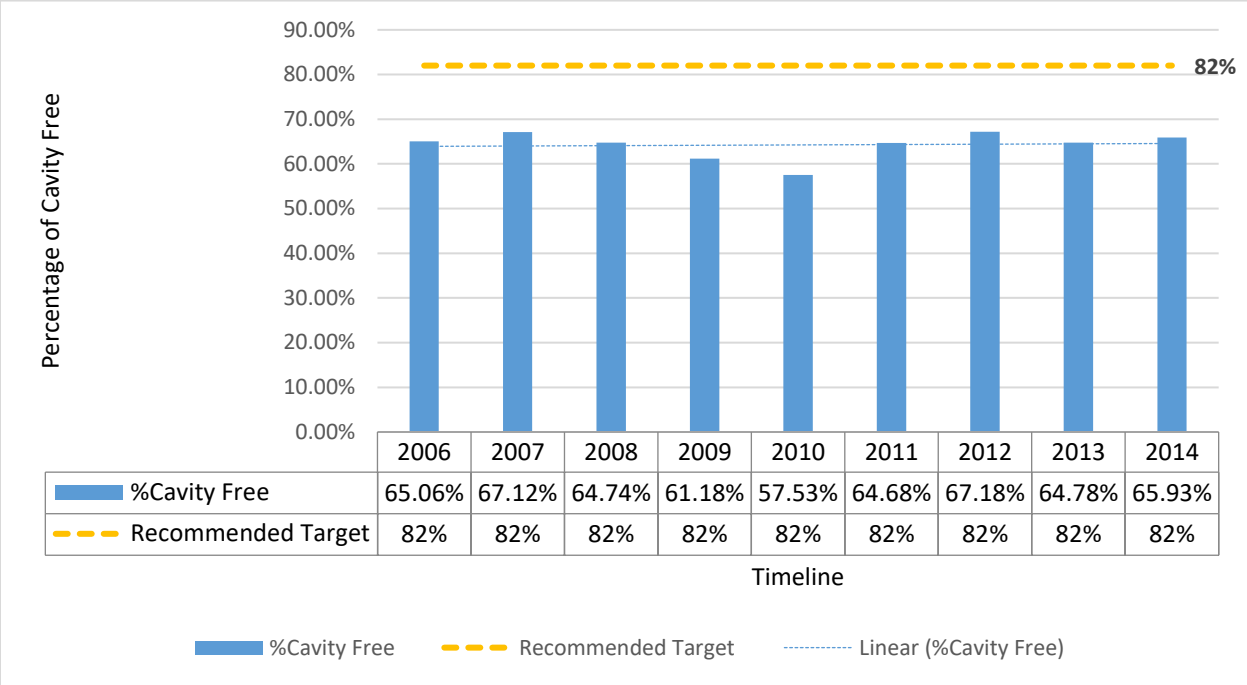


	2006	2007	2008	2009	2010	2011	2012	2013	2014
%Cavity Free	51.76%	56.44%	56.14%	52.43%	50.69%	52.81%	61.52%	60.80%	62.50%
Recommended Target	73%	73%	73%	73%	73%	73%	73%	73%	73%

95% Confidence Interval for the proportion of Cavity Free are as follows: (2006): 41.14%-62.39%; (2007): 48.83%-64.05%;(2008): 48.70%-63.58%;(2009): 45.24%-59.63%; (2010): 44.04%-57.34%;(2011): 47.62%-57.99%; (2012): 57.41%-65.64% ;(2013): 51.85%-59.78%;(2014): 58.75%-66.25%.

In every screening year, the percentage of 4 year old children who were Cavity Free was smaller than the recommended target (73%).

Figure-49: % Cavity Free and Recommended Target: 3 Year Old Children

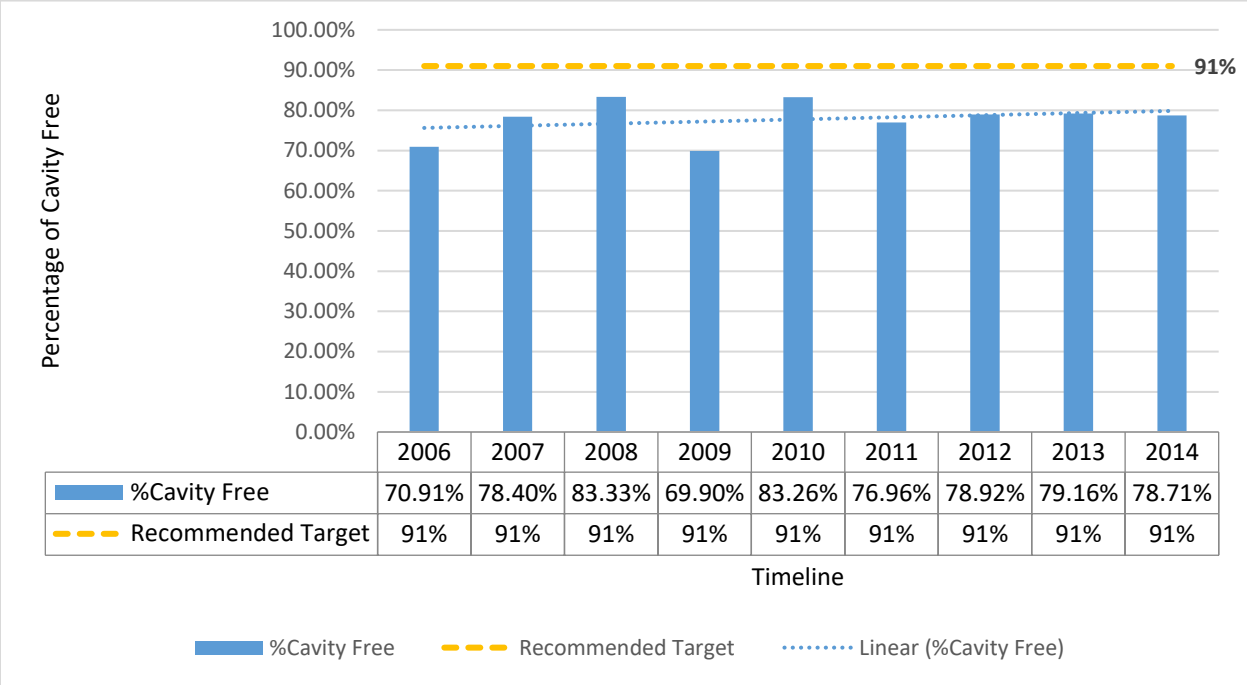


	2006	2007	2008	2009	2010	2011	2012	2013	2014
%Cavity Free	65.06%	67.12%	64.74%	61.18%	57.53%	64.68%	67.18%	64.78%	65.93%
Recommended Target	82%	82%	82%	82%	82%	82%	82%	82%	82%

95% Confidence Interval for the proportion of Cavity Free are as follows: (2006): 54.80%-75.32% ;(2007): 59.50%-74.74%;(2008): 57.25%-72.24%;(2009): 53.44%-68.93%; (2010): 50.99%-64.08%;(2011): 58.57%-70.79%; (2012): 62.06%-72.30%;(2013): 59.93%-69.64%;2014): 61.04%-70.82%

In every screening year, the percentage of 3 year old children who were Cavity Free was smaller than the recommended target (82%).

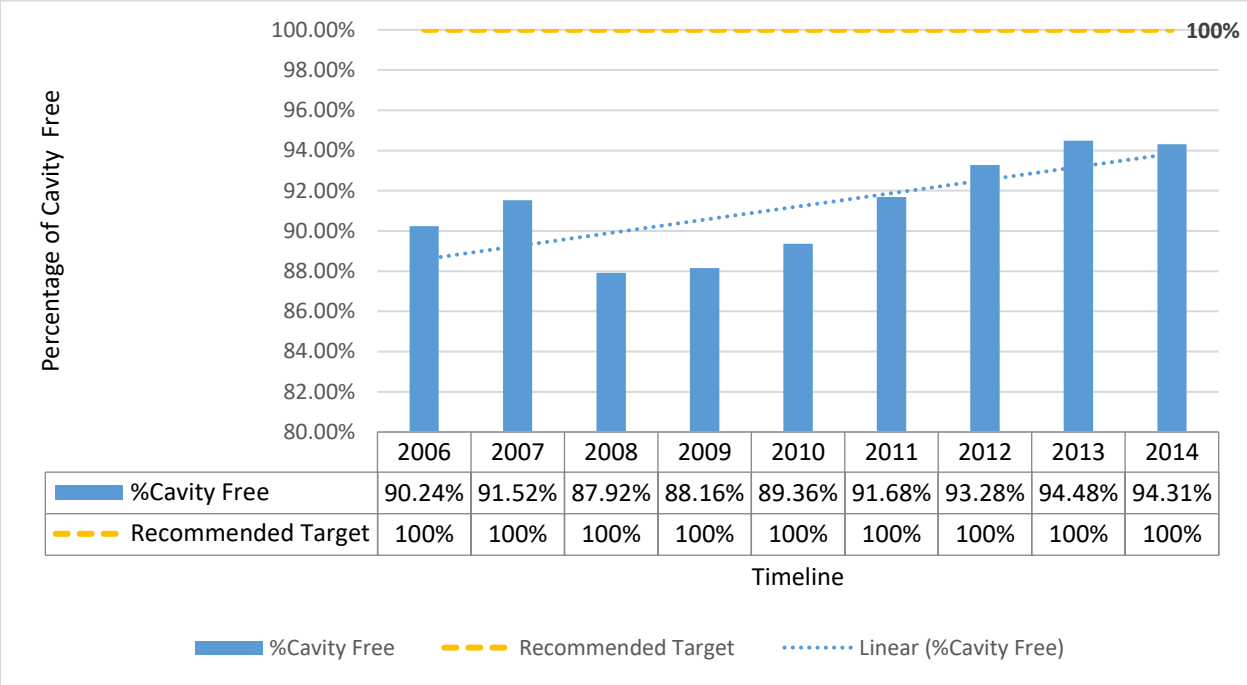
Figure-50: % Cavity Free and Recommended Target: 2 Year Old Children



95% Confidence Interval for the proportion of Cavity Free are as follows: (2006): 62.42%-79.40%; (2007): 72.06%-84.73%; (2008): 77.59%-89.07%;(2009): 63.64%-76.17%; (2010): 78.47%-88.06%; (2011): 71.51%-82.40%; (2012): 74.87%-82.97%; (2013): 75.41%-82.91%; (2014): 74.72%-82.70%.

In every screening year, the percentage of 2 year old children who were Cavity Free was smaller than the recommended target (91%).

Figure-51: % Cavity Free and Recommended Target: 1 Year Old Children

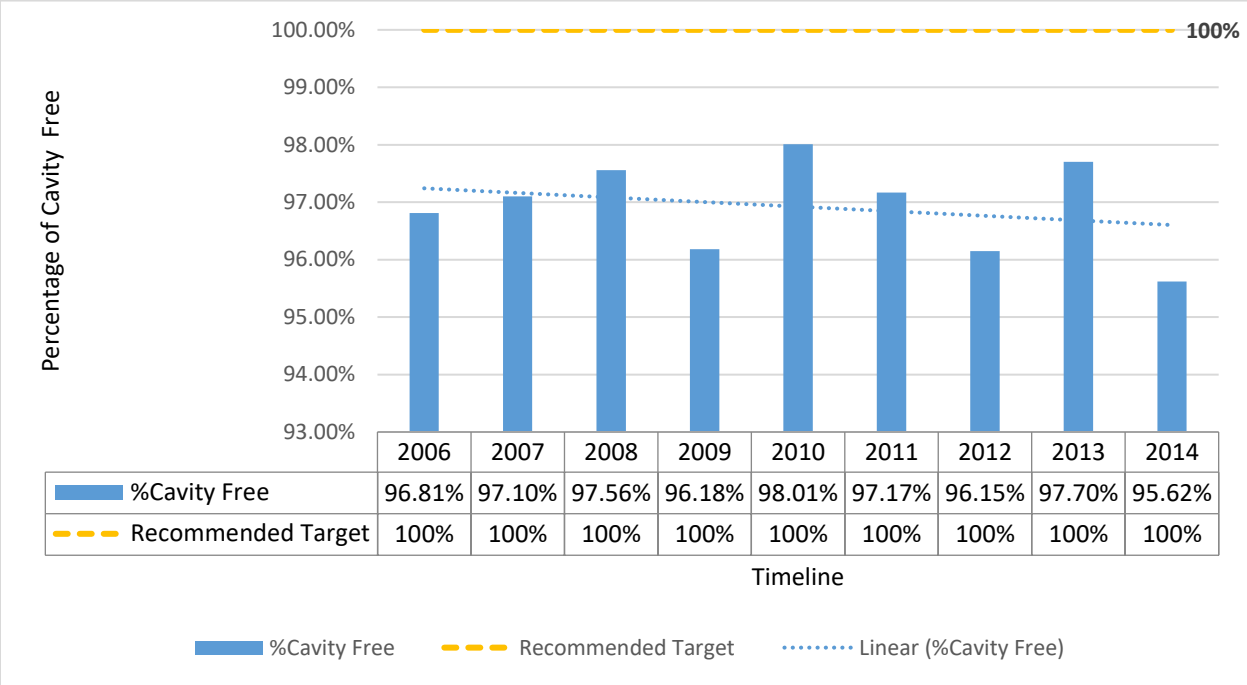


	2006	2007	2008	2009	2010	2011	2012	2013	2014
%Cavity Free	90.24%	91.52%	87.92%	88.16%	89.36%	91.68%	93.28%	94.48%	94.31%
Recommended Target	100%	100%	100%	100%	100%	100%	100%	100%	100%

95% Confidence Interval for the proportion of Cavity Free are as follows: (2006): 86.18%-94.31%; (2007): 88.51%-94.52%; (2008): 84.40%-91.43%;(2009): 84.98%-91.34%; (2010): 86.42%-92.30%; (2011): 89.27%-94.09%; (2012): 91.73%-94.83%; (2013): 93.14%-95.83%; (2014): 92.90%-95.72%.

In every screening year, the percentage of 1 year old children who were Cavity Free was smaller than the recommended target (100%).

Figure 52: % Cavity Free and Recommended Target: <1 Year Old Children



95% Confidence Interval for the proportion of Cavity Free are as follows: (2006): 93.26%-100 %; (2007): 94.30%-99.90%; (2008): 94.83%-100 %;(2009): 92.90%-99.46%; (2010): 95.79%-100 %; (2011): 94.01%-100%; (2012): 93.36%-98.95%; (2013): 95.47%-99.93%; (2014): 92.19%-99.05%.

In every screening year, the percentage of younger than one year old children who were Cavity Free was smaller than the recommended target (100%).

Comparative Analysis

The comparative analysis involved designating children into groups based on a specific measure to examine the effect of that particular factor on their oral health. This analysis carried out to examine the effect of factors that might highlight the disparities on the oral health of children.

These factors included:

- Child's Residence: Urban vs. Rural.
- Neighborhood Income Status: Low Income Measure (LIM) vs. Non-Low Income Measure (Non-LIM) Neighborhoods.

The comparative analysis was carried out in three age groups:

- 0-2 Year Old children (0-35 months) (n=8,914);
- 3-5 Year Old children (36-71 months) (n=7,315);
- 6 Year Old children (72-83 months) (n=7,558).

The analysis was carried out on different indicators including:
mean deft/DMFT; Caries Free (deft+DMFT=0); Caries Free in primary dentition (d=0); Caries Free in Permanent dentition (D=0); Untreated Cavities (d+D>0); Early Childhood Tooth Decay (ECTD,S-ECTD); Dental Health Status (NDE,CCC,PCC,NEC); and Priority Scores.

For the analysis of deft+DMFT score, Independent two sample T-test was used. To examine the association of the factor with the oral health of the children, Chi-square test/Fisher's exact test were carried out. P-value <0.05 was taken as significant.

Child's Residence: Urban vs. Rural

For the comparative analysis, Saskatoon and Humboldt was considered "Urban" and the rest were categorized as "Rural"area.

Comparative Analysis: Urban vs. Rural; 0-2 Year Old Children

The comparative analysis (Urban vs. Rural) for 8,914 children of 0-2 years of age is illustrated in **Tables-48** to **56 and Figures-53** to **56.**

Table-49: Comparative Analysis: Urban vs. Rural; 2006: 0-2 Year Old Children

2006: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=347	Rural n=62	
deft score (mean±SD)		0.56±1.72	0.83±2.42	0.402[a]
deft=0		301 (86.74%)	53 (85.48%)	0.789[b]
d=0		301 (86.74%)	53 (85.48%)	0.789[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	46 (13.26%)	9 (14.52%)	0.789[b]
Dental Health Status	NDE	302 (87.03%)	53 (85.48%)	0.740[b]
	CCC	0	0	-
	PCC	1 (0.29%)	0	>0.999[c]
	NEC	44 (12.68%)	9 (14.52%)	0.692[b]
Priority Scores	1	1 (0.29%)	0	>0.999[c]
	2	41 (11.82%)	8 (12.90%)	0.943[b]
	3	305 (87.90%)	54 (87.10%)	0.860[b]

SD: Standard Deviation
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2006, there was no association between Child's Residence and oral health indicators of 0-2 year old children.

Table-50: Comparative Analysis: Urban vs. Rural; 2007: 0-2 Year Old Children

2007: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=487	Rural n=143	
deft score (mean±SD)		0.47±1.47	0.16±0.77	*0.001[a]
deft=0		428 (87.89%)	135 (94.41%)	*0.026[b]
d=0		431 (88.50%)	137 (95.80%)	*0.010[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	59 (12.11%)	8 (5.59%)	*0.026[b]
Dental Health Status	NDE	431 (88.50%)	136 (95.10%)	*0.021[b]
	CCC	3 (0.62%)	2 (1.40%)	0.319[c]
	PCC	0	0	-
	NEC	53 (10.88%)	5 (3.50%)	*0.007[b]
Priority Scores	1	2 (0.41%)	0	>0.999[c]
	2	47 (9.65%)	9 (6.29%)	0.215[b]
	3	438 (89.94%)	134 (93.71%)	0.171[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2007, the mean deft in 0-2 year old children in Rural area was significantly smaller compared to those in Urban (p-value=0.001). There was significant association between being Caries Free and Child's Residence (p-value=0.026).Also, having No Evidence of Care was associated with location (p-value=0.026). The proportion of children with Childhood Tooth Decay in Rural area was smaller compared to Urban.

Table-51: Comparative Analysis: Urban vs. Rural; 2008: 0-2 Year Old Children

2008: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=479	Rural n=137	
deft score (mean±SD)		0.52±1.53	0.17±0.88	*0.001[a]
deft=0		417 (87.06%)	129 (94.16%)	*0.021[b]
d=0		421 (87.89%)	131 (95.62%)	*0.009[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	61 (12.73%)	8 (5.84%)	*0.024[b]
Dental Health Status	NDE	419 (87.47%)	129 (94.16%)	*0.028[b]
	CCC	3 (0.63%)	2 (1.46%)	0.309[c]
	PCC	1 (0.21%)	0	>0.999[c]
	NEC	56 (11.69%)	6 (4.38%)	*0.012[b]
Priority Scores	1	3 (0.63%)	1 (0.73%)	>0.999[c]
	2	55 (11.48%)	5 (3.65%)	*0.006[b]
	3	421 (87.89%)	131 (95.62%)	*0.009[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2008, the mean deft in 0-2 year old children in Rural area was significantly smaller compared to those in Urban (p-value=0.001). In addition, there was significant association between Child's Residence and the majority of the health indicators (p-value<0.05). Out of the 10 oral health indicators examined in the two populations, 7 of them had better measurements in Rural locations.

Table-52: Comparative Analysis: Urban vs. Rural; 2009: 0-2 Year Old Children

2009: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=625	Rural n=109	
deft score (mean±SD)		0.67±1.88	0.27±1.16	*0.003[a]
deft=0		519 (83.04%)	101 (92.66%)	*0.011[b]
d=0		528 (84.48%)	101 (92.66%)	*0.024[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	103 (16.48%)	8 (7.34%)	*0.014[b]
Dental Health Status	NDE	524 (83.84%)	101 (92.66%)	*0.017[b]
	CCC	8 (1.28%)	0	0.613[c]
	PCC	2 (0.32%)	0	>0.999[c]
	NEC	91 (14.56%)	8 (7.34%)	*0.042[b]
Priority Scores	1	2 (0.032%)	0	>0.999[c]
	2	92 (14.72%)	8 (7.34%)	*0.038[b]
	3	531 (84.96%)	101 (92.66%)	*0.032[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2009, the mean deft in 0-2 year old children in Rural area was significantly smaller compared to those in Urban (p-value=0.003). In addition, there was significant association between Child's Residence and the majority of the oral health indicators. That is, most of the oral health indicators had better measurements in Rural areas.

Table-53: Comparative Analysis: Urban vs. Rural; 2010: 0-2 Year Old Children

2010: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=669	Rural n=138	
deft score (mean±SD)		0.48±1.80	0.21±1.01	*0.016[a]
deft=0		592 (88.49%)	128 (92.75%)	0.141[b]
d=0		596 (89.09%)	128 (92.75%)	0.197[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	76 (11.36%)	10 (7.25%)	0.154[b]
Dental Health Status	NDE	592 (88.49%)	128 (92.75%)	0.141[b]
	CCC	3 (0.45%)	0	>0.999[c]
	PCC	0	0	-
	NEC	74 (11.06%)	10 (7.25%)	0.181[b]
Priority Scores	1	4 (0.60%)	0	>0.999[c]
	2	70 (10.46%)	10 (7.25%)	0.25[b]
	3	595 (88.94%)	128 (92.75%)	0.181[b]

SD: Standard Deviation; * statistically significant; N/A: Not Applicable
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2010, the mean deft in 0-2 year old children in Rural area was significantly smaller compared to those in Urban (p-value=0.016). There was no association between health parameters and Child's Residence.

Table-54: Comparative Analysis: Urban vs. Rural; 2011: 0-2 Year Old Children

2011: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=589	Rural n=252	
deft score (mean±SD)		0.49±1.53	0.33±1.40	0.151[a]
deft=0		513 (87.10%)	230 (91.27%)	0.084[b]
d=0		514 (87.27%)	230 (91.27%)	0.096[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	75 (12.73%)	20 (7.94%)	*0.044[b]
Dental Health Status	NDE	514 (87.27%)	232 (92.43%)	*0.044[b]
	CCC	1 (0.17%)	0	>0.999[c]
	PCC	2 (0.34%)	1 (0.40%)	>0.999[c]
	NEC	72 (12.22%)	18 (7.17%)	*0.029[b]
Priority Scores	1	2 (0.34%)	2 (0.79%)	0.587[c]
	2	72 (12.22%)	17 (6.75%)	*0.018[b]
	3	515 (87.44%)	233 (92.46%)	*0.033[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2011, there was significant association between S-ECTD and Child's Residence. Also, a significant relationship was found between having No Evidence of Care and the location. Child's Residence the proportion of 0-2 year old children in Rural area with No Evidence of Care, as well as Childhood Tooth Decay was smaller than those in Urban district.

Table-55: Comparative Analysis: Urban vs. Rural; 2012: 0-2 Year Old Children

2012: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=1073	Rural n=495	
deft score (mean±SD)		0.46±1.57	0.16±1.14	*<0.001[a]
deft=0		941 (87.70%)	471 (95.15%)	*<0.001[b]
d=0		944 (87.98%)	472 (95.35%)	*<0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	132 (12.30%)	24 (4.85%)	*<0.001[b]
Dental Health Status	NDE	941 (87.70%)	472 (95.35%)	>0.999[b]
	CCC	3 (0.28%)	1 (0.20%)	>0.999[c]
	PCC	3 (0.28%)	1 (0.20%)	>0.999[c]
	NEC	126 (11.74%)	21 (4.24%)	>0.999[b]
Priority Scores	1	9 (0.84%)	1 (0.20%)	0.185[c]
	2	123 (11.46%)	23 (4.24%)	*<0.001[b]
	3	941 (87.70%)	473 (95.56%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2012, the mean deft in 0-2 year old children in Rural area was significantly smaller compared to those in Urban (p-value<0.001). There was significance association between percentage of Caries Free and Child's Residence (p-value<0.05). The proportion of 0-2 year old children in Rural area with Childhood Tooth Decay was smaller than those in Urban district.

Table-56: Comparative Analysis: Urban vs. Rural; 2013: 0-2 Year Old Children

2013: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=1115	Rural n=616	
deft score (mean±SD)		0.46±1.59	0.12±0.69	*<0.001[a]
deft=0		987 (88.52%)	586 (95.13%)	<0.001[b]
d=0		992 (87.97%)	590 (95.78%)	*<0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	127 (11.39%)	30 (4.87%)	*<0.001[b]
Dental Health Status	NDE	988 (88.61%)	585 (94.97%)	*<0.001[b]
	CCC	5 (0.45%)	4 (0.65%)	0.729[c]
	PCC	1 (0.09%)	2 (0.32%)	0.290[c]
	NEC	121 (10.85%)	25 (4.06%)	*<0.001[b]
Priority Scores	1	7 (0.63%)	1 (0.16%)	0.272[c]
	2	116 (10.40%)	26 (4.22%)	*<0.001[b]
	3	992 (88.97%)	589 (95.62%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2013, the mean deft in 0-2 year old children in Rural area was significantly smaller compared to those in Urban (p-value<0.001). There was association between being Caries Free and Child's Residence (p-value<0.05). The proportion of 0-2 year old children in Rural area with Childhood Tooth Decay was smaller than those in Urban district.

Table-57: Comparative Analysis: Urban vs. Rural; 2014: 0-2 Year Old Children

2014: 0-2 Year Old Children		Child's Residence		p-value
		Urban n=1046	Rural n=532	
deft score (mean±SD)		0.57±1.93	0.13±0.88	*<0.001[a]
deft=0		916 (87.75%)	511 (96.05%)	*<0.001[b]
d=0		928 (88.72%)	513 (96.43%)	*<0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	127 (12.14%)	20 (3.76%)	*<0.001[b]
Dental Health Status	NDE	920 (87.95%)	512 (96.24%)	*<0.001[b]
	CCC	12 (1.15%)	1 (0.19%)	0.072[c]
	PCC	0	0	-
	NEC	114 (10.90%)	19 (3.57%)	*<0.001[b]
Priority Scores	1	5 (0.48%)	0	0.174[c]
	2	109 (10.42%)	19 (3.57%)	*<0.001[b]
	3	532 (89.10%)	513 (96.43%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2014, the mean deft in 0-2 year old children in Rural area was significantly smaller compared to those in Urban (p-value<0.001). In addition, there was association between Child's Residence and the majority of the oral health indicators (p-value<0.05).

Comparative Analysis: Urban vs. Rural; 3-5 Year Old Children

The comparative analysis (Urban vs Rural) for 7,315 children of 3-5 years of age is illustrated in in **Tables-57** to **65 and Figures-57** to **60.**

Table-58: Comparative Analysis: Urban vs. Rural; 2006: 3-5 Year Old Children

2006: 3-5 Year Old Children		Child's Residence		p-value
		Urban n=152	Rural n=67	
deft score (mean±SD)		2.80±4.21	2.01±3.11	0.126[a]
DMFT score (mean±SD)		0	0.03±0.17	0.159[a]
deft +DMFT (mean±SD)		2.80±4.21	2.04±3.14	0.142[a]
deft+DMFT=0		89 (58.55%)	36 (53.73%)	0.507[b]
d=0		109 (71.71%)	42 (62.69%)	0.184[b]
D=0		152 (100%)	67 (100%)	-
d+D>0		43 (28.29%)	25 (37.31%)	0.184[b]
Childhood Tooth Decay	ECTD	17 (11.18%)	15 (22.39%)	*0.031[b]
	S-ECTD	46 (30.26%)	16 (23.88%)	0.334[b]
Dental Health Status	NDE	91 (59.87%)	41 (61.19%)	0.853[b]
	CCC	19 (12.50%)	7 (10.45%)	0.665[b]
	PCC	9 (5.92%)	2 (2.99%)	0.510[c]
	NEC	33 (21.71%)	17 (25.37%)	0.552[b]
Priority Scores	1	2 (1.32%)	2 (2.99%)	0.588[c]
	2	44 (28.95%)	21 (31.34%)	0.721[b]
	3	106 (69.73%)	44 (65.67%)	0.551[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2006, there was association between Early Childhood Tooth Decay and Child's Residence (p-value<0.05). The proportion of 3-5 year old children in Urban area with ECTD was smaller than those in Rural district.

