

2013-2014

**Saskatchewan Dental Health
Screening Program Report**

Simran Singh Gill

September, 2014

Saskatchewan Dental Health Screening Program Report 2013-14



Table of Contents

List of Tables & Figures	4
Acknowledgements.....	6
Executive Summary.....	7
Introduction	11
Methods.....	12
Dental Health Screening Results, Saskatchewan 2013-2014.....	13
Participation.....	13
Location.....	13
Gender Distribution	14
Age	14
Dental Health Assessment	14
Early Childhood Tooth Decay (ECTD)	17
Quadrants	18
'deft' Index	19
'DMFT' Index	22
Dental Health Status	26
Priority Scores	29
Tobacco Usage:	31
Dental Health Trends in Saskatchewan	32
Canadian Oral Health Strategy (COHS) Guidelines for 2010: Goal 2 ¹	37
Canadian Oral Health Framework 2013-2014 (COHF): ²	40
Dental Health Disparities	43
COMPARATIVE ANALYSIS.....	44
Dental Health Status by Region	59
Epidemiological Studies:	60
Discussion.....	62
APPENDIX	64
References	78

List of Tables & Figures

Table 1: Participation in the Dental Health Screening, Saskatchewan, 2013-2104.....	13
Table 2: Percentage of Students Screened by Health Region, 2013-2104	13
Figure 1: Percentage of Students Screened by Health Region, 2013-2104	14
Table 3: Gender of Students Screened, Saskatchewan, 2013-2014	14
Table 4: Mean Age of Students, Saskatchewan, 2013-2104.....	14
Figure 2: Dental Health Needs, Grade One and Grand Seven Students, Saskatchewan, 2013-2014.....	15
Table 5A: Grade One Students Dental Health Needs, Saskatchewan, 2013-2014	15
Table 5B: Grade Seven Students Dental Health Needs, Saskatchewan, 2013-2014	15
Table 5C: Grade One and Grade Seven Students Dental Health Needs, Saskatchewan, 2013-2014	16
Table 6 Early Childhood Tooth Decay, Saskatchewan, 2013-2104	17
Figure 3 Early Childhood Tooth Decay, Saskatchewan, 2013-2014.....	17
Table 7A: Grade One Students with Decay, Saskatchewan 2013-2104.....	18
Table 7B: Grade Seven Students with Decay, Saskatchewan 2013-2104.....	18
Table 7C: Grade One and Grade Seven Students with Decay, Saskatchewan 2013-2104	18
Figure 4: Proportion of Grade One and Grade Seven Students by Number of Affected Quadrants, Saskatchewan, 2013-2014	19
Table 8A: Grade One Students 'deft' Components, Saskatchewan, 2013-2014.....	19
Figure 5A: Grade One Students 'deft' Components, Saskatchewan, 2013-2014	20
Table 8B: Grade One Students 'deft' Scores, Saskatchewan, 2013-2014	20
Figure 5B: Proportion of Grade One Students 'deft' Scores, Saskatchewan, 2013-2014	20
Table 9A: Grade Seven Students 'deft' Components, Saskatchewan, 2013-2014.....	21
Figure 6A: Grade Seven Students 'deft' Components, Saskatchewan, and 2013-2014	21
Table 9B: Grade Seven Students 'deft' Scores, Saskatchewan, 2013-2014	21
Figure 6B: Proportion of Grade Seven Students 'deft' Scores, Saskatchewan, 2013-2014	22
Table 10A: Grade One Students' 'DMFT' Components, Saskatchewan, 2013-2014.....	22
Figure 7A: Grade One Students' 'DMFT' Components, Saskatchewan, 2013-2014.....	23
Table 10B: Grade One Students' 'DMFT' Scores, Saskatchewan, 2013-2014	23
Figure 7B: Grade One Students' 'DMFT' Scores, Saskatchewan, 2013-2014.....	23
Table 11A: Grade Seven Students 'DMFT' Components, Saskatchewan, 2013-2014.....	24
Figure 8A: Grade Seven Students 'DMFT' Components, Saskatchewan, 2013-2014	24
Table 11B: Grade Seven Students 'DMFT' Scores, Saskatchewan, 2013-2014	25
Figure 8B: Grade Seven Students 'DMFT' Scores, Saskatchewan, 2013-2014.....	25
Table 12A: Grade One Students Dental Health Status, Saskatchewan, 2013-2014	26
Figure 9A: Grade One Students Dental Health Status, Saskatchewan, 2013-2014	26
Table 12B: Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014	27
Figure 9B: Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014	27
Table 13: Grade One and Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014	27
Figure 10: Grade One and Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014	28
Table 14A: Grade One Students Priority Scores, Saskatchewan, 2013-2014	29
Figure 11A: Grade One Students Priority Scores, Saskatchewan, 2013-2014	29
Table 14B: Grade Seven Students Priority Scores, Saskatchewan, 2013-2014	30
Figure 11B: Grade Seven Students Priority Scores, Saskatchewan, 2013-2014	30
Table 15: Grade One & Seven Students Priority Scores, Saskatchewan, 2013-2014	30

Figure 12: Grade One & Seven Students Priority Scores, Saskatchewan, 2013-2014	31
Table16: Grade One Students Dental Health by Screening Year, Saskatchewan	32
Figure 13: Grade One Comparisons; Average deft/DMFT	32
Figure 14: Grade One Comparisons; % with Cavities.....	33
Figure 15: Grade One Comparisons; % with No Evidence of Dental Care	33
Figure 16: Grade One Comparisons; Pain (%).....	34
Figure 17: Grade One Comparisons; %Cavity Free	34
Table17: Grade Seven Students Dental Health by Screening Year, Saskatchewan	35
Figure 18: Grade Seven Comparisons; Average 'deft/DMFT'	35
Figure 19: Grade Seven Comparisons; % with Cavities.....	35
Figure 20: Grade Seven Comparisons; % Cavities free	36
Table 18: COHS 2010 Guidelines, Saskatchewan (Grade One; 2008-09 vs. 2013-14)	37
Table 19: COHS 2010 Guidelines, Saskatchewan (Grade Seven; 2008-09 vs. 2013-14)	38
Table 20 Canadian Oral Health Guidelines for 2018: 6-year old	40
Table 21: Canadian Oral Health Guidelines for 2018: 12-year old	41
Table 22: COHF 2013-2018; FN/I school based preventive services	42
Table-23: Comparative analysis; Urban vs. Rural	44
.Figure 21: Dental Health of Students by Urban/Rural School Location, Saskatchewan, 2013-2014.	45
Table-24: Comparative analysis; Water Supply: Fluoridated vs. Non-Fluoridated.....	46
Figure 22: Dental Health of Students by Fluoridated/Non-Fluoridated Water Supply, Saskatchewan, 2013-2014.	47
Table-25: Comparative analysis; Dental Visit; YES vs. NO	48
Figure 23: Dental Health of Students by Dental Visit YES/NO, Saskatchewan, 2013-2014.....	50
Table-26: Comparative Analysis; Aboriginal vs. Non-Aboriginal.	51
Figure 24: Dental Health of Students by Aboriginal/Non-Aboriginal Status, Saskatchewan, 2013-2014.	52
Table 27: Comparative Analysis; Hutterite vs. Non-Hutterite.	53
Figure 25: Dental Health of Students by Hutterite/Non-Hutterite Community, Saskatchewan, 2013-2014.	54
Table 28: Comparative Analysis; Dental Insurance (Yes vs. No).....	55
Figure 26: Dental Health of Students by Dental Insurance Yes vs. No, Saskatchewan, 2013-2014.	56
Table 29: Comparative Analysis; City (Regina vs. Saskatoon).....	57
Figure 27: Dental Health of Students by City (Regina vs. Saskatoon), Saskatchewan, 2013-2014.....	58
Table 30: Dental Health of Students by Health Region. 2013-2014, Saskatchewan	59
Table 31: Calculation of Odds Ratio for being Cavity free between Urban and Rural communities in Saskatchewan, 2013-2014	60
Table 32: Calculation of Odds Ratio for being Cavity free between Schools that have access to Community Water Fluoridation and Schools that do not have access in Saskatchewan, 2013-2014	60
Table 33: Calculation of Odds Ratio for being Cavity free between Hutterite Schools and Non-Hutterite Schools in Saskatchewan, 2013-2014	61

Acknowledgements

Dental Health Screening Advisors

Leslie Topola	Manager, Population and Public Health
Cynthia Ostafie	Saskatoon Health Region
Julie Laberge-Lalonde	Saskatoon Health Region
Cindy Hansen	Keewatin Yatthé Health Region
Cathleen Lesperance	Prince Albert Parkland Health Region
Ashley White	Prairie North Health Region
Clara Ellert	Five Hills Health Region
Shari Moneta	Kelsey Trail Health Region
Janet Gray	Mamawetan Churchill River Health Region
Loretta Singh	Cypress Health Region
Bernie Laevens	Sunrise Health Region
Valerie Stopanski	Heartland Health Region
Juanita McArthur Big Eagle	Sun Country Health Region
Rosemary Henriksen	Regina Qu'Appelle Health Region

Data Analysis

Simran S Gill	M.P.H. Practicum Student (U of S)
---------------	-----------------------------------

Writing

Simran S Gill	M.P.H. Practicum Student (U of S)
Leslie Topola	Manager, Population and Public Health

Editing

Simran S Gill	M.P.H. Practicum Student (U of S)
Leslie Topola	Manager, Population and Public Health
Cynthia Ostafie	Dental Health Educator
Julie Laberge-Lalonde	Dental Health Educator

Office Administration

Bob Toso	IT Department
Joyce Birchfield	Office Administrative Assistant
Barbara Anderson	Office Administrative Assistant
Josh Marko	Epidemiologist, Public Health Observatory

Sponsor

College of Dentistry, University of Saskatchewan

Executive Summary

The Saskatchewan Dental Health Screening Program 2013-2014 Report highlights the results of dental health screening program in Saskatchewan during 2013-2014. It assesses the oral health status, monitors trends, determines the schools and communities that are at high risk for caries, identifies the students with unmet dental needs and measures the effectiveness of preventive dental programs. It is the fifth screening survey of the Saskatchewan Dental Health Education Program since its introduction in 1993-1994. The 2013-2014 screening provides a comprehensive and pivotal appraisal of the dental health of Grade One and Grade Seven students. The screening program involved the public health dental professionals and was designed to have an insight on the dental health of children in Saskatchewan.

In 2013-2014 school year, 19279 children participated in the provincial Grade One and Grade Seven dental screenings (Table-1). Along with the proportion of students screened in each health region (Table-2), analysis of the gender distribution and mean age of students participating in dental screening was also carried out (Table 3 & 4). The oral health issues like Calculus, Staining, Gingivitis and Malocclusion were analyzed to understand the oral health better (Table 5).

The 2013-2014 Dental Health Screening marks the introduction of measuring and analysis of Early Childhood Tooth Decay (ECTD) (previously measured as Early Childhood Caries) and Severe Early Childhood Tooth Decay, which is an additional component of ECTD (Table-6) (Appendix-2). ECTD was measured using a different criteria, thus, it cannot be compared to the past screening results. However, it provides the baseline for the future screenings. ECTD was experienced by 2.76% of Grade One students (Table-6) and rate of S-ECTD in Grade One students was 2.17%.

To determine the caries burden, carious involvement of quadrants was assessed. The Grade One students had a higher carious burden with 27.62% of students having visible tooth decay while 14.23 % of Grade Seven students had visible tooth decay at the time of examination.

The tooth decay in the primary and permanent dentition was determined using 'deft' and 'DMFT' index respectively. The 'deft' measures the prevalence of dental caries (past or present) in primary dentition and is a significant indicator of tooth decay in Grade One students. The 'DMFT' index is used to determine the prevalence of caries in permanent dentition (Appendix-1). The results of 2013-2014 screening showed that Saskatchewan children in Grade One are experiencing more decay as compared to Grade Seven students. The average deft+DMFT for Grade One students was 3.58 in relation to average deft+DMFT of 1.68 for Grade Seven students.

The prevalence of dental caries for primary dentition among Grade One students in Saskatchewan, 2013-2014, was 60.69% (See Table 8B). The proportion of Grade One students with at least one decayed primary tooth was 27.95% while 4.19% students had at least one or more decayed permanent teeth. The prevalence of dental caries in the

permanent dentition among Grade Seven students was 43.28% (Table 11B). Also, 3.95% Grade Seven students had at least one decayed primary tooth while 12.79% students had at least one or more decayed permanent teeth.

The deft and DMFT indices were used to allocate Dental Health Status to each child, categorized as NDE, CCC, PCC and NEC (Appendix-3). Grade One students were shown to have caries experience with 15.97% partial caries care (PCC) and 13.54% students had no evidence of care (NEC) (Table 12). For Grade Seven students, the caries experience was 9.26% with partial caries care (PCC) and 6.44% students had no evidence of care (NEC) (Table 12B). Compared to 2008-2009, NEC increased from 8.6% to 10.44% in 2013-2014 for Grade One and Grade Seven Combined while NDE decreased from 49.20% in 2008-2009 to 44.19% in 2013-2014.

Unmet dental needs were measured in the Dental Health Screening 2013-2014 based on the Priority scores for both Grade One and Grade Seven. Of the Grade One students, 72.33% did not require any immediate treatment while proportion of students with unmet dental needs was 27.67%. (Table 14A). For Grade Seven students, 85.96% did not require any immediate treatment while the percentage of unmet dental needs among Grade Seven students of Saskatchewan was 14.02%.

Optional information was collected from the students regarding dental insurance coverage, visit to dentist in past year, history of dental sealants and tobacco usage. Of the students who responded to the Tobacco usage question, 0.71% responded with 'Yes'.

The dental health trends in Saskatchewan were analyzed and compared with the previous dental screenings. The analysis outlines the decline in oral health of Saskatchewan students as measured from factors like average deft+DMFT, current cavities and absence of decay. The percentage of Grade One students with cavities was highest (29.71%) and that of cavity free (39.2%) was lowest in 2013-2014 as compared to all the dental screenings since 1993-1994. However, Grade One students have shown improvement in the number of students presenting with pain and those who have no evidence of care compared to previous dental screenings (Table 16). On the other hand, Grade Seven students showed improvement only in the case of students who presented with pain while depicting decline in other factors when compared to 2008-2009 (Table 17).

The 2008-2009 Dental Health Screening used *Canadian Oral Health Strategy 2005-2010 (COHS)*¹ to assess the results in accordance with goals and guidelines. The results of 2013-2014 were also analyzed on the basis of COHS 2010 guidelines to determine the progress in relation to the previous Dental Screening program. The screening results of 2008-2009 did not meet the goals for Grade One/6 year old children while it partially met goals for Grade Seven/12 year old children. However, the results from 2013-2014 screening did not meet the goals for both Grade One/6 year old and Grade Seven/12 year old children. Overall the measurements in 2008-2009 for the COHS guidelines were better as compared to the measurements in 2013-2014 (Table 18 & 19).

The Dental Health Screening 2013-2014 results were also analyzed in accordance with the *Canadian Oral Health Framework 2013-2018 (COHF)*². The *Canadian Oral Health Framework 2013-18* is the second national oral health Framework produced by the Federal, Provincial and Territorial Dental Working Group (Canadian Oral Health Framework 2013-2108). It identifies the challenges existing in different categories of oral health care and the dental screening data was related to two of these categories namely improvement in oral health and access to care.

The first goal is to improve the oral health of children which has five different objectives under it. Objectives 1a, 1b and 1c (Table 20) include guidelines for Grade One/6 years old children while objectives 1d and 1e (Table 21) included guidelines for Grade Seven/12 years old children². The objectives for Grade One/6 years old (1a,1b,1c) were not met as per the 2013-2014 data (Table 20). For Grade Seven/12 years old in Saskatchewan, both the objectives (1d, 1e) were not met, but Heartland Health Region and Saskatoon Health Region met objective 1d (average DMFT of <1.0 for 12 years old) (Table 21).