Table-59: Comparative Analysis: Urban vs. Rural; 2007: 3-5 Year Old Children

2007: 3-5 Year Old Children		Child's Residence		p-value
		Urban n=249	Rural n=118	
deft score (mean±SD)		2.05±3.51	2.16±3.19	0.759[a']
DMFT score (mean±SD)		0	0.03±0.18	*0.045[a]
deft +DMFT (mean±SD)		2.05±3.51	2.20±3.23	0.693[a']
deft+DMFT=0		151 (60.64%)	68 (57.63%)	0.582[b]
d=0		180 (72.29%)	92 (77.97%)	0.247[b]
D=0		249 (100%)	117 (99.15%)	0.322[c]
d+D>0		69 (27.71%)	27 (22.88%)	0.325[b]
Childhood Tooth Decay	ECTD	43 (17.27%)	19 (16.10%)	0.780[b]
	S-ECTD	55 (22.09%)	31 (26.27%)	0.377[b]
Dental Health Status	NDE	152 (61.04%)	81 (68.64%)	0.158[b]
	CCC	29 (11.65%)	13 (11.02%)	0.860[b]
	PCC	14 (5.62%)	3 (2.54%)	0.190[b]
	NEC	54 (21.69%)	21 (17.80%)	0.388[b]
Priority Scores	1	6 (2.41%)	0	0.183[c]
	2	54 (21.69%)	26 (22.03%)	0.940[b]
	3	189 (75.90%)	92 (77.97%)	0.663[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2007, the mean DMFT in 3-5 year old children in Urban area was smaller compared to Rural (p-value=0.045). There was no association between other health indicators and Child's Residence.

Table-60: Comparative Analysis: Urban vs. Rural; 2008: 3-5 Year Old Children

2008: 3-5 Year Old Children		Child's Residence		P-value
		Urban n=429	Rural n=172	
deft score (mean±SD)		2.56±3.98	1.66±3.10	*0.003[a]
DMFT score (mean±SD)		0.005±0.06	0	0.371[a']
deft +DMFT (mean±SD)		2.57±3.99	1.66±3.10	*0.003[a]
deft+DMFT=0		235 (54.78%)	109 (63.37%)	0.054[b]
d=0		299 (69.70%)	128 (74.42%)	0.249[b]
D=0		427 (99.53%)	172 (100%)	>0.999[c]
d+D>0		131 (30.54%)	44 (25.58%)	0.227[b]
Childhood Tooth Decay	ECTD	84 (19.58%)	26 (15.12%)	0.201[b]
	S-ECTD	110 (25.64%)	37 (21.51%)	0.287[b]
Dental Health Status	NDE	237 (55.24%)	110 (63.95%)	0.051[b]
	CCC	61 (14.22%)	19 (11.05%)	0.301[b]
	PCC	27 (6.29%)	5 (2.91%)	0.095[b]
	NEC	104 (24.25%)	38 (22.09%)	0.575[b]
Priority Scores	1	18 (4.20%)	3 (1.74%)	0.139[b]
	2	110 (25.64%)	37 (21.51%)	0.287[b]
	3	301 (70.16%)	132 (76.74%)	0.104[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2008, the average deft/DMFT in 3-5 year old children in Rural area was smaller compared to Urban (p-value=0.003).

Table-61: Comparative Analysis: Urban vs. Rural; 2009: 3-5 Year Old Children

2009: 3-5 Year Old Children		Child's Residence		p-value
		Urban n=325	Rural n=148	
deft score (mean±SD)		3.29±4.55	2.43±3.86	*0.036[a]
DMFT score (mean±SD)		0.006±0.11	0.014±0.11	0.510[a']
deft +DMFT (mean±SD)		3.29±4.56	2.45±3.87	*0.038[a]
deft+DMFT=0		153 (47.08%)	87 (58.78%)	*0.018[b]
d=0		178 (54.77%)	109 (73.65%)	*<0.001[b]
D=0		324 (99.69%)	146 (98.65%)	0.232[c]
d+D>0		147 (45.23%)	39 (26.35%)	*<0.001[b]
Childhood Tooth Decay	ECTD	53 (16.31%)	24 (16.22%)	0.980[b]
	S-ECTD	119 (36.62%)	36 (24.32%)	*0.008[b]
Dental Health Status	NDE	154 (47.38%)	91 (61.49%)	*0.004[b]
	CCC	24 (7.38%)	19 (12.83%)	0.056[b]
	PCC	16 (4.92%)	9 (6.08%)	0.602[b]
	NEC	131 (40.32%)	29 (19.60%)	*<0.001[b]
Priority Scores	1	22 (6.77%)	2 (1.35%)	*0.013[b]
	2	126 (38.77%)	35 (23.65%)	*0.001[b]
	3	177 (54.46%)	111 (75.00%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2009, the average deft/DMFT in 3-5 year old children in Rural area was smaller compared to Urban (p-value=0.038).In addition, there was significant relationship between Child's Residence and the majority of the oral health indicators (p-value<0.05); that is, most of the oral health indicators had better measurements in Rural areas.

Table-62: Comparative Analysis: Urban vs. Rural; 2010: 3-5 Year Old Children

2010: 3-5 Year Old Children		Child's Residence		p-value
		Urban n=401	Rural n=153	
deft score (mean±SD)		2.84±4.15	1.96±3.20	*0.008[a]
DMFT score (mean±SD)		0.007±0.14	0	0.537[a']
deft +DMFT (mean±SD)		2.85±4.17	1.96±3.20	*0.008[a]
deft+DMFT=0		206 (51.37%)	85 (55.56%)	0.378[b]
d=0		241 (60.10%)	107 (69.93%)	*0.032[b]
D=0		400 (99.75%)	153 (100%)	>0.999[c]
d+D>0		160 (39.90%)	46 (30.07%)	*0.032[b]
Childhood Tooth Decay	ECTD	51 (12.72%)	37 (24.18%)	*0.001[b]
	S-ECTD	144 (35.91%)	31 (20.26%)	*<0.001[b]
Dental Health Status	NDE	208 (51.87%)	88 (57.52%)	0.234[b]
	CCC	33 (8.23%)	21 (13.73%)	0.882[b]
	PCC	13 (3.24%)	6 (3.92%)	0.694[b]
	NEC	147 (36.66%)	38 (24.84%)	*0.008[b]
Priority Scores	1	17 (4.24%)	3 (1.96%)	0.199[b]
	2	143 (35.66%)	41 (26.80%)	*0.048[b]
	3	241 (60.10%)	109 (71.24%)	*0.015[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2010, the average deft/DMFT in 3-5 year old children in Rural area was smaller compared to Urban (p-value=0.008). There was significant association between % Untreated Cavities (d+D>0) and Child's Residence (p-value<0.05). Even though the proportion of children with ECTD was higher in Rural, the severe form of decay, S-ECTD, was less prevalent.

Table-63: Comparative Analysis: Urban vs. Rural; 2011: 3-5 Year Old Children

2011: 3-5 Year Old Children		Child's Residence		p-value
		Urban n=674	Rural n=280	
deft score (mean±SD)		3.54±4.63	1.84±3.20	<0.001[a]
DMFT score (mean±SD)		0.027±0.24	0	0.005[a]
deft +DMFT (mean±SD)		3.56±4.66	1.84±3.20	<0.001[a]
deft+DMFT=0		306 (45.40%)	168 (60.00%)	<0.001[b]
d=0		415 (61.57%)	201 (71.79%)	0.003[b]
D=0		666 (98.81%)	280 (100%)	0.114[c]
d+D>0		263 (39.02%)	79 (28.21%)	0.002[b]
Childhood Tooth Decay	ECTD	143 (21.22%)	45 (16.07%)	0.069[b]
	S-ECTD	220 (32.64%)	68 (24.29%)	0.010[b]
Dental Health Status	NDE	309 (45.85%)	168 (60.00%)	<0.001[b]
	CCC	104 (15.43%)	35 (12.50%)	0.243[b]
	PCC	61 (9.05%)	7 (2.50%)	<0.001[b]
	NEC	200 (29.67%)	70 (25.00%)	0.145[b]
Priority Scores	1	49 (7.27%)	9 (3.21%)	0.017[b]
	2	281 (41.69%)	71 (25.36%)	<0.001[b]
	3	344 (51.04%)	200 (71.43%)	<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2011, the average deft/DMFT in 3-5 year old children in Rural area was smaller compared to Urban (p-value<0.001). There was significant association between % Priority Scores and Child's Residence (p-value<0.05). The proportion of children with S-ECTD and Untreated Cavities in Rural area was smaller than Urban district.

Table-64: Comparative Analysis: Urban vs. Rural; 2012: 3-5 Year Old Children

2012: 3-5 Year Old Children		Child's Residence		P-value
		Urban n=780	Rural n=455	
deft score (mean±SD)		2.91±4.13	1.47±2.99	*<0.001[a]
DMFT score (mean±SD)		0.009±0.16	0	0.127[a]
deft +DMFT (mean±SD)		2.91±4.14	1.47±2.99	*<0.001[a]
deft+DMFT=0		408 (52.31%)	308 (67.69%)	*<0.001[b]
d=0		509 (65.26%)	362 (79.56%)	*<0.001[b]
D=0		779 (99.87%)	455 (100%)	>0.999[c]
d+D>0		271 (34.74%)	93 (20.44%)	*<0.001[b]
Dental Health Status	ECTD	150 (19.23%)	86 (18.90%)	0.887[b]
	S-ECTD	214 (27.44%)	62 (13.63%)	*<0.001[b]
Oral Health Status	NDE	414 (53.08%)	308 (67.69%)	*<0.001[b]
	CCC	99 (12.69%)	55 (12.09%)	0.756[b]
	PCC	38 (4.87%)	16 (3.52%)	0.261[b]
	NEC	229 (29.36%)	76 (16.70%)	*<0.001[b]
Priority Scores	1	30 (3.85%)	6 (1.32%)	*0.012[b]
	2	259 (33.21%)	112 (24.62%)	*0.001[b]
	3	491 (62.95%)	337 (74.07%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2012, the average deft/DMFT in 3-5 year old children in Rural area was smaller compared to Urban (p-value<0.001). There was association between the majority of oral health measurements and Child's Residence (p-value<0.05); that is, most of the oral health indicators had better measurements in Rural areas.

Table-65: Comparative Analysis: Urban vs. Rural; 2013: 3-5 Year Old Children

2013: 3-5 Year Old Children		Child's Residence		p-value
		Urban n=907	Rural n=513	
deft score (mean±SD)		3.07±4.34	1.61±3.24	*<0.001[a]
DMFT score (mean±SD)		0.11±0.16	0	*0.041[a]
deft +DMFT (mean±SD)		3.08±4.37	1.61±3.24	*<0.001[a]
deft+DMFT=0		454 (50.06%)	347 (67.64%)	*<0.001[b]
d=0		570 (62.84%)	410 (79.92%)	*<0.001[b]
D=0		902 (99.45%)	513 (100%)	0.166[c]
d+D>0		341 (37.60%)	103 (20.08%)	*<0.001[b]
Childhood Tooth Decay	ECTD	193 (21.28%)	99 (19.30%)	0.375[b]
	S-ECTD	253 (27.89%)	64 (12.48%)	*<0.001[b]
Dental Health Status	NDE	456 (50.28%)	348 (67.84%)	*<0.001[b]
	CCC	111 (12.24%)	62 (12.09%)	0.933[b]
	PCC	66 (7.27%)	17 (3.31%)	*0.002[b]
	NEC	274 (30.21%)	86 (16.76%)	*<0.001[b]
Priority Scores	1	37 (4.08%)	5 (0.97%)	*0.001[b]
	2	307 (33.85%)	99 (19.30%)	*<0.001[b]
	3	363 (62.07%)	409 (79.73%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2013, the average deft/DMFT in 3-5 year old children in Rural area was smaller compared to Urban (p-value<0.001). There was association between the majority of oral health measurements and Child's Residence (p-value<0.05); that is, most of the oral health indicators had better measurements in Rural areas.

Table-66: Comparative Analysis: Urban vs. Rural; 2014: 3-5 Year Old Children

2014: 3-5 Year Old Children		Child's Residence		p-value
		Urban n=950	Rural n=542	
deft score (mean±SD)		2.82±4.10	1.65±3.29	*<0.001[a]
DMFT score (mean±SD)		0.003±0.07	0.011±0.25	0.375[a']
deft +DMFT (mean±SD)		2.84±4.10	1.66±3.30	*<0.001[a]
deft+DMFT=0		510 (53.68%)	375 (69.19%)	*<0.001[b]
d=0		628 (66.11%)	441 (81.37%)	*<0.001[b]
D=0		948 (99.79%)	541 (99.82%)	>0.999[c]
d+D>0		322 (33.89%)	102 (18.82%)	*<0.001[b]
Childhood Tooth Decay	ECTD	189 (19.89%)	80 (14.76%)	*0.013[b]
	S-ECTD	241 (25.37%)	77 (14.21%)	*<0.001[b]
Dental Health Status	NDE	520 (54.74%)	384 (70.85%)	*<0.001[b]
	CCC	116 (12.21%)	57 (10.52%)	0.326[b]
	PCC	48 (5.05%)	20 (3.69%)	0.225[b]
	NEC	266 (28.00%)	81 (14.94%)	*<0.001[b]
Priority Scores	1	29 (3.05%)	5 (0.92%)	*0.008[b]
	2	288 (30.32%)	95 (17.53%)	*<0.001[b]
	3	633 (66.63%)	442 (81.55%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2014, the average deft/DMFT in 3-5 year old children in Rural area was smaller compared to Urban (p-value<0.001). There was association between the majority of oral health measurements and Child's Residence (p-value<0.05); that is, most of the oral health indicators had better measurements in Rural areas.

Comparative Analysis: Urban vs. Rural; 6 Year Old Children

The comparative analysis (Urban vs Rural) for 7,558 children of 6 years of age is illustrated in **Tables-66** to **72 and Figures-61** to **63.**

Table-67: Comparative Analysis: Urban vs. Rural; 2008: 6 Year Old Children

2008: 6 Year Old Children		Child's Residence		p-value
		Urban n=1612	Rural n=304	
deft score (mean±SD)		2.31±3.24	1.97±2.84	0.068[a]
DMFT score (mean±SD)		0.4±0.33	0.4±0.29	0.699[a']
deft +DMFT (mean±SD)		2.35±3.30	2.01±2.87	0.065[a]
deft+DMFT=0		838 (51.99%)	169 (55.59%)	0.248[b]
d=0		1326 (82.26%)	258 (84.87%)	0.270[b]
D=0		1597 (99.07%)	302 (99.34%)	>0.999[c]
d+D>0		284 (18.24%)	47 (15.46%)	0.510[b]
Dental Health Status	NDE	842 (52.23%)	170 (55.92%)	0.237[b]
	CCC	477 (29.60%)	87 (28.62%)	0.733[b]
	PCC	160 (9.92%)	19 (6.25%)	*0.043[b]
	NEC	133 (8.25%)	28 (9.21%)	0.580[b]
Priority Scores	1	67 (4.16%)	3 (0.99%)	*0.004[b]
	2	229 (14.21%)	46 (15.13%)	0.673[b]
	3	1316 (81.63%)	255 (83.88%)	0.350[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2008, there was no association between the majority of oral health measurements and Child's Residence. However, the percentage of Priority 1 was higher in 6 year old Urban children.

Table-68: Comparative Analysis: Urban vs. Rural; 2009: 6 Year Old Children

2009: 6 Year Old Children		Child's Residence		p-value
		Urban n=157	Rural n=229	
deft score (mean±SD)		3.37±3.54	2.68±3.06	*0.047[a]
DMFT score (mean±SD)		0.032±0.26	0.079±0.53	0.255[a]
deft +DMFT (mean±SD)		3.40±3.57	2.76±3.13	0.067[a]
deft+DMFT=0		58 (36.94%)	91 (39.74%)	0.579[b]
d=0		102 (64.97%)	173 (75.55%)	0.024[b]
D=0		155 (98.73%)	228 (99.56%)	0.569[c]
d+D>0		56 (35.67%)	56 (24.45%)	*0.017[b]
Dental Health Status	NDE	58 (36.94%)	91 (39.74%)	0.579[b]
	CCC	43 (27.39%)	82 (35.81%)	0.082[b]
	PCC	29 (18.47%)	21 (9.17%)	*0.008[b]
	NEC	27 (17.20%)	35(15.28%)	0.615[b]
Priority Scores	1	6 (3.82%)	7 (3.06%)	0.682[b]
	2	50 (31.85%)	51(22.27%)	*0.035[b]
	3	101 (64.33%)	171 (74.67%)	*0.029[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2009, the average deft/DMFT in 6 year old children in Rural area was smaller compared to Urban (p-value<0.001). There was association between the Priority Scores (2 and 3) and Child's Residence (p-value<0.05).

Table-69: Comparative Analysis: Urban vs. Rural; 2010: 6 Year Old Children

2010: 6 Year Old Children		Child's Residence		p-value
		Urban n=182	Rural n=71	
deft score (mean±SD)		3.24±3.98	3±3.71	0.659[a']
DMFT score (mean±SD)		0.038 ±0.33	0.014±0.11	0.554[a']
deft +DMFT (mean±SD)		3.28±3.98	3.01±3.71	0.627[a']
deft +DMFT=0		78 (42.86%)	32 (45.07%)	0.750[b]
d=0		117 (64.29%)	53 (74.65%)	0.115[b]
D=0		179 (98.35%)	70 (98.59%)	>0.999[c]
d+D>0		67 (36.81%)	18 (25.35%)	0.083[b]
Dental Health Status	NDE	78 (42.86%)	34 (47.89%)	0.469[b]
	CCC	37 (20.33%)	19 (26.76%)	0.268[b]
	PCC	30 (16.48%)	6 (8.45%)	0.10[b]
	NEC	37 (20.33%)	12 (16.90%)	0.535[b]
Priority Scores	1	6 (3.30%)	1 (1.41%)	0.677[b]
	2	62 (34.06%)	15(21.13%)	*0.044[b]
	3	114 (62.64%)	55 (77.46%)	*0.024[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2010, there was association between the Priority scores (2 and 3) and Child's Residence (p-value<0.05). The proportion of 6 year old Rural children who didn't require immediate treatment (priority 3) was higher than Urban children. Percentage of Priority 2 was smaller in Rural compared to Urban area.

Table-70: Comparative Analysis: Urban vs. Rural; 2011: 6 Year Old Children

2011: 6 Year Old Children		Child's Residence		p-value
		Urban n=436	Rural n=47	
deft score (mean±SD)		3.51±4.18	4.28±3.63	0.230[a']
DMFT score (mean±SD)		1.19±0.73	0.09±0.58	0.248[a]
deft +DMFT (mean±SD)		3.71±4.41	4.36±3.85	0.329[a']
deft +DMFT=0		170 (38.99%)	9 (19.15%)	*0.007[b]
d=0		291 (66.74%)	32 (68.09%)	0.853[b]
D=0		412 (94.50%)	47 (100%)	*0.005[b]
d+D>0		159 (36.47%)	15 (31.91%)	0.537[b]
Dental Health Status	NDE	178 (40.83%)	9 (19.15%)	*0.004[b]
	CCC	104 (23.85%)	23 (48.94%)	*<0.001[b]
	PCC	68 (15.60%)	4 (8.51%)	0.195[b]
	NEC	86 (19.72%)	11(23.40%)	0.550[b]
Priority Scores	1	22 (5.05%)	3 (6.38%)	0.694[c]
	2	128 (29.36%)	12 (25.52%)	0.725[b]
	3	286 (65.60%)	32 (68.09%)	0.732[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2011, there was significant association between percentage of Cavity Free children and their Residence. 19.15% of 6 year old children in Rural area never experienced caries compared to 38.99% in Urban area. In addition, proportion of Rural children who received Complete Caries Care was higher than Urban ones.

Table-71: Comparative Analysis: Urban vs. Rural; 2012: 6 Year Old Children

2012: 6 Year Old Children		Child's Residence		p-value
		Urban n=522	Rural n=190	
deft score (mean±SD)		3.55±4.41	3.02±3.95	0.143[a']
DMFT score (mean±SD)		0.17±0.71	0.30±0.23	*<0.001[a]
deft +DMFT (mean±SD)		3.73±4.56	3.06±3.97	0.058[a]
deft +DMFT=0		216 (41.38%)	87 (45.79%)	0.292[b]
d=0		362 (69.35%)	146 (76.84%)	0.050[b]
D=0		495 (94.83%)	186 (97.89%)	0.076[b]
d+D>0		175 (33.52%)	47 (24.74%)	*0.025[b]
Dental Health Status	NDE	224 (42.91%)	92 (48.42%)	0.191[b]
	CCC	122(23.37%)	53 (27.89%)	0.215[b]
	PCC	65 (12.45%)	19 (10.00%)	0.370[b]
	NEC	111 (21.26%)	26 (13.69%)	*0.023[b]
Priority Scores	1	26 (4.98%)	6 (3.16%)	0.299[b]
	2	146 (27.97%)	36 (18.95%)	*0.015[b]
	3	350 (67.05%)	148 (77.89%)	*0.005[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test

In 2012, the average DMFT in 6 year old children in Urban area was smaller compared to Rural (p-value<0.001). However, there was no statistically difference in deft+DMFT. There was association between Untreated Cavities and Child's Residence (p-value<0.05); that is proportion of children in Rural with Untreated Cavities (d+D>0) was lower than those in Urban area.

Table-72: Comparative Analysis: Urban vs. Rural; 2013: 6 Year Old Children

2013: 6 Year Old Children		Child's Residence		p-value
		Urban n=2112	Rural n=780	
deft score (mean±SD)		2.74±3.60	2.64±3.45	0.517[a']
DMFT score (mean±SD)		0.08±0.50	0.05±0.31	*0.048[a]
deft +DMFT (mean±SD)		2.82±3.70	2.69±3.50	0.401[a']
deft +DMFT=0		1013 (47.96%)	374 (47.95%)	0.994[b]
d=0		1648 (78.03%)	626 (80.26%)	0.195[b]
D=0		2064 (97.73%)	763 (97.82%)	0.881[b]
d+D>0		490 (23.20%)	159 (20.38%)	0.107[b]
Dental Health Status	NDE	1023 (48.44%)	380 (48.72%)	0.893[b]
	CCC	603 (28.55%)	241 (30.90%)	0.218[b]
	PCC	229 (10.84%)	72 (9.23%)	0.208[b]
	NEC	257 (12.17%)	87 (11.15%)	0.454[b]
Priority Scores	1	41 (1.94%)	9 (1.15%)	0.149[b]
	2	421 (19.93%)	132 (16.92%)	0.068[b]
	3	1650 (78.13%)	639 (81.93%)	*0.026[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test

In 2013, the average DMFT in 6 year old children in Urban area was smaller compared to Rural (p-value=0.048). However, there was no statistically difference in deft+DMFT. There was association between Priority 3 and Child's Residence (p-value<0.05); that is proportion of children in Rural who didn't require immediate treatment was higher than those in Urban area.

Table-73: Comparative Analysis: Urban vs. Rural; 2014: 6 Year Old Children

2014: 6 Year Old Children		Child's Residence		p-value
		Urban n=589	Rural n=327	
deft score (mean±SD)		3.76±3.97	2.55±3.31	<0.001[a]
DMFT score (mean±SD)		0.10±0.49	0.07±0.52	0.337[a']
deft +DMFT (mean±SD)		3.87±4.10	2.62±3.37	<0.001[a]
deft +DMFT=0		204 (34.63%)	160 (48.93%)	*<0.001[b]
d=0		388 (65.87%)	275 (84.10%)	*<0.001[b]
D=0		571 (96.94%)	321 (98.17%)	0.268[b]
d+D>0		209 (35.48%)	55 (16.82%)	*<0.001[b]
Dental Health Status	NDE	215 (36.51%)	167 (51.07%)	*<0.001[b]
	CCC	168 (28.52%)	108 (33.03%)	0.155[b]
	PCC	86 (14.60%)	22 (6.73%)	*<0.001[b]
	NEC	120 (20.37%)	30 (9.17%)	*<0.001[b]
Priority Scores	1	17 (2.89%)	5 (1.53%)	0.199[b]
	2	181 (30.73%)	43 (13.15%)	*<0.001[b]
	3	391 (66.38%)	279 (85.32%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test

In 2014, the average deft/DMFT in 6 year old children in Rural area was smaller compared to Urban (p-value=0.048). However, there was no statistically difference in deft+DMFT. There was association between Priority 3 and Child's Residence (p-value<0.05); proportion of children in Rural who didn't require immediate treatment was higher than those in Urban area.

Neighborhood Income Status: Non-LIM vs. LIM

According to Statistics Canada, a Neighborhood is defined as Low Income when more than 30% of the families in the Neighborhood meet the definition of Low Income Measure (LIM).[28] To simplify, "the LIM is a fixed percentage (50%) of median adjusted economic family income, where "adjusted" indicates that family needs are taken into account".[26]

On the basis of the LIM definition, the children were categorized as the group who belonged to LIM Neighborhoods and Non-LIM Neighborhoods. In each screening year, the LIM information was unavailable for a few children who were excluded in this comparative analysis. Out of 23,787 children, 22,691 were considered for this analysis. **Tables-73** to **97** illustrate the comparative analysis based on Neighborhood Income Status in detail (including the number of participants).

Comparative Analysis: Non-LIM vs. LIM; 0-2 Year Old Children

The comparative analysis (Non-LIM vs LIM) for 8,530 children of 0-2 years of age is illustrated in **Tables-73** to **81 and Figures-64** to **67.**

Table-74: Comparative Analysis: Non-LIM vs. LIM; 2006: 0-2 Year Old Children

2006: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=246	LIM n=152	
deft score (mean±SD)		0.54±1.87	0.70±1.81	0.406[a]
deft=0		218 (88.62%)	127 (83.55%)	0.148[b]
d=0		218 (88.62%)	127 (83.55%)	0.148[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	28 (11.38%)	25 (16.45%)	0.148[b]
Dental Health Status	NDE	219 (89.03%)	127 (83.55%)	0.116[b]
	CCC	0	0	-
	PCC	1 (0.41%)	0	>0.999[c]
	NEC	26 (10.57%)	25 (16.45%)	0.088[b]
Priority Scores	1	1 (0.41%)	0	>0.999[c]
	2	26 (10.57%)	21 (13.82%)	0.329[b]
	3	219 (89.02%)	131 (86.18%)	0.389[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2006, the mean deft was not statistically different between 0-2 year old children in LIM and Non-LIM Neighborhood. Also there was no association between oral health indicators and Neighborhood Income Status.

Table-75: Comparative Analysis: Non-LIM vs. LIM; 2007: 0-2 Year Old Children

2007: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=421	LIM n=180	
deft score (mean±SD)		0.27±1.03	0.70±1.88	*0.005[a]
deft=0		387 (91.92%)	150 (83.33%)	*0.002[b]
d=0		390 (92.64%)	151 (83.89%)	*0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	34 (8.08%)	30 (16.67%)	*0.002[b]
Dental Health Status	NDE	389 (92.40%)	152 (84.44%)	*0.003[b]
	CCC	3 (0.71%)	1 (0.56%)	>0.999[c]
	PCC	0	0	-
	NEC	29 (6.89%)	27 (15%)	*0.002[b]
Priority Scores	1	1 (0.24%)	1 (0.56%)	0.510[c]
	2	30 (7.13%)	24 (13.33%)	*0.015[b]
	3	390 (92.64%)	155 (86.11%)	*0.012[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2007, the average deft in 0-2 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value=0.005). There was association between the majority of oral health measurements and Income Status (p-value<0.05); that is, most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-76: Comparative Analysis: Non-LIM vs. LIM; 2008: 0-2 Year Old Children

2008: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=407	LIM n=181	
deft score (mean±SD)		0.45±1.44	0.49±1.48	0.715[a]
deft=0		361 (88.70%)	158 (87.29%)	0.625[b]
d=0		367 (90.17%)	158 (87.29%)	0.297[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	45 (11.06%)	23 (12.71%)	0.563[b]
Dental Health Status	NDE	362 (88.94%)	159 (87.85%)	0.699[b]
	CCC	5 (1.23%)	0	0.330[c]
	PCC	1 (0.25%)	0	>0.999[c]
	NEC	39 (9.58%)	22 (12.15%)	0.345[c]
Priority Scores	1	3 (0.74%)	1 (0.55%)	>0.999[c]
	2	38 (9.34%)	21 (11.60%)	0.399[b]
	3	366 (89.93%)	159 (87.85%)	0.451[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2008, the mean deft was not statistically different between 0-2 year old children in LIM and Non-LIM Neighborhood. Also, there was no association between oral health indicators and Neighborhood Income Status.