The second goal related to the Dental Health Screening 2013-2014 was to improve Oral Health of Aboriginal people². Three objectives were analyzed under this goal for school based preventive services, Grade One/6 years old and Grade Seven/12 years old. All the three objectives were met in 2013-2104 and the data also provides a baseline for the future screening and analysis (Table 22)

The 2013-2014 data was analyzed to determine dental health disparities based on different factors like location of schools in urban or rural areas, Hutterite or non Hutterite areas, access to fluoridated water, income, dental insurance and aboriginal status.

The dental health disparities were noted among children attending schools located in urban and rural communities. The average deft+DMFT per child attending a school in urban community was 2.60 as compared to 2.86 for a child attending a school in rural community. Also, 93.39% students attending schools in urban communities had caries free permanent dentition and 82.75% had caries free primary dentition. For the students attending schools located in rural communities, 90.80% had caries free permanent dentition while 82.36% had caries free primary dentition (Table 23).

The students having access to fluoridated water and students without access to fluoridated water also showed dental health disparities. The average deft+DMFT per child with access to fluoridated water was 2.45 while it was 2.95 per child with no access to fluoridated water. The caries free proportion of children having access to fluoridated water is 94.31% and 90.43% for permanent and primary dentition respectively, compared to 84.89% and 80.90% for permanent and primary dentition respectively in children with no access to fluoridated water (Table 24).

The dental health disparities were also noted among children who visited a dentist in the past one year compared to children who did not visit a dentist in past one year. The average deft+DMFT per child who visited a dentist was 2.35 as compared to 2.21 for a child who did not visit a dentist. Also, 95.65% and 87.20% children who visited a dentist had caries free permanent and primary dentition respectively as compared to 89.11% and

75.30% caries free permanent and primary dentition respectively in children who did not visit a dentist. Of the Grade One and Grade Seven students, 82.17% children who visited a dentist had dental insurance coverage while 60.37% children who did not visit a dentist had dental insurance coverage (Table 25).

There were evident disparities between Aboriginal and Non-Aboriginal students in 2013-2014. The average deft+DMFT per aboriginal child was 5.05 compared to 2.66 per Non-aboriginal child. The caries free proportion of aboriginal children was 81.49% and 74.84% for permanent and primary dentition respectively. For Non-Aboriginal students, 92.38% students had caries free permanent dentition while 82.79% had caries free primary dentition (Table 26).

In 2013-2014, dental health disparities were measured between Hutterite and non-Hutterite school children of Saskatchewan. The average deft+DMFT per Hutterite child was 4.1 compared to 2.74 for a non-Hutterite child. Among the Hutterite children, the proportion of caries free primary dentition (90.05%) was higher than caries free permanent dentition (87.96%). For non-Hutterite school children, 92.19% had caries free permanent dentition while 82.45% had caries free primary dentition (Table 27).

The dental health disparities were also noted between children who had dental insurance coverage as compared to children who did not have dental insurance coverage. The average deft+DMFT per child who had dental coverage was 2.35 as compared to 2.34 for a child who did not have coverage. For the students with dental coverage, the proportion of students with caries free permanent and primary dentition was 94.93% and 85.72% respectively. On the other hand 92.83% students without dental coverage had caries free permanent dentition and 76.92% had caries free primary dentition. Also, 82.42% of children had visited a dentist in the past year had dental insurance coverage while 58.20% of children who had visited the dentist did not have dental insurance coverage (Table 28).

Epidemiological studies were conducted for the 2013-2104 data which include odds ratio for having dental decay and determining association with factors like location, water fluoridation and attending Hutterite schools.

The Dental Health Screening Program 2013-2014 tracks the patterns and trends of dental health indicators in Saskatchewan. It also appraises the effectiveness of the preventive dental programs and policies in augmenting the oral health of children in Saskatchewan.

Introduction

Oral health is an integral part of overall health and contributes to physical, mental and social wellbeing. Good oral health is imperative to enjoy life's possibilities, as it allows one to speak, eat and socialize unhindered by pain, discomfort or embarrassment.³

According to World Health Organization (WHO), a healthy oral cavity is a state free from chronic oro-facial pain, oro-pharyngeal cancer, oral ulcers, congenital oro-facial defects such as cleft palate and cleft lips, dental caries, tooth fatality due to dental caries and other pathological factors that affect the oral cavity.⁴ WHO estimates 60-90% of school children worldwide have dental cavities, often leading to pain and discomfort.⁵ It is considered one of the major factors of economic burden owing to oral health issues.⁵

Oral health is greatly influenced by socioeconomic factors. *Canadian Oral Health Framework 2013-2014* identifies the disparities among different populations regarding access to dental care and higher rates of disease in specific populations.² There has been a decrease in funding of publicly-provided services in Canada which can further widen these disparities.² First Nations and Inuit people are found to have higher rate of dental caries than non-Aboriginals and they have lesser access to oral health care than the Canadian average.²

Despite being preventable, dental caries greatly impairs the quality of life due to inflicting pain, difficulty eating and sleeping. Once established, dental caries requires treatment and if left untreated, it not only becomes extensive but more expensive to repair also.⁶ Early Childhood Decay is a severe form of tooth decay affecting primary teeth in child 71 months of age or younger. It involves multiple primary teeth and in severe cases may require dental surgery under general anesthesia.⁷

Dental caries can be prevented by maintaining a constant low level of fluoride in the oral cavity. Water fluoridation is the most effective public health measure for the prevention of dental decay.^{6,8} Long term exposure to optimal levels of fluoride level in water significantly reduce the dental caries in children as well as adults.⁶ Other sources of fluoride are toothpastes, mouth rinses and gels, as well as through application of foams and varnishes.⁸

The dental health screening report provides comprehensive information regarding oral health status of the Grade One and Grade Seven students in Saskatchewan including comparative analysis based on health disparities.

Methods

Dental screening was offered to all the Grade One and Grade Seven students who attended schools in Saskatchewan between September 2013 and 2014,

The oral health screenings were carried out by licensed Saskatchewan Dental Therapists and a licensed Dental Hygienist by recording history and visual examinations of Grade One and Grade Seven students. Mouth mirrors, LED (light emitting diode) flashlights were used to carry out visual oral examinations. The examinations recorded oral health indicators like filled/restored teeth and cavitated lesions/untreated tooth decay. These recordings were then entered into the database where further oral health measures were calculated using the Microsoft Access Software.

A 'Dear Parent/Guardian' letter was initially provided (Appendix - 6) which also included four optional questions to be filled by the parent/guardian. The responses to these questions were also added to the database along with the other screening data.

Students were assessed for possible health needs, and these were communicated via a 'Dear Parent/Guardian letter'. The students were also provided basic recommendation for oral hygiene, including illustrations of proper flossing and tooth brushing techniques.

An extensive oral health data was collected through history, visual examination and 'Dear Parent/Guardian' letter which was then entered into an Access database. The screening data was exported to Microsoft Excel and SPSS 22.0 for analysis. The data was cleaned, filtered and compared to original database. In cases where anomalous values were not resolved, they were excluded from the analysis.

Grade One and Grade Seven students were analyzed together for dental health disparities. Epidemiological studies, involving Odds ratio for having Dental decay were calculated using the software OpenEpi, Version 2.3. The significance level used for inferential statistics was 0.05 prior to calculation of p-value.

Dental Health Screening Results, Saskatchewan 2013-2014

Participation

The total students enrolled in Grade One and Grade Seven are 22851, out of which 19279 students* participated in the Dental Health Screening 2013-2014. Out of the total number of students screened, 10851 students were of Grade One while 8428 were of Grade Seven. There were 12 out of 13 health regions that participated in the dental screening. The Athabasca Health Authority (AHA) did not participate due to staffing.

Table 1: Participation in the Dental Health Screening, Saskatchewan, 2013-2104

Participation-Saskatchewan 2013-2014		
Total Enrolments	Total Screened*	Total Absent\Refused
22851	19279 (84.37%)	3572 (15.13%)

*Includes students screened in schools only

Location

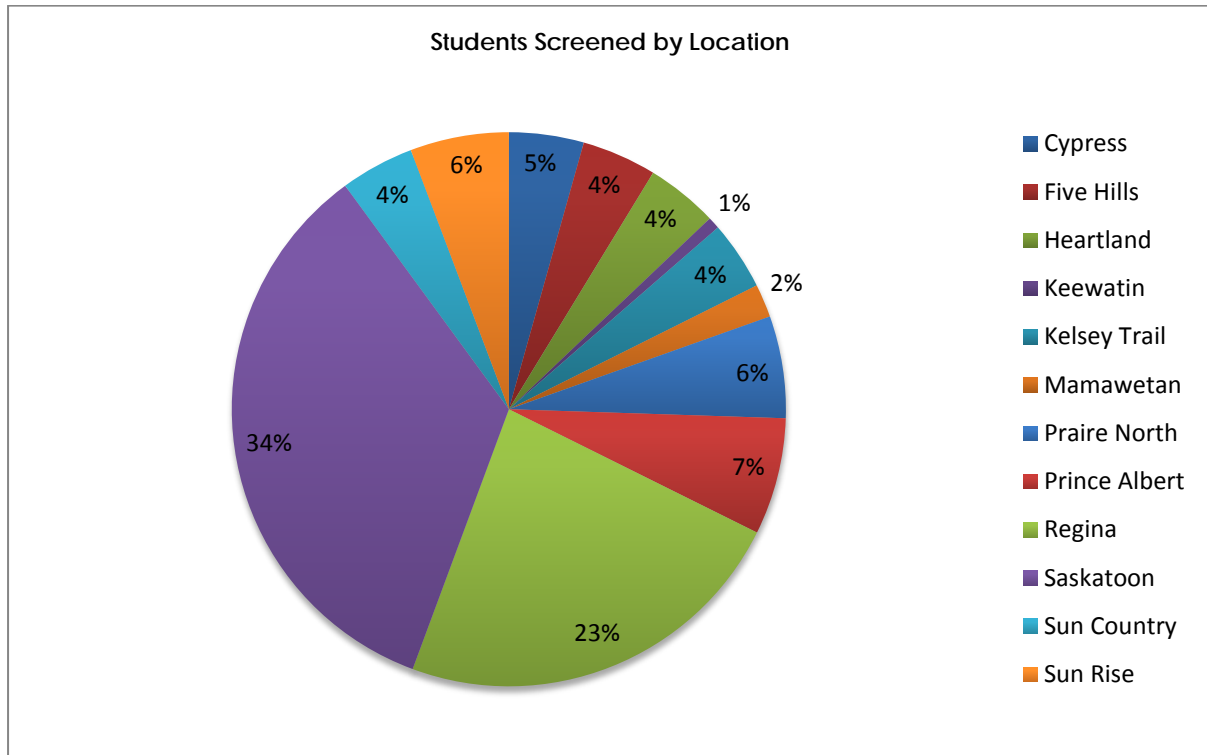
Of the total number of students screened, 10168 students attended rural schools and 9111 attended urban schools*. Majority of the students included in the analysis were from Saskatoon Health Region (6611), Regina Qu'Appelle Health Region (4493), and the rest were from other small health regions in Saskatchewan. (See Table 2, Figure 1)

Table 2: Percentage of Students Screened by Health Region, 2013-2104

Location		
Location of School	Screened Number	Percentage
Cypress	841	4.36%
Five Hills	840	4.36%
Heartland	809	4.20%
Keewatin	134	0.70%
Kelsey Trail	774	4.01%
Mamawetan	374	1.94%
Prairie North	1148	5.95%
Prince Albert	1315	6.82%
Regina	4493	23.31%
Saskatoon	6611	34.29%
Sun Country	830	4.31%
Sun Rise	1110	5.76%

*Includes students screened in schools only **Athabasca Health Authority) did not participate due to lack of staff to carry out the dental screenings

Figure 1: Percentage of Students Screened by Health Region, 2013-2104



Gender Distribution

The gender distribution seems to be similar in Grade One while the proportion of male students seems to be higher than female students in Grade Seven. (See Table 3)

Table 3: Gender of Students Screened, Saskatchewan, 2013-2014

Grade	Male*		Female*	
	Number	Percentage	Number	Percentage
Grade One	5371	50.3%	5299	49.7%
Grade Seven	4316	52.1%	3963	47.9%

*Gender recorded for 10670 Grade 1 students & 8279 Grade 7 students

Age

Student's date of birth and date of examination were entered into the screening database and the descriptive statistics were analysed based on this information

Table 4: Mean Age of Students, Saskatchewan, 2013-2104

Mean Age	
Grade One	6.67 years (80.09 months)
Grade Seven	12.67 years (152.08 months)

Dental Health Assessment

Dental Health Assessment ascertains the dental health by determining decayed, treated or teeth extracted due to caries. These three aspects of dental health assessment are

important for determining past or present caries experiences and also any outstanding dental needs.

The factors included for assessment of Dental Health Needs were malocclusion, staining, gingivitis and calculus, the extent of which is illustrated in Figure 2 and Tables 5 A&B

Figure 2: Dental Health Needs, Grade One and Grand Seven Students, Saskatchewan, 2013-2014

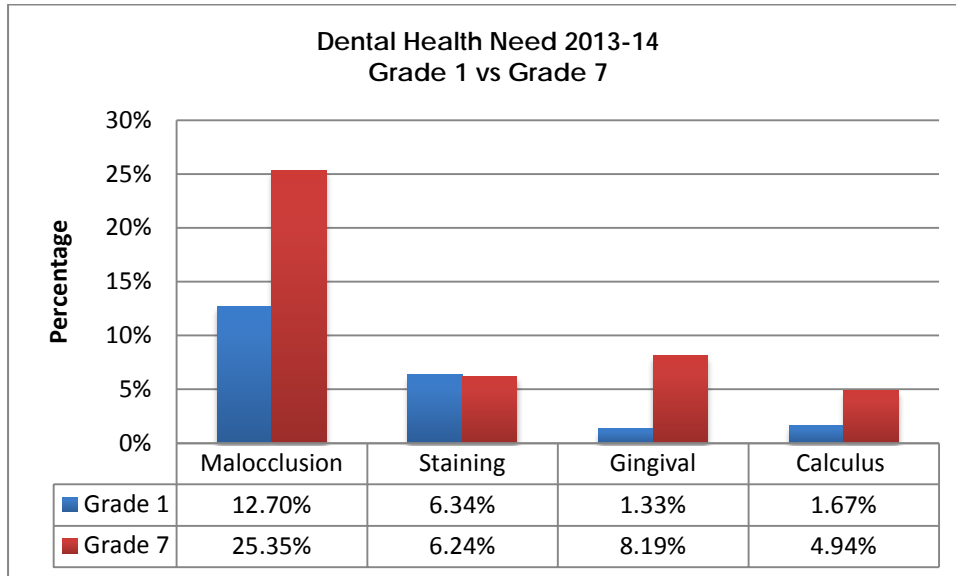


Table 5: Grade One and Grade Seven Students Dental Health Needs, Saskatchewan, 2013-2014

Table 5A: Grade One Students Dental Health Needs, Saskatchewan, 2013-2014

Grade 1				
Dental Health Need	Malocclusion	Staining	Gingival	Calculus
Number	1379	689	145	182
Percentage	12.70%	6.34%	1.33%	1.67%

Table 5B: Grade Seven Students Dental Health Needs, Saskatchewan, 2013-2014

Grade 7				
Dental Health Need	Malocclusion	Staining	Gingival	Calculus
Number	2137	526	691	415
Percentage	25.35%	6.24%	8.19%	4.94%

Table 5C: Grade One and Grade Seven Students Dental Health Needs, Saskatchewan, 2013-2014

Grade 1 and 7				
Dental Health Need	Malocclusion	Staining	Gingival	Calculus
Number	3516	1215	836	597
Percentage	18.20%	6.30%	4.30%	3.10%

The Dental Health Needs factors like malocclusion, gingivitis and calculus are higher in Grade Seven Students but slightly lower in staining.