Table 77: Comparative Analysis: Non-LIM vs. LIM; 2009: 0-2 Year Old Children

2009: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=478	LIM n=237	
deft score (mean±SD)		0.50±1.58	0.84±2.14	*0.027[a]
deft=0		412 (86.19%)	191 (80.59%)	0.052[b]
d=0		419 (87.66%)	193 (81.43%)	*0.026[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	65 (13.60%)	44 (18.57%)	0.082[b]
Dental Health Status	NDE	415 (86.82%)	193 (81.43%)	0.057[b]
	CCC	6 (1.26%)	2 (0.84%)	>0.999[c]
	PCC	2 (0.42%)	0	>0.999[c]
	NEC	55 (11.51%)	42 (17.72%)	*0.022[b]
Priority Scores	1	1 (0.21%)	1 (0.42%)	0.553[c]
	2	57 (11.92%)	41 (17.30%)	*0.049[b]
	3	420 (87.87%)	195 (82.28%)	*0.043[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2009, the average deft in 0-2 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value=0.027). There was association between the majority of oral health measurements and Income Status (p-value<0.05). That is, most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-78: Comparative Analysis: Non-LIM vs. LIM; 2010: 0-2 Year Old Children

2010: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=523	LIM n=257	
deft score (mean±SD)		0.35±1.58	0.62±1.95	0.051[a]
deft=0		476 (91.01%)	222 (86.38%)	*0.047[b]
d=0		478 (91.49%)	224 (87.16%)	0.064[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	46 (8.80%)	35 (13.62%)	*0.038[b]
Dental Health Status	NDE	476 (91.01%)	222 (86.38%)	*0.047[b]
	CCC	2 (0.38%)	1 (0.39%)	>0.999[c]
	PCC	0	0	-
	NEC	45 (8.60%)	34 (13.23%)	*0.044[b]
Priority Scores	1	1 (0.19%)	3 (1.17%)	0.107[c]
	2	43 (8.22%)	32 (12.45%)	0.060[b]
	3	479 (91.59%)	222 (86.38%)	*0.024[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2010, Childhood Tooth Decay was associated with Income Status in 0-2 year old children (p-value=0.038). Also, there was relationship between being Caries Free and Income Status (p-value=0.047). The proportion of 0-2 year old children with No Evidence of Care in Non-LIM Neighborhood was smaller compared to LIM Neighborhood.

Table-79: Comparative Analysis: Non-LIM vs. LIM; 2011: 0-2 Year Old Children

2011: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=584	LIM n=221	
deft score (mean±SD)		0.34±1.44	0.70±1.67	*0.006[a]
deft=0		534 (91.44%)	177 (80.09%)	*<0.001[b]
d=0		534 (91.44%)	178 (80.54%)	*<0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	49 (8.39%)	42 (19.00%)	*<0.001[b]
Dental Health Status	NDE	537 (91.95%)	178 (80.55%)	*<0.001[b]
	CCC	0	1 (0.45%)	0.275[c]
	PCC	2 (0.34%)	1 (0.45%)	>0.999[c]
	NEC	45 (7.71%)	41 (18.55%)	*<0.001[b]
Priority Scores	1	4 (0.68%)	0	0.580[c]
	2	42 (7.19%)	43 (19.46%)	*<0.001[b]
	3	538 (92.12%)	178 (80.54%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2011, the average deft in 0-2 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value=0.006). There was association between the majority of oral health measurements and Income Status (p-value<0.05); that is, most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-80: Comparative Analysis: Non-LIM vs. LIM; 2012: 0-2 Year Old Children

2012: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=1157	LIM n=337	
deft score (mean±SD)		0.27±1.29	0.68±1.92	*<0.001[a]
Caries Free-Primary Dentition (deft=0)		1065 (92.05%)	282 (83.68%)	*<0.001[b]
d=0		1066 (92.13%)	284 (84.27%)	*<0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	92 (7.95%)	55 (16.32%)	*<0.001[b]
Dental Health Status	NDE	1066 (92.13%)	282 (83.68%)	*<0.001[b]
	CCC	1 (0.09%)	2 (0.59%)	0.129[c]
	PCC	4 (0.35%)	0	0.580[c]
	NEC	86 (7.43%)	53 (15.73%)	*<0.001[b]
Priority Scores	1	7 (0.61%)	3 (0.89%)	0.703[c]
	2	84 (7.26%)	52 (15.43%)	*<0.001[b]
	3	1066 (92.13%)	282 (83.68%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2012, the average deft in 0-2 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-81: Comparative Analysis: Non-LIM vs. LIM; 2013: 0-2 Year Old Children

2013: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=1311	LIM n=342	
deft score (mean±SD)		0.25±1.10	0.73±2.04	*<0.001[a]
deft=0		1213 (92.52%)	288 (84.21%)	*<0.001[b]
d=0		1220 (93.06%)	290 (84.80%)	*<0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	98 (7.48%)	53 (15.50%)	*<0.001[b]
Dental Health Status	NDE	1212 (92.45%)	289 (84.50%)	*<0.001[b]
	CCC	7 (0.53%)	2 (0.58%)	>0.999[c]
	PCC	3 (0.23%)	0	>0.999[c]
	NEC	89 (6.79%)	51 (14.91%)	*<0.001[b]
Priority Scores	1	5 (0.38%)	3 (0.88%)	0.218[c]
	2	88 (6.71%)	48 (14.03%)	*<0.001[b]
	3	1218 (92.91%)	291 (85.09%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2013, the average deft in 0-2 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); that is, most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-82: Comparative Analysis: Non-LIM vs. LIM; 2014: 0-2 Year Old Children

2014: 0-2 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=1208	LIM n=288	
deft score (mean±SD)		0.31±1.34	0.87±2.52	*<0.001[a]
deft=0		1111 (91.97%)	242 (84.03%)	*<0.001[b]
d=0		1119 (92.63%)	247 (85.76%)	*<0.001[b]
Childhood Tooth Decay	ECTD	0	0	-
	S-ECTD	93 (7.70%)	45 (15.63%)	*<0.001[b]
Dental Health Status	NDE	1116 (92.38%)	243 (84.38%)	*<0.001[b]
	CCC	6 (0.50%)	5 (1.74%)	0.043[c]
	PCC	0	0	-
	NEC	86 (7.12%)	40 (13.89%)	*<0.001[b]
Priority Scores	1	2 (0.17%)	2 (0.69%)	0.169[c]
	2	84 (6.95%)	38 (13.19%)	*0.001[b]
	3	1122 (92.88%)	248 (86.11%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2014, the average deft in 0-2 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); that is most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Comparative Analysis: Non-LIM vs. LIM; 3-5 Year Old Children

The comparative analysis (Non-LIM vs LIM) for 6,980 children of 3-5 years of age is illustrated in **Tables-82** to **90 and Figures-68** to **71.**

Table-83: Comparative Analysis: Non-LIM vs. LIM; 2006: 3-5 Year Old Children

2006: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=160	LIM n=50	
deft score (mean±SD)		2.26±3.71	3.60±4.46	0.059[a]
DMFT score (mean±SD)		0.01±0.11	0	0.429[a']
deft +DMFT (mean±SD)		2.27±3.72	3.60±4.46	0.061[a]
deft+DMFT=0		94 (58.75%)	26 (52%)	0.400[b]
d=0		109 (68.13%)	36 (72%)	0.605[b]
D=0		160 (100%)	50 (100%)	-
d+D>0		51 (31.87%)	14 (28%)	0.605[b]
Childhood Tooth Decay	ECTD	24 (15%)	5 (10%)	0.371[b]
	S-ECTD	42 (26.25%)	19 (38%)	0.110[b]
Dental Health Status	NDE	100 (62.50%)	27 (54%)	0.283[b]
	CCC	15 (9.38%)	10 (20.00%)	*0.043[b]
	PCC	7 (4.38%)	3 (6%)	0.705[c]
	NEC	38 (23.74%)	10 (20.00%)	0.581[b]
Priority Scores	1	3 (1.88%)	1 (2%)	>0.999[c]
	2	49 (30.62%)	13 (26%)	0.531[b]
	3	108 (67.50%)	36 (72%)	0.550[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2006, there was no association between the majority of oral health measurements and Income Status. The proportion of 3-5 year old children with Complete Caries Care in LIM Neighborhood was higher compared to Non-LIM.

Table-84: Comparative Analysis: Non-LIM vs. LIM; 2007: 3-5 Year Old Children

2007: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=267	LIM n=82	
deft score (mean±SD)		1.86±3.14	2.70±3.92	0.080[a]
DMFT score (mean±SD)		0.015±0.121	0	*0.045[a]
deft +DMFT (mean±SD)		1.88±3.16	2.70±3.92	0.086[a]
deft+DMFT=0		171 (64.04%)	38 (46.34%)	*0.004[b]
d=0		209 (78.28%)	49 (59.67%)	*0.001[b]
D=0		266 (99.63%)	82 (100%)	>0.999[c]
d+D>0		59 (22.10%)	33 (40.24%)	*0.001[b]
Childhood Tooth Decay	ECTD	37 (13.86%)	20 (24.39%)	*0.024[b]
	S-ECTD	59 (22.10%)	24 (29.27%)	0.182[b]
Dental Health Status	NDE	185 (69.29%)	38 (46.34%)	*<0.001[b]
	CCC	27 (10.11%)	11 (13.41%)	0.401[b]
	PCC	12 (4.49%)	4 (4.88%)	>0.999[c]
	NEC	43 (16.11%)	29 (35.37%)	*<0.001[b]
Priority Scores	1	2 (0.75%)	4 (4.88%)	*0.024[c]
	2	51 (19.10%)	25 (30.49%)	*0.029[b]
	3	214 (80.15%)	53 (64.63%)	*0.004[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2007, there was association between the majority of oral health measurements and Income Status (p-value<0.05); that is most of the oral health indicators in 3-5 year old children had better measurements in Non-LIM Neighborhood.

Table-85: Comparative Analysis: Non-LIM vs. LIM; 2008: 3-5 Year Old Children

2008: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=456	LIM n=115	
deft score (mean±SD)		1.79±3.23	4.14±4.81	*<0.001[a]
DMFT score (mean±SD)		0.004±0.066	0	0.158[a']
deft +DMFT (mean±SD)		1.80±3.24	4.14±4.81	*<0.001[a]
deft+DMFT=0		283 (62.02%)	46 (40.00%)	*<0.001[b]
d=0		341 (74.95%)	65 (56.52%)	*<0.001[b]
D=0		454 (99.56%)	115 (100%)	>0.999[c]
d+D>0		115 (25.22%)	50 (43.48%)	*<0.001[b]
Childhood Tooth Decay	ECTD	87 (19.08%)	17 (14.78%)	0.286[b]
	S-ECTD	86 (18.86%)	52 (45.22%)	*<0.001[b]
Dental Health Status	NDE	286 (62.72%)	46 (40.00%)	*<0.001[b]
	CCC	56 (12.28%)	19 (16.52%)	0.229[b]
	PCC	25 (5.48%)	4 (3.48%)	0.382[b]
	NEC	89 (19.52%)	46 (40.00%)	*<0.001[b]
Priority Scores	1	14 (3.07%)	6 (5.22%)	0.261[c]
	2	95 (20.83%)	43 (37.39%)	*<0.001[b]
	3	347 (76.10%)	66 (57.39%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2008, the average deft/DMFT in 3-5 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-86: Comparative Analysis: Non-LIM vs. LIM; 2009: 3-5 Year Old Children

2009: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=330	LIM n=114	
deft score (mean±SD)		2.77±4.19	3.55±4.42	0.094[a']
DMFT score (mean±SD)		0.012±0.134	0	0.337[a']
deft +DMFT (mean±SD)		2.78±4.20	3.55±4.42	0.099[a']
deft+DMFT=0		178 (53.94%)	48 (42.11%)	*0.029[b]
d=0		210 (63.64%)	60 (52.63%)	*0.038[b]
D=0		327 (99.09%)	114 (100%)	0.099[a']
d+D>0		120 (36.36%)	54 (47.37%)	*0.038[b]
Childhood Tooth Decay	ECTD	59 (17.88%)	12 (10.53)	0.065[b]
	S-ECTD	92 (27.88%)	54 (47.37%)	*<0.001[b]
Dental Health Status	NDE	182 (55.15%)	48 (42.11%)	*0.016[b]
	CCC	29 (8.79%)	12 (10.53%)	0.580[b]
	PCC	21 (6.36%)	1 (0.88%)	*0.020[b]
	NEC	98 (29.70%)	53 (46.48%)	*0.001[b]
Priority Scores	1	16 (4.85%)	5 (4.39%)	0.841[c]
	2	103 (31.21%)	49 (42.98%)	*0.022[b]
	3	211 (63.94%)	60 (52.63%)	*0.033[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2009, there was association between the majority of oral health measurements in 3-5 year old children and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-87: Comparative Analysis: Non-LIM vs. LIM; 2010: 3-5 Year Old Children

2010: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=388	LIM n=140	
deft score (mean±SD)		2.26±3.65	3.67±4.53	*0.001[a]
DMFT score (mean±SD)		0.008±0.152	0	0.549[a']
deft +DMFT (mean±SD)		2.27±3.69	3.67±4.53	*0.001[a]
deft+DMFT=0		211 (54.38%)	62 (44.29%)	*0.040[b]
d=0		250 (64.43%)	80 (57.14%)	0.127[b]
D=0		387 (99.74%)	140 (100%)	>0.999[c]
d+D>0		138 (35.57%)	60 (42.86%)	0.127[b]
Childhood Tooth Decay	ECTD	70 (18.04%)	17 (12.14%)	0.107[b]
	S-ECTD	107 (27.58%)	61 (43.57%)	*<0.001[b]
Dental Health Status	NDE	215 (55.41%)	63 (45.00%)	*0.034[b]
	CCC	37 (9.54%)	17 (12.14%)	0.383[b]
	PCC	15 (3.87%)	3 (2.14%)	0.425[c]
	NEC	121 (31.18%)	57 (40.71%)	*0.041[b]
Priority Scores	1	13 (3.35%)	6 (4.29%)	0.611[b]
	2	122 (31.44%)	55 (39.29%)	0.092[b]
	3	253 (65.21%)	79 (56.42%)	0.065[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2010, the average deft/DMFT in 3-5 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value=0.001). There was association between being No Evidence of Care and Income Status (p-value=0.041). Being caries free was associated with Income Status (p-value=0.040).The proportion of children with S-ECTD was higher in Non-LIM Neighborhood compared to LIM Neighborhood.

Table-88: Comparative Analysis: Non-LIM vs. LIM; 2011: 3-5 Year Old Children

2011: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=660	LIM n=260	
deft score (mean±SD)		2.72±4.11	3.91±4.80	*<0.001[a]
DMFT score (mean±SD)		0.012±0.15	0.038±0.31	0.198[a]
deft +DMFT (mean±SD)		2.73±4.14	3.95±4.83	*<0.001[a]
deft+DMFT=0		353 (53.48%)	104 (40%)	*<0.001[b]
d=0		438 (66.36%)	156 (60.00%)	0.069[b]
D=0		657 (99.55%)	255 (98.08%)	*0.045[c]
d+D>0		223 (33.79%)	107 (41.15%)	*0.036[b]
Childhood Tooth Decay	ECTD	116 (17.58%)	66 (25.38%)	*0.007[b]
	S-ECTD	190 (28.79%)	87 (33.46%)	0.164[b]
Dental Health Status	NDE	353 (53.48%)	106 (40.76%)	*0.001[b]
	CCC	85 (12.88%)	49 (18.85%)	*0.021[b]
	PCC	47 (7.12%)	21 (8.08%)	0.618[b]
	NEC	175 (26.52%)	84 (32.31%)	0.079[b]
Priority Scores	1	32 (4.85%)	23 (8.85%)	*0.021[b]
	2	228 (34.55%)	116 (44.62%)	*0.004[b]
	3	400 (60.60%)	121 (46.53%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2011, the average deft/DMFT in 3-5 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-89: Comparative Analysis: Non-LIM vs. LIM; 2012: 3-5 Year Old Children

2012: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=951	LIM n=226	
deft score (mean±SD)		2.12±3.60	3.35±4.34	*<0.001[a]
DMFT score (mean±SD)		0.006±0145	0	0.513[a']
deft +DMFT (mean±SD)		2.128±3.60	3.358±4.34	*<0.001[a]
deft+DMFT=0		580 (60.99%)	105 (46.46%)	*<0.001[b]
d=0		692 (72.77%)	138 (61.33%)	*0.001[b]
D=0		951 (100%)	226 (100%)	-
d+D>0		259 (27.23%)	87 (38.50%)	*0.001[b]
Childhood Tooth Decay	ECTD	176 (18.51%)	50 (22.12%)	0.215[b]
	S-ECTD	191 (20.08%)	68 (30.09%)	*0.001[b]
Dental Health Status	NDE	583 (61.30%)	108 (47.79%)	*<0.001[b]
	CCC	112 (11.78%)	33 (14.60%)	0.245[b]
	PCC	42 (4.42%)	10 (4.42%)	0.996[b]
	NEC	214 (22.50%)	75 (33.19%)	*0.001[b]
Priority Scores	1	28 (2.94%)	6 (2.65%)	0.815[b]
	2	265 (27.87%)	88 (38.94%)	*0.001[b]
	3	658 (69.19%)	132 (58.41%)	*0.002[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test

In 2012, the average deft/DMFT in 3-5 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-90: Comparative Analysis: Non-LIM vs. LIM; 2013: 3-5 Year Old Children

2013: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=1127	LIM n=240	
deft score (mean±SD)		2.18±3.81	4.18±4.66	*<0.001[a]
DMFT score (mean±SD)		0.007±0.13	0.004±0.06	0.750[a']
deft +DMFT (mean±SD)		2.19±3.83	4.19±4.66	*<0.001[a]
deft+DMFT=0		684 (60.69%)	89 (37.08%)	*<0.001[b]
d=0		817 (72.49%)	125 (52.08%)	*<0.001[b]
D=0		1123 (99.65%)	239 (99.58%)	>0.999[c]
d+D>0		313 (27.77%)	116 (48.33%)	*<0.001[b]
Childhood Tooth Decay	ECTD	230 (20.41%)	53 (22.08%)	0.561[b]
	S-ECTD	207 (18.37%)	96 (40.00%)	*<0.001[b]
Dental Health Status	NDE	685 (60.78%)	90 (37.50%)	*<0.001[b]
	CCC	130 (11.54%)	34 (14.17%)	0.255[b]
	PCC	55 (4.88%)	25 (10.42%)	*<0.001[b]
	NEC	257 (22.80%)	91 (37.92%)	*<0.001[b]
Priority Scores	1	31 (2.75%)	11 (4.58%)	0.135[b]
	2	285 (25.29%)	106 (44.17%)	*<0.001[b]
	3	811 (71.96%)	123 (51.25%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2013, the average deft/DMFT in 3-5 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-91: Comparative Analysis: Non-LIM vs. LIM; 2014: 3-5 Year Old Children

2014: 3-5 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=1167	LIM n=247	
deft score (mean±SD)		2.091±3.56	4.057±4.90	*<0.001[a]
DMFT score (mean±SD)		0.006±0.178	0.008±0.127	0.860[a']
deft +DMFT (mean±SD)		2.097±3.567	4.065±4.90	*<0.001[a]
deft+DMFT=0		729 (62.47%)	107 (43.32%)	*<0.001[b]
d=0		870 (74.55%)	136 (55.06%)	*<0.001[b]
D=0		1165 (99.83%)	246 (99.60%)	0.438[c]
d+D>0		298 (25.54%)	111 (44.94%)	*<0.001[b]
Childhood Tooth Decay	ECTD	197 (16.88%)	57 (23.08%)	*0.021[b]
	S-ECTD	222 (19.02%)	82 (33.20%)	*<0.001[b]
Dental Health Status	NDE	746 (63.92%)	109 (44.13%)	*<0.001[b]
	CCC	130 (11.14%)	29 (11.74%)	0.786[b]
	PCC	42 (3.60%)	22 (8.91%)	*<0.001[b]
	NEC	249 (21.34%)	87 (35.22%)	*<0.001[b]
Priority Scores	1	23 (1.97%)	10 (4.05%)	*0.049[b]
	2	269 (23.05%)	100 (40.49%)	*<0.001[b]
	3	875 (74.98%)	137 (55.47%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2014, the average deft/DMFT in 3-5 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Comparative Analysis: Non-LIM vs. LIM; 6 Year Old Children

The comparative analysis (Non-LIM vs LIM) for 7,181 children of 6 years of age is illustrated in **Tables-91** to **97 and Figures-72** to **74.**

Table-92: Comparative Analysis: Non-LIM vs. LIM; 2008: 6 Year Old Children

2008: 6 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=1639	LIM n=223	
deft score (mean±SD)		2.12±3.09	3.19±3.72	*<0.001[a]
DMFT score (mean±SD)		0.03±0.30	0.08±0.45	<0.125[a]
deft +DMFT (mean±SD)		2.16±3.13	3.27±3.81	*<0.001[a]
deft+DMFT=0		896 (54.67%)	88 (39.46%)	*<0.001[b]
d=0		1393 (84.99%)	155 (69.51%)	*<0.001[b]
D=0		1625 (99.15%)	220 (98.65%)	0.446[c]
d+D>0		253 (15.44%)	70 (31.39%)	*<0.001[b]
Dental Health Status	NDE	901 (54.97%)	88 (39.46%)	*<0.001[b]
	CCC	486 (29.65%)	65 (29.15%)	0.887[b]
	PCC	129 (7.87%)	40 (17.94%)	*<0.001[b]
	NEC	123 (7.50%)	30 (13.45%)	*0.002[b]
Priority Scores	1	54 (3.29%)	14 (6.28%)	*0.026[b]
	2	204 (12.45%)	56 (25.11%)	*<0.001[b]
	3	1381 (84.26%)	153 (68.61%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (a') Independent two sample T-test: equal variances
(b) Chi-square test; (c) Fisher's exact test

In 2008, the average deft/DMFT in 6 year old children in Non-LIM was smaller compared to LIM Neighborhood .Most of the oral health indicators had better measurements in Non-LIM.

Table-93: Comparative Analysis: Non-LIM vs. LIM; 2009: 6 Year Old Children

2009: 6 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=337	LIM n=26	
deft score (mean±SD)		2.72±3.11	5.46±4.16	*<0.001[a']
DMFT score (mean±SD)		0.06±0.47	0	0.481[a']
deft +DMFT (mean±SD)		2.78±3.18	5.46±4.16	*<0.001[a']
deft+DMFT=0		139 (41.25%)	3 (11.54%)	*0.003[b]
d=0		247 (73.29%)	13 (50.00%)	*0.011[b]
D=0		335 (99.41%)	26 (100%)	>0.999[c]
d+D>0		90 (26.71%)	13 (50.00%)	*0.011[b]
Dental Health Status	NDE	139 (41.25%)	3 (11.54%)	*0.003[b]
	CCC	108 (32.05%)	10 (38.46%)	0.501[b]
	PCC	39 (11.57%)	6 (23.08%)	0.086[b]
	NEC	51 (15.13%)	7 (26.92%)	0.158[c]
Priority Scores	1	9 (2.67%)	1 (3.85%)	0.529[c]
	2	84 (24.93%)	11 (42.31%)	0.052[b]
	3	244 (72.40%)	14 (53.85%)	*0.044[b]

SD: Standard Deviation; * statistically significant
(a') Independent two sample T-test: equal variances; (b) Chi-square test; (c) Fisher's exact test

In 2009, the average deft/DMFT in 6 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the being Cavity Free and Income Status (p-value=0.003); the percentage of Cavity Free children was higher in Non-LIM Neighborhood.

Table-94: Comparative Analysis: Non-LIM vs. LIM; 2010: 6 Year Old Children

2010: 6 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=200	LIM n=39	
deft score (mean±SD)		3.04±3.73	3.94±4.50	0.183[a']
DMFT score (mean±SD)		0.03±0.29	0.05±0.32	0.688[a']
deft +DMFT (mean±SD)		3.07±3.74	4.00±4.48	0.174[a']
deft+DMFT=0		89 (44.50%)	14 (35.90%)	0.321[b]
d=0		138 (69.00%)	23 (58.97%)	0.222[b]
D=0		197 (98.50%)	38 (97.44%)	0.512[c]
d+D>0		64 (32.00%)	16 (41.03%)	0.275[b]
Dental Health Status	NDE	91 (45.50%)	14 (35.90%)	0.269[b]
	CCC	45 (25.50%)	9 (23.08%)	0.937[b]
	PCC	31 (15.50%)	2 (5.13%)	0.086[b]
	NEC	33 (16.50%)	14 (35.90%)	*0.015[b]
Priority Scores	1	6 (3.00%)	1 (2.56%)	>0.999[c]
	2	57 (28.50%)	15 (38.46%)	0.215[b]
	3	137 (68.50%)	23 (58.98%)	0.247[b]

SD: Standard Deviation; * statistically significant
(a') Independent two sample T-test: equal variances; (b) Chi-square test; (c) Fisher's exact test

In 2010, there was no association between the majority of oral health measurements in 6 year old children and Income Status. Except the fact that there was relationship between having No Evidence of Care and Income Status. The proportion of children with no NEC was higher in LIM Neighborhood compared to Non-LIM.

Table-95: Comparative Analysis: Non-LIM vs. LIM; 2011: 6 Year Old Children

2011: 6 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=333	LIM n=139	
deft score (mean±SD)		3.36±3.91	4.07±4.55	0.108[a]
DMFT score (mean±SD)		0.11±0.56	0.32±0.97	*0.020[a]
deft +DMFT (mean±SD)		3.48±4.10	4.40±4.81	0.050[a]
deft+DMFT=0		131 (39.34%)	43 (30.94%)	0.085[b]
d=0		229 (68.77%)	84 (60.43%)	0.081[b]
D=0		319 (95.80%)	129 (92.81%)	0.178[b]
d+D>0		112 (33.63%)	61 (43.88%)	*0.035[b]
Dental Health Status	NDE	140 (42.04%)	42 (30.22%)	*0.016[b]
	CCC	85 (25.53%)	37 (26.62%)	0.805[b]
	PCC	46 (13.81%)	26 (18.71%)	0.178[b]
	NEC	62 (18.62%)	34 (24.45%)	0.151[b]
Priority Scores	1	16 (2.80%)	9 (6.47%)	0.460[b]
	2	90 (27.03%)	49 (35.25%)	0.074[b]
	3	227 (68.17%)	81 (58.27%)	*0.040[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test

In 2011, there was association between having Untreated Cavities and Income Status (p-value=0.035). The proportion of 6 year old children with Untreated Cavities (d+D>0) was smaller in Non-LIM compared to LIM Neighborhood.

Table-96: Comparative Analysis: Non-LIM vs. LIM; 2012: 6 Year Old Children

2012: 6 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=565	LIM n=120	
deft score (mean±SD)		3.10±4.09	4.60±4.62	*0.001[a]
DMFT score (mean±SD)		0.06±0.36	0.50±1.22	*<0.001[a]
deft +DMFT (mean±SD)		3.16±4.13	5.10±4.97	*<0.001[a]
deft+DMFT=0		262 (46.37%)	34 (28.33%)	*<0.001[b]
d=0		418 (73.98%)	74 (61.67%)	*0.006[b]
D=0		551 (97.52%)	105 (87.50%)	*<0.001[b]
d+D>0		157 (27.79%)	53 (44.17%)	*<0.001[b]
Dental Health Status	NDE	271 (47.96%)	36 (30.00%)	*<0.001[b]
	CCC	138 (24.42%)	31 (25.83%)	0.745[b]
	PCC	58 (10.27%)	23 (19.17%)	*0.006[b]
	NEC	98 (17.35%)	30 (25.00%)	0.051[b]
Priority Scores	1	20 (3.54%)	9 (7.50%)	0.050[b]
	2	129 (22.83%)	44 (36.67%)	*0.002[b]
	3	416 (73.63%)	67 (55.83%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test

In 2012, the average deft/DMFT in 6 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-97: Comparative Analysis: Non-LIM vs. LIM; 2013: 6 Year Old Children

2013: 6 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=2381	LIM n=299	
deft score (mean±SD)		2.60±3.48	3.66±4.12	*<0.001[a]
DMFT score (mean±SD)		0.05±0.41	0.21±0.79	*0.001[a]
deft +DMFT (mean±SD)		2.66±3.54	3.87±4.31	*<0.001[a]
deft+DMFT=0		1176 (49.39%)	111 (37.12%)	*<0.001[b]
d=0		1899 (79.76%)	204 (68.23%)	*<0.001[b]
D=0		2337 (98.15%)	281(93.98%)	*<0.001[b]
d+D>0		504 (21.17%)	102 (34.11%)	*<0.001[b]
Dental Health Status	NDE	1191 (50.02%)	111 (37.12%)	*<0.001[b]
	CCC	690 (28.98%)	86 (28.76%)	0.938[b]
	PCC	235 (9.87%)	43 (14.38%)	*0.016[b]
	NEC	265 (11.13%)	59 (19.73%)	*<0.001[b]
Priority Scores	1	35 (1.47%)	9 (3.01%)	0.085[c]
	2	429 (18.02%)	90 (30.10%)	*<0.001[b]
	3	1917 (80.51%)	200 (66.89%)	*<0.001[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2013, the average deft/DMFT in 6 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value<0.001). There was association between the majority of oral health measurements and Income Status (p-value<0.05); most of the oral health indicators had better measurements in Non-LIM Neighborhood.

Table-98: Comparative Analysis: Non-LIM vs. LIM; 2014: 6 Year Old Children

2014: 6 Year Old Children		Neighborhood Income Status		p-value
		Non-LIM n=770	LIM n=110	
deft score (mean±SD)		3.13±3.64	4.49±4.43	*0.003[a]
DMFT score (mean±SD)		0.07±0.43	0.24±0.85	*0.042[a]
deft +DMFT (mean±SD)		3.20±3.70	4.73±4.76	*0.002[a]
deft+DMFT=0		318 (41.30%)	34 (30.91%)	*0.037[b]
d=0		570 (74.03%)	68 (61.82%)	*0.007[b]
D=0		752 (97.66%)	105 (95.45%)	0.193[c]
d+D>0		210 (27.27%)	42 (38.18%)	*0.018[b]
Dental Health Status	NDE	336 (43.64%)	35 (31.82%)	*0.019[b]
	CCC	230 (29.87%)	33 (30.00%)	0.978[b]
	PCC	83 (10.78%)	16 (14.55%)	0.242[b]
	NEC	121 (15.71%)	26 (23.63%)	*0.037[b]
Priority Scores	1	17 (2.21%)	5 (4.55%)	0.180[c]
	2	180 (23.38%)	33 (30.00%)	0.129[b]
	3	573 (74.41%)	72 (65.45%)	*0.047[b]

SD: Standard Deviation; * statistically significant
(a) Independent two sample T-test: unequal variances; (b) Chi-square test; (c) Fisher's exact test

In 2014, the average deft/DMFT in 6 year old children in Non-LIM Neighborhood was smaller compared to LIM Neighborhood (p-value=0.002). There was association between being caries free and Income Status (p-value=0.037). Having Untreated Cavities was associated with Income Status (p-value=0.018).The difference in measure of No Evidence of Care (NEC) was also prominent between the two populations.

Epidemiological Studies

An Odds Ratio (OR) is a measure of association between an exposure and an outcome. The OR represents that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure.[29]

In the following Odds Ratio measures, the outcome is "Dental Decay" and the exposures are:

1) Child's Residence

2) Low Income Measure (LIM) Neighborhoods.

To calculate the Odds Ratio and associated p-value, Logistic Regression Analysis was used. The Significance Level $\alpha = 0.05$ was used for the statistical analysis.

With regard to Odd Ratio interpretation:

- <1: implies the exposure is protective factor;
- 1.0-1.2: implies no association between exposure and outcome;
- 1.2-1.5: implies weak association between exposure and outcome;
- 1.5-3.0: implies moderate association between exposure and outcome;
- 3.0-10.0: implies strong association between exposure and outcome;
- >10: implies extremely strong association between exposure and outcome.

Child's Residence

To calculate the Odds Ratio, the measures of Dental Decay (deft+DMFT≠0) in **Tables-48** to **72** have been used.

Table-99: Effect Estimate for Association between Dental Caries and Child's Residence

Year	Odds Ratio: Dental Caries and Child's Residence					
	0-2 Years Old		3-5 Years Old		6 Years Old	
	Odds Ratio (95% CI)	p-value	Odds Ratio (95% CI)	p-value	Odds Ratio (95% CI)	p-value
2006	1.11 (0.51,2.40)	0.789	1.21 (0.68,2.17)	0.507	-	-
2007	0.43 (0.20,0.92)	*0.030	1.13 (0.72,1.76)	0.582	-	-
2008	0.41 (0.19,0.89)	*0.025	0.70 (0.48,1.00)	0.055	0.86 (0.67,1.10)	0.248
2009	0.38 (0.18,0.82)	*0.013	0.62 (0.42,0.92)	*0.019	0.88 (0.58,1.35)	0.580
2010	0.60 (0.30,1.19)	0.145	0.84 (0.58,1.22)	0.378	0.91 (0.52,1.58)	0.750
2011	0.64 (0.39,1.06)	0.086	0.55 (0.41,0.73)	*<0.001	2.69 (1.27,5.72)	*0.010
2012	0.36 (0.23,0.56)	*<0.001	0.52 (0.41,0.66)	*<0.001	0.83 (0.59,1.16)	0.293
2013	0.39 (0.26,0.59)	*<0.001	0.47 (0.38,0.60)	*<0.001	1.00 (0.84,1.17)	0.994
2014	0.29 (0.18,0.46)	*<0.001	0.51 (0.41,0.64)	*<0.001	0.55 (0.42,0.72)	*<0.001

CI: Confidence Interval; * statistically significant (p-value<0.05)

0-2 Year Old Children

In 2006, 0-2 year old children residing in Rural communities were almost as likely to have "Dental Decay" than children residing in Urban communities in the Saskatoon Health Region (Odds Ratio=1.11). To summarize, there was no association found between Dental Decay and residing in Urban or Rural communities. However, this association between the Location and Dental Decay

was found to be statistically insignificant as the p-value was 0.789 (which is greater than the significance level = 0.05).

In 2007, 0-2 year old children residing in Rural communities were 0.57% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.43). In Rural communities, 94.4% of the students were Cavity Free, compared to Urban locations where the Cavity Free percentage was 87.89%. Refer to **Table-48** for the mentioned figures. This association between the Location and Dental Decay was found to be statistically significant (p-value =0.03).

In 2008, 0-2 year old children residing in Rural communities were 0.59% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.41). This association between the Location and Dental Decay was found to be statistically significant (p-value =0.025).

In 2009, 0-2 year old children residing in Rural communities were 0.62% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.38). This association between the Location and Dental Decay was found to be statistically significant (p-value =0.013).

In 2010, 0-2 year old children residing in Rural communities were 0.40% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.60). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.145).

In 2011, 0-2 year old children residing in Rural communities were 0.36% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.64). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.086).

In 2012, 0-2 year old children residing in Rural communities were 0.64% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.36). This association between the Location and Dental Decay was found to be statistically significant (p-value <0.001).

In 2013, 0-2 year old children residing in Rural communities were 0.61% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.39). This association between the Location and Dental Decay was found to be statistically significant (p-value <0.001).

In 2014, 0-2 year old children residing in Rural communities were 0.71% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.29). This association between the Location and Dental Decay was found to be statistically significant (p-value <0.001).

3-5 Year Old Children

In 2006, 3-5 year old children residing in Rural communities were almost as likely to have "Dental Decay" than children residing in Urban communities in the Saskatoon Health Region (Odds Ratio=1.21). To summarize, there was no association found between Dental Decay and residing in Urban or Rural communities. However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value=0.507).

In 2007, 3-5 year old children residing in Rural communities were almost as likely to have "Dental Decay" than children residing in Urban communities in the Saskatoon Health Region (Odds Ratio=1.13). To summarize, there was no association found between Dental Decay and residing in Urban or Rural communities. However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value=0.582).

In 2008, 3-5 year old children residing in Rural communities were 0.30% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.70). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.055).

In 2009, 3-5 year old children residing in Rural communities were 0.38% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.62). This association between the Location and Dental Decay was found to be statistically significant (p-value=0.019).

In 2010, 3-5 year old children residing in Rural communities were 0.16% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds

Ratio=0.84). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.378).

In 2011, 3-5 year old children residing in Rural communities were 0.45% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.55). This association between the Location and Dental Decay was found to be statistically significant (p-value<0.001).

In 2012, 3-5 year old children residing in Rural communities were 0.48% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.52). This association between the Location and Dental Decay was found to be statistically significant (p-value<0.001).

In 2013, 3-5 year old children residing in Rural communities were 0.53% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.47). This association between the Location and Dental Decay was found to be statistically significant (p-value<0.001).

In 2014, 3-5 year old children residing in Rural communities were 0.49% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.51). This association between the Location and Dental Decay was found to be statistically significant (p-value<0.001).

6 Year Old Children

In 2008, 6 year old children residing in Rural communities were 0.14% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.86). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.248).

In 2009, 6 year old children residing in Rural communities were 0.12% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.88). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.580).

In 2010, 6 year old children residing in Rural communities were 0.09% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds

Ratio=0.91). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.750).

In 2011, 6 year old children residing in Rural communities were 2.69 times more likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=2.69). To summarize, there was a moderate association found between Dental Decay and residing in Urban or Rural communities This association between the Location and Dental Decay was found to be statistically significant (p-value=0.010).

In 2012, 6 year old children residing in Rural communities were 0.17% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.83). However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.293).

In 2013, 6 year old children residing in Rural communities were as likely to have "Dental Decay" than children residing in Urban communities in the Saskatoon Health Region (Odds Ratio=1.00). To summarize, there was no association found between Dental Decay and residing in Urban or Rural communities. However, this association between the Location and Dental Decay was found to be statistically insignificant (p-value= 0.994).

In 2014, 6 year old children residing in Rural communities were 0.45% less likely to have "Dental Decay" than those residing in Urban communities in the Saskatoon Health Region (Odds Ratio=0.55). This association between the Location and Dental Decay was found to be statistically significant (p-value<0.001).

Low Income Measure (LIM) Neighborhood

To calculate the Odds Ratio, the measures of Dental Decay (deft+DMFT≠0) in **Tables-73** to **97** have been used.

Table-100: Effect Estimate for Association between Dental Caries and Income Status

Year	Odds Ratio: Dental Caries and LIM Neighborhoods					
	0-2 Years Old		3-5 Years Old		6 Years Old	
	Odds Ratio (95% CI)	p-value	Odds Ratio (95% CI)	p-value	Odds Ratio (95% CI)	p-value
2006	1.53 (0.85,2.74)	0.150	1.31 (0.69,2.48)	0.401	-	-
2007	2.27 (1.34,3.85)	*0.002	2.06 (1.25,3.40)	*0.005	-	-
2008	1.14 (0.67,1.94)	0.625	2.45 (1.61,3.72)	*<0.001	1.85 (1.39,2.46)	*<0.001
2009	1.50 (0.99,2.27)	0.053	1.61 (1.04,2.47)	*0.030	5.38 (1.58,18.27)	*007
2010	1.59 (1.01,2.54)	*0.049	1.50 (1.01,2.21)	*0.041	1.43 (0.70,2.91)	0.323
2011	2.65 (1.71,4.12)	*<0.001	1.72 (1.28,2.30)	*<0.001	1.44 (0.95,2.20)	0.85
2012	2.25 (1.57,3.23)	*<0.001	1.80 (1.34,2.41)	*<0.001	2.18 (1.42,3.36)	*<0.001
2013	2.32 (1.62,3.31)	*<0.001	2.62 (1.96,3.49)	*<0.001	1.65 (1.29,2.11)	*<0.001
2014	2.17 (1.49,3.17)	*<0.001	2.17 (1.64,2.87)	*<0.001	1.57 (1.02,2.41)	*0.039

CI: Confidence Interval; * statistically significant (p-value<0.05)

0-2 Year Old Children

In 2006, 0-2 year old children residing in LIM Neighborhoods were 1.53 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.53). To summarize, there was a weak to moderate association found between Dental Decay and Income Status. However, this association between LIM Neighborhood and Dental Decay was found to be statistically insignificant (p-value= 0.15).

In 2007, 0-2 year old children residing in LIM Neighborhoods were 2.27 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.27). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value= 0.002).

In 2008, 0-2 year old children residing in LIM Neighborhoods were almost as likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.14). To summarize, there was no association found between Dental Decay and Income Status. However, this association between LIM Neighborhood and Dental Decay was found to be statistically insignificant (p-value= 0.625).

In 2009, 0-2 year old children residing in LIM Neighborhoods were 1.50 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.50). To summarize, there was a week association found between Dental Decay and Income Status. However, this association between LIM Neighborhood and Dental Decay was found to be statistically insignificant (p-value= 0.053).

In 2010, 0-2 year old children residing in LIM Neighborhoods were 1.59 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.59). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value= 0.049).

In 2011, 0-2 year old children residing in LIM Neighborhoods were 2.65 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.65). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value<0.001).

In 2012, 0-2 year old children residing in LIM Neighborhoods were 2.25 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.25). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value<0.001).

In 2013, 0-2 year old children residing in LIM Neighborhoods were 2.32 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region

(Odds Ratio=2.32). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value<0.001).

In 2014, 0-2 year old children residing in LIM Neighborhoods were 2.17 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.17). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value<0.001).

3-5 Year Old Children

In 2006, 3-5 year old children residing in LIM Neighborhoods were 1.31 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.31). To summarize, there was a weak association found between Dental Decay and Income Status (p-value= 0.401).

In 2007, 3-5 year old children residing in LIM Neighborhoods were 2.06 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.06). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value= 0.005).

In 2008, 3-5 year old children residing in LIM Neighborhoods were 2.45 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.45). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value< 0.001).

In 2009, 3-5 year old children residing in LIM Neighborhoods were 1.61 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.61). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value= 0.030).

In 2010, 3-5 year old children residing in LIM Neighborhoods were 1.50 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.50). To summarize, there was a week to moderate association found between Dental Decay and Income Status (p-value< 0.041).

In 2011, 3-5 year old children residing in LIM Neighborhoods were 1.72 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.72). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value< 0.001).

In 2012, 3-5 year old children residing in LIM Neighborhoods were 1.80 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.80). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value< 0.001).

In 2013, 3-5 year old children residing in LIM Neighborhoods were 2.62 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.62). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value< 0.001).

In 2014, 3-5 year old children residing in LIM Neighborhoods were 2.17 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.17). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value< 0.001).

6 Year Old Children

In 2008, 6 year old children residing in LIM Neighborhoods were 1.85 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.85). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value< 0.001).

In 2009, 6 year old children residing in LIM Neighborhoods were 5.38 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=5.38). To summarize, there was a strong association found between Dental Decay and Income Status (p-value= 0.007).

In 2010, 6 year old children residing in LIM Neighborhoods were 1.43 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.43). To summarize, there was a week association found between Dental Decay and Income Status. However, this association between LIM Neighborhood and Dental Decay was found to be statistically insignificant (p-value= 0.323).

In 2011, 6 year old children residing in LIM Neighborhoods were 1.44 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.44). To summarize, there was a week association found between Dental Decay and Income Status. However, this association between LIM Neighborhood and Dental Decay was found to be statistically insignificant (p-value= 0.85).

In 2012, 6 year old children residing in LIM Neighborhoods were 2.18 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=2.18). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value<0.001).

In 2013, 6 year old children residing in LIM Neighborhoods were 1.65 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.65). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value<0.001).

In 2014, 6 year old children residing in LIM Neighborhoods were 1.57 times more likely to have "Dental Decay" than children residing in Non-LIM Neighborhoods in the Saskatoon Health Region (Odds Ratio=1.57). To summarize, there was a moderate association found between Dental Decay and Income Status (p-value=0.039).

Trend of Oral Health Status over the time period

In the previous sections the comparison of Urban vs. Rural / LIM vs. Non-LIM was shown. In this part, the trend of oral health status within each category (Child's Residence and Neighborhood Income Status) will be presented.

- Trend of oral health status in Urban area
- Trend of oral health status in Rural area
- Trend of oral health status in Non-Low Income Neighborhood
- Trend of oral health status in Low Income Neighborhood

To analyze the mean deft/DMFT, One Way ANOVA or Welch Robust test (and Games-Howell Post-hoc test) was used. The Significance Level $\alpha = 0.05$ was used for the statistical analysis.

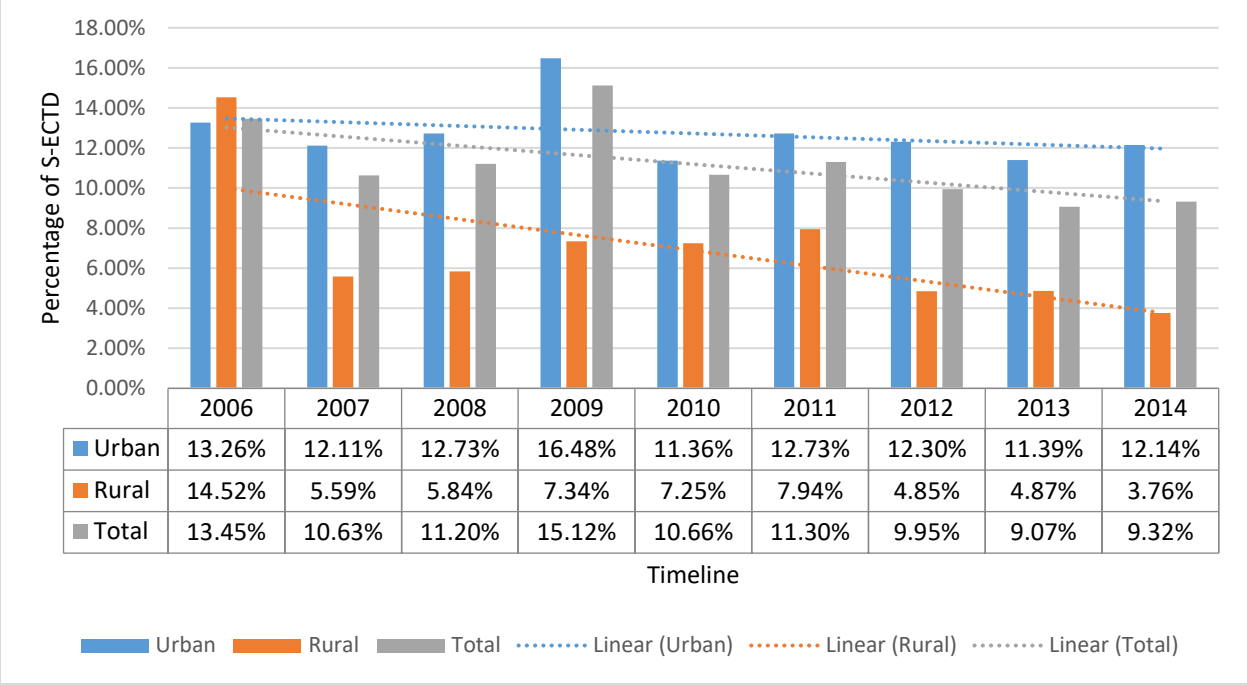
Trend of Oral Health Status by Child's Residence

Figures-53 to **62** and **Tables-100** to **101** illustrate how oral health status within Urban and Rural areas has changed over time.

Trend of Oral Health Status; Urban and Rural: 0-2 Year Old Children

Figures-53 to **56** illustrate oral health status trend among 0-2 year old children within Urban and Rural area over time.

Figure-53: Percentage of S-ECTD; Urban and Rural: 0-2 Year Old Children



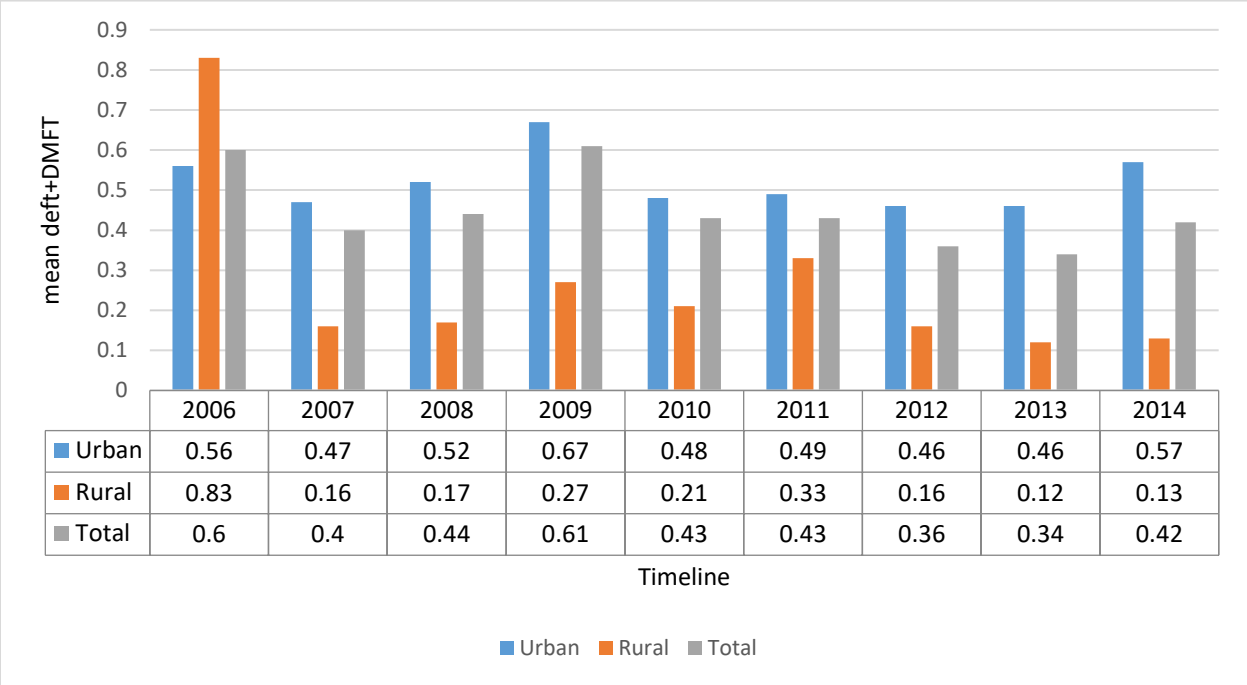
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	13.26%	12.11%	12.73%	16.48%	11.36%	12.73%	12.30%	11.39%	12.14%
Rural	14.52%	5.59%	5.84%	7.34%	7.25%	7.94%	4.85%	4.87%	3.76%
Total	13.45%	10.63%	11.20%	15.12%	10.66%	11.30%	9.95%	9.07%	9.32%

S- ECTD: Severe Early Childhood Tooth Decay

In 2006, the percentage of S-ECTD in 0-2 year old children in Rural area was slightly higher than Urban area. Since 2007, the pattern has completely reversed. In 2014, S-ECTD was almost 3 times as common in Urban as in Rural area (12.14% vs.3.76%).

Although there was fluctuation in percentage of childhood decay, overall the graphs would suggest that there was a downward trend in both Urban and Rural areas. Particularly the extent of decrease was more prominent in Rural areas.

Figure-54: deft+DMFT; Urban and Rural: 0-2 Year Old Children

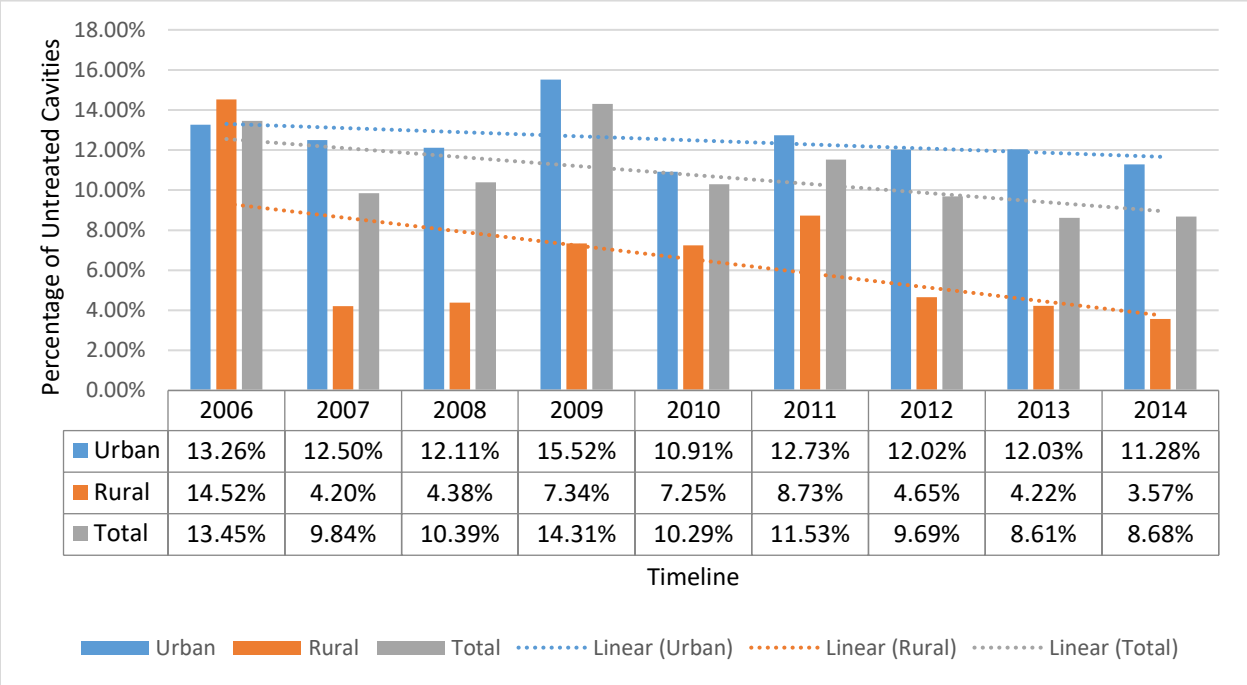


	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	0.56	0.47	0.52	0.67	0.48	0.49	0.46	0.46	0.57
Rural	0.83	0.16	0.17	0.27	0.21	0.33	0.16	0.12	0.13
Total	0.6	0.4	0.44	0.61	0.43	0.43	0.36	0.34	0.42

Regarding Urban districts, the Welch Robust test, did not show any significant difference in mean deft/DMFT of 0-2 year old children over the years (p-value=0.368). The average score in 2014 marginally was higher than 2013.

Similarly for the Rural areas, mean deft/DMFT didn't show significant difference over the years (p-value=0.186).

Figure-55: % Untreated Cavities; Urban and Rural: 0-2 Year Old Children

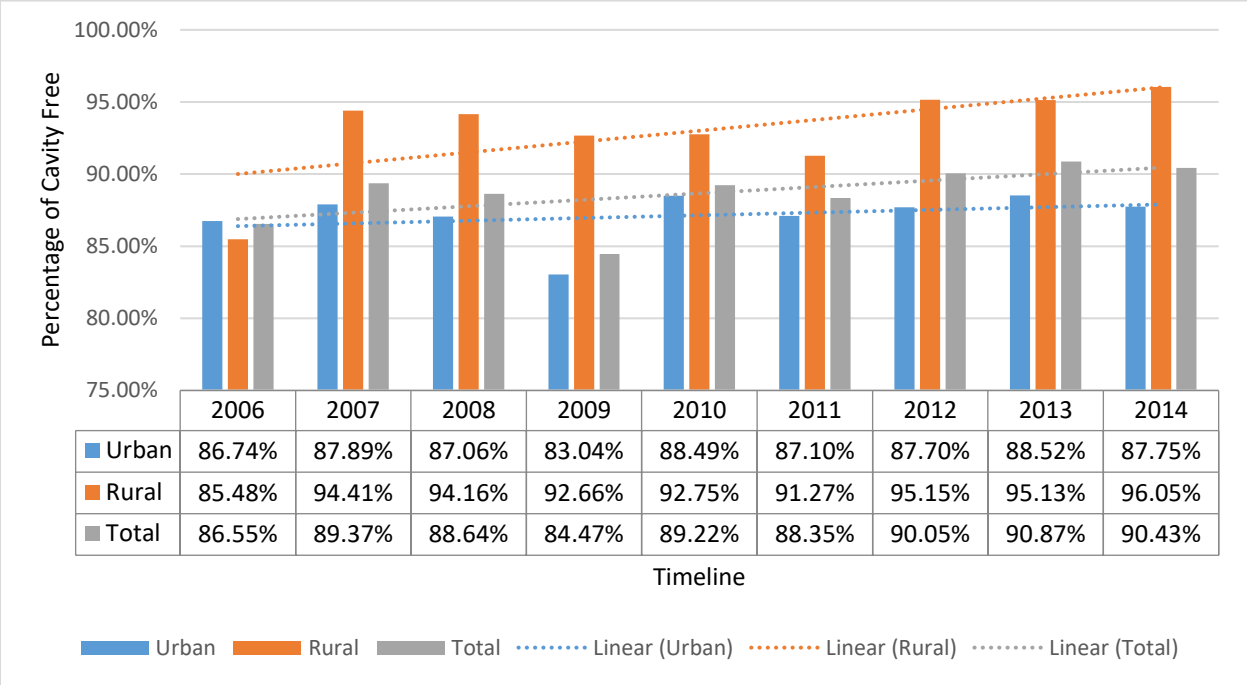


	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	13.26%	12.50%	12.11%	15.52%	10.91%	12.73%	12.02%	12.03%	11.28%
Rural	14.52%	4.20%	4.38%	7.34%	7.25%	8.73%	4.65%	4.22%	3.57%
Total	13.45%	9.84%	10.39%	14.31%	10.29%	11.53%	9.69%	8.61%	8.68%

Since 2007, the proportion of children with Untreated Cavities in Rural area has been smaller compared to Urban.

Although there was fluctuation in proportion of 0-2 year old children with Untreated Cavities, overall the graphs would suggest that there was a downward trend in both Urban and Rural areas. Particularly the extent of decrease was more prominent in Rural areas.