Definitions:

Malocclusion: Crooked or crowded teeth and/or poor bite.

Staining: Suspicious areas (possible decay), tartar and/or frank surface staining.

Gingival: Bleeding gums, early signs of gum disease.

Calculus: Hardened plaque on teeth.

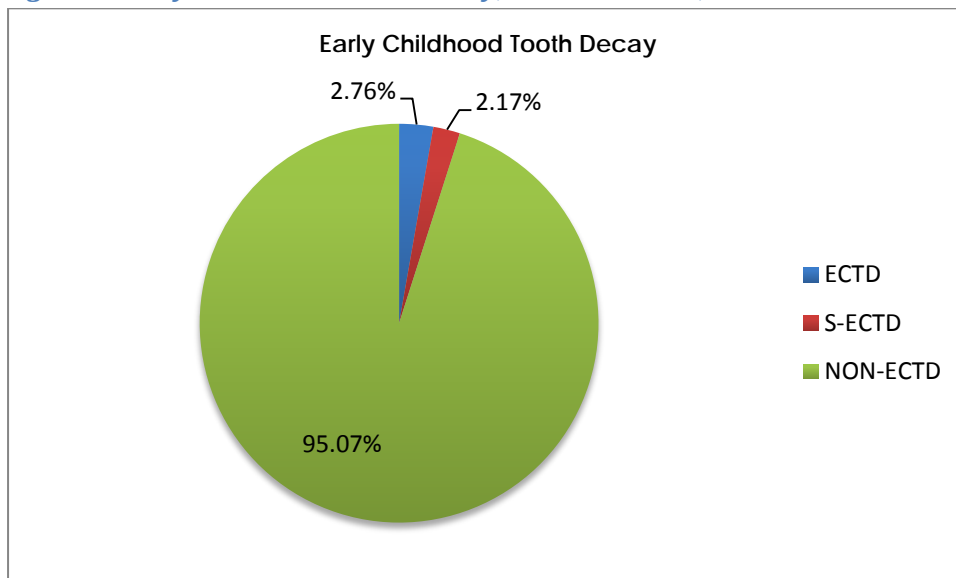
Early Childhood Tooth Decay (ECTD)

ECTD is a rapid form of tooth decay affecting deciduous dentition which was previously measured as Early Childhood Caries (ECC). As described by American Academy of Pediatric Dentistry, 2008, ECTD has an additional form S-ECTD which is defined as extreme form of ECTD. It is measured only for children less than or equal to 71 months of age. Therefore, only Grade One students were assessed for ECTD; the extent is illustrated in **Table 6** and **Figure 3**

Table 6 Early Childhood Tooth Decay, Saskatchewan, 2013-2104

EARLY CHILDHOOD TOOTH DECAY	ECTD	S-ECTD	NON-ECTD
	300	236	10315
	2.76%	2.17%	95.07%

Figure 3 Early Childhood Tooth Decay, Saskatchewan, 2013-2014



Early Childhood Caries was measured using a different criteria in the previous reports and was not measured as ECTD. Therefore, the results mentioned above cannot be compared to those of previous reports. Refer to **Appendix (3)**, for Dental Screening Program Definitions-2013/2014 for further details.

Quadrants

Grade One and Grade Seven students were assessed for visible, current tooth decay and scored on the specific quadrant (0-4) of the oral cavity. The dental arches were divided into the quadrants as upper right, upper left, lower right and lower left. Any decay in one of these quadrants was recorded as involved in decay.

2997 (27.62%) of Grade One students had visible tooth decay and 1199 (14.23%) of Grade Seven students had visible tooth decay at the time of examination, the extent is illustrated in **Table 7 and Figure 4**

Table 7: Grade One and Grade Seven Students with Decay, Saskatchewan 2013-2104

Table 7A: Grade One Students with Decay, Saskatchewan 2013-2104

Grade 1					
Quadrant	None	1 Quadrant	2 Quadrant	3 Quadrant	4 Quadrant
Number	7854	1085	897	419	596
Percentage	72.38%	9.99%	8.26%	3.86%	5.49%

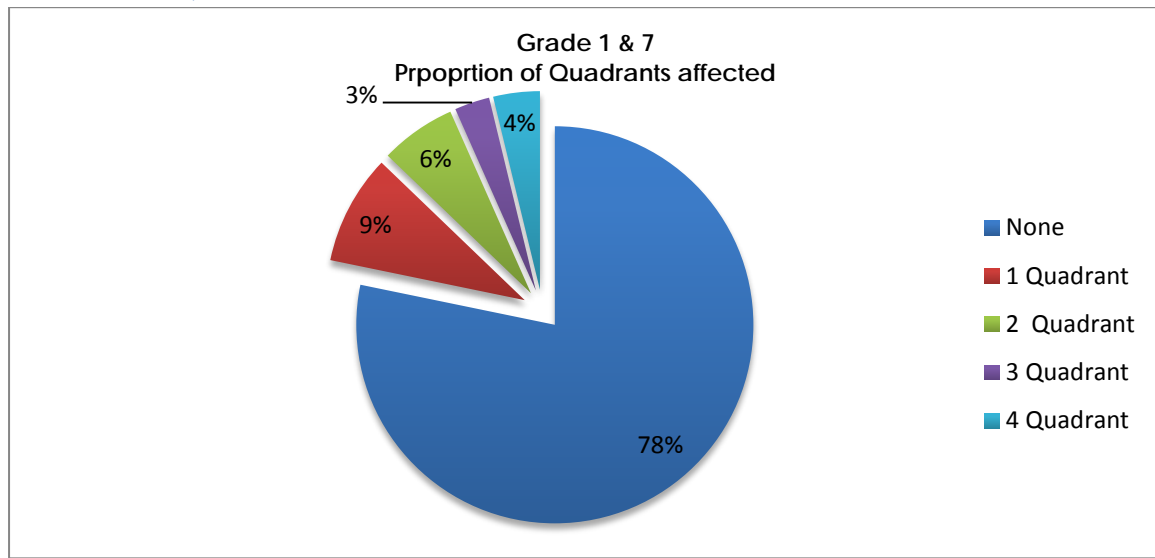
Table 7B: Grade Seven Students with Decay, Saskatchewan 2013-2104

Grade 7					
Quadrant	None	1 Quadrant	2 Quadrant	3 Quadrant	4 Quadrant
Number	7229	639	293	132	135
Percentage	85.77%	7.58%	3.48%	1.56%	1.60%

Table 7C: Grade One and Grade Seven Students with Decay, Saskatchewan 2013-2104

Grade 1 & 7					
Quadrant	None	1 Quadrant	2 Quadrant	3 Quadrant	4 Quadrant
Number	15083	1724	1190	551	731
Percentage	78.24%	8.94%	6.17%	2.86%	3.79%

Figure 4: Proportion of Grade One and Grade Seven Students by Number of Affected Quadrants, Saskatchewan, 2013-2014



'deft' Index

'deft' is an index which describes the prevalence of caries in primary dentition. It has three components namely decayed (**d**), extracted (due to caries) (**e**) and filled (**f**) which measures the current caries as well as previous carious experience. It is calculated by counting the number of decayed, extracted and filled deciduous teeth. Refer to **Appendix - 1** for the Dental Screening Program Definitions 2013-2104.

Table 8: Grade One Students 'deft' Components and Scores, Saskatchewan, 2013-2014

Table 8A: Grade One Students 'deft' Components, Saskatchewan, 2013-2014

Grade 1 deft Components			
Number of Affected Teeth	Decayed	Extracted	Filled
None	7818 (72.05%)	9209 (84.88%)	5996(55.28%)
1 to 3	1965 (18.11%)	1236 (11.39 %%)	1833 (16.90%)
4 to 6	633 (5.83%)	318(2.93%)	1679(15.48%)
7+	435(4.01%)	86(0.79%)	1338(12.34%)

There were 27.95% Grade One students who had at least one decayed primary tooth. About 15.11% had at least one primary tooth extracted as a consequence of dental caries and the proportion with at least one primary tooth filled was 44.72%.

Figure 5A: Grade One Students 'deft' Components, Saskatchewan, 2013-2014

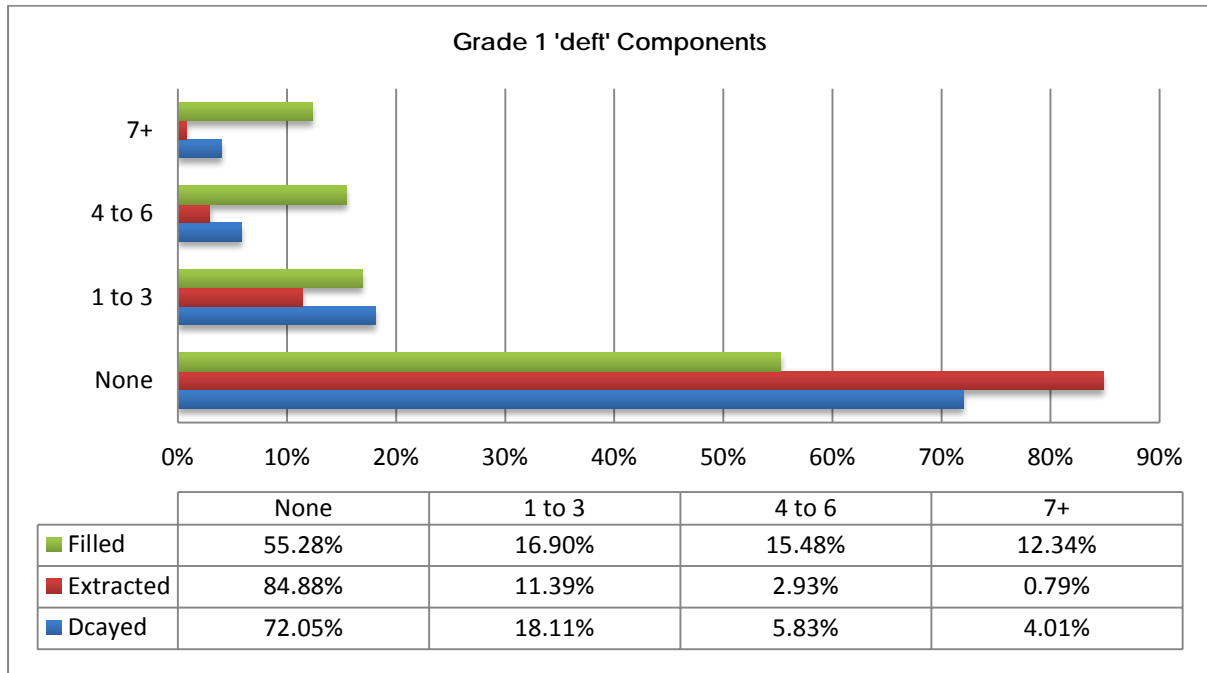
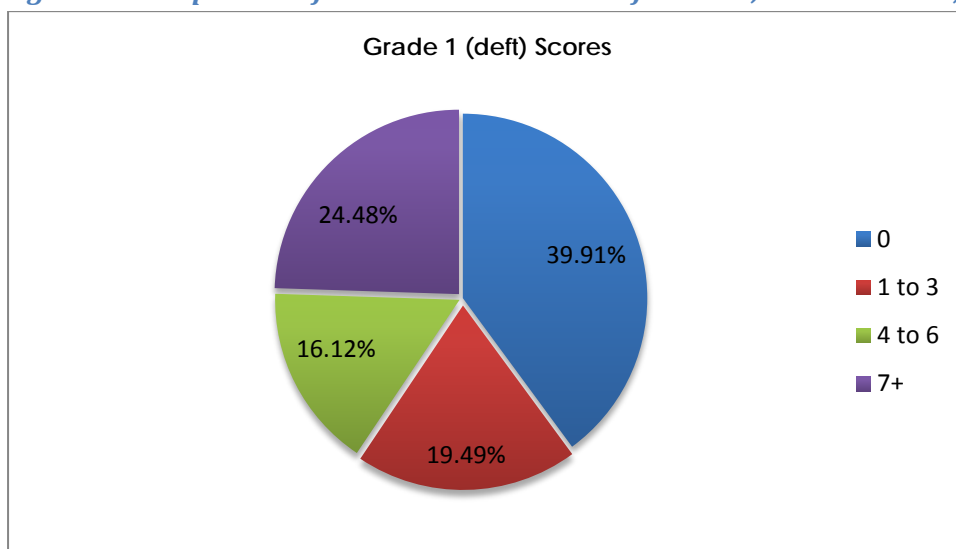


Table 8B: Grade One Students 'deft' Scores, Saskatchewan, 2013-2014

Grade 1 deft Scores		
deft' Score	Number	Proportion
0	4328	39.91%
1 to 3	2113	19.49%
4 to 6	1748	16.12%
7+	2655	24.48%

Average deft for Grade One students was **3.4**

Figure 5B: Proportion of Grade One Students 'deft' Scores, Saskatchewan, 2013-2014



The prevalence of dental caries for primary dentition among Grade One students in Saskatchewan, 2013-2014, was 60.69%. (See Table 8B)

Table 9: Grade Seven Students 'deft' Components and Scores, Saskatchewan, 2013-2014

Table 9A: Grade Seven Students 'deft' Components, Saskatchewan, 2013-2014

Grade 7 (deft)			
Number of Affected Teeth	Decayed	Extracted	Filled
None	8095 (96.05%)	8373 (99.35%)	7433 (88.19%)
1 to 3	316 (3.75%)	51 (0.61%)	824 (9.78%)
4 to 6	15 (0.18%)	4 (0.05%)	151 (1.79%)
7+	2 (0.02%)	0	20 (0.24%)

Of the Grade Seven students, 3.95% had at least one decayed primary tooth. About 0.66% had at least one primary tooth extracted as a consequence of dental caries and the proportion with at least one primary tooth filled was 11.81%.

Figure 6A: Grade Seven Students 'deft' Components, Saskatchewan, and 2013-2014

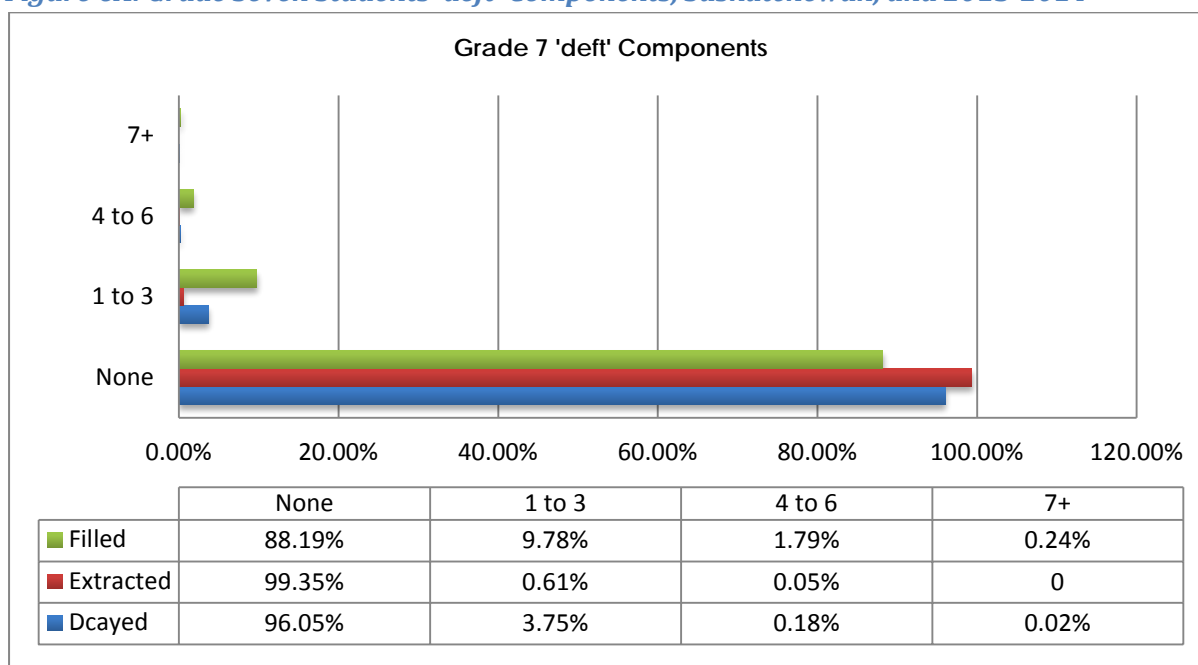
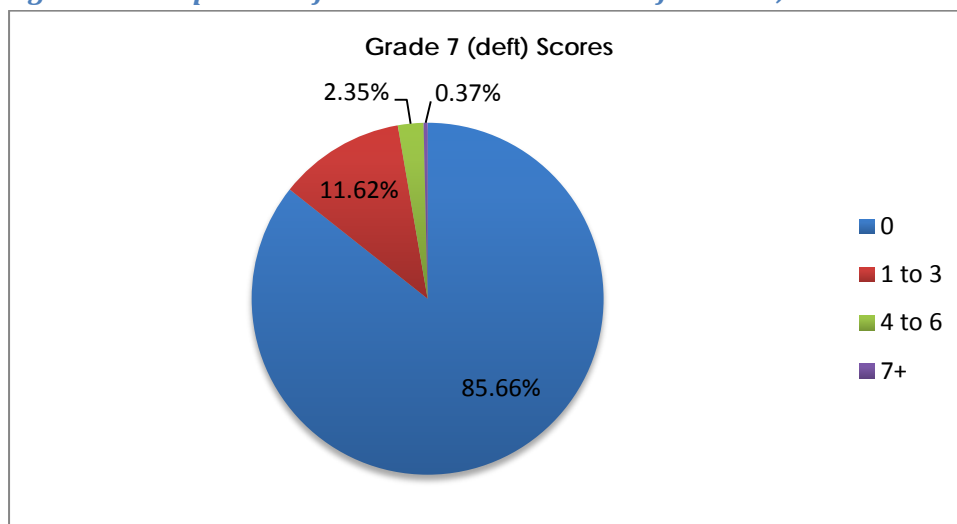


Table 9B: Grade Seven Students 'deft' Scores, Saskatchewan, 2013-2014

Grade 7 deft Scores		
deft' Score	Number	Proportion
0	7220	85.67%
1 to 3	979	11.62%
4 to 6	198	2.35%
7+	31	0.37%

Average deft for Grade Seven students was **0.33**

Figure 6B: Proportion of Grade Seven Students 'deft' Scores, Saskatchewan, 2013-2014



The prevalence of dental caries for primary dentition among Grade Seven students in Saskatchewan, 2013-2014, was 14.34%. (See Table 9B)

'DMFT' Index

'DMFT' is an index which describes the prevalence of caries index in permanent dentition. It also has three components namely decayed (**D**), Missing (due to caries) (**M**) and filled (due to caries) (**F**) which measures the current caries as well as previous carious experience. It is calculated by counting the number of decayed, missing and filled permanent teeth. Refer to **Appendix - (1)** for the Dental Screening Program Definitions 2013-2104.

Table 10: Grade One Students' 'DMFT' Components and Scores, Saskatchewan, 2013-2014

Table 10A: Grade One Students' 'DMFT' Components, Saskatchewan, 2013-2014

Grade 1 DMFT Components			
Number of Affected Teeth	Decayed	Extracted/Missing	Filled
None	10392 (95.8%)	10847 (99.96%)	10505(96.8%)
1 to 3	405 (3.7%)	4 (0.04%)	306(2.8%)
4 to 6	54 (0.49%)	0 (0%)	37(0.34%)
7+	0 (0%)	0 (0%)	3(0.03%)

Out of the total Grade One students, 4.19% students had at least one or more Decayed (D) and 0.04% had at least on teeth Missing (M) as a consequence of extraction due to dental caries (Tooth Fatality Rate). On the other hand, 3.17% had at least one tooth filled permanent teeth.

Figure 7A: Grade One Students' 'DMFT' Components, Saskatchewan, 2013-2014

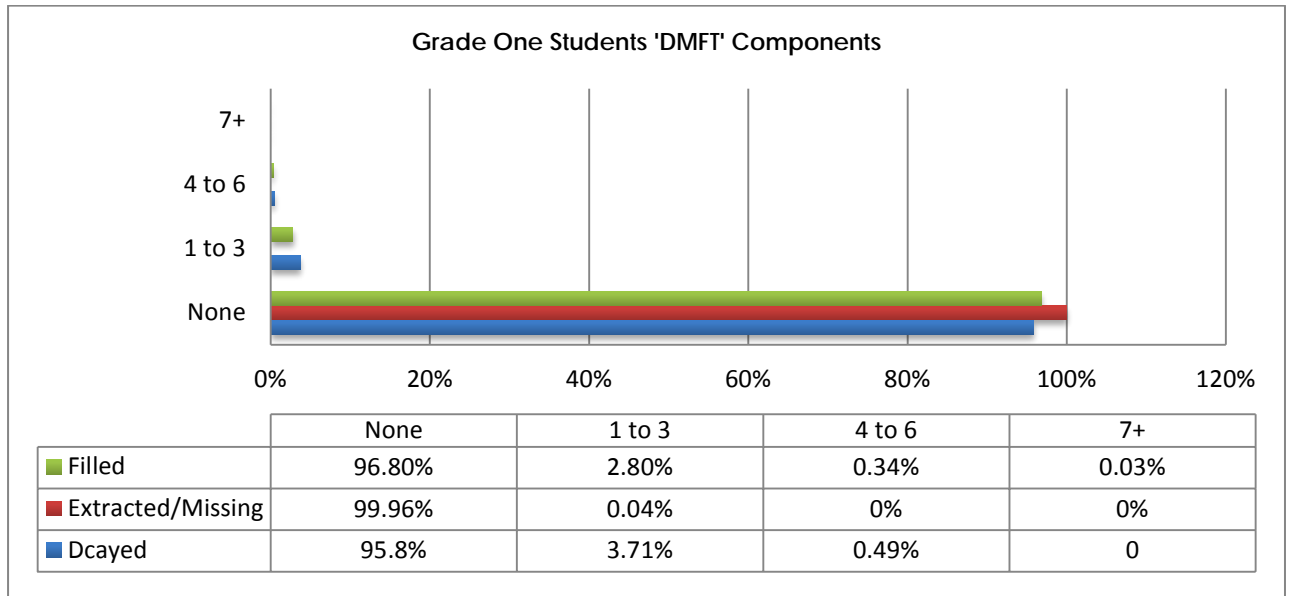
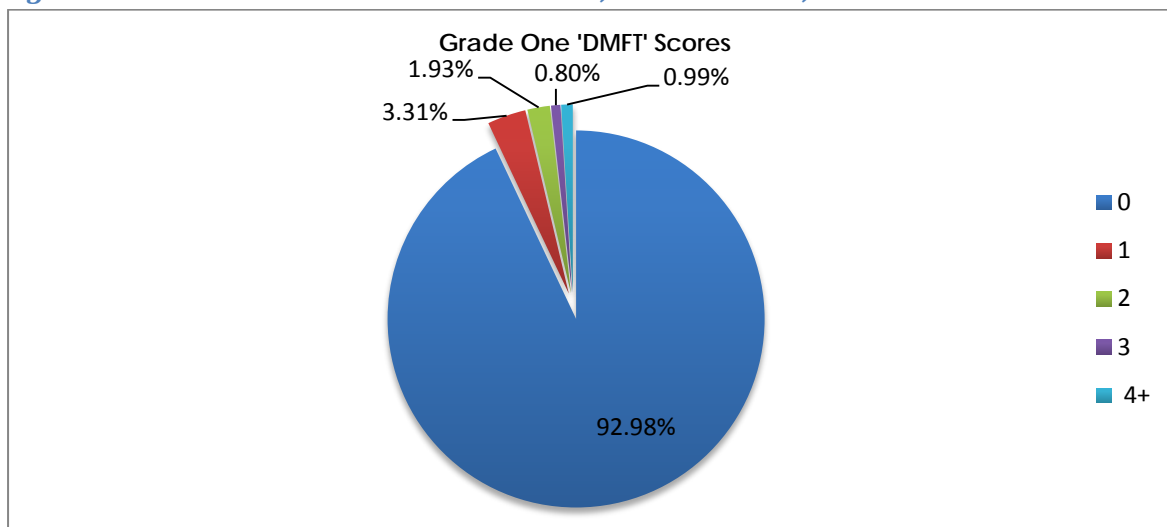


Table 10B: Grade One Students' 'DMFT' Scores, Saskatchewan, 2013-2014

Grade 1		
DMFT' Score	Number	Proportion
0	10089	92.98%
1	359	3.31%
2	209	1.93%
3	87	0.80%
4+	107	0.99%

Out of all Grade One students 92.98% had DMFT score of zero. The prevalence of dental caries in permanent dentition among Grade One students was 7.02%; the extent is illustrated in Table 10B and Figure 7B

Figure 7B: Grade One Students' 'DMFT' Scores, Saskatchewan, 2013-2014



The low prevalence of caries in permanent teeth among Grade One students is due to eruption sequence of permanent teeth. They start erupting around age of six (average of Grade One students), thus, Grade One students have very low number of permanent teeth which corresponds to low caries prevalence in permanent dentition in them.

The average DMFT Score for Grade 1 was **0.13**

Table 11: Grade Seven Students 'DMFT' Components and Scores, Saskatchewan, 2013-2014

Table 11A: Grade Seven Students 'DMFT' Components, Saskatchewan, 2013-2014

Grade 7			
Number of Affected Teeth	Decayed	Extracted/Missing	Filled
None	7350 (87.21%)	8190(97.18%)	5345 (63.42%)
1 to 3	863 (10.24%)	212 (2.52%)	2253 (26.73%)
4 to 6	154 (1.83%)	24 (0.28%)	696 (8.26%)
7+	61 (0.72%)	2 (0.02%)	134 (1.59%)

Out of the total Grade Seven students, 12.79% students had at least one or more Decayed (D) and 2.82% had at least one teeth Missing (M) as a consequence of extraction due to dental caries (Tooth Fatality Rate). On the other hand, 36.58% had at least one filled permanent tooth.

Figure 8A: Grade Seven Students 'DMFT' Components, Saskatchewan, 2013-2014

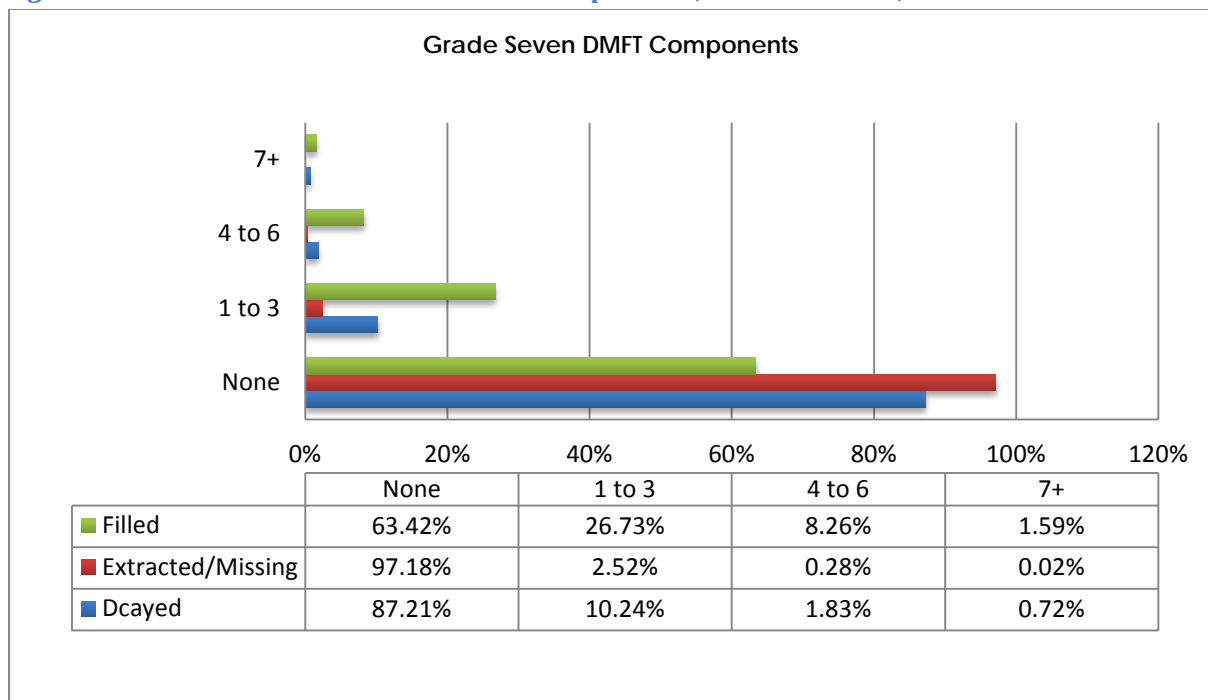
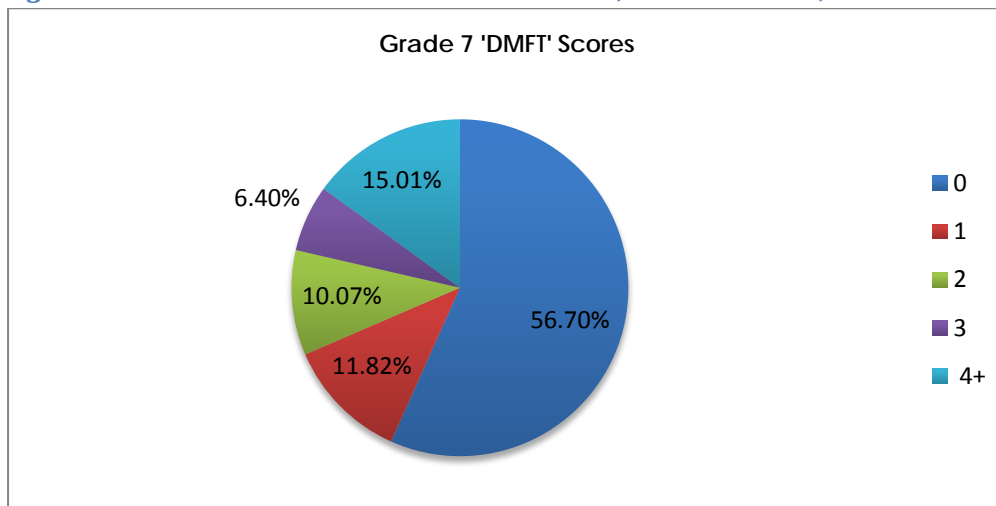


Table 11B: Grade Seven Students 'DMFT' Scores, Saskatchewan, 2013-2014

Grade 7		
DMFT' Score	Number	Proportion
0	4779	56.72%
1	996	11.82%
2	849	10.07%
3	539	6.40%
4+	1265	15.01%

The average DMFT Score for Grade Seven was 1.35. Out of all Grade Seven students 56.72% had DMFT score of zero. The prevalence of dental caries in permanent dentition among Grade Seven students was 43.28%; the extent is illustrated in Table 11B and Figure 8B

Figure 8B: Grade Seven Students 'DMFT' Scores, Saskatchewan, 2013-2014



Dental Health Status

The Combination Index was calculated from deft/DMFT to assign every student with a Dental Health status. The Database automatically calculated the status from the information. Refer to Appendix-1 for Dental Screening Program Definitions-2013/2014 for Calculation Formulas.