Figure-56: % Cavity Free; Urban and Rural: 0-2 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	86.74%	87.89%	87.06%	83.04%	88.49%	87.10%	87.70%	88.52%	87.75%
Rural	85.48%	94.41%	94.16%	92.66%	92.75%	91.27%	95.15%	95.13%	96.05%
Total	86.55%	89.37%	88.64%	84.47%	89.22%	88.35%	90.05%	90.87%	90.43%

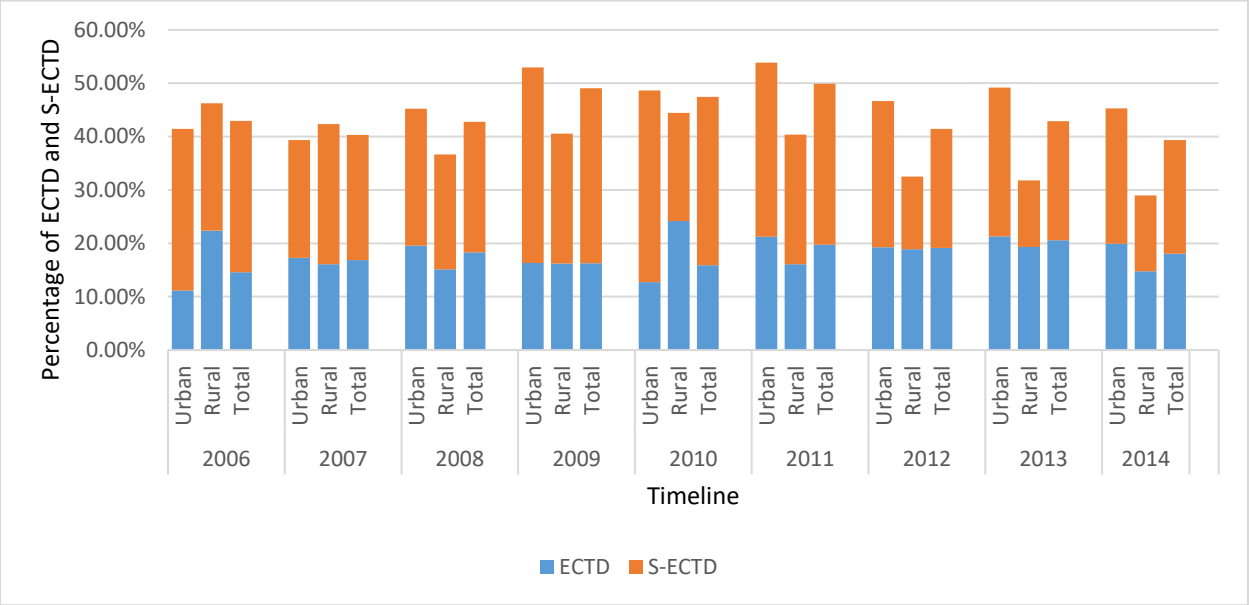
Since 2007, the proportion of 0-2 year old children who were Cavity Free in Rural area has been higher compared to Urban district.

Despite the fluctuations in proportion of Cavity Free children, overall the graphs would suggest that there was an upward trend in both Urban and Rural areas. Particularly the extent of increase was more prominent in Rural areas.

Trend of Oral Health Status; Urban and Rural: 3-5 Year Old Children

Figures-57 to **63** and **Table-100** illustrate oral health status trend among 3-5 year old children within Urban and Rural area over time.

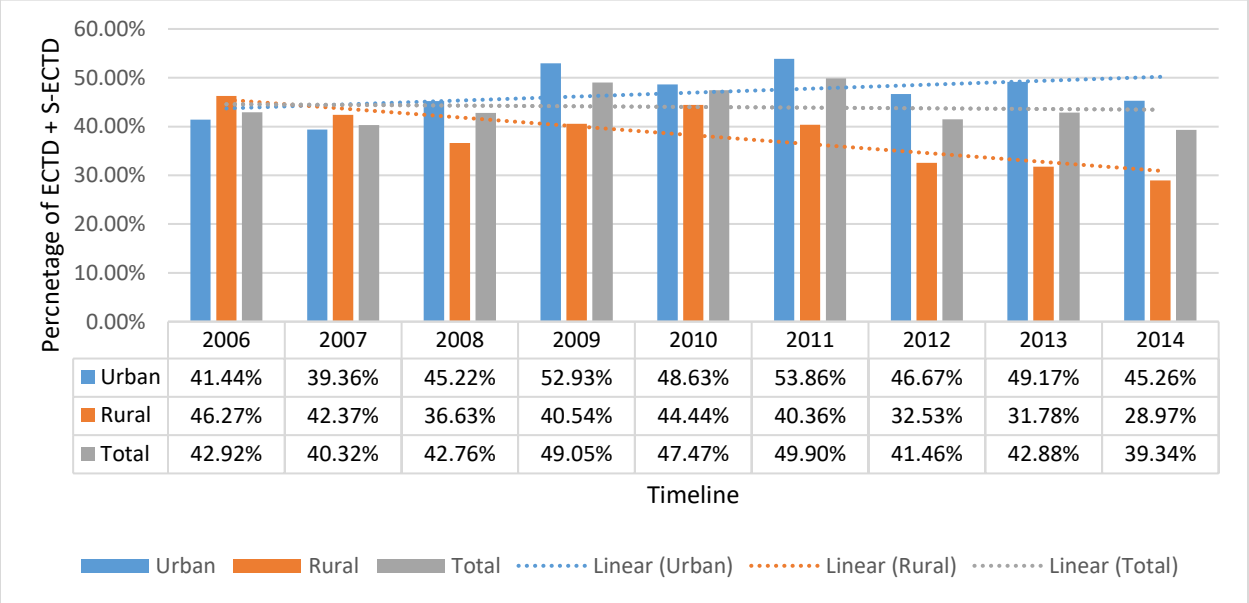
Figure-57: Percentage of ECTD and S-ECTD; Urban and Rural: 3-5 Year Old Children



ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

In the most recent years, the major constitute of Early Childhood Caries in Rural children is ECTD vs. S-ECTD.

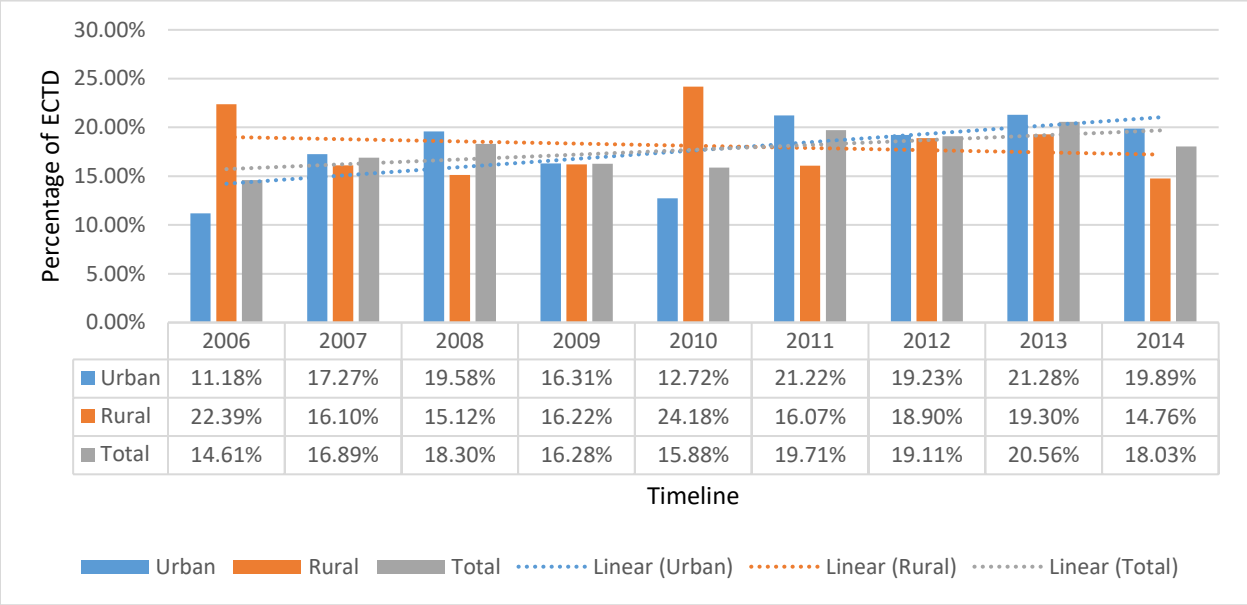
Figure-58: Percentage of ECTD+S-ECTD; Urban and Rural: 3-5 Year Old Children



ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

In 2006 and 2007, the percentage of combined ECTD, S-ECTD in 3-5 year old children in Rural area was slightly higher than Urban. Since 2008, the pattern has reversed. In 2014, the proportion of children with combined ECTD, S-ECTD in Urban and Rural was 45.26% vs. 28.97%.

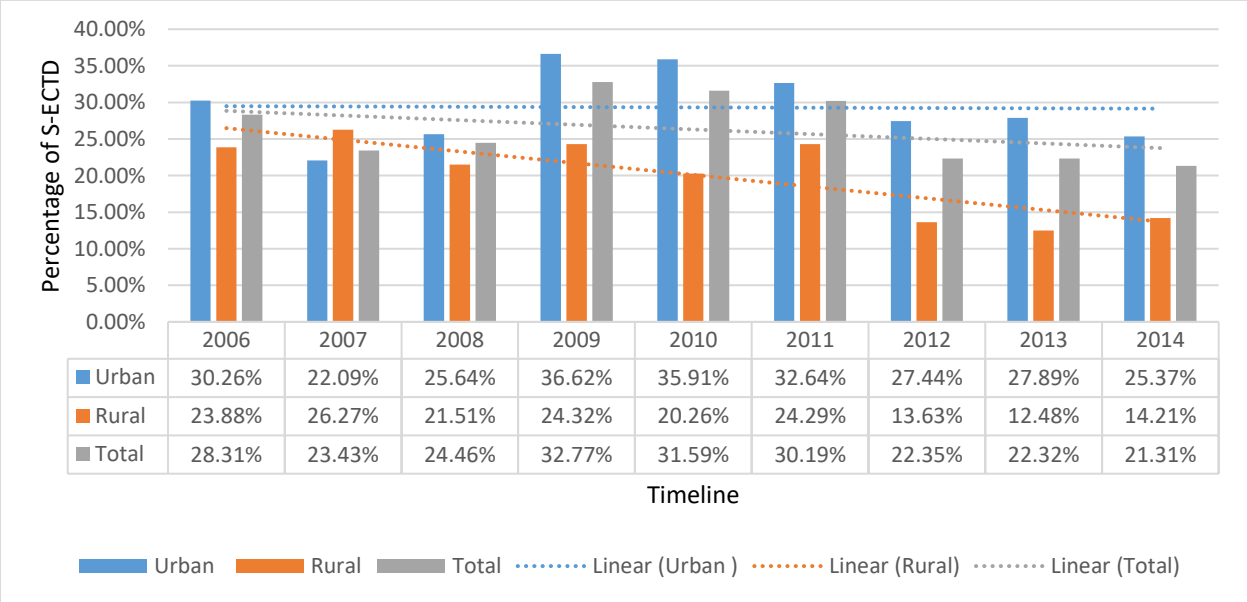
Figure-59: Percentage of ECTD; Urban and Rural: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	11.18%	17.27%	19.58%	16.31%	12.72%	21.22%	19.23%	21.28%	19.89%
Rural	22.39%	16.10%	15.12%	16.22%	24.18%	16.07%	18.90%	19.30%	14.76%
Total	14.61%	16.89%	18.30%	16.28%	15.88%	19.71%	19.11%	20.56%	18.03%

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

Figure-60: Percentage of S-ECTD; Urban and Rural: 3-5 Year Old Children



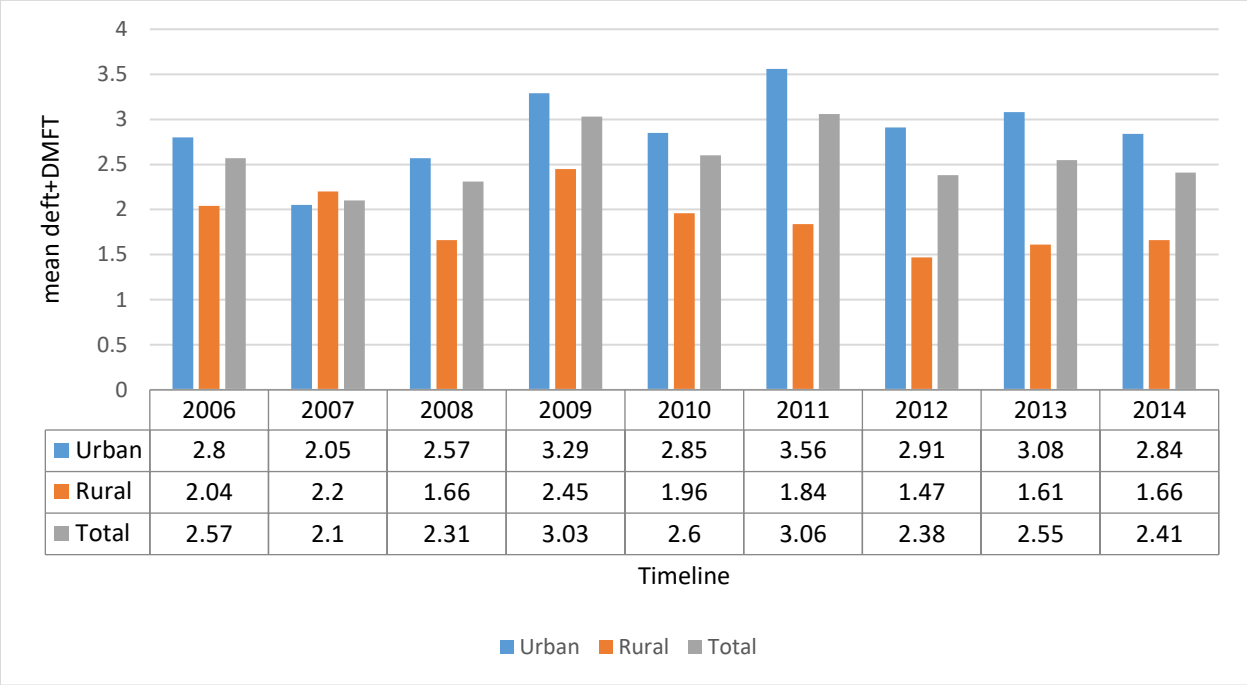
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	30.26%	22.09%	25.64%	36.62%	35.91%	32.64%	27.44%	27.89%	25.37%
Rural	23.88%	26.27%	21.51%	24.32%	20.26%	24.29%	13.63%	12.48%	14.21%
Total	28.31%	23.43%	24.46%	32.77%	31.59%	30.19%	22.35%	22.32%	21.31%

ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay

Figures-57 to **60** would suggest that overall, there was a downward trend for ECTD+S-ECTD; S-ECTD; and S-ECTD in 3-5 year old Rural children.

Regarding the Urban areas, the graphs would suggest that there was an upward trend for ECTD+ S-ECTD; and S-ECTD. The proportion of children with S-ECTD has remained stable.

Figure-61: deft+DMFT; Urban and Rural: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	2.8	2.05	2.57	3.29	2.85	3.56	2.91	3.08	2.84
Rural	2.04	2.2	1.66	2.45	1.96	1.84	1.47	1.61	1.66
Total	2.57	2.1	2.31	3.03	2.6	3.06	2.38	2.55	2.41

With regard to Urban area, the results of Welch's Robust test showed that at 0.05 level of significance, with a p-value<0.001, the true mean deft/DMFT for at least two screening years differed. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Only the statistically significant results of Post-hoc are presented in **Table-100**.

Table-101: deft+DMFT (Post-hoc Test): Urban; 3-5 Year Old Children

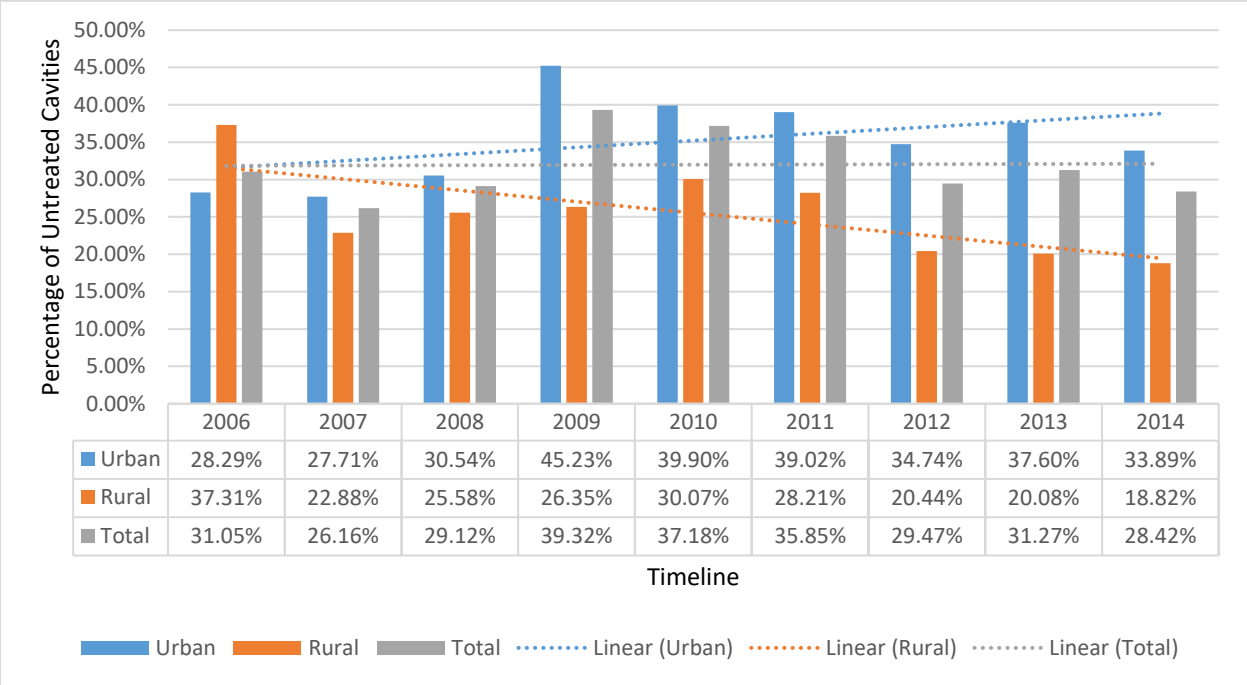
Pairwise Comparison Between Screening Years	deft+DMFT : Urban; 3-5 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2007 and 2009	-1.24 (-2.29, -0.19)	0.007
2007 and 2011	-1.51 (-2.40, -0.62)	<0.001
2007 and 2012	-0.86 (-1.70,-0.033)	0.034
2007 and 2013	-1.03 (-1.86,-0.20)	0.004
2008 and 2011	-0.99 (-1.81, -0.17)	0.005
2011 and 2014	0.72 (0.02,1.41)	0.035

In each row, positive figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is larger than the following year and vice versa if the figure is negative.

In Urban area, the average deft/DMFT in 3-5 year old children in 2007 was found to be significantly smaller than 2009,2011,2012,2013. Refer to **Table-100** for the p-values. The mean deft/DMFT in 2011 was significantly larger compared to 2008 (p-value=0.005), and 2014 (p-value=0.035).

Based on Welch's Robust test, in Rural communities there was no statistically difference in the average deft/DMFT in 3-5 year old children between screening years (p-value=0.097).

Figure-62: % Untreated Cavities; Urban and Rural: 3-5 Year Old Children



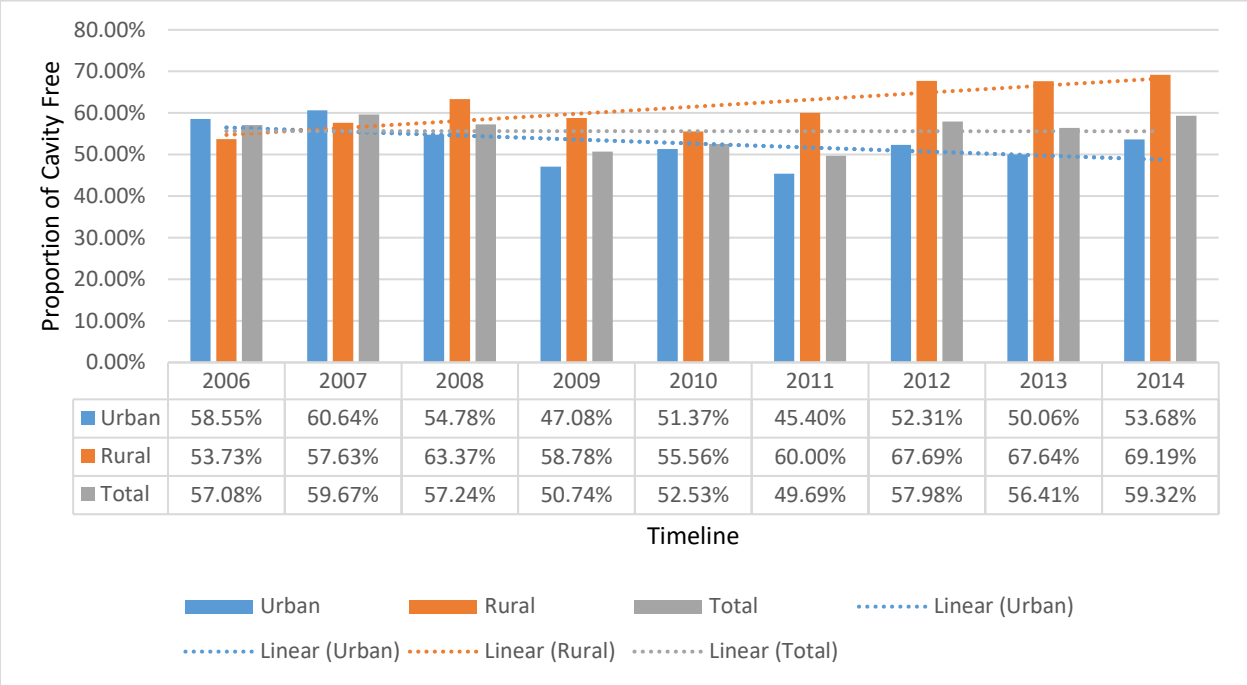
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	28.29%	27.71%	30.54%	45.23%	39.90%	39.02%	34.74%	37.60%	33.89%
Rural	37.31%	22.88%	25.58%	26.35%	30.07%	28.21%	20.44%	20.08%	18.82%
Total	31.05%	26.16%	29.12%	39.32%	37.18%	35.85%	29.47%	31.27%	28.42%

Over the past 9 years, the proportion of 3-5 year old children with Untreated Cavities in Rural area was smaller compared to Urban district. However, the difference between the two areas has increased in the recent years.

In Urban area, the proportion of children with Untreated Cavities in 2014 (37.60%) decreased compared to 2013 (33.89%).

In Rural communities, the proportion of children with Untreated Cavities in 2014 (20.08%) reduced compared to 2013 (18.82%).

Figure-63: % Cavity Free; Urban and Rural: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Urban	58.55%	60.64%	54.78%	47.08%	51.37%	45.40%	52.31%	50.06%	53.68%
Rural	53.73%	57.63%	63.37%	58.78%	55.56%	60.00%	67.69%	67.64%	69.19%
Total	57.08%	59.67%	57.24%	50.74%	52.53%	49.69%	57.98%	56.41%	59.32%

Since 2008, the proportion of 3-5 year old children who were Cavity Free in Rural area was larger compared to Urban district.

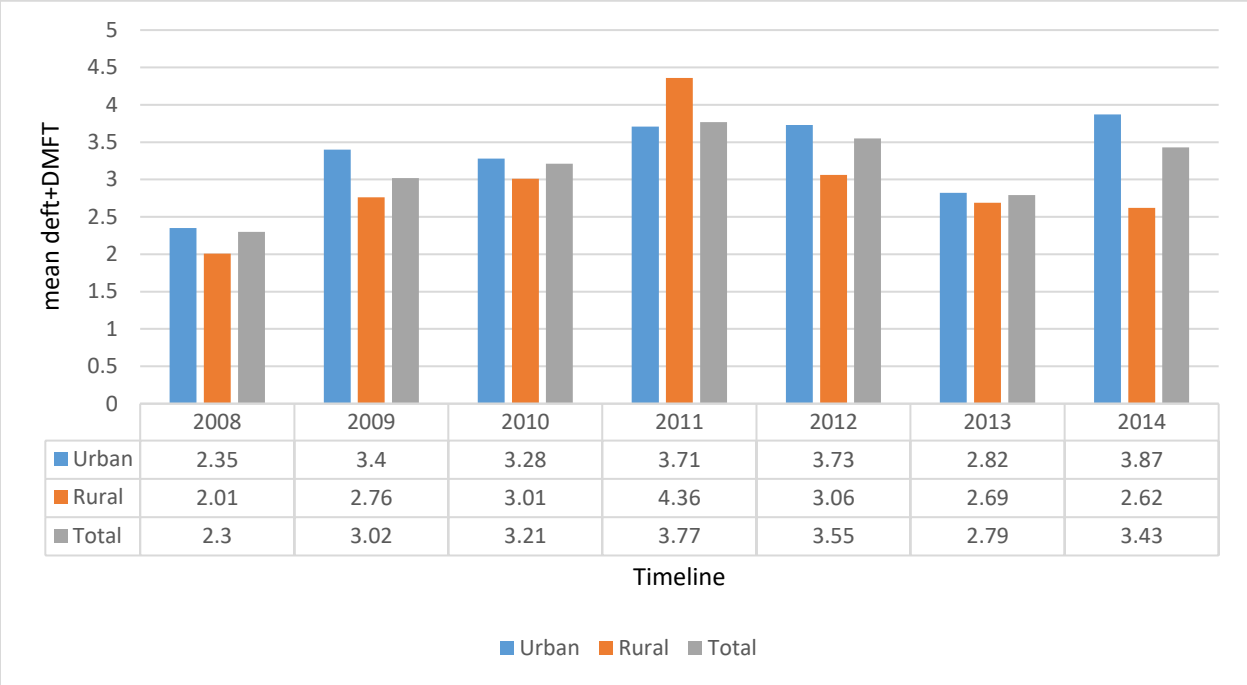
Generally, the graphs would suggest that there was an upward trend for the proportion of Cavity Free children in Rural areas. In contrast, this proportion followed a downward trend.

Over the past nine years, the percentage of Cavity Free Rural children was the highest in 2014 (69.19%). Also, in Urban areas the highest percentage in the most recent years belonged to 2014 (53.68%).

Trend of Oral Health Status; Urban and Rural: 6 Year Old Children

Figures-64 to **66** and **Tables-101** to **102** illustrate oral health status trend among 6 year old children within Urban and Rural area over time.

Figure-64: deft+DMFT; Urban and Rural: 6 Year Old Children



	2008	2009	2010	2011	2012	2013	2014
Urban	2.35	3.4	3.28	3.71	3.73	2.82	3.87
Rural	2.01	2.76	3.01	4.36	3.06	2.69	2.62
Total	2.3	3.02	3.21	3.77	3.55	2.79	3.43

With regard to Urban area, the results of Welch's Robust test showed that at 0.05 level of significance, with a p-value<0.001, the true mean deft/DMFT in 6 year old children for at least two screening years was different. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Only the statistically significant results of Post-hoc are presented in **Table-101**.

Table-102: deft+DMFT (Post-hoc Test): Urban; 6 Year Old Children

Pairwise Comparison Between Screening Years	deft+DMFT : Urban; 6 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2008 and 2009	-1.05 (-1.94, -0.17)	0.008
2008 and 2010	-0.93 (-1.84, -0.17)	0.043
2008 and 2011	-1.35 (-2.02, -0.68)	<0.001
2008 and 2012	-1.38 (-2.01, -0.74)	<0.001
2008 and 2013	-0.47 (-0.81, -0.13)	0.001
2008 and 2014	-1.52 (-2.07, -0.96)	<0.001
2011 and 2013	0.88 (0.21,1.55)	0.002
2012 and 2013	0.90 (0.27,1.54)	0.001
2013 and 2014	-1.04 (-1.60,-0.49)	<0.001

In each row, positive figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is larger than the following year and vice versa if the figure is negative.

The mean deft/DMFT in 6-year old Urban children in 2008 was significantly smaller compared to all other screening years. The average score in 2013, was significantly smaller in the past 4 years. Refer to **Table-101** for the p-values.

With regard to Rural areas area, the results of Welch's Robust test showed that at 0.05 level of significance, with a p-value<0.001, there was a difference in mean deft/DMFT between the screening years. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Only the statistically significant results of Post-hoc are presented in **Table-102**.