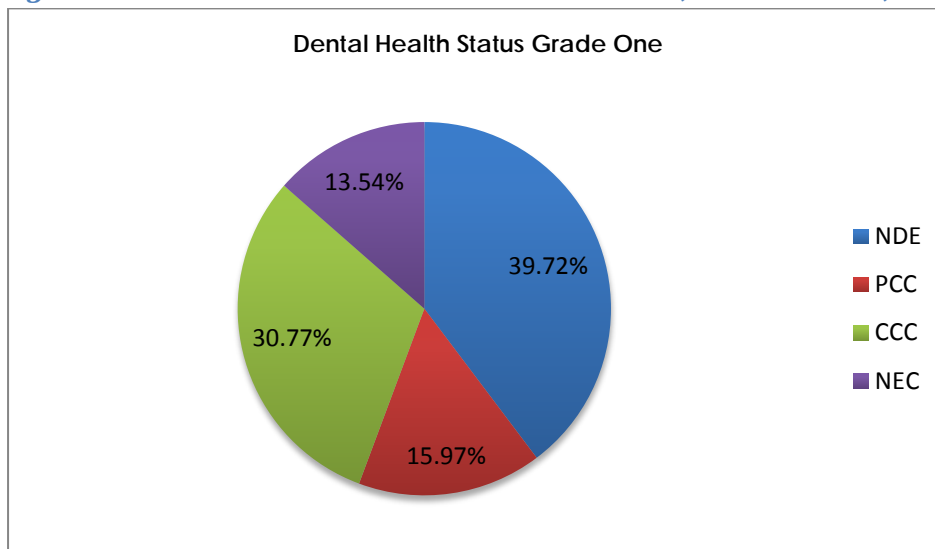
Grade One students were shown to have caries experience with 15.97% partial caries care (PCC) and 13.54% students had no evidence of care (NEC). The results are indicated in Table12A.

Table 12: Grade One and Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014

Table 12A: Grade One Students Dental Health Status, Saskatchewan, 2013-2014

Grade 1				
Classification	NDE	PCC	CCC	NEC
Number	4309	1733	3338	1469
Percentage	39.72%	15.97%	30.77%	13.54%

Figure 9A: Grade One Students Dental Health Status, Saskatchewan, 2013-2014

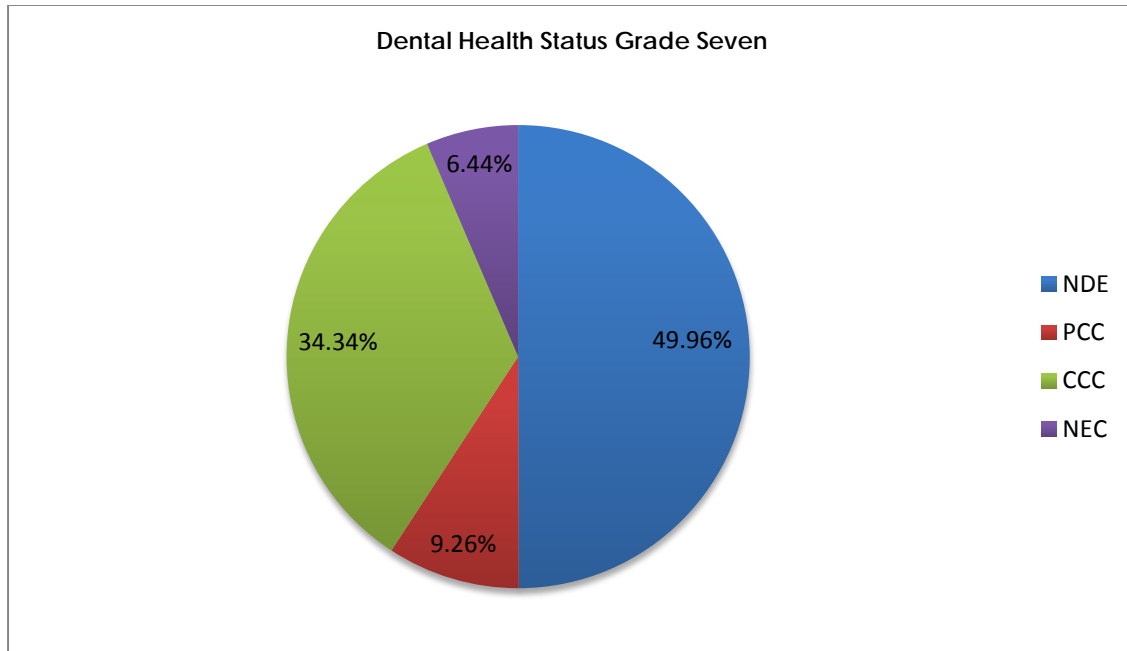


Grade Seven students were shown to have caries experience with 9.26% partial caries care (PCC) and 6.44% students had no evidence of care (NEC). The results are indicated in Table12B.

Table 12B: Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014

Grade 7				
Classification	NDE	PCC	CCC	NEC
Number	4210	780	2894	543
Percentage	49.96%	9.26%	34.34%	6.44%

Figure 9B: Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014

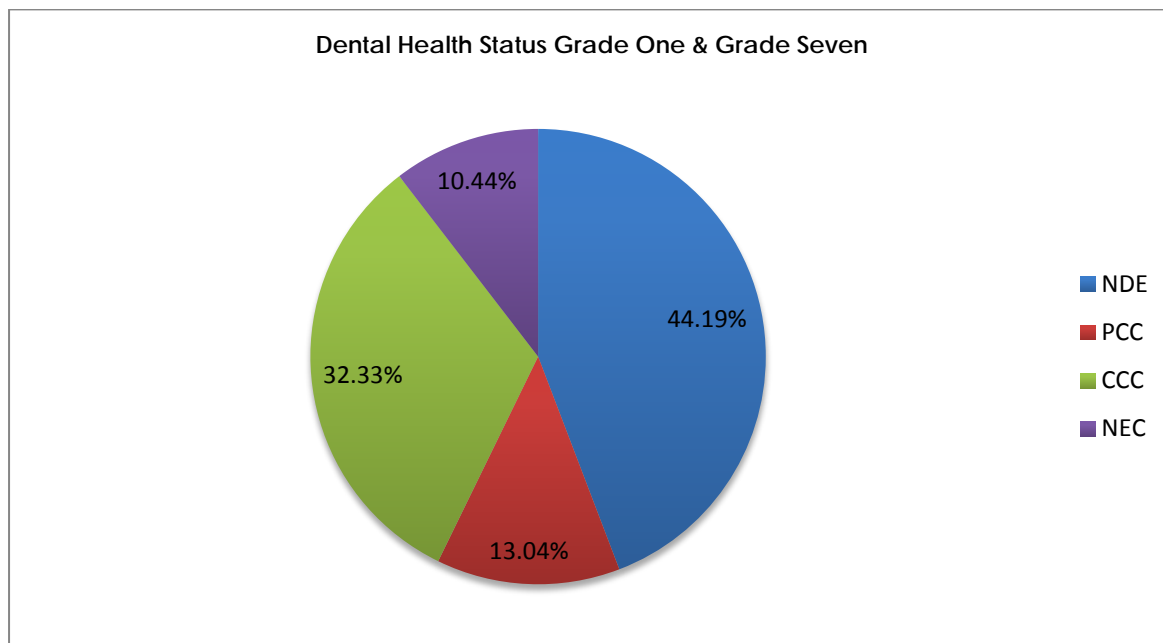


Combined Grade One and Grade Seven: Dental Health Status:

Table 13: Grade One and Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014

Combined Grade 1 & 7				
Classification	NDE	PCC	CCC	NEC
Number	8519	2513	6232	2012
Percentage	44.19%	13.03%	32.33%	10.44%

Figure 10: Grade One and Grade Seven Students Dental Health Status, Saskatchewan, 2013-2014



Definitions:

NDE = No decay, fillings or extractions evident.

CCC = All decayed teeth appear to have been treated.

PCC = Some teeth are treated; but decay still evident.

NEC = Decay with no evidence of past or present treatment.

Priority Scores

Depending on the urgency of their dental health needs, students were scored for treatment priority. The priorities 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 indicated.

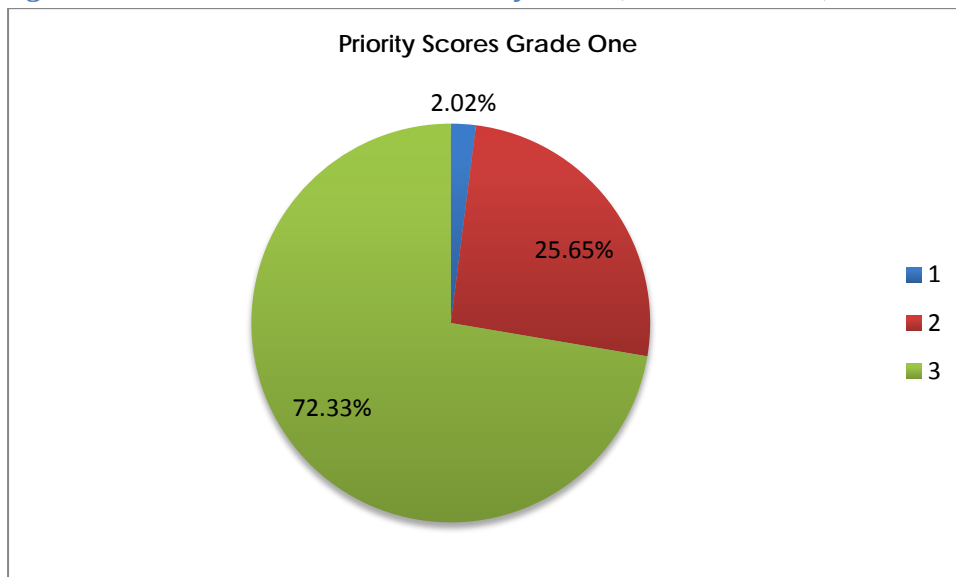
Table 14: Grade One and Grade Seven Students Priority Scores, Saskatchewan, 2013-2014

Of the Grade One Students, 72.33% did not require any immediate treatment. However, the percentage of unmet dental needs among Grade One students of Saskatchewan is 27.67%. (See Table 14A and Figure 11A)

Table 14A: Grade One Students Priority Scores, Saskatchewan, 2013-2014

Priority Scores Grade One		
1	2	3
219(2.02%)	2783(25.65%)	7849(72.33%)

Figure 11A: Grade One Students Priority Scores, Saskatchewan, 2013-2014

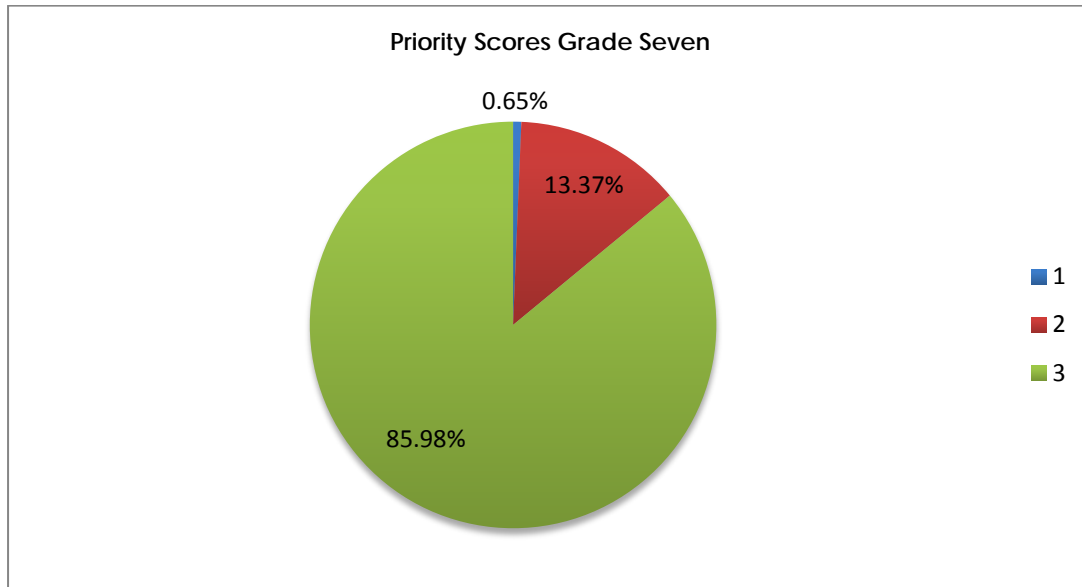


Of the Grade Seven Students, 85.96% did not require any immediate treatment. However, the percentage of unmet dental needs among Grade Seven students of Saskatchewan is 14.02%. (See Table 14B and Figure 11B)

Table 14B: Grade Seven Students Priority Scores, Saskatchewan, 2013-2014

Priority Scores Grade Seven		
1	2	3
55(0.65%)	1127(13.37%)	7246(85.96%)

Figure 11B: Grade Seven Students Priority Scores, Saskatchewan, 2013-2014



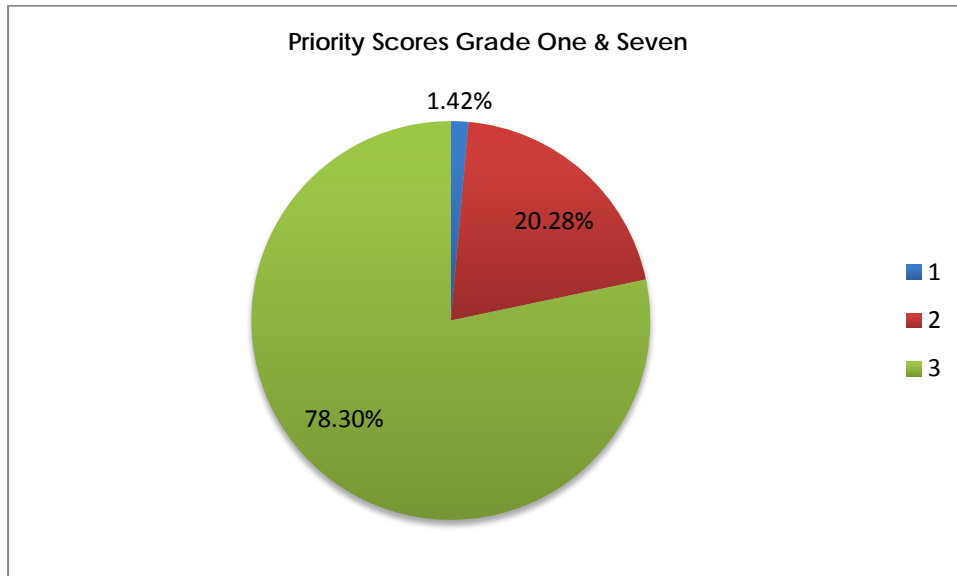
Grade One and Grade Seven Combined: Priority Scores

Table 15 and Figure 12 illustrate the total number and percentage of Priority Scores in both the grades combined.

Table 15: Grade One & Seven Students Priority Scores, Saskatchewan, 2013-2014

Priority Scores Grade One and Seven		
1	2	3
274(1.42%)	3910(20.28%)	15095(78.30%)

Figure 12: Grade One & Seven Students Priority Scores, Saskatchewan, 2013-2014



Tobacco Usage:

Tobacco usage was asked of Grade 7 students only. There were 3243 students who responded to the question regarding tobacco usage, out of these 3173 (98.95%) responded 'No', 47(1.45%) were not sure about the use while 23(0.71%) replied 'Yes' to Tobacco usage. Out of those who responded 'Yes', 19 used tobacco in the form of Cigarettes and 4 used tobacco in the form of Spit tobacco.

Dental Health Trends in Saskatchewan

Table 16: Grade One Students Dental Health by Screening Year, Saskatchewan

Grade 1						
Screening Year	Number of Children Screened	Average 'deft/DMFT'	% with Cavities	% with No Evidence of Dental Care	Pain (%)	% Cavity-free
1993-94	13398	2.74	20	9.6	5.8	45.2
1998-99	12701	2.61	24.9	12.4	3.6	46.7
2003-04	10832	2.94	25.5	13.2	3.9	44.7
2008-09	9079	3.14	27.5	11.9	4	41.5
2013-14	10851	3.58	29.71	10.8	2.24	39.2

Figure 13: Grade One Comparisons; Average deft/DMFT

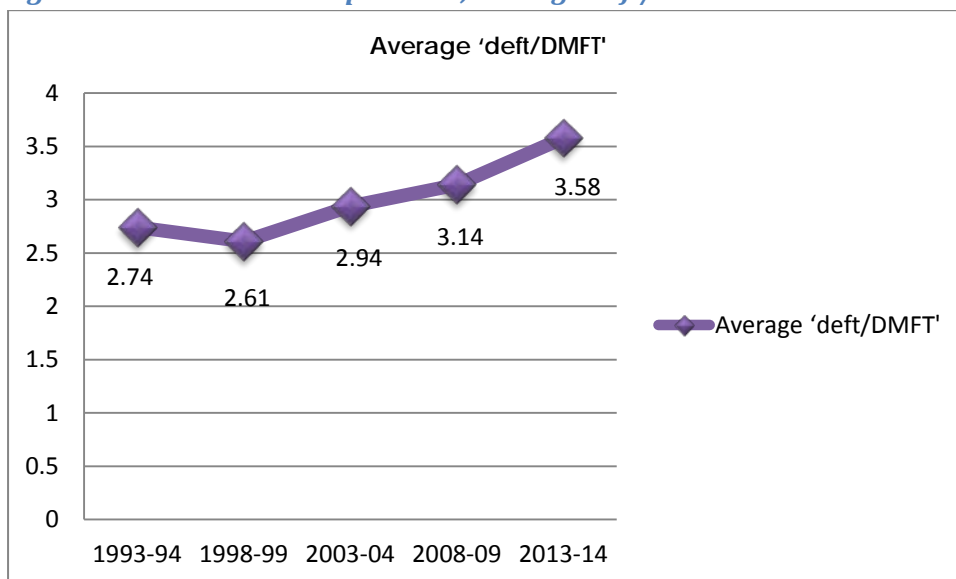


Figure 14: Grade One Comparisons; % with Cavities

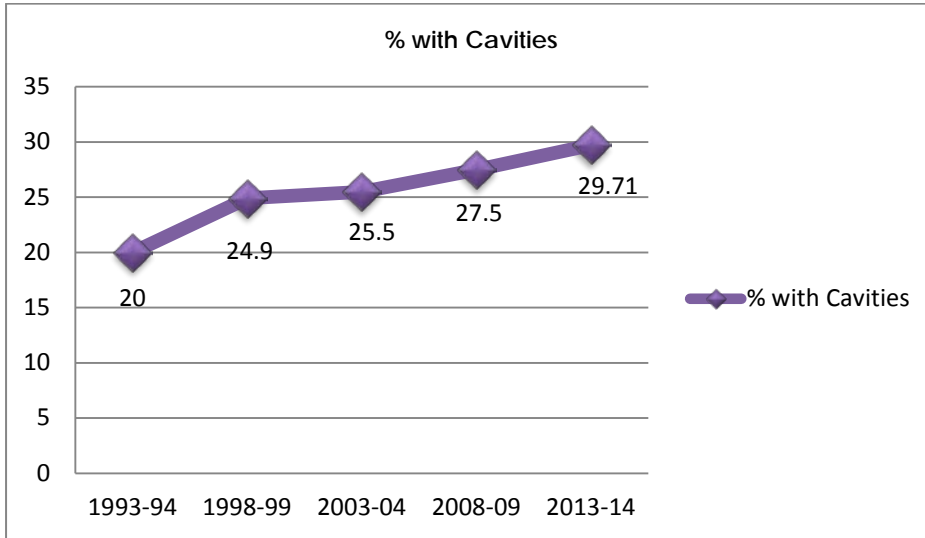


Figure 15: Grade One Comparisons; % with No Evidence of Dental Care

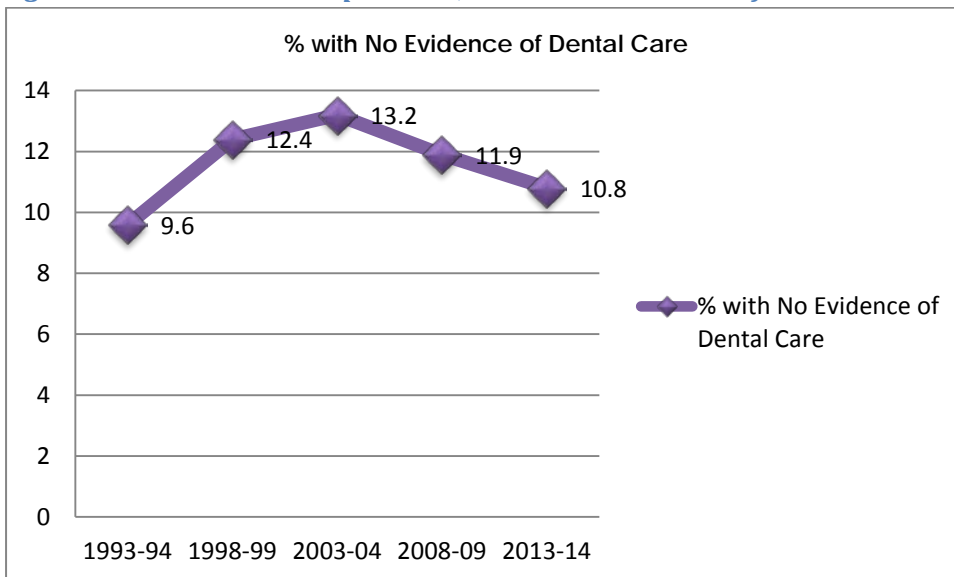


Figure 16: Grade One Comparisons; Pain (%)

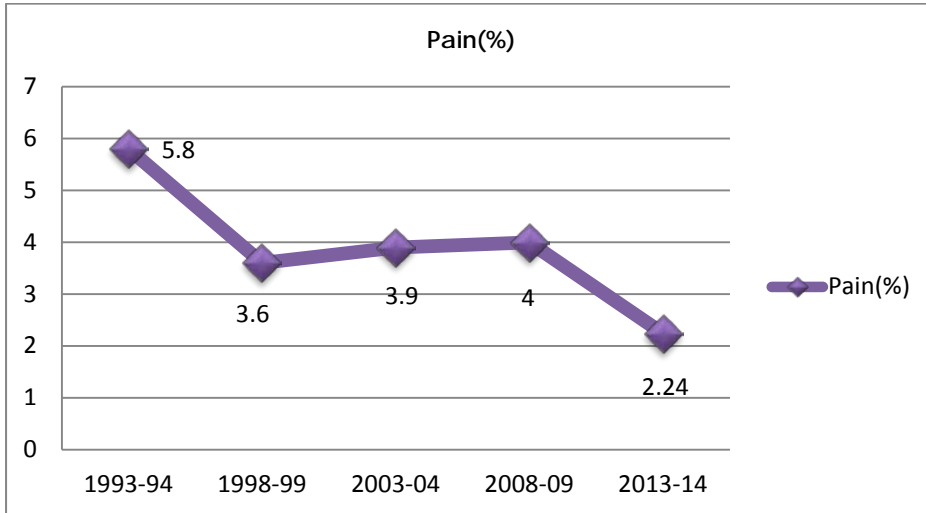


Figure 17: Grade One Comparisons; %Cavity Free

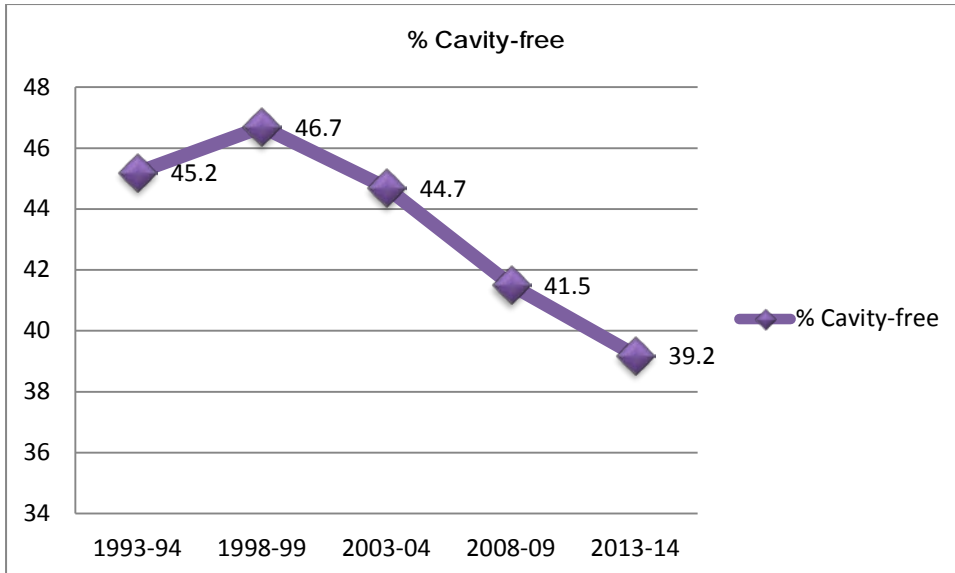


Table 17: Grade Seven Students Dental Health by Screening Year, Saskatchewan

Grade 7						
Screening Year	Number of Children Screened	Average 'deft/DMFT'	% with Cavities	% with No Evidence of Dental Care	Pain (%)	% Cavity-free
2008-09	8835	1.24	11.3	5.3	0.9	57.1
2013-14	8428	1.68	15.81	5.8	0.7	49.14

Figure 18: Grade Seven Comparisons; Average 'deft/DMFT'

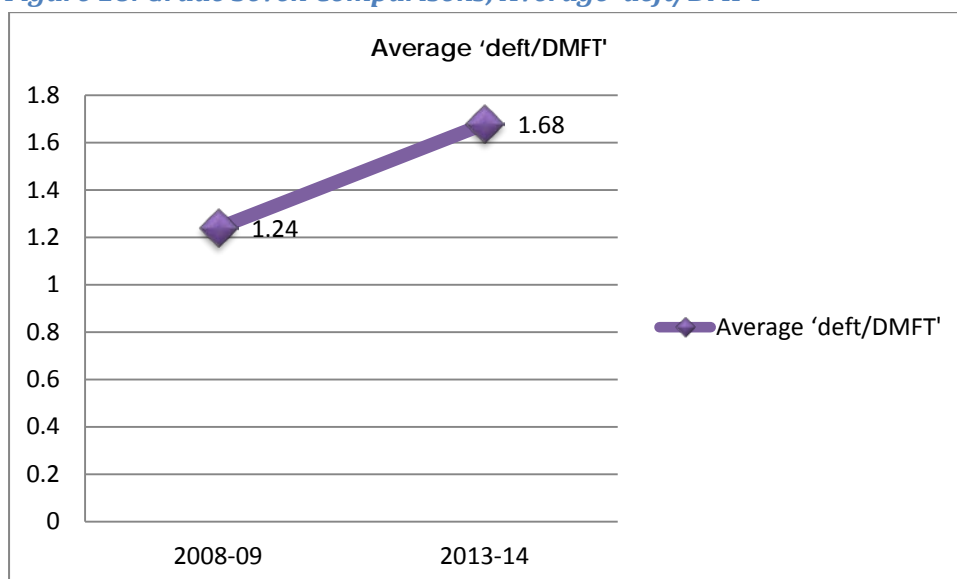


Figure 19: Grade Seven Comparisons; % with Cavities

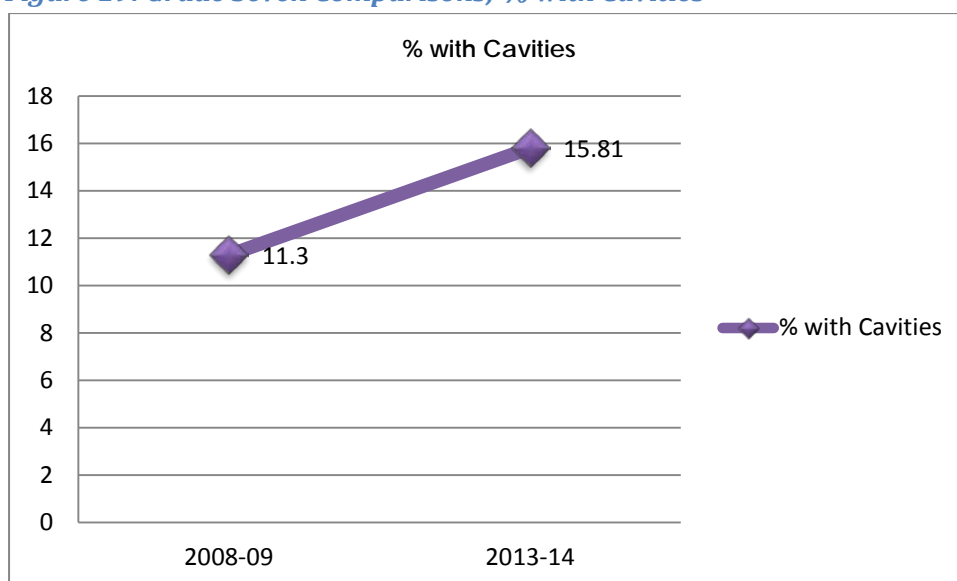
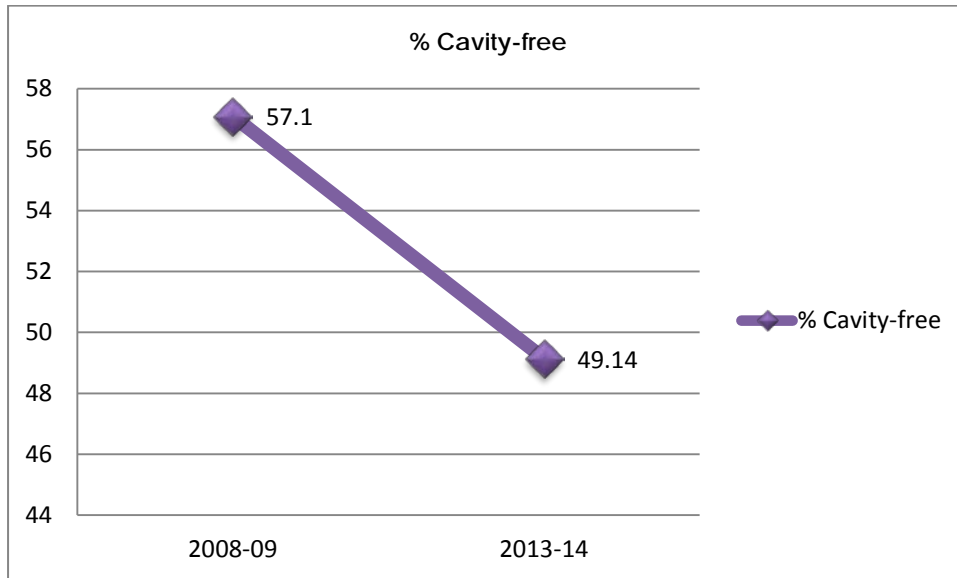


Figure 20: Grade Seven Comparisons; % Cavities free



Canadian Oral Health Strategy (COHS) Guidelines for 2010: Goal 2¹

2.2: Reduction of dental decay

At age 6, 50% of children have never experienced dental decay.