Table-103: deft+DMFT (Post-hoc Test): Rural; 6 Year Old Children

Pairwise Comparison Between Screening Years	deft+DMFT : Rural; 6 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2008 and 2011	-2.35 (-4.14,-0.55)	0.003
2008 and 2012	-1.05 (-2.03,-0.06)	0.028
2008 and 2013	-0.68 (-1.29, -0.07)	0.017

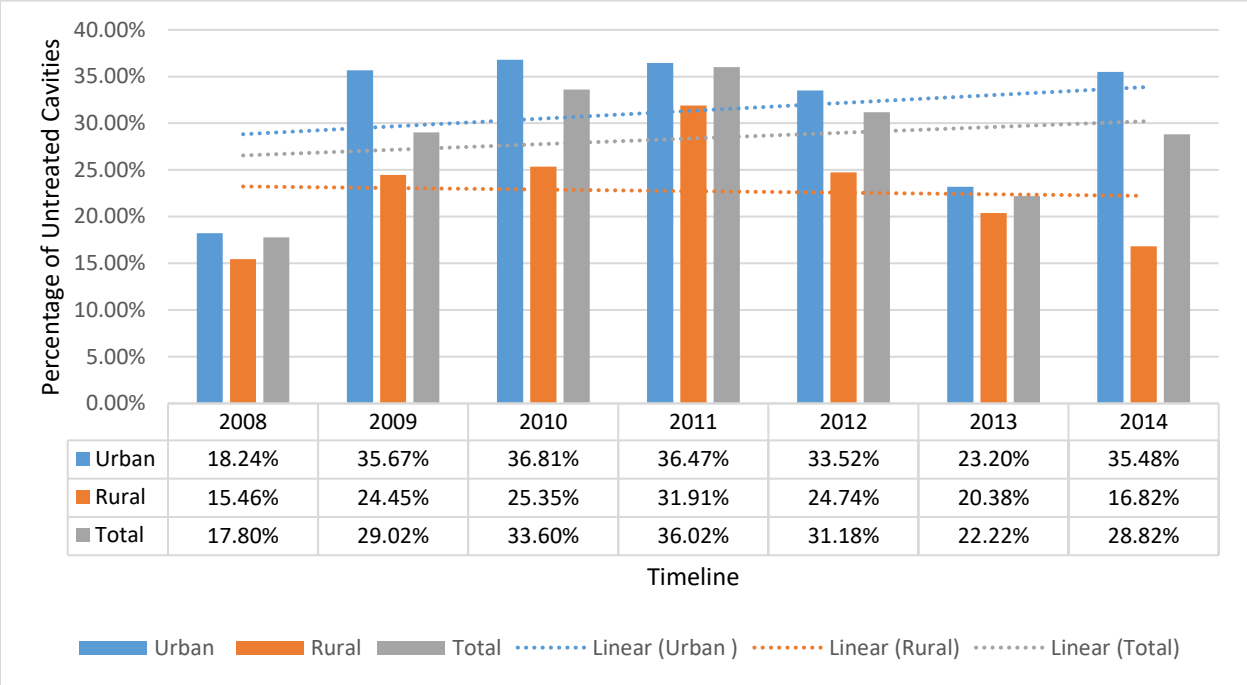
In each row, negative figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is smaller than the following year.

The mean deft/DMFT in 6 year old Rural children in 2008 was significantly smaller compared to 2011, 2012, 2013. Refer to **Table-102** for the p-values**.**

Unlike the results for Urban area, the difference between 2013 and 2014 was not statistically significant.

With regard to COHF guideline, in 2008 the mean deft/DMFT for 6 year old children in Urban (2.35) and Rural (2.01) area, met the COHF target (COHF target is < 2.5).

Figure-65: % Untreated Cavities; Urban and Rural: 6 Year Old Children

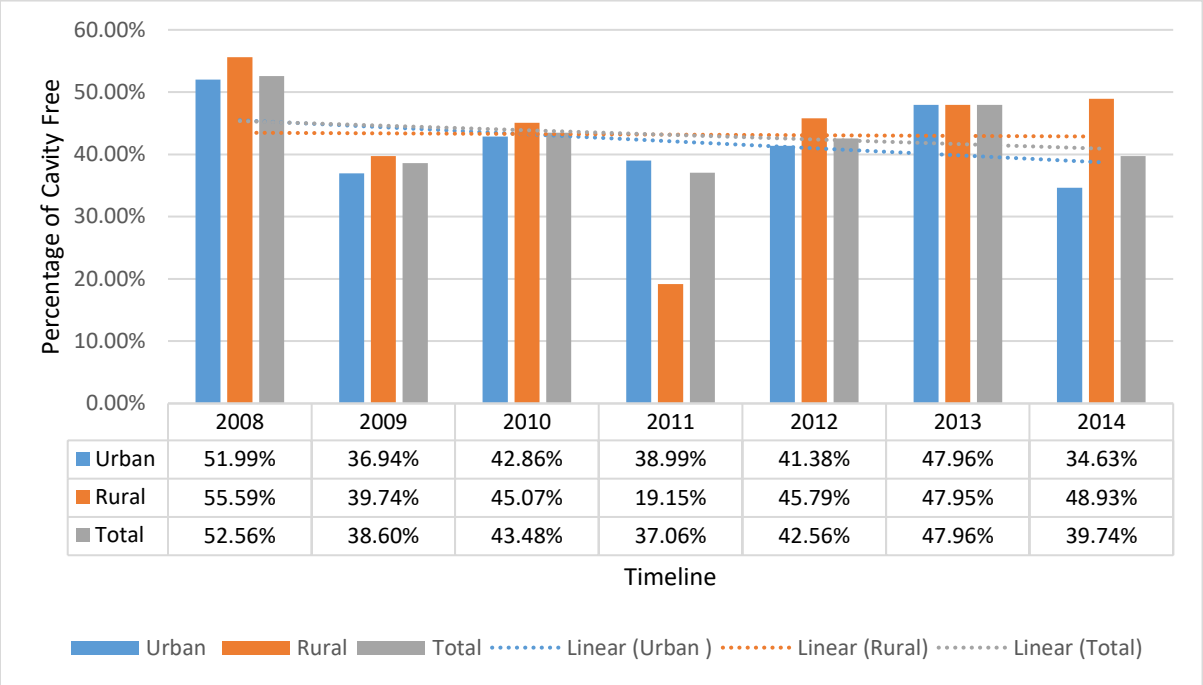


	2008	2009	2010	2011	2012	2013	2014
Urban	18.24%	35.67%	36.81%	36.47%	33.52%	23.20%	35.48%
Rural	15.46%	24.45%	25.35%	31.91%	24.74%	20.38%	16.82%
Total	17.80%	29.02%	33.60%	36.02%	31.18%	22.22%	28.82%

Over the study period, the proportion of 6 year old children with Untreated Cavities in Rural area was smaller compared to Urban district. In 2014, the difference between the two areas was prominent; that is the proportion of Rural children who had Untreated Cavities was less than half of the value for Urban area (16.82% vs. 35.48%).

In Urban area, in 2014 the proportion of 6 year old children with Untreated Cavities increased compared to 2013 (35.48% vs. 23.20%).Whereas, in 2014 in Rural communities the proportion of Untreated Cavities was smaller than 2013 (16.82% vs.20.38%).

Figure-66: % Cavity Free; Urban and Rural: 6 Year Old Children



	2008	2009	2010	2011	2012	2013	2014
Urban	51.99%	36.94%	42.86%	38.99%	41.38%	47.96%	34.63%
Rural	55.59%	39.74%	45.07%	19.15%	45.79%	47.95%	48.93%
Total	52.56%	38.60%	43.48%	37.06%	42.56%	47.96%	39.74%

In 2011, the percentage of Cavity Free 6 year old Urban children was twice as much as Rural districts. In 2014, the proportion of Cavity Free children in Rural was 48.93% compared to Urban area where it was 34.63%.

The graphs would suggest that there was a downward trend for the proportion of Cavity Free 6 year old children in Urban areas. The proportion has remained stable for Rural children.

Regarding the COHF guideline, only the results for Rural children in 2008 met the COHF target, where 55.59% of children were Cavity Free (COHF target is >55%).

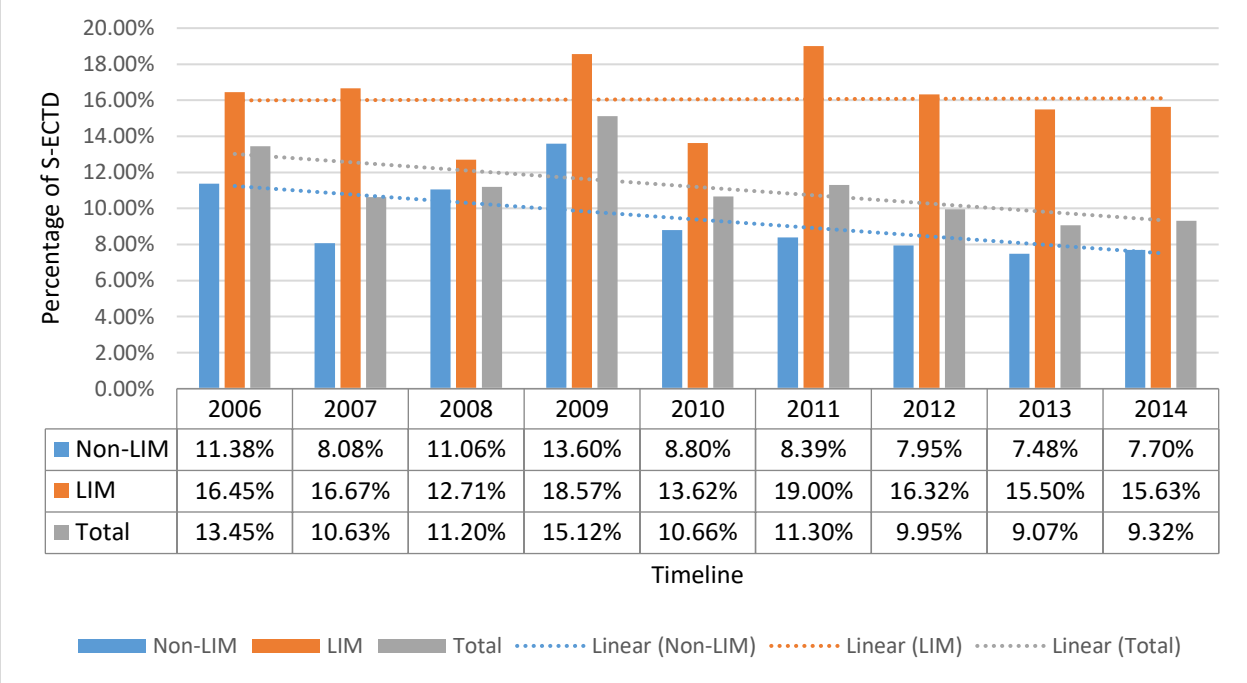
Trend of Oral Health Status over Years by Neighborhood Income Status

Figures-67 to **80** and **Tables-103** to **106** illustrate how oral health status within Non-Low Income Neighborhood and Low Income Neighborhood has changed over time.

Trend of Oral Health Status; Non-LIM and LIM: 0-2 Year Old Children

Figures-67 to **70** and **Table-103** illustrate oral health status trend among 0-2 year old children within Non-Low Income Neighborhood and Low Income Neighborhood over time.

Figure-67: Percentage of S-ECTD; Non-LIM and LIM: 0-2 Year Old Children



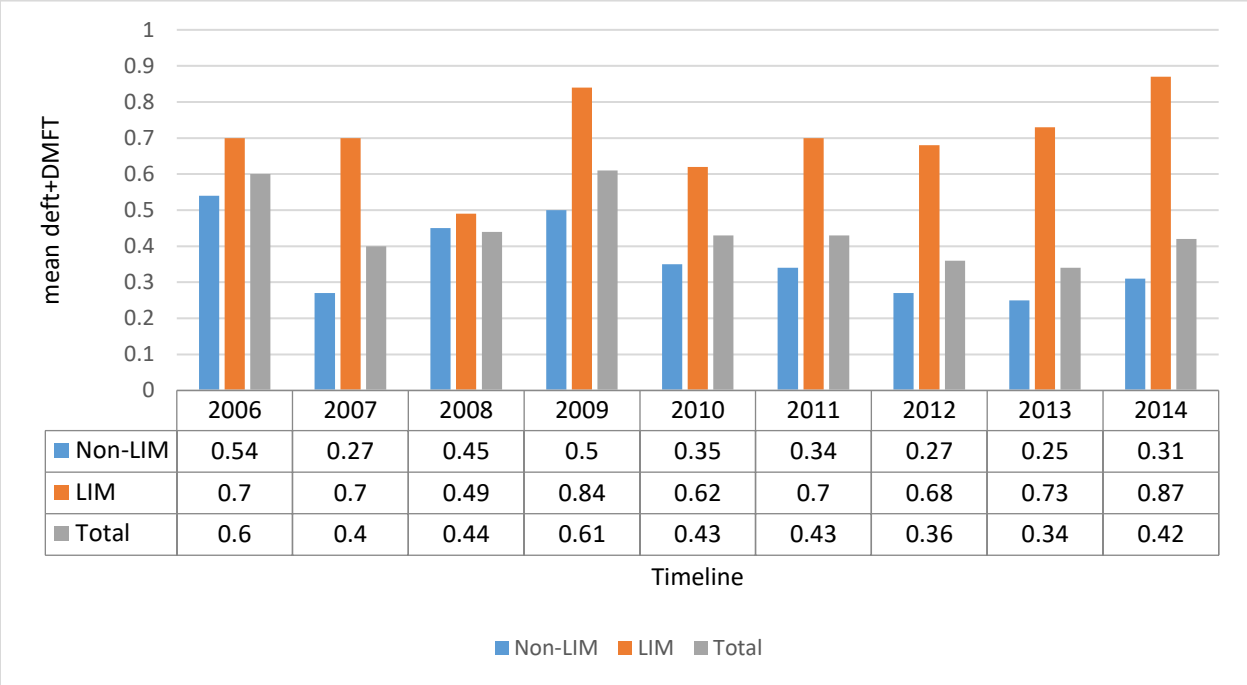
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	11.38%	8.08%	11.06%	13.60%	8.80%	8.39%	7.95%	7.48%	7.70%
LIM	16.45%	16.67%	12.71%	18.57%	13.62%	19.00%	16.32%	15.50%	15.63%
Total	13.45%	10.63%	11.20%	15.12%	10.66%	11.30%	9.95%	9.07%	9.32%

S- ECTD: Severe Early Childhood Tooth Decay; LIM: Low Income Measure

In 2014, percentage of S-ECTD in 0-2 year old children was almost 2 times as common in LIM as in Non-LIM Neighborhood (15.63% vs.7.70%).

Overall, the graphs would suggest that there was a downward trend in percentage of S-ECTD in Non-LIM areas. Regarding LIM Neighborhoods, the percentage of S-ECTD remained almost stable over the study period.

Figure-68: deft+DMFT; Non-LIM and LIM: 0-2 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	0.54	0.27	0.45	0.5	0.35	0.34	0.27	0.25	0.31
LIM	0.7	0.7	0.49	0.84	0.62	0.7	0.68	0.73	0.87
Total	0.6	0.4	0.44	0.61	0.43	0.43	0.36	0.34	0.42

LIM: Low Income Measure

With regard to Non-LIM areas, the results of Welch's Robust test showed that at 0.05 level of significance, with a p-value=0.01, the true mean deft/DMFT in 0-2 year old children for at least two screening years differed. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. Refer to **Table-103** for the results of Post-hoc test.

Table-104: deft+DMFT (Post-hoc Test): Non-LIM; 0-2 Year Old Children

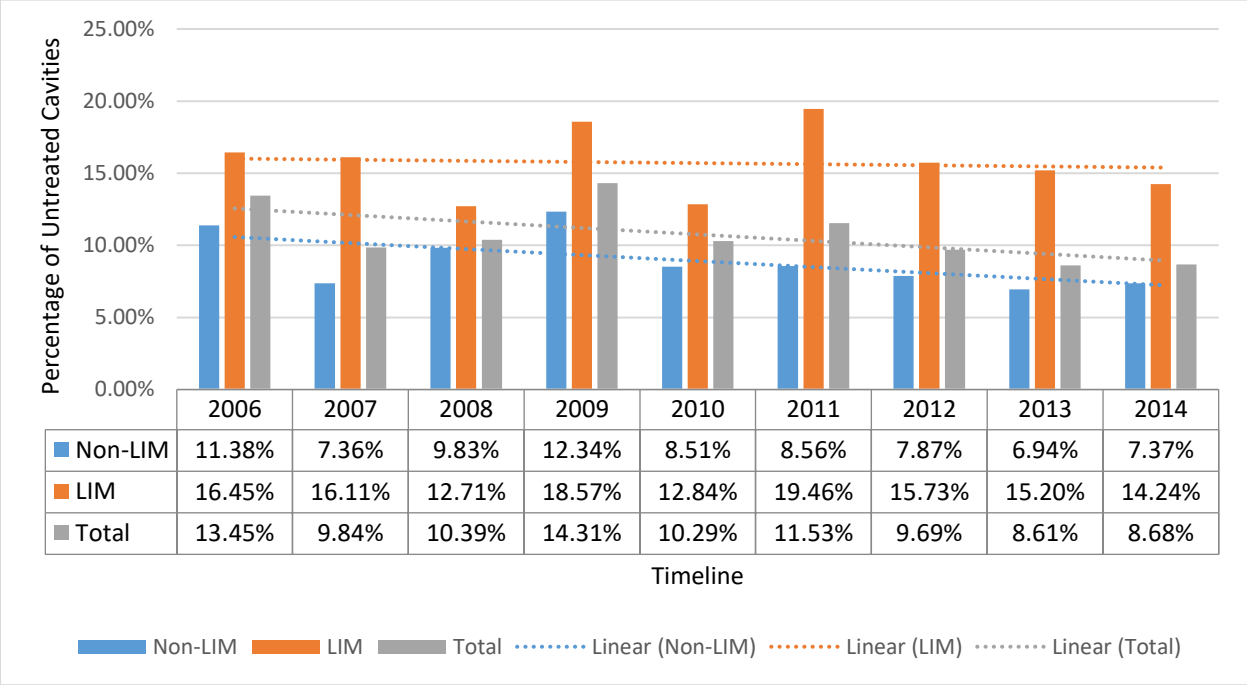
Pairwise Comparison Between the Screening Years	deft+DMFT : Non-LIM; 0-2 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2009 and 2013	0.24 (0.002,0.493)	0.046

Positive figure for mean difference indicate that mean of deft+DMFT in the corresponding first year is larger than the following year.

In Non-LIM areas, the mean deft/DMFT in 2009 was significantly higher than 2013 (p-value=0.046).

With regard to LIM areas, the results of Welch's Robust test showed that at 0.05 level of significance, there was no difference in mean deft/DMFT in 0-2 year old children between the screening years (p-value=0.613)

Figure-69: % Untreated Cavities; Non-LIM and LIM: 0-2 Year Old Children



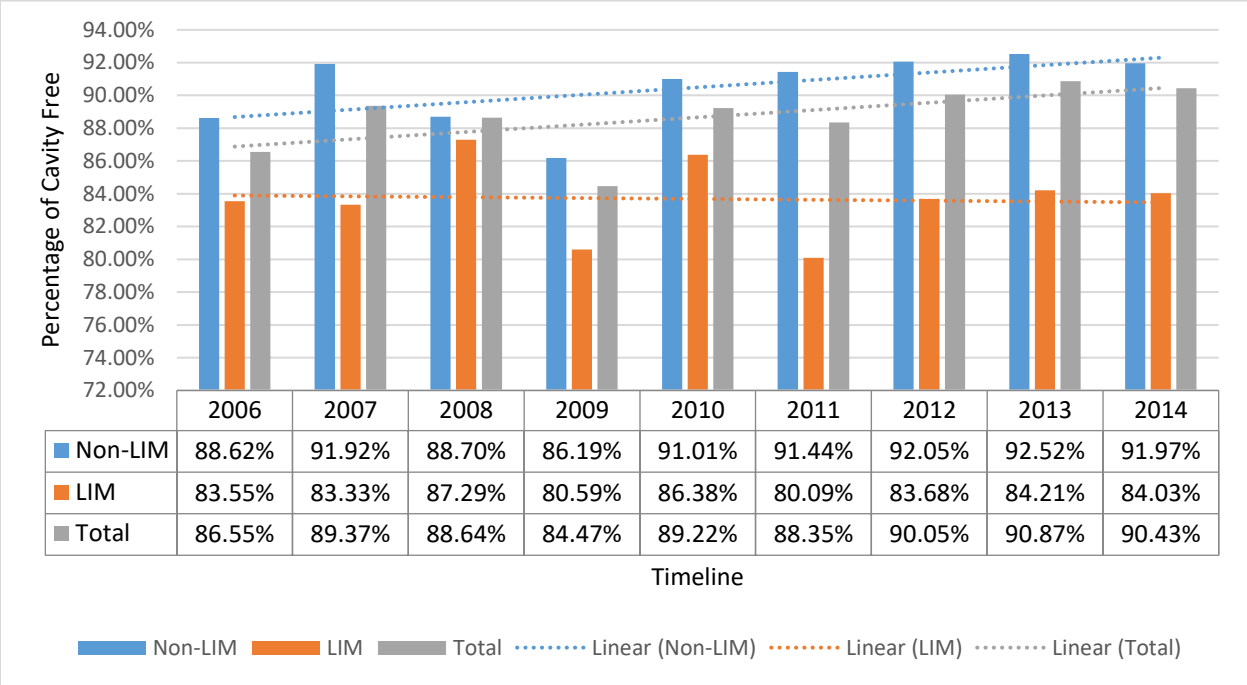
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	11.38%	7.36%	9.83%	12.34%	8.51%	8.56%	7.87%	6.94%	7.37%
LIM	16.45%	16.11%	12.71%	18.57%	12.84%	19.46%	15.73%	15.20%	14.24%
Total	13.45%	9.84%	10.39%	14.31%	10.29%	11.53%	9.69%	8.61%	8.68%

LIM: Low Income Measure

In 2014, 14.24% of 0-2 year old children in LIM had Untreated Cavities, compared to 7.37% in Non-LIM Neighborhoods,

Overall, the proportion of 0-2 year old children with Untreated Cavities in LIM Neighborhoods has remained stable. Whereas, there was a decrease for Non-LIM Neighborhoods.

Figure-70: % Cavity Free; Non-LIM and LIM: 0-2 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	88.62%	91.92%	88.70%	86.19%	91.01%	91.44%	92.05%	92.52%	91.97%
LIM	83.55%	83.33%	87.29%	80.59%	86.38%	80.09%	83.68%	84.21%	84.03%
Total	86.55%	89.37%	88.64%	84.47%	89.22%	88.35%	90.05%	90.87%	90.43%

LIM: Low Income Measure

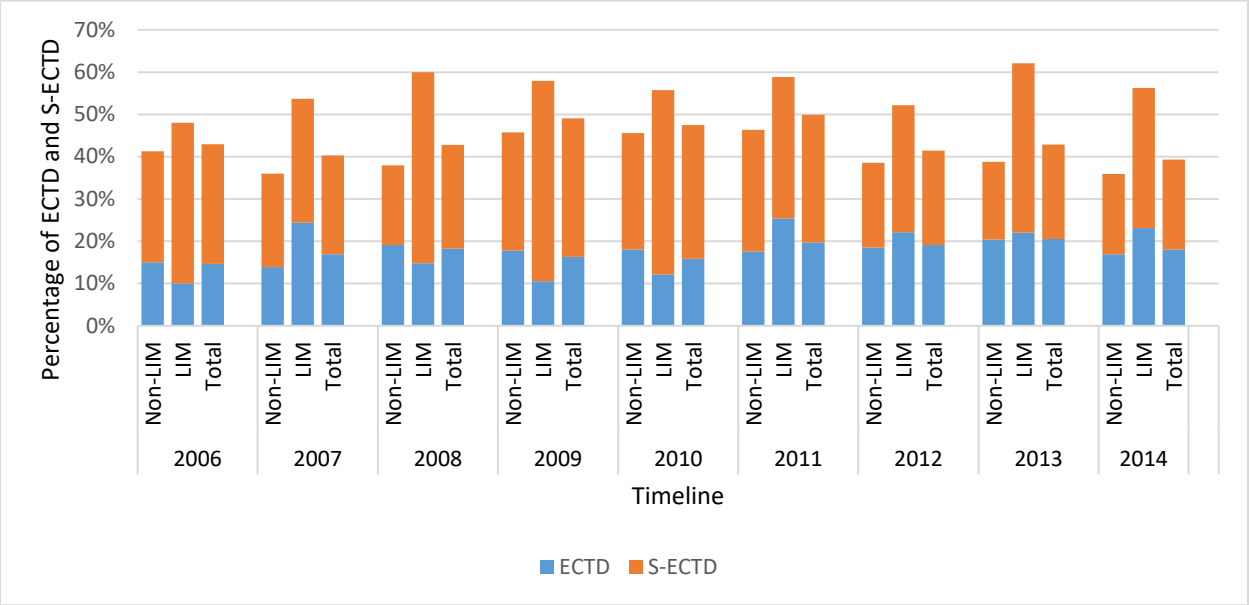
For the most part of the study period, the percentage of Cavity Free 0-2 year old children in Non-LIM was higher than LIM Neighborhood.

Overall, the graphs would suggest that the proportion of Cavity Free children in LIM Neighborhood remained almost stable. However, there was an upward trend for Non-LIM Neighborhoods.

Trend of Oral Health Status; Non-LIM and LIM: 3-5 Year Old Children

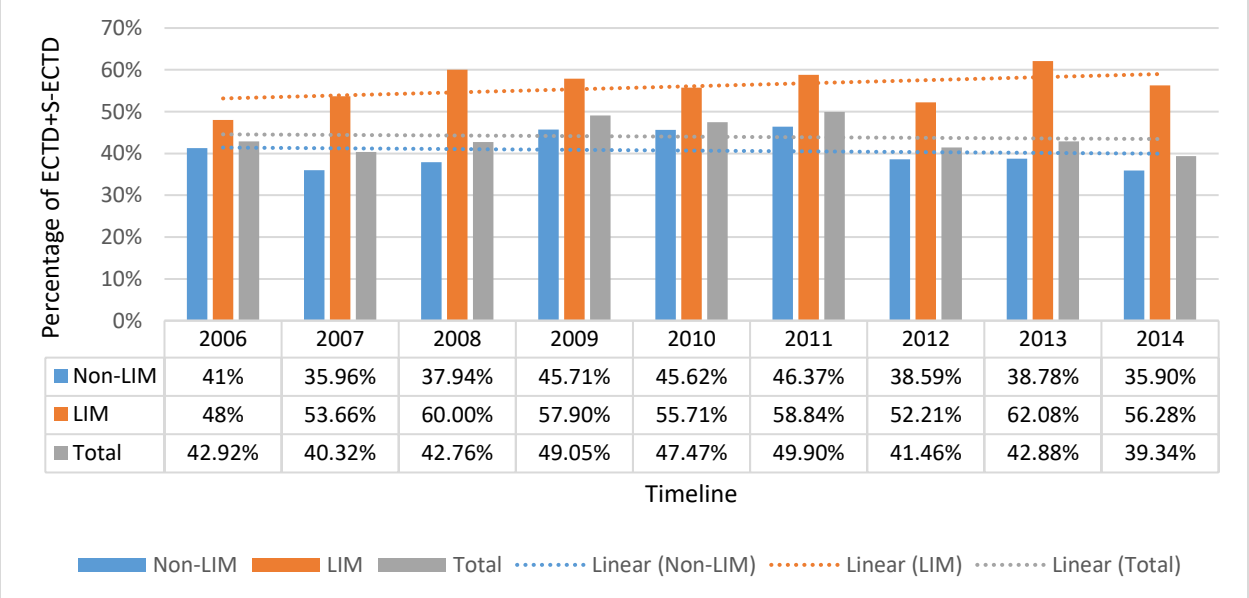
Figures-71 to **77** and **Table-104** illustrate oral health status trend among 3-5 year old children within Non-Low Income Neighborhood and Low Income Neighborhood over time.

Figure-71: Percentage of ECTD and S-ECTD; Non-LIM and LIM: 3-5 Year Old Children



ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay; LIM: Low Income Measure

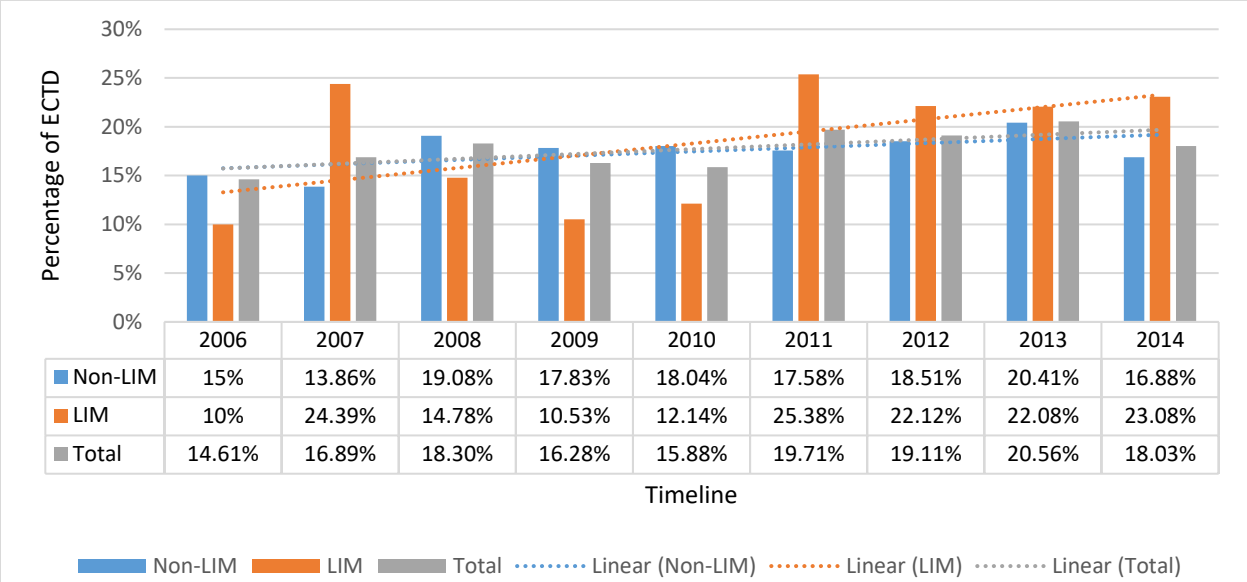
Figure-72: Percentage of ECTD+S-ECTD; Non-LIM and LIM: 3-5 Year Old Children



ECTD: Early Childhood Tooth Decay; S- ECTD: Severe Early Childhood Tooth Decay; LIM: Low Income Measure

Since 2007, the percentage of combined ECTD, S-ECTD in 3-5 year old children in Low Income Neighborhoods has been higher compared to Non-LIM areas. In 2014, the proportion of children with combined ECTD, S-ECTD in LIM and Non-LIM was 56.28% vs. 35.90%. Overall the proportion of 3-5 year olds in Non-LIM has remained almost stable. Whereas, this proportion has increased in LIM Neighborhoods.