At age 6, no more than 20% of children have unmet dental treatment needs.

At age 12, 75% of children have never experienced decay in their permanent teeth.

At age 12, no more than 10% of children have unmet dental treatment needs.

At age 12, an average 'DMFT' of 1.0 or less.

At age 12, a 'Significant Caries Index', 'DMFT' of 3.0 or less.

Table 18: COHS 2010 Guidelines, Saskatchewan (Grade One; 2008-09 vs. 2013-14)

COHS Guidelines 2010: Grade One				
Health Region	50% of children have never experienced dental decay		No more than 20% of children have unmet dental treatment needs	
	2008-09	2013-14	2008-09	2013-14
Cypress	45.5%	36.8%	21.1%	27.5%
Five Hills	47.5%	40.2%	27.8%	31.6%
Heartland	35.0%	33.3%	28.1%	31.3%
Keewatin	11.1%	5.2%	62.2%	61.0%
Kelsey Trail	34.0%	36.5%	32.8%	34.4%
Mamawetan	21.6%	16.0%	56.5%	61.0%
Prairie North	37.8%	32.12%	27.1%	28.6%
Prince Albert	26.6%	27.8%	29.0%	38.9%
Regina	42.9%	38.6%	31.9%	33.8%
Saskatoon	50.8%	47.3%	19.4%	19.7%
Sun Country	43.4%	41.5%	29.6%	26.6%
Sun Rise	35.7%	34.6%	26.5%	35.1%
Saskatchewan	41.5%	39.9%	27.1%	29.1%

The Canadian Oral Health Strategy (COHS) Guidelines 2010 for Saskatchewan Grade One students are not met in 2013-2104 , as 39.9% of students have never experienced dental decay and 29.1% of students have unmet dental treatment needs. In 2008-2009, the COHS Guidelines were also not met as 41.5% of students have never experienced dental decay and 27.1% of students have unmet dental treatment needs.

Table 19: COHS 2010 Guidelines, Saskatchewan (Grade Seven; 2008-09 vs. 2013-14)

COHS Guidelines 2010: Grade Seven								
Health Region	75% of children have never experienced decay in their permanent teeth		No more than 10% of children have unmet dental treatment needs		Average 'DMFT' of 1.0 or less		'Significant Caries Index', 'DMFT' of 3.0 or less.	
	2008-09	2013-14	2008-09	2013-14	2008-09	2013-14	2008-09	2013-14
Cypress	76.7%	68.1%	8.3%	17.6%	0.7	1.1	2.58	3.16
Five Hills	80.7%	55.3%	9.3%	16.7%	0.5	1.3	1.42	3.65
Heartland	64.3%	65.5%	12.9%	16.0%	0.9	0.8	2.59	2.36
Keewatin	13.7%	12.3%	47.1%	61.4%	3.9	3.2	7.21	5.89
Kelsey Trail	59.0%	43.8%	14.1%	19.3%	3.9	1.9	3.00	4.67
Mamawetan	53.5%	47.83%	24.2%	11.2%	1.4	2.5	3.79	6.83
Prairie North	62.9%	49.14%	14.9%	17.5%	0.9	1.8	2.57	4.64
Prince Albert	31.7%	28.9%	12.1%	28.0%	2.8	2.7	6.02	5.91
Regina	62.7%	55.71%	14.9%	18.8%	1.0	1.41	3.04	3.90
Saskatoon	74.8%	63.9%	6.5%	7.0%	0.6	0.9	1.81	2.70
Sun Country	69.5%	61.8%	15.0%	17.3%	0.8	1.1	2.32	3.06
Sun Rise	57.6%	54.8%	9.4%	15.1%	1.1	1.5	2.64	4.06
Saskatchewan	66.2%	56.7%	11.4%	14.8%	0.8	1.3	3.00	3.73

The *Canadian Oral Health Strategy* (COHS) Guidelines 2010 for Saskatchewan Grade Seven students are not met in 2013-2014, as 56.7% of students have never experienced dental decay and 14.8% of students have unmet dental treatment needs. The Grade Seven students have an average DMFT of 1.3 and Significant Caries Index of 3.73.

In 2008-2009, the *Canadian Oral Health Strategy* (COHS) Guidelines for Grade Seven students were partially met with the average 'DMFT' of 0.8 and the 'Significant Caries Index' of 3.00. As 66.2% of students have never experienced decay in their permanent teeth and 11.4% of students have unmet dental treatment needs, these do not meet the COHS Guidelines.

Significant Caries Index (SiC): Grade Seven Students, Saskatchewan, 2008-2009¹

Significant Caries Index for Grade Seven Students, Saskatchewan, 2013-2014 is **3.73** as compared to **3.00** in 2008-2009.

Significant Caries Index:

- New goal set by World Health Organization (WHO).
- New goal set by the Canadian Oral Health Strategy Guidelines for Grade Seven/ children who are twelve years of age.
- For countries, who still did not achieve the WHO/FDI (Fédération Dentaire International) global health goal of 'DMFT' less than or equal to 3, this goal is an urgent priority.
- Ideally 'SiC' should be less than 3, by the year 2015.

SiC is calculated by recording the mean 'DMFT' scores of one-third of the population with highest 'DMFT' scores.

Canadian Oral Health Framework 2013-2014 (COHF):²

Objectives:

- **Improve Oral Health:** Improve Oral Health for Children and Youth
- **Access to Care:** Improve Oral Health for Aboriginal People

➤ **Improve Oral Health:** Improve Oral Health for Children and Youth

Table 20 Canadian Oral Health Guidelines for 2018: 6-year old

Canadian Oral Health Framework 2013-2018			
S.No.	Objective	Baseline	Indicator
1.a	Reduce the number of teeth affected by cavities in 6-year-olds	2.52	deft +DMFT of <2.5 for 6 y.o.
1.b	Reduce the percentage of 6-year-olds who experienced cavities	46.60%	55%. of 6 y.o. have dmft+DMFT=0
1.c	Reduce the percentage of 6-year-olds with untreated cavities	18.60%	<15% of 6 y.o. have d+D>0

Canadian Oral Health Framework 2013-2018 -6 year olds			
Health Region	1.a	1.b	1.c
Cypress	3.45	36.84%	26.54%
Five Hills	3.83	40.16%	29.82%
Heartland	3.64	33.33%	28.41%
Keewatin	8.07	5.19%	51.95%
Kelsey Trail	4.15	36.46%	31.90%
Mamawetan	7.47	15.96%	52.58%
Prairie North	4.17	32.12%	27.69%
Prince Albert	5.19	27.83%	35.42%
Regina	3.53	38.63%	32.33%
Saskatoon	2.79	47.28%	20.92%
Sun Country	2.64	41.51%	25.58%
Sun Rise	3.91	34.62%	33.95%
Saskatchewan	3.58	39.90%	28.20%

The Canadian Oral Health Strategy (COHS) Guidelines 2018 for Saskatchewan Grade One students are not met as

- deft+DMFT is 3.58 (1.a)
- % of students with deft+DMFT=0 is 39.90% (1.b)
- % of students with untreated cavities is 28.20% (1.c)

Table 21: Canadian Oral Health Guidelines for 2018: 12-year old

Canadian Oral Health Framework 2013-2018			
S.No.	Objective	Baseline	Indicator
1.d	Improve the DMFT rate for 12 year olds	1.02	DMFT of <1.0 for 12 y.o.
1.e	Decrease the percentage of 12-year-olds who experienced permanent tooth cavities	61.30%	>70% of 12 y.o. have DMFT=0

Canadian Oral Health Framework 2103-2018 -12 year olds		
Health Region	1.d	1.e
Cypress	1.02	68.10%
Five Hills	1.33	55.33%
Heartland	0.79	65.47%
Keewatin	3.22	12.28%
Kelsey Trail	1.88	43.80%
Mamawetan	2.51	47.83%
Prairie North	1.76	49.14%
Prince Albert	2.73	28.90%
Regina	1.40	55.71%
Saskatoon	0.93	63.90%
Sun Country	1.07	61.76%
Sun Rise	1.48	54.76%
Saskatchewan	1.35	56.70%

The Canadian Oral Health Strategy (COHS) Guidelines 2018 for Saskatchewan Grade Seven students are not met as:

- DMFT rate of 12 years old is 1.35 (1.d)
- % of students with DMFT=0 is 56.70% (1.e)

➤ **Improve Oral Health Access for Aboriginal People: COHF Guidelines 2013-2018 for FN/I School based preventive services;²**

The Aboriginal status of children was determined using the information provided on the dental insurance coverage. Under dental insurance coverage, there was an option to declare the type of coverage used for dental care. The students who declared their coverage from First Nations/Inuit Branch were considered to be Aboriginal.

Table 22: COHF 2013-2018; FN/I school based preventive services

Canadian Oral Health Framework 2103-2018			
#	Objectives	Indicator	Saskatchewan 2013-2014
2.b	50% of FN/I schools provide school-based preventive dental services	% of FN/I schools provide school-based preventive dental services	89.58%

Canadian Oral Health Framework 2103-2018 -6 year olds (Aboriginal)				
#	Objective	Baseline	Indicator	Saskatchewan 2013-14
2.c	Improve the oral health status of those children entering school (6 year olds)	13.90%	15% of 6 y.o. FN/I have deft +DMFT=0 of 6 year-old First Nations and Inuit children have not had tooth decay	17.47%

Canadian Oral Health Framework 2103-2018 -12 year olds (Aboriginal)				
#	Objective	Baseline	Indicator	Saskatchewan 2013-14
2.d	Improve the oral health status of 12 year old FN/I	17.8% of 12 y.o. FN (from p. 37 COHF) 38.7% of 12 y.o. Canadians	20% of 12 y.o. FN/I have DMFT=0	31.56%

The *Canadian Oral Health Strategy (COHS) Guidelines 2018* for Saskatchewan for Aboriginal People are met as 89.58% of FN/I schools provide school-based preventive dental services, 17.47% have deft+DMFT=0 (6 years old) and 31.56% 12 years old have DMFT=0.

Dental Health Disparities

In this section, we analyzed the screening data for Grade One and Grade Seven students together. Comparisons among students:

Attending schools located in rural versus urban areas.

Attending schools located in communities with and without access to fluoridated water systems.

Attending Hutterite versus non-Hutterite schools.

Residing in Regina and Saskatoon neighbourhoods by income status.

Urban/Rural, water fluoridation, neighbourhoods by income status and Hutterite categories were determined according to where each child attended school i.e. school location.

The results for these comparisons are provided in the following section.

COMPARATIVE ANALYSIS

Statistical analysis of the Dental Screening 2013-2014 results was done based on different criterion. The criteria highlight the disparities that might exist in oral health of children on the basis of following factors:-

Location; Urban vs. Rural Schools:

All children were assigned as attending a rural or urban school based on the location of the school they attended during the screening year.

Table-23: Comparative analysis; Urban vs. Rural

		School Location		p-value
		Urban	Rural	
DMFT Score ^(a)		0.52	0.79	< 0.001
deft Score ^(a)		1.89	2.23	< 0.001
Caries Free - Permanent Dentition ^(b)		7799 (94.79%)	9943 (89.97%)	< 0.001
Caries Free - Primary Dentition ^(b)		6876 (83.57%)	9037 (81.78%)	0.477
Childhood Tooth Decay ^(b)	ECTD^(b)	157 (1.91%)	163 (1.47%)	0.032
	S-ECTD^(b)	94 (1.14%)	153 (1.38%)	0.448
Oral Health Status ^(b)	NDE	4009 (48.72%)	3143 (28.44%)	< 0.001
	CCC	2535 (30.81%)	2663 (24.10%)	< 0.001
	NEC	860 (10.45%)	958 (8.67%)	0.001
Priority Scores ^(b)	1	88 (1.07%)	185 (1.67%)	0.030
	2	1474 (17.91%)	2436 (22.04%)	< 0.001
	3	6666 (81.02%)	8428 (76.26%)	< 0.001
Existing Pain ^(b)	Yes	110 (1.34%)	195 (1.76%)	0.324

(a) Independent two sample T-test. (b) Chi-square test. (c) Fisher's Exact test

Comparative analysis of students attending schools in urban communities and rural communities was carried out on thirteen different indicators. It denotes a better oral health of students attending schools in urban communities than rural communities with ten indicators being statistically significant (as the p-value is less than $0.05 = \alpha$). For analysis, only the cities of Regina and Saskatoon (both with population greater than 100,000) were included in the Urban area in accordance with the new terminology of "population centre" adopted in Canada 2011 census.

.Figure 21: Dental Health of Students by Urban/Rural School Location, Saskatchewan, 2013-2014.

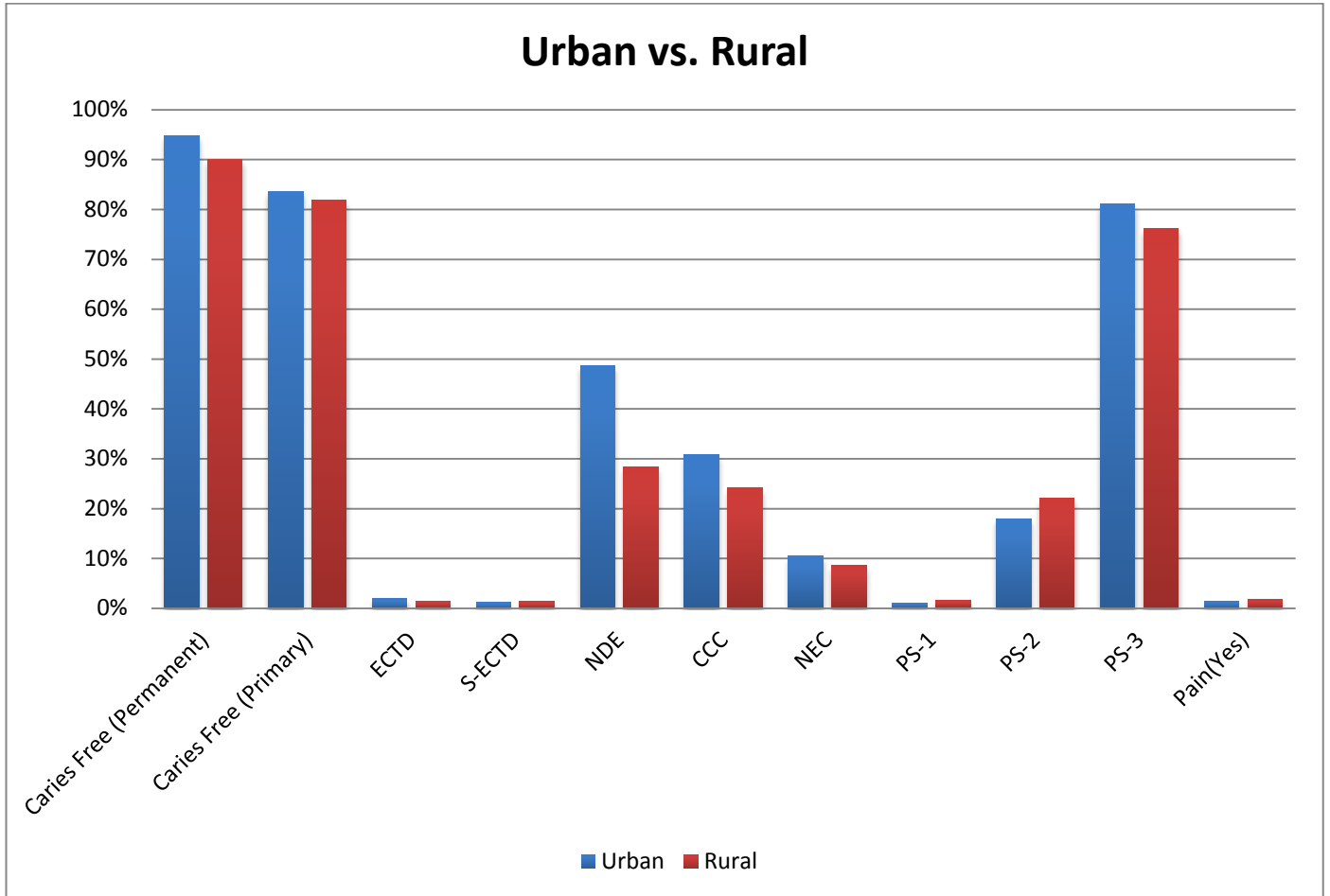


Table-24: Comparative analysis; Water Supply: Fluoridated vs. Non-Fluoridated

		Water Supply		p-value
		Fluoridated	Non-Fluoridated	
DMFT Score ^(a)		0.57	0.73	< 0.001
deft Score ^(a)		1.88	2.22	< 0.001
Caries Free - Permanent Dentition ^(b)		7477 (94.31%)	10265 (90.43%)	< 0.001
Caries Free - Primary Dentition ^(b)		6730 (84.89%)	9183 (80.90%)	< 0.001
Childhood Tooth Decay ^(b)	ECTD	186 (2.34%)	134 (1.18%)	< 0.001
	S-ECTD	97 (1.22%)	150 (1.32%)	0.552
Oral Health Status ^(b)	NDE	2689 (33.92%)	5239 (46.15%)	< 0.001
	CCC	1803 (22.74%)	3639 (32.05%)	< 0.001
	NEC	608 (7.66%)	1304 (11.49%)	< 0.001
Priority Scores ^(b)	1	106 (1.33%)	167 (2.10%)	0.438
	2	1351 (17.04%)	2559 (22.54%)	< 0.001
	3	6470 (81.61%)	8623 (75.97%)	< 0.001
Pain	YES	117(1.48%)	188(1.66%)	0.323

(a) Independent two sample T-test. (b) Chi-square test. (c) Fisher's Exact test.