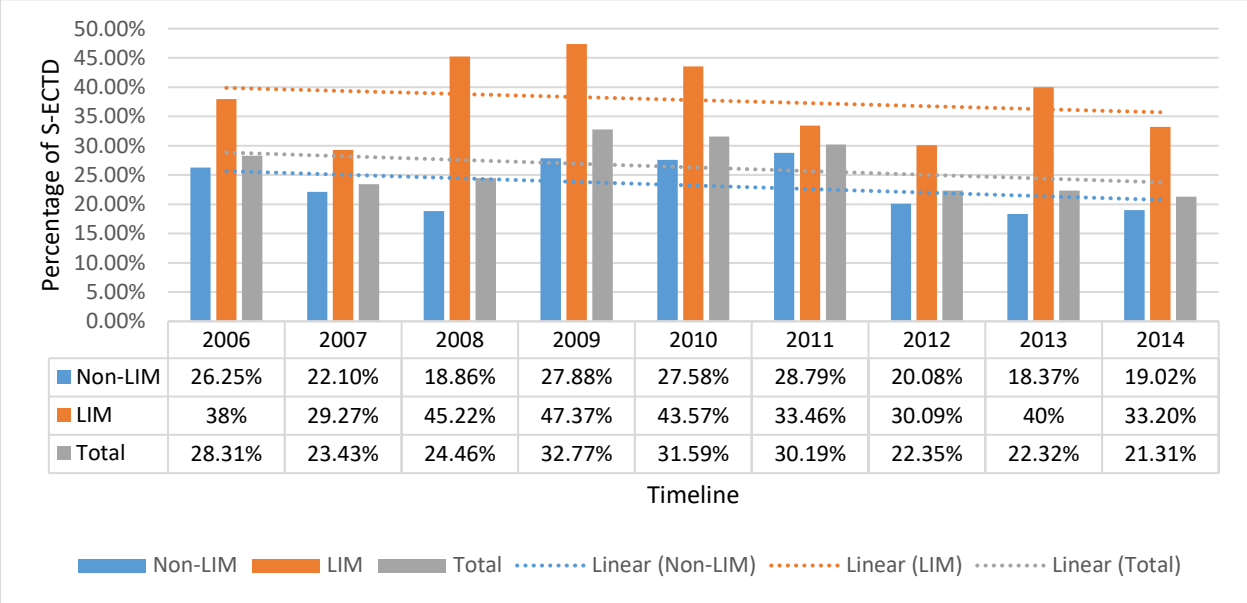
Figure-73: Percentage of ECTD; Non-LIM and LIM: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	15%	13.86%	19.08%	17.83%	18.04%	17.58%	18.51%	20.41%	16.88%
LIM	10%	24.39%	14.78%	10.53%	12.14%	25.38%	22.12%	22.08%	23.08%
Total	14.61%	16.89%	18.30%	16.28%	15.88%	19.71%	19.11%	20.56%	18.03%

ECTD: Early Childhood Tooth Decay; LIM: Low Income Measure

Figure-74: Percentage of S-ECTD; Non-LIM and LIM: 3-5 Year Old Children



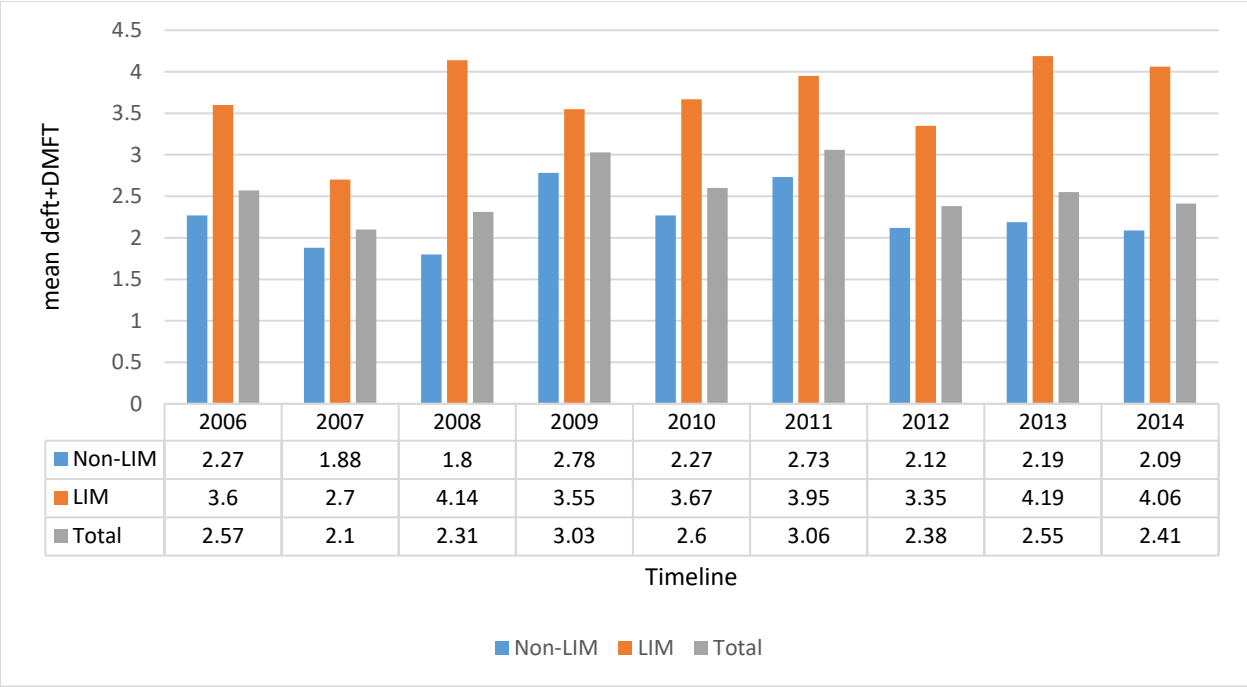
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	26.25%	22.10%	18.86%	27.88%	27.58%	28.79%	20.08%	18.37%	19.02%
LIM	38%	29.27%	45.22%	47.37%	43.57%	33.46%	30.09%	40%	33.20%
Total	28.31%	23.43%	24.46%	32.77%	31.59%	30.19%	22.35%	22.32%	21.31%

S- ECTD: Severe Early Childhood Tooth Decay; LIM: Low Income Measure

Figures-71 to **74** would suggest that overall, with the upward trend for ECTD and downward trend for S-ECTD, the proportion of children with ECTD+S-ECTD in Non-LIM Neighborhood has remained stable.

Regarding the LIM Neighborhood, the graphs would suggest that there was an upward trend for ECTD+ S-ECTD as well as ECTD. Whereas, the trend for S-ECTD showed a downward direction.

Figure-75: deft+DMFT; Non-LIM and LIM: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	2.27	1.88	1.8	2.78	2.27	2.73	2.12	2.19	2.09
LIM	3.6	2.7	4.14	3.55	3.67	3.95	3.35	4.19	4.06
Total	2.57	2.1	2.31	3.03	2.6	3.06	2.38	2.55	2.41

LIM: Low Income Measure

With regard to non-LIM Neighborhoods, the results of Welch's Robust test showed that at 0.05 level of significance, with a p-value<0.001, there was a significant difference over years. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. The statistically significant results are presented in **Table-104**.

Table-105: deft+DMFT (Post-hoc Test): Non-LIM; 3-5 Year Old Children

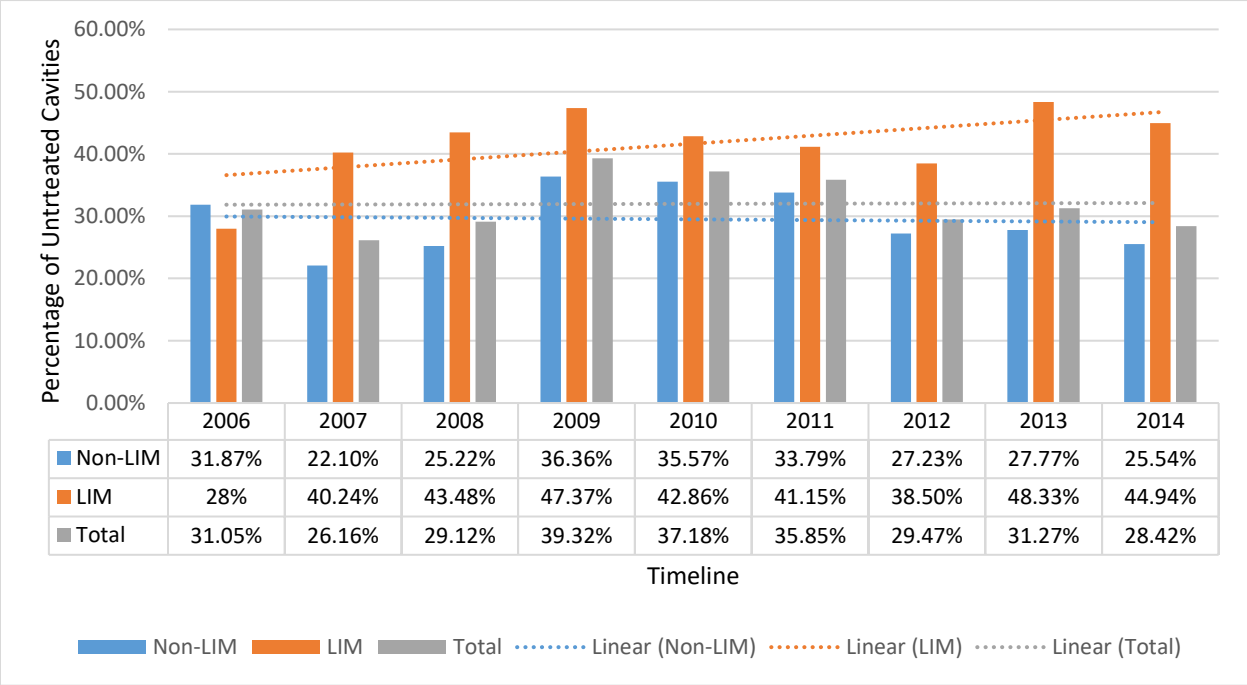
Pairwise Comparison Between the Screening Years	deft+DMFT : Non-LIM; 3-5 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2007and 2011	-0.84 (-1.63,-0.06)	0.023
2008 and 2009	-0.98 (-1.84, -0.12)	0.012
2008 and 2011	-0.92 (-1.61, -.0.24)	0.001

In each row, negative figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is smaller than the following year.

In Non-LIM areas, the mean deft/DMFT in 2007 was significantly lower than in 2011 (p-value=0.023). The average in 2008 was significantly smaller than 2009 (p-value=0.012) and 2011 (p-value=0.001).

Regarding LIM Neighborhoods, the One Way ANOVA test showed no significant difference in mean deft/DMFT in 3-5 year old children over years (p-value=0.0227)

Figure-76: % Untreated Cavities; Non-LIM and LIM: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	31.87%	22.10%	25.22%	36.36%	35.57%	33.79%	27.23%	27.77%	25.54%
LIM	28%	40.24%	43.48%	47.37%	42.86%	41.15%	38.50%	48.33%	44.94%
Total	31.05%	26.16%	29.12%	39.32%	37.18%	35.85%	29.47%	31.27%	28.42%

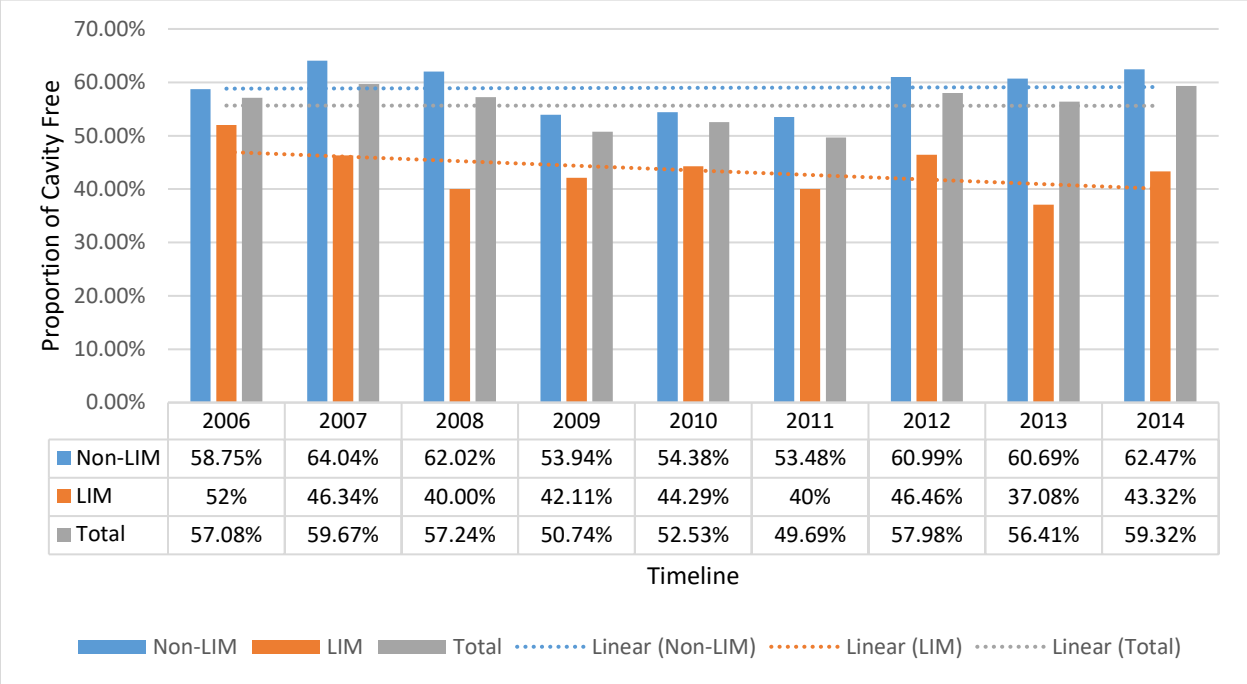
LIM: Low Income Measure

Since 2007, the proportion of 3-5 year old children in LIM Neighborhood has been higher than Non-LIM area.

In Non-LIM Neighborhoods, the percentage of children with Untreated Cavities remained almost stable over the study period.

The graphs would suggest that there was an upward trend in Untreated Cavities in LIM Neighborhoods. However, in 2014 the percentage of children who had Untreated Cavities, was slightly lower compared to 2013 (44.94% vs. 48.33%).

Figure-77: % Cavity Free; Non-LIM and LIM: 3-5 Year Old Children



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-LIM	58.75%	64.04%	62.02%	53.94%	54.38%	53.48%	60.99%	60.69%	62.47%
LIM	52%	46.34%	40.00%	42.11%	44.29%	40%	46.46%	37.08%	43.32%
Total	57.08%	59.67%	57.24%	50.74%	52.53%	49.69%	57.98%	56.41%	59.32%

LIM: Low Income Measure

Over the study period, the percentage of Cavity Free 3-5 year old children residing in Non-LIM Neighborhoods was higher compared to LIM areas.

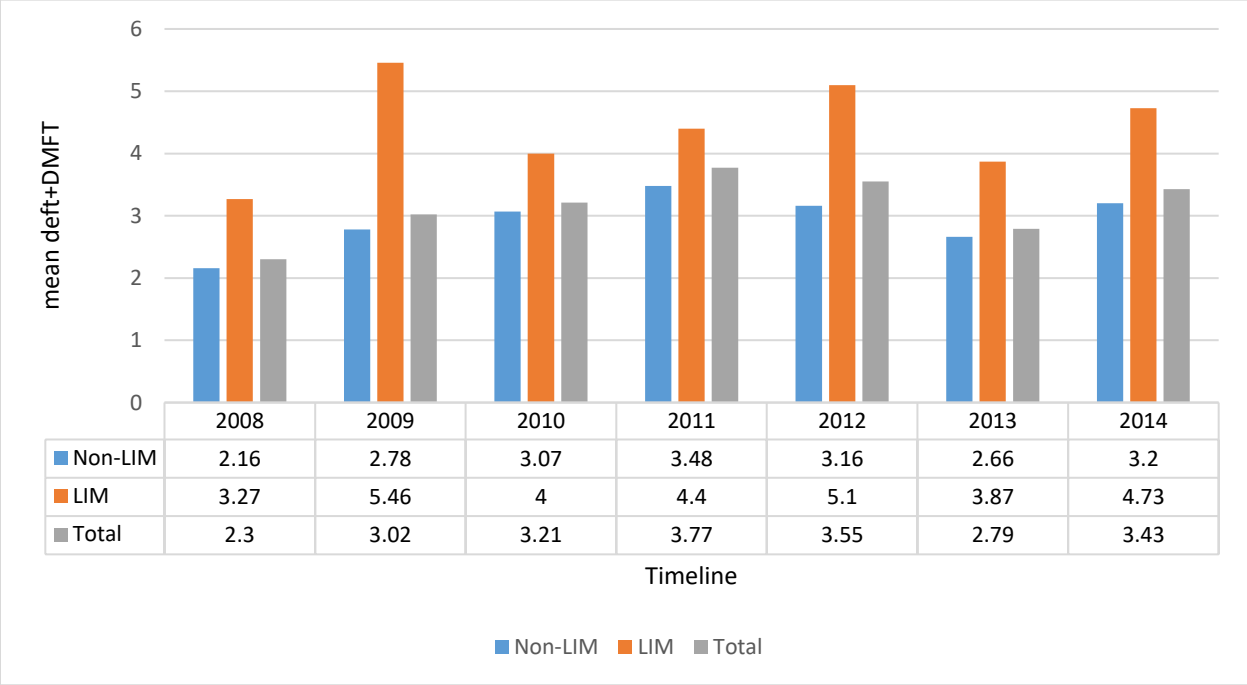
Since 2006 the proportion of Cavity Free children in Non-LIM has remained stable.

In LIM Neighborhood, the percentage of children with no cavity experience decreased. However, the proportion of Cavity Free children in 2014 was slightly higher (43.32%) compared to 2013 (37.08%).

Trend of Oral Health Status; Non-LIM and LIM: 6 Year Old Children

Figures-78 to **80** and **Tables-105** to **106** illustrate oral health status trend among 6 year old children within Non-Low Income Neighborhood and Low Income Neighborhood over time.

Figure-78: deft+DMFT; Non-LIM and LIM: 6 Year Old Children



	2008	2009	2010	2011	2012	2013	2014
Non-LIM	2.16	2.78	3.07	3.48	3.16	2.66	3.2
LIM	3.27	5.46	4	4.4	5.1	3.87	4.73
Total	2.3	3.02	3.21	3.77	3.55	2.79	3.43

LIM: Low Income Measure

With regard to Non-LIM Neighborhoods, the Welch's Robust test showed that at 0.05 level of significance, with a p-value<0.001, there was a significant difference over years. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. The significant results are presented in **Table-105**.

Table-106: deft+DMFT (Post-hoc Test): Non-LIM; 6 Year Old Children

Pairwise Comparison Between the Screening Years	deft+DMFT : Non-LIM; 6 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2008 and 2009	-0.62 (-1.18, -0.06)	0.018
2008 and 2010	-0.91 (-1.73,-0.09)	0.018
2008 and 2011	-1.32 (-2.02, -0.61)	<0.001
2008 and 2012	-1.00 (-1.57,-0.44)	<0.001
2008 and 2013	-0.50 (-0.81, -0.19)	<0.001
2008 and 2014	-1.04 (-1.50,-0.58)	<0.001
2011 and 2013	0.81 (0.11,1.51)	0.01
2013 and 2014	-0.54 (-0.98, -0.09)	0.007

In each row, positive figures for mean difference indicate that mean of deft+DMFT in the corresponding first year is larger than the following year and vice versa if the figure is negative.

In Non-LIM Neighborhoods, the mean deft/DMFT in 6 year old children in 2008, was significantly smaller compared to the other screening years. Refer to **Table-105** for the p-values. The average deft/DMFT in 2013 was significantly smaller than 2011 (p-value<0.001) and 2014 (p-value=0.007).

With regard to COHF guideline, the mean deft/DMFT for 6 year old children residing in Non-LIM children in 2008, met the COHF target, where it was 2.16 (COHF target <2.5).

With regard to LIM Neighborhoods, the Welch's Robust test showed that at 0.05 level of significance, with a p-value=0.003, there was a significant difference in deft+DMFT over years. Games-Howell Post-hoc test was used to make pairwise comparisons between the screening years. The statistically significant results are presented in **Table-106**.

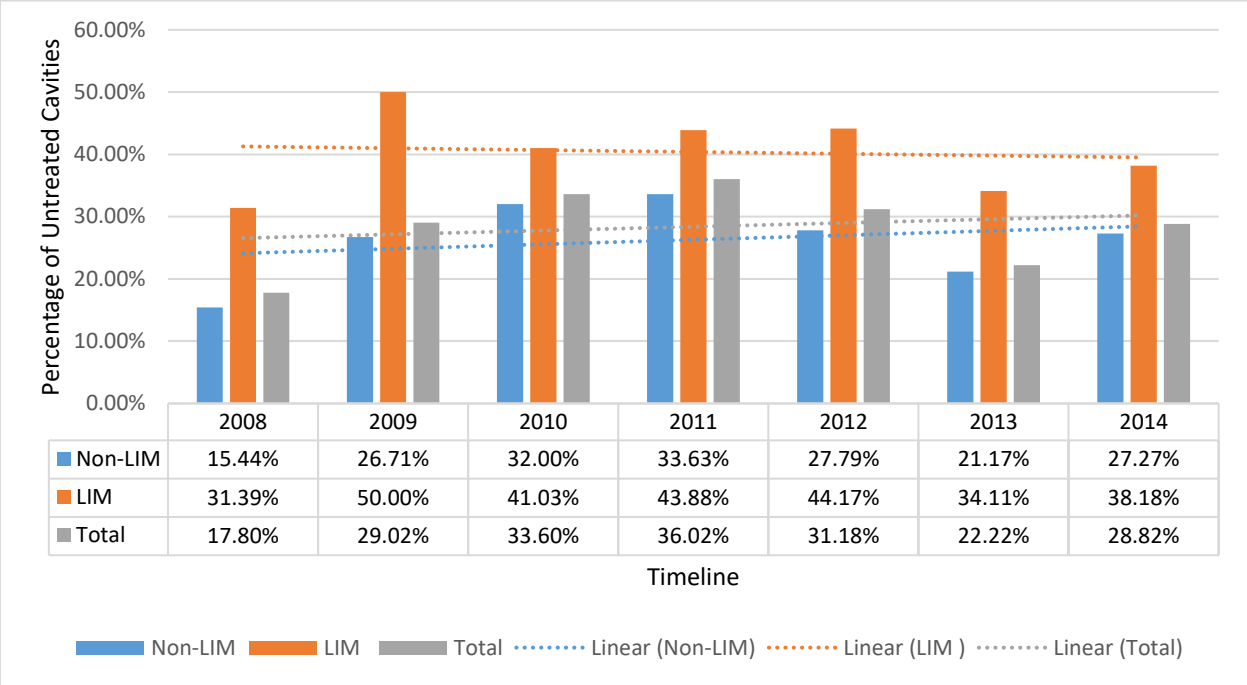
Table-107: deft+DMFT (Post-hoc Test): LIM; 6 Year Old Children

Pairwise Comparison Between the Screening Years	deft+DMFT : LIM; 6 Year Old Children	
	Difference in Mean for deft+DMFT (95% Confidence Interval)	p-value
2008 and 2012	-1.82 (-3.37, -0.26)	0.01

Negative figure for mean difference indicate that mean of deft+DMFT in the corresponding first year is smaller than the following year.

In LIM Neighborhood, the mean deft/DMFT in 6 year old children in 2008 was significantly smaller compared to 2012 (p-value=0.01).

Figure-79: % Untreated Cavities; Non-LIM and LIM: 6 Year Old Children



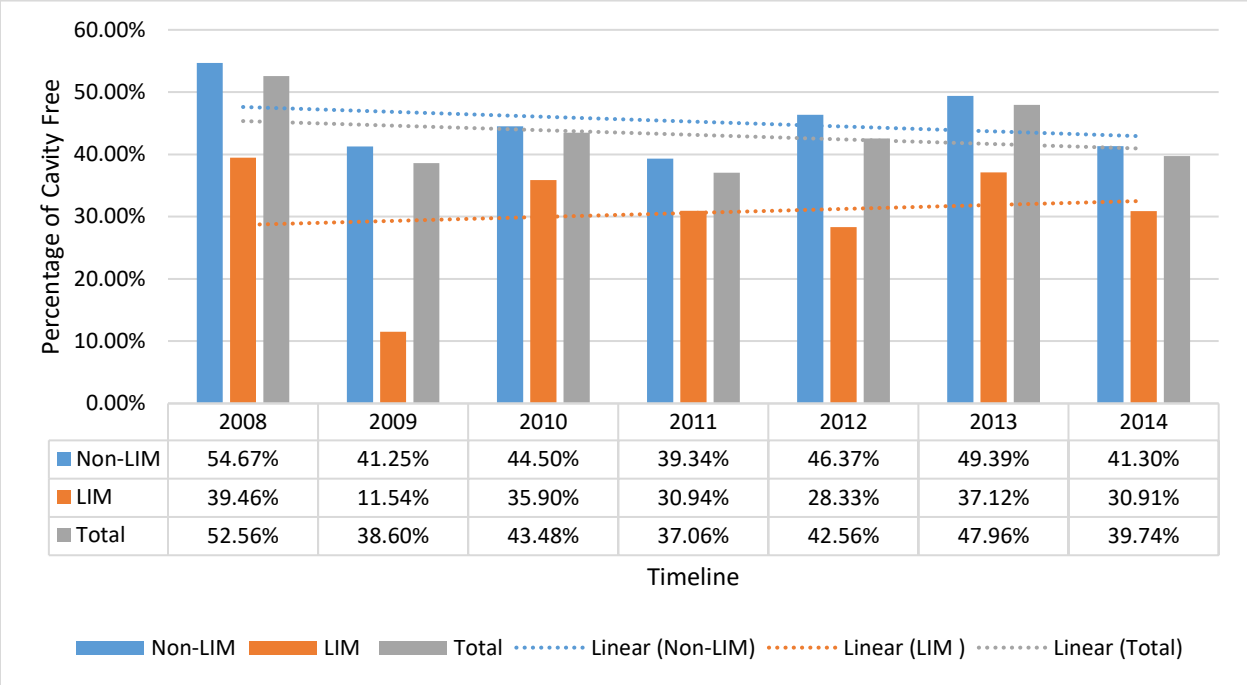
	2008	2009	2010	2011	2012	2013	2014
Non-LIM	15.44%	26.71%	32.00%	33.63%	27.79%	21.17%	27.27%
LIM	31.39%	50.00%	41.03%	43.88%	44.17%	34.11%	38.18%
Total	17.80%	29.02%	33.60%	36.02%	31.18%	22.22%	28.82%

LIM: Low Income Measure

Over the study period, the percentage of 6 year old children with Untreated Cavities in Non-LIM was lower compared to LIM Neighborhood.

The percentage of 6 year old children with Untreated Cavities in Non-LIM remained stable. Whereas, in LIM Neighborhood the proportion of children with Untreated Cavities slightly increased.

Figure-80: % Cavity Free; Non-LIM and LIM: 6 Year Old Children



	2008	2009	2010	2011	2012	2013	2014
Non-LIM	54.67%	41.25%	44.50%	39.34%	46.37%	49.39%	41.30%
LIM	39.46%	11.54%	35.90%	30.94%	28.33%	37.12%	30.91%
Total	52.56%	38.60%	43.48%	37.06%	42.56%	47.96%	39.74%

LIM: Low Income Measure

Over the study period, the percentage of 6 year old Cavity Free children in LIM was lower compared to Non-LIM Neighborhood.

Over the study period, in Non-LIM Neighborhood, the percentage of 6 year old children who were Cavity Free increased. In contrast, in LIM Neighborhood the proportion of Cavity Free children decreased.

Discussion

The oral health status of 23,787 children of *0-6* years of age, (with the male: female ratio of approximately 1:1) in Saskatoon Health Region from 2006 to 2015 were analyzed. The age group were stratified into *<1*, *1*, *2*, *3*, *4*, *5*, and *6* years old.

Early Childhood Tooth Decay (ECTD) a rapid form of tooth decay affecting the primary dentition of children younger than 6 year old. The advanced form is referred to as Severe Early Childhood Tooth Decay (S-ECTD). Refer to **Appendix-A** for detailed definition. Tooth decay impacts several aspects of children's functioning including eating, sleeping, speaking, learning and growth. The results showed that, the percentage of ECTD+S-ECTD in *0-2* year old ranged from 9.07% to 15.12% and in *3-5* year old children was 39.34%-49.90%. Of the *0-2* year old children experiencing childhood caries, none of them had the milder form (ECTD).The percentage of *3-5* year old children with ECTD+S-ECTD was the lowest in 2014 (39.34%) compared to all the past screening years. Since 2007, the proportion of children with ECTD+S-ECTD followed this pattern: *five* year old > *four* year old >*three* year old >*two* year old >*one* year old > *younger than one* year old children (*infants*). This finding was not surprising; the older the child becomes, the more likely he or she will be exposed to tooth decay risk factors.

Overall, the data would suggest that the proportion of ECTD+S-ECTD in *infants* and *3* year old children remained stable; there was a downward trend for *1*, *2*, and *4* year old children; and upward trend for *5* year old children. The proportion of *3*, *4*, and *5* year old children combined (*3-5* year olds) who experienced ECTD+S-ECTD has remained stable over time. The breakdown, showed that despite the upward trend in ECTD in 3-5 year olds, the severity of disease (S-ECTD) decreased.

To determine the burden of tooth decay, the number of quadrants affected by the decay were recorded. In recent years, in *infants* the majority of caries were seen in one quadrant unlike the earlier years where mostly two quadrants were involved. Also, in most recent years, fewer *1* year old children had tooth decay in two quadrants compared to the previous years. In children of *2*, *3*, *4*, *5* years of age the pattern of number of quadrants involved remained stable, where in the majority of screening years, two quadrants were affected. Similarly, the trend for *6* year old

children remained almost unchanged.

We also assessed the children based on their dental health treatment needs which were recorded as Priority Scores. The data would suggest that the proportion of *six* year old children that required urgent/ immediate dental care has decreased over years. In contrast, upward trend for Priority1 was seen in *one, three,* and *five* year old children. For *infants, two* and *four* year old children, the trend showed no change.
In 2014, the percentage of children that required urgent dental treatment was: *infants* (0%), *one* year old (0.10%), *two* year old (0.99%), *three* year old (1.94%), *four* year old (2.03%), *five* year old (2.85%), and *six* year old children (2.40%).

The past and present tooth decay was assessed using "deft" and "DMFT"index. The "deft" is a teeth index which measures the prevalence of tooth decay in primary dentition, in contrast to "DMFT" which is used for the same measurement in permanent dentition. Refer to **Appendix-A** for the detailed definition. The "deft+DMFT" measures the average number of "deft" and "DMFT".

In 2014, the mean deft/DMFT in different age groups was as follows: *infants* (0.18) < *one* year old (0.22) < *two* year old (1.05) < *three* year old (1.70) < *four* year old (2.27) < *five* year old (3.12) < *six* year old children (3.43). The percentage of Cavity Free children was: *infants* (95.62%), *one* year old (94.31%), *two* year old (78.71%), *three* year old (65.93%), *four* year old (62.5%), *five* year old (50.31%), and *six* year old (39.74%).This also indicates that the dental decay was more prevalent as the child grew older.

The mean deft+DMFT in *infants, 2,* and *3* year old children didn't change significantly over years. However, there was significant change in mean deft+DMFT among *1* year olds where in 2012, 2013, and 2014 this measurement was significantly smaller compared to 2008. Similarly, the deft+DMFT measurement in *4* year old children in 2012, 2013, and 2014 was significantly smaller compared to 2011.In contrast, the mean deft/DMFT in *5* year old children in 2009, 2011, and 2013 has considerably increased compared to 2008. With regard to *6* year old children, deft+DMFT was found to be the smallest in 2008 compared to all the past screening years, and was smaller in 2013 compared to 2011, 2012, and 2014 (p-value<0.05).

The "deft" and "DMFT" indices were also used to assign every student with a Dental Health Status which were categorized as NDE, CCC, PCC and NEC. Refer to **Appendix-A** for the definitions. With regard to No Evidence of Care, the data would suggest that there was a downward trend for *infants*, *1*, *2*, and *4* year old children over the last 9 years. In contrast, an upward trend for NEC was seen in *3*, *5*, and *6* year old children. In 2014, the proportion of children who received Complete Caries Care was as follows: *infants* (0.73%), *one* year old (0.39%), *two* year old (1.98%), *three* year old (5.26%), *four* year old (9.38%), *five* year old (19.14%), and *six* year old children (30.13%). In 2014, the percentage of children with CCC was the highest among 6 year old followed by 5 year old children.

With regard to the components of "deft", the results indicate that, the major component of "deft" in *0,1,2,3,4* year old children throughout the whole period, and in 5 year olds for the majority of the period, was decayed (d), followed by filled (f) primary teeth. Whereas, in *6* year old children the main contributor was filled (f) teeth rather than decay (d) and extracted (e) teeth.
In 2014, the proportion of children with at least one decayed (f) teeth was 3.65% (*infants*), 5.30% (*one* year olds), *19.06*% (two year olds), 29.09% (*three* year olds), 26.88% (*four* year olds), 29.74% (*five* year olds), and 27.62% (*six* year olds).
In 2014, the percentage of children who had at least one filled (f) primary teeth was as follows: 0.73% (*infants*), 0.39% (*one* year olds), *1.49*% (two year olds), 5.82% (*three* year olds), 13.13% (*four* year olds), 28.11% (*five* year olds), and 41.92% (*six* year olds). In more recent years, the gap between % decay (d) and % filling (f) in *5* year old children has narrowed; in 2014, the proportion of those with at least one decay was almost equal to children who had at least one filled teeth. These findings indicate improved access and provision of dental treatment for *6* year olds (and more recently for *5* year old children). Similarly, the analysis from the other perspective shows that in 2014, 30.13% of *six* year old received Complete Caries Care as opposed to 19.14% *five* year old, and 9.38% *four* year olds. All these finding suggest children mostly started to seek dental care from *5* and *6* years, therefore more emphasis is required on caries treatment in younger children.

Regarding DMFT, the findings suggest that the children of *four* years started to experience caries in their permeant teeth. Although it is not common for permanent teeth to erupt before *6*, this can happen due to some reasons (e.g. premature loss of primary teeth, genetics, etc.). In 2014, 0.31%

of *four* year olds, 0.20% of *five* year olds, and 2.62% of *six* year old children had at least one current Decay (D) in their permanent teeth.

The Dental Health Screening results for 6 year olds were measured in line with the *Canadian Oral Health Framework 2013-2018 (COHF)* guidelines. In 2008, the guideline which required < 2.5 average "deft/DMFT" was met as the average "deft/DMFT" of 6 year old children was 2.3. However, the other guidelines related to 55% students with "dmft+DMFT"= 0 and d+D<15% was not met in any of the screening years.

For children younger than 6 year old, COHF did not set a guideline, therefore we established targets for these age groups. The targets include: 64% of 5 year old, 73% of 4 year old, 82% of 3 year old, 91% of 2 year old, and 100% of ≤1 year old children are Cavity Free.

On the basis of a detailed statistical analysis, the effect of Child's Residence and Income Status on the oral health of children were analyzed. In the case of Child's Residence, since 2008 and 2009, children of all age groups (*0-2*, *3-5*, *6* year old) in Rural generally had better health measurements in oral health. In 2014, deft+DMFT of children in all age groups in Rural was significantly lower than Urban children. The mean deft/DMFT was as follows: in *6* years old 2.62 vs. 3.87; in *3-5* year old children 1.66 vs. 2.84, and in *0-2* year olds 0.13 vs. 0.57. Apart from the statistical analysis, the epidemiological studies also suggested an association between Child's Residence and dental decay. In 2014, children in three age groups (*0-2*, *3-5*, *6* years old) in Rural communities were 0.45-0.71% less likely to have "Dental Decay" than those residing in Urban locations (p-value<0.05).These finding indicates the children in Rural areas had improved oral health compared to Urban districts.

There are many factors which might contribute to this finding. Since 2009 the involvements of Public Health Nurses/Nurse Practitioners (through oral health education and Fluoride Varnish application) might have had a significant role in this improvement. As they are in continuous contact with the children and their families and perform frequent follow ups. On the other hand, less frequent turnover in the health care professionals providing the care will certainly help build the trust with the families. Based on the *Saskatoon Health Region Dental Health Screening Program Report 2013-2014*, although the fluoride water content has not improved significantly over the years [26], our results suggests the oral health has improved which again signifies the role of Public Health Nurses/Nurse Practitioners delivering the oral health care. On the contrary, it might also indicate the changes in lifestyle and habits in Urban locations which demands more oral health promotion and preventive services.

As mentioned above, generally Rural children had better oral condition than Urban children. Overall, the oral health status of Rural children has improved over years. Also, the trend of oral health of Urban children over the years would suggest improvements in some certain age groups. In Urban areas, the proportion of 0-2 year old children with Untreated Cavities has decreased; at the same time proportion of Cavity Free children increased; mean deft/DMFT in 3-5 year old children significantly was smaller in 2014 compared to 2011 (2.41 vs. 3.06; p-value=0.035). In contrast, in Urban areas there was a downward trend in Cavity Free proportion, and upward trend in proportion of Untreated Cavities in 3-5 year old children. The oral health of 6 year old Urban children was more of a concern, where the mean deft/DMFT in 2014 significantly was larger compared to 2013; also proportion of Cavity Free children and those with Untreated Cavities showed unfavorable trend.

Dental health disparities were also studied between children living in Low Income Neighborhood and Non- Low Income Neighborhood. For the majority of the time period, children from all the age groups (*0-2*, *3-5*, *6* year old) in Non- Low Income Neighborhood generally had better health measurements in oral health. In 2014, deft+DMFT of children in all age groups in Non- Low Income Neighborhood was significantly smaller than those residing in Low Income Neighborhood. The mean deft/DMFT was as follows: in *6* years old 3.20 vs. 4.73; in *3-5* year old children 2.09 vs. 4.06, and in *0-2* year olds 0.31 vs. 0.87. Additionally, the epidemiological studies suggested an association between Income Status and dental decay. In 2014, children in three age groups (*0-2*, *3-5*, *6* years old) in Low Income Neighborhood were 1.57 to 2.17 more likely to have "Dental Decay" than those residing in Non- Low Income Neighborhood (OR=1.57, 2.17, 2.17 respectively; p-value<0.05).These finding indicates children living in Non- Low Income Neighborhood had better oral health compared to Low Incomes. This certainly demands for more attention towards these marginalized populations.

As mentioned above, generally children in Non-Low Income Neighborhoods had better conditions than Low Income Neighborhoods. Further analysis of oral health indicators within a given neighborhood would suggest that, over the years overall there was improvements in oral health in Non-Low Income Neighborhood children. Regarding Low Income Neighborhoods, for the most part, the oral health indicators has remained stable or even showed unfavorable trend over the years. For example, for *0-2* year old children residing in Low Income Neighborhoods , the proportion of children with Untreated Cavities, S-ECTD, percentage of Cavity Free children has

remained stable; the mean deft/DMFT did not show any significant difference over years. In *3-5* year old children living in Low Income Neighborhood, the mean deft/DMFT did not show significant difference; proportion of Cavity Free children and those with Untreated Cavities showed unfavorable trend. With regard to *6* year old children in Low Income Neighborhoods, percentage of Cavity Free children remained stable and proportion of children with Untreated Cavities slightly increased. However, some favorable findings were also seen. For instance, in *3-5* year old children in Low Income Neighborhoods, despite an upward trend for ECTD+ S-ECTD, the trend for S-ECTD showed a downward direction which implies that the severity of disease has decreased. Additionally, the best results of oral health for *6* year old children with Low Income Status in recent years was seen in 2013, where mean deft/DMFT was 3.87, 34.11% of children were found to have Untreated Cavities, and 37.12% were Cavity Free. These improvements in part could be due to the education and care provided by health care professionals. However, there are still ample room for improvement in children in Low Income Neighborhood.

As children are the most vulnerable population and the oral health issues are multi-factorial, engaging parents/guardians is key in improving the oral health. The dental hygiene and health before the age when children reach school is most critical in developing habits towards better oral health in the future. Public health dental clinics must be utilized to full potential to meet the needs of children. There is a need to recognize barriers to accessing preventive dental care that originate on the basis of Income Status. These barriers need to be considered for planning future service delivery and deploy the public health resources to protect and promote the oral health of children.

Limitations

- The screening was conducted using a mouth mirror and LED flashlight. Cavities not detected visually might have been detected with radiographs.

- The effect of potential confounding factors such as Aboriginal status, immigration status, dental insurance, and dental visits on oral health status was not assessed because they were not available for the majority of the children. Also, we did not examine the association of community water fluoridation and oral health. Because, based on the *Saskatoon Health Region Dental Health Screening Program Report 2013-2014*, the children showed no significant difference in oral health measures when they were analyzed as being from Fluoridated and

- Non-Fluoridated communities. In addition, the effect of education level of parents/caregiver, child's ethnicity and gender on oral health status was not evaluated.
- Except 2008 and 2013 for 6 year old children, the study samples were not representative of the population; which would imply the results could not be generalized to the population.
- The Fluoride Varnish Program was not evaluated. The data was reviewed but it was not reliable.

Recommendations

- Given the risks associated with untreated tooth decay in pregnant women, it is suggested to include oral health education as part of EMR (Electronic Medical Recording) systems so that, health professionals would identify women at high risk for dental caries as early as possible, preferably prior to pregnancy, to provide anticipatory guidance and early intervention.

- Improving the oral health of pregnant women prevents complications of dental diseases during pregnancy, and has the potential to subsequently decrease Early Childhood Caries in their children. Therefore, it is suggested that pregnant women, during routine prenatal care, should be referred to oral health professionals for examinations and preventive care or treatment.

- Given that the bacteria causing caries is transferable, it seems logical to educate pregnant women/mothers about avoiding saliva-sharing activities through social media.

- Considering that some oral health professionals are hesitant to treat pregnant women (because of misunderstanding, fear of lawsuits or lack of evidence-based information), they should get more training. Also, dentists should receive more pediatric training in dentistry school.

- Because most children have visited a child health professional many times (during well child visits) before their first dental visit, non-dental health care professionals (e.g. family physicians and nurses) can play a significant role in preventing oral disease when educated about oral diseases. The integration of primary dental and medical care can improve patient care.

- Ever since the Public Health Nurses/Nurse Practitioners in Rural areas delivered Fluoride Varnish Programs, the oral health of children has improved; they are in continuous contact with the children /their families, performing frequent follow ups. Therefore, it is recommended that the same strategy regarding involvement of Public Health Nurses/Nurse Practitioners be implemented in Urban areas.

- While preventive dental care for young children isn’t part of Canada’s universal health-care system and about one third of Canadians have no dental insurance, it is recommended to incorporate oral preventive health care in the universal health care system.

- We recommend continuing oral screening program for children 0-6 years of age.
- We recommend continuing Fluoride Varnish Program and frequent assessment, focusing on children residing in Low-Income Neighborhood.
- Since the data analysis is the basis of the policy making, it is of utmost importance that to have the most accurate data possible. Therefore, it is recommended that data entry be performed as soon as possible (preferably the same day), and most preferably web-based in real time. Any delay in data entry may lead to loss of some important information. It is also suggested to include data regarding immigration status, Aboriginal status, ethnicity, and socioeconomic status of parents/caregivers.
- The success of primary health care model is a strong proof for the effectiveness of ongoing follow-up and holistic approach towards medical conditions, therefore we support and emphasize on establishment of dental home as early as 12 months of age, as recommended by *Population and Public Health Strategies 2013-2016*.
- We continue to recommend the provision of a free consultation/checkup for the children age 1 to support Canadian Dental Association policy for the first dental visit at age 1.
- The only recent national survey regarding oral health is *Canadian Health Measures Survey (CHMS) 2007-2009*, which is the gold standard for people older than 6 years old. As there is no such a national survey for children younger than 6, we strongly recommend a national dental survey to be carried out focusing on this age group.
- We recommend incorporating oral health education in the curriculum of preschool and elementary schools.

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Appendices

Appendix-A: Dental Screening Program Definition

deft/DMFT:

- index used to measure disease experience. It is the count of the number of decayed, extracted (due to caries), and filled **primary** teeth of an individual and the number of decayed, missing and filled (due to caries) **permanent** teeth of an individual.

deft:

decay:

- visual or obvious decay of primary teeth
- discoloration or loss of translucency typical of undermined or de-mineralized enamel
- the tooth may or may not be restorable.

extracted:

- the primary teeth that have been extracted because of dental caries. Teeth missing for other reasons (i.e.: ortho, trauma, heredity) are not recorded.

filled:

- a primary tooth with a permanent or temporary restoration as a result of caries
- if the tooth has a defective restoration without evidence of decay. (**Note**: Record as broken/fractured/lost).

DMFT:

Decay:

- visual or obvious decay of permanent teeth
- discoloration or loss of translucency typical of undermined or de-mineralized enamel
- the tooth may or may not be restorable.

Missing:

- the permanent teeth that have been extracted as a result of dental caries. Teeth lost for other reasons (i.e.: ortho, trauma, heredity) are not recorded.

Filled:

- a permanent tooth with a permanent or temporary restoration as a result of caries
- if the tooth has a defective restoration without evidence of decay. (**Note**: Record as broken/fractured/lost).

Note - Recurrent decay:

- when a tooth has visible recurrent decay (around a filling) then the tooth is marked as **decayed** even though it may have a restoration in place.

- when a tooth has a restoration in place with **no** visible recurrent decay (around a filling) but decay is visible on another surface (e.g. mesial, distal) record the tooth as **decayed.**

Pain:
- pain as a result of tooth decay, injury, periodontal disease, or over retention.

Infection:
- infection visible (abscess).

ECTD*:
- is the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. (American Academy of Pediatric Dentistry, 2008)

*Dental Screening Database has formula set to calculate this automatically.

S-ECTD*:
- is any sign of smooth-surface caries in children younger than 3 years of age. From ages 3 through 5, one or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing or filled score of ≥4 (age 3), ≥5 (age 4), or ≥6 (age 5) surfaces constitutes S-ECC. (American Academy of Pediatric Dentistry, 2008)

*Dental Screening Database has formula set to calculate this automatically.

Priority 1:
- pain and/or infection present
- urgent, requires immediate attention

Priority 2:
- ECTD or S-ECTD
- visible decay in 1-4 quadrants
- treatment required as soon as possible

Note: If treatment of decay may not be necessary clarify in comments section

Priority 3:
- no visible decay

Note: Record suspicious areas that **may** be decay as **"stained"**.

Status:

No Decay Experience (NDE):
- indicates that no decay, fillings or extractions are evident

Complete Caries Care (CCC):
- Indicates that all decayed teeth appear to have been treated

Partial Caries Care (PCC):
- Indicates that some teeth have been treated, but decay is still evident

No Evidence of Care/Neglect (NEC):
- indicates that there is decay but no evidence of past or present dental treatment.

Formulas:

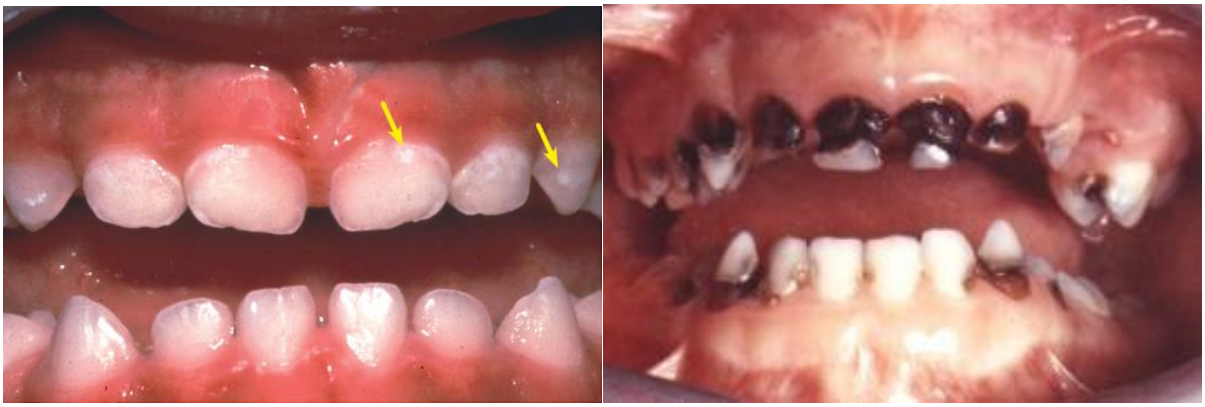
Priority 1:
Pain
Infection

Priority 2:
Quadrants 1-4 marked
d/D = 1 or more
ECC or S-ECC

Priority 3:
Blank – Pain
Blank - Infection
Blank – Quadrants 1-4
Blank – ECC+
d/D = 0
⊙ Neither is marked

NDE:
deft/DMFT = 0
CCC:
d, D = 0; e, f, M & F = 1 or more
PCC:
d/D = 1 or more **and** e, f, M, F = 1 or more
NEC:
d/D = 1 or more **and** e, f, M, F = 0

Appendix-B: Early Childhood Tooth Decay and Severe- Early Childhood Tooth Decay



Left image: ECTD in front teeth (arrows) Right image: S-ECTD

Appendix-C: pH and Sugar Content of a Variety of Soft Drinks and Other Popular Beverages.

Beverage	pH	Sugar (gram/serving)
Pepsi Regular	2.49	42
Pepsi Diet	3.05	0
Coca Cola Classic	2.53	39
Coca Cola Diet	3.39	0
Minute Maid Orange Soda	2.80	47
Snapple Lemonade	2.56	30
A&W Root Beer	4.41	31
Lipton's Iced Tea	3.86	22[30]

Appendix-D: CDA Guidelines for Oral Hygiene/Dietary Habits

Age group	Note
0-6 months	-Wipe all around baby's mouth, especially along the gum line, with a soft, moist cloth.[31] -Never put a baby to bed with a bottle of milk and other sugary drinks.[31] -Delay pacifier use in breast fed infants until 6 weeks to get breastfeeding well established, because sucking action used for each is different.[32] *Long periods of pacifier use may affect a baby's growth and development and jaw formation.[32]
6 months	-When teeth first appear, brush them with wet soft toothbrush twice a day.[31] -*Ad libitum* breastfeeding should be avoided after the first primary tooth begins to erupt and other dietary carbohydrates are introduced .[14] -Lift the lip once a month to look at the teeth and check for tooth decay. [31] *To relieve the itchy feeling of gums during teething, use a clean finger/back of cool spoon. (teething biscuits are not recommended because they can stick to baby's teeth and cause tooth decay/ they may have sugar added or contain hidden sugars.[33] * Mixing infant formula with fluoridated water on a regular basis for those primarily fed in this way may increase the chance of fluorosis.[17]
6-9 months	-Encourage baby to start using a regular cup.[31] -If considering using a training cup during this transition, use regular training cup (with no valve) instead of no-spill training cup.[34] *No-spill training cup is not recommended. This cup has a valve under the spout that keeps the liquid from spilling. The sucking action is the same motion used when drinking from a baby bottle. As a result the child will not learn the mature drinking pattern and not develop mature muscle movement which lead to future speech difficulties or delays.[34]
1 year	-Visit a dental office by first year.[31] -Have infants drink from a cup as they approach their first birthday.[34] -Wean baby from bottle by age 12-14 months.[34]
6months-3 years	-*Low risk child*: Adult should brush child's teeth with wet soft toothbrush twice a day.[21] -*High risk child*: Adult should brush child's teeth with a *rice sized* amount of fluoride toothpaste twice a day Children should spit out the toothpaste to reduce the risk of potential fluorosis.[21]
3-6 years	-Adult should supervise/assist child with brushing teeth with a green *pea-sized* amount of fluoride toothpaste twice a day- Children should spit out the toothpaste. [21] -Adult floss the child's teeth that touch together once a day.[31] * No fluoride mouth rinse should be used for children under 6 years old.[21]
1-6 years	- Consume no more than four to six ounces of fruit juice per day.[14]

CDA: CanadianDental Association

Appendix-E: Fluoride Varnish Clinics in Saskatoon Health Region

Clinics in Urban District (Saskatoon)	Clinics in Rural District
Mayfair Child Health Clinic	Humboldt Public Health Office
North East Clinic	Rosthern Public Health Off
Pinehouse Child Health Clinic	Wadena Public Health Office
Pleasant Hill Health Clinic	Watrous Public Health Office
Riversdale Child Health Clinic	Wynyard Health Center
South East Health Center	
West Winds Primary Health Center	
WP Bate Child Health Clinic	

Appendix-F: Fluoride Varnish Consent Form

Government of Saskatchewan
Ministry of Health

CONSENT

Dental Health

Fluoride Varnish Program

Is Your Child At Risk for Early Childhood Tooth Decay?

Fluoride varnish applications prevent tooth decay. To find out if your child is at risk for early childhood tooth decay, read the points below. For each **yes**, check the box.

Does your child:

- ❑ live in an area with a non-fluoridated water supply, or a low natural fluoride level of less than 0.3mg/L? If you do not know, you can check with your local public health office.
- ❑ have visible plaque on teeth?
- ❑ have teeth brushed less than once a day?
- ❑ have a visible cavity or white chalky area on a tooth?
- ❑ have fillings, crowns, or extractions?
- ❑ see a dentist less than once a year?
- ❑ regularly eat foods or drink beverages that contain sugar (including natural sugars) between meals? This includes the use of a bottle or training cup filled with any liquid other than water.
- ❑ regularly use sweetened medicine?
- ❑ use a training cup or bottle after age 1?
- ❑ have a history of premature birth, with a low birth weight of less than 1500 grams (3 pounds)?
- ❑ have special health care needs?
- ❑ have a sibling, parent or caregiver with untreated cavities or existing fillings, crowns and extractions?
- ❑ have a sibling who had dental treatment under general anaesthetic?

If you did not check **any** box above, your child is at **low risk** for early childhood tooth decay. Your child would benefit from **one** fluoride varnish application each year.

If you checked **one or more** boxes above, your child is **at risk** for early childhood tooth decay. Your child would benefit from **two** fluoride varnish applications each year.

If you want your child to have fluoride varnish applications, complete the fluoride varnish consent form on the back of this page.

For more information, contact your local Public Health office.

August 2013
DH 268

Primary Health Services
3475 Albert St
Regina, SK S4S 6X6

1-800-667-7766
(306) 787-0889

HealthLine 811
HEALTHLINEONLINE.CA

Fluoride Varnish Program Consent

Child's Name: _____ _____ Date of Birth __ __/__ __/__ __ __ __
Last **First** **(day/month/year)**
Saskatchewan Health Card Number: ___ ___ ___ ___ ___ ___ ___ ___ ___ ❑ Female ❑ Male

Address: _____ Postal Code: __ __ ___ __ __ __
(City/Town)
Telephone Number: _____ _____ _____
Home Work Cell
E-mail Address: _____ Local Public Health Office: _____

1. Does your child have an allergy to colophony (pine resin): ❑ Yes ❑ No ❑ Don't Know
2. Does your child have an allergy to latex: ❑ Yes ❑ No ❑ Don't Know
3. Does your child have dental insurance/coverage: ❑ Yes ❑ No ❑ Don't Know
4. Has your child seen a dentist in the past year: ❑ Yes ❑ No ❑ Don't Know
5. How did you learn of the fluoride varnish program: ❑Another parent ❑Community Agency
❑Dentist ❑Preschool/Daycare ❑Public Health Nurse ❑Public Health Office ❑School

I consent to my child receiving the fluoride varnish. This includes a visual dental inspection and one or more applications of fluoride varnish. If there is a change in my child's allergies, I will contact the local public health office. This consent is active until I withdraw it. I can withdraw it by contacting my local public health office.
I also consent to the collection, use and storage of my child's dental health information in both electronic and paper form for public health and research purposes. If I provide an email address, I consent to receiving dental health information by email.

Parent/Legal Guardian Name (please print): _____

Parent/Legal Guardian Signature: _____ **Date:** _____

Office Use Only

Number of Quadrants of Decay:	**1 2 3 4**	❑ **No Risk** ❑ **Risk**	
Pain/infection: ❑ **Yes**	**ECTD :** ❑ **Yes**	**Referral to:** _____	**Follow-up Complete**: ❑ (Pain/Infection/4 Quads)

Date dd/mm/yyyy	**Provider Initials**	**Dental Screening Data**								**MH**	**Comment**	**Date to Return**	**SHS/Tob**
		d	e	f	n/a	D	M	F	n/a				❑____
		d	e	f	n/a	D	M	F	n/a				❑____
		d	e	f	n/a	D	M	F	n/a				❑____
		d	e	f	n/a	D	M	F	n/a				❑____
		d	e	f	n/a	D	M	F	n/a				❑____

DH 268

Population and Public Health
Oral Health Program
101 – 310 Idylwyld Drive North
Saskatoon, SK S7L 0Z2

For more information call 306-655-4462, or contact the
Oral Health Program at oralhealthprogram@saskatoonhealthregion.ca

Saskatoon Health Region

Oral Health Program

Population and Public Health