Comparative analysis of students attending schools in communities with fluoridated water and communities with non-fluoridated water was carried out on thirteen different indicators. The students having access to fluoridated water showed better oral health on nine of the thirteen indicators analyzed and ten indicators were statistically significant as well (as the p-value is less than $0.05 = \alpha$).

Figure 22: Dental Health of Students by Fluoridated/Non-Fluoridated Water Supply, Saskatchewan, 2013-2014.

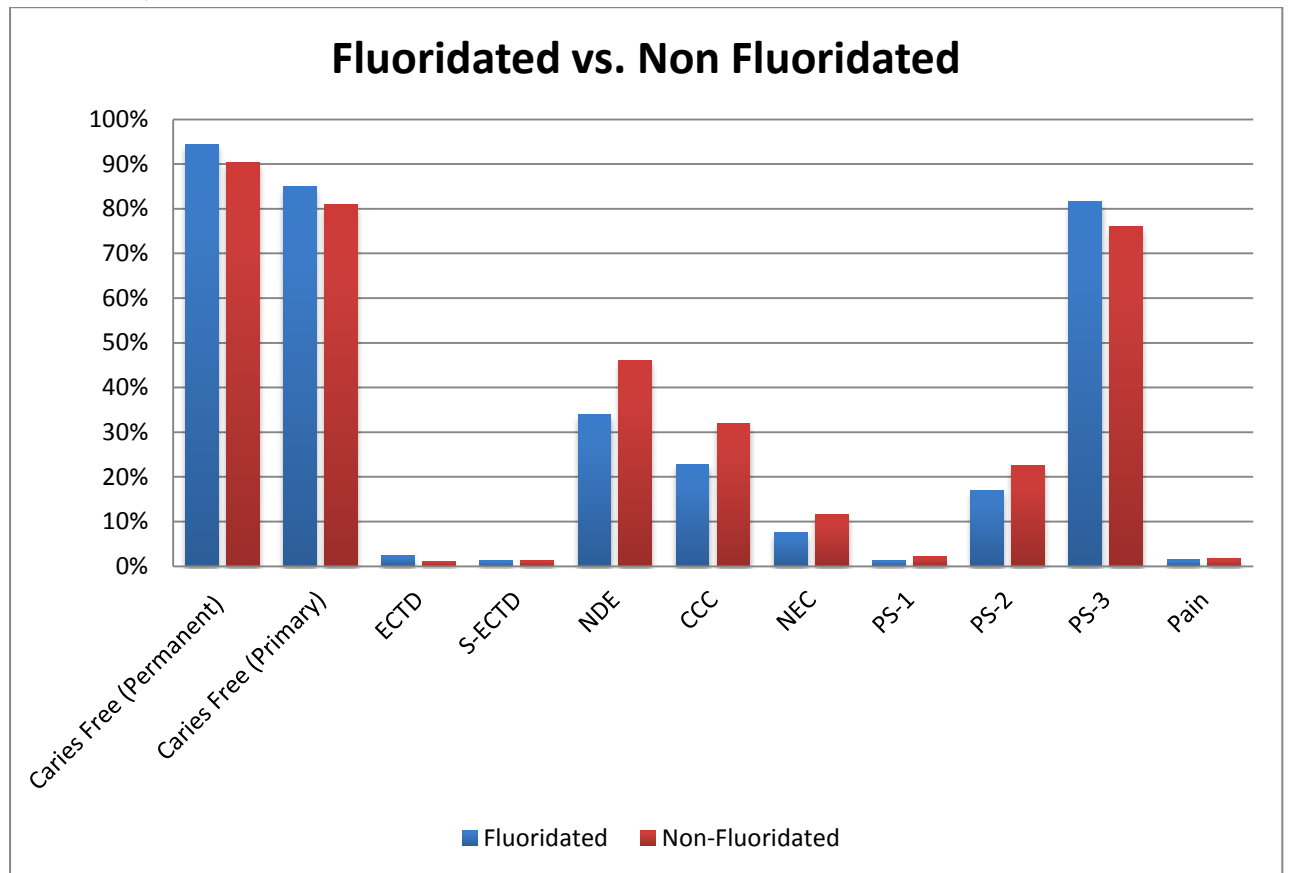


Table-25: Comparative analysis; Dental Visit; YES vs. NO

		Dental Visit		p-value
		Yes	No	
DMFT Score ^(a)		0.53	0.53	0.953
deft Score ^(a)		1.82	1.68	0.064
Caries Free - Permanent Dentition ^(b)		7837 (95.65%)	1801 (89.11%)	<0.001
Caries Free - Primary Dentition ^(b)		7144 (87.20%)	1521 (75.30%)	<0.001
Childhood Tooth Decay ^(b)	ECTD	114 (1.39%)	51 (2.52%)	<0.001
	S-ECTD	93 (1.12%)	23 (1.14%)	0.954
Oral Health Status ^(b)	NDE	3946 (48.16%)	1025 (50.71%)	0.040
	CCC	2926 (35.71%)	327 (16.18%)	<0.001
	NEC	461 (5.62%)	453 (22.41%)	<0.001
Priority Scores ^(b)	1	78 (0.95%)	46 (2.27%)	<0.001
	2	1120 (1.37%)	560 (27.71%)	<0.001
	3	6995 (85.37%)	1415 (70.01%)	<0.001
Existing Pain ^(b)	Yes	88 (1.07%)	51 (2.52%)	<0.001
Dental Insurance ^(b)	Yes	6732 (82.17%)	1220 (60.37%)	<0.001

(a) Independent two sample T-test. (b) Chi-square test.

Comparative analysis of students who visited a dentist in past one year and those who did not visit a dentist was carried out. Eleven indicators were statistically significant (as the p-value is less than $0.05 = \alpha$) and denote that students who visited a dentist had better oral health than students who did not visit a dentist. Also, 82.17% of the students who visited dentist answered 'Yes' for having dental coverage as compared to 60.37% of the students who answered 'No' to the same question. Eleven indicators were statistically significant as well (as the p-value is less than $0.05 = \alpha$).

Optional information was collected from the students about having a regular family dentist. Of the students who responded to this question, 68.52% had a family dentist while 15.70% did not have a family dentist and 15.78% were not sure about it.

Table: Comparative analysis; Family Dentist: Yes Vs .No

		Regular Dentist		
		Yes	No	p-value
DMFT Score ^(a)		0.49	0.60	0.006
deft Score ^(a)		1.67	1.93	0.003
Caries Free - Permanent Dentition ^(b)		7347 (96.34%)	1557 (89.12%)	< 0.001
Caries Free - Primary Dentition ^(b)		6768 (88.74%)	1271 (72.75%)	< 0.001
Childhood Tooth Decay ^(c)	ECTD	4 (0.05%)	4 (0.23%)	0.045
	NDE	3857 (50.57%)	806(46.13%)	0.001
Oral Health Status ^(b)	CCC	2692 (35.30%)	322 (18.43%)	< 0.001
	NEC	360 (4.72%)	425 (24.32%)	< 0.001
	1	58 (0.76%)	62 (3.55%)	< 0.001
Priority Scores ^(b)	2	929 (12.18%)	505 (28.90%)	< 0.001
	3	6639 (87.06%)	1180(67.54%)	< 0.001
	Dental Visit ^(b)	Yes	6921 (90.75%)	539 (31.01%)
Dental Insurance ^(b)	Yes	6446 (84.52%)	897(51.34%)	< 0.001

Comparative analysis between students having regular dentist and those not having regular dentist was carried out. Out of the thirteen dental health indicators, students with a regular dentist had better oral health than those without a regular dentist in all the indicators. All indicators were statistically significant as well (as the p-value is less than 0.05 = α). Also, 90.75% of the students who had a regular dentist answered 'Yes' for visiting a dentist in past year as compared to 31.01% of the students who answered 'No' to the same question. Moreover, 84.52% of the students with dental coverage had a regular dentist compared to 51.34% without a coverage.

Figure 23: Dental Health of Students by Dental Visit YES/NO, Saskatchewan, 2013-2014.

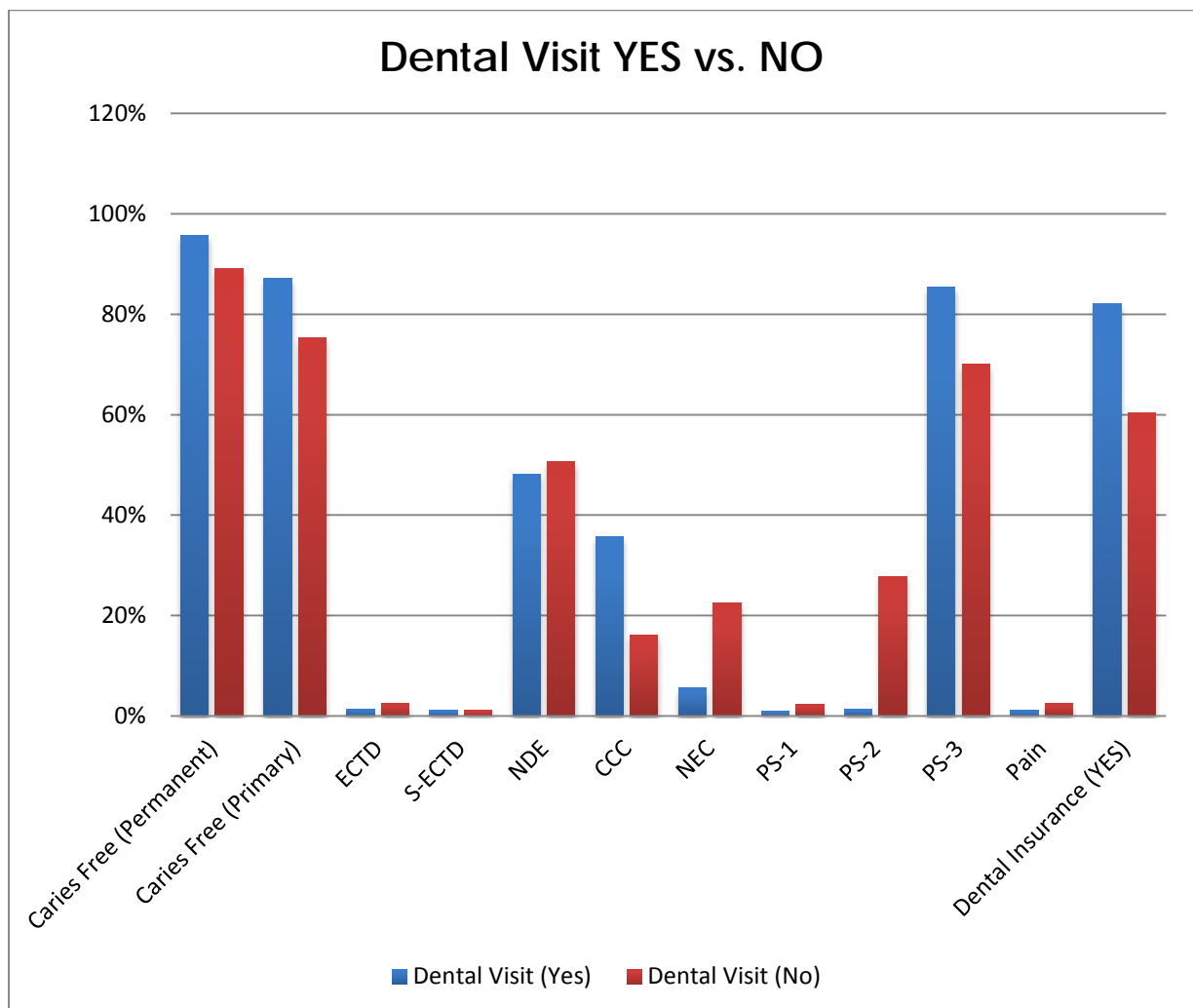


Table-26: Comparative Analysis; Aboriginal vs. Non-Aboriginal.

The Aboriginal status of children was determined using the information provided on the dental insurance coverage. Under dental insurance coverage, there was option to declare the type of coverage used for dental care. The students who declared their coverage from First Nations/Inuit Branch were considered to be Aboriginal.

		Aboriginal Status		p-value
		Aboriginal	Non-Aboriginal	
DMFT Score ^(a)		1.31	0.64	< 0.001
deft Score ^(a)		3.74	2.02	< 0.001
Caries Free - Permanent Dentition ^(b)		502 (81.49%)	17240 (92.38%)	< 0.001
Caries Free - Primary Dentition ^(b)		461 (74.84%)	15452 (82.79%)	< 0.001
Childhood Tooth Decay	ECTD^(b)	14 (2.27%)	306 (1.63%)	0.226
	S-ECTD^(b)	21 (3.41%)	226 (1.21%)	< 0.001
Oral Health ^(b) Status	NDE	148 (22.24%)	5972 (32.00%)	< 0.001
	CCC	225 (36.53%)	4325 (23.17%)	< 0.001
	NEC	72 (11.68%)	1651 (8.85%)	0.015
Priority Scores	1^(b)	20 (3.25%)	253 (1.36%)	< 0.001
	2^(b)	195 (31.66%)	3715 (19.91%)	< 0.001
	3^(b)	401 (65.10%)	14693 (78.73%)	< 0.001
Existing Pain ^(b)	Yes	24 (3.90%)	281 (1.51%)	< 0.001

(a) Independent two sample T-test. (b) Chi-square test.

Comparative analysis of Aboriginal students and non-Aboriginal students was carried out on thirteen different indicators. Non-Aboriginal students performed better on twelve of the thirteen indicators signifying the barriers existing in the access to oral health care for Aboriginal population. Out of these twelve indicators were statistically significant as well (as the p-value is less than $0.05 = \alpha$).

Figure 24: Dental Health of Students by Aboriginal/Non-Aboriginal Status, Saskatchewan, 2013-2014.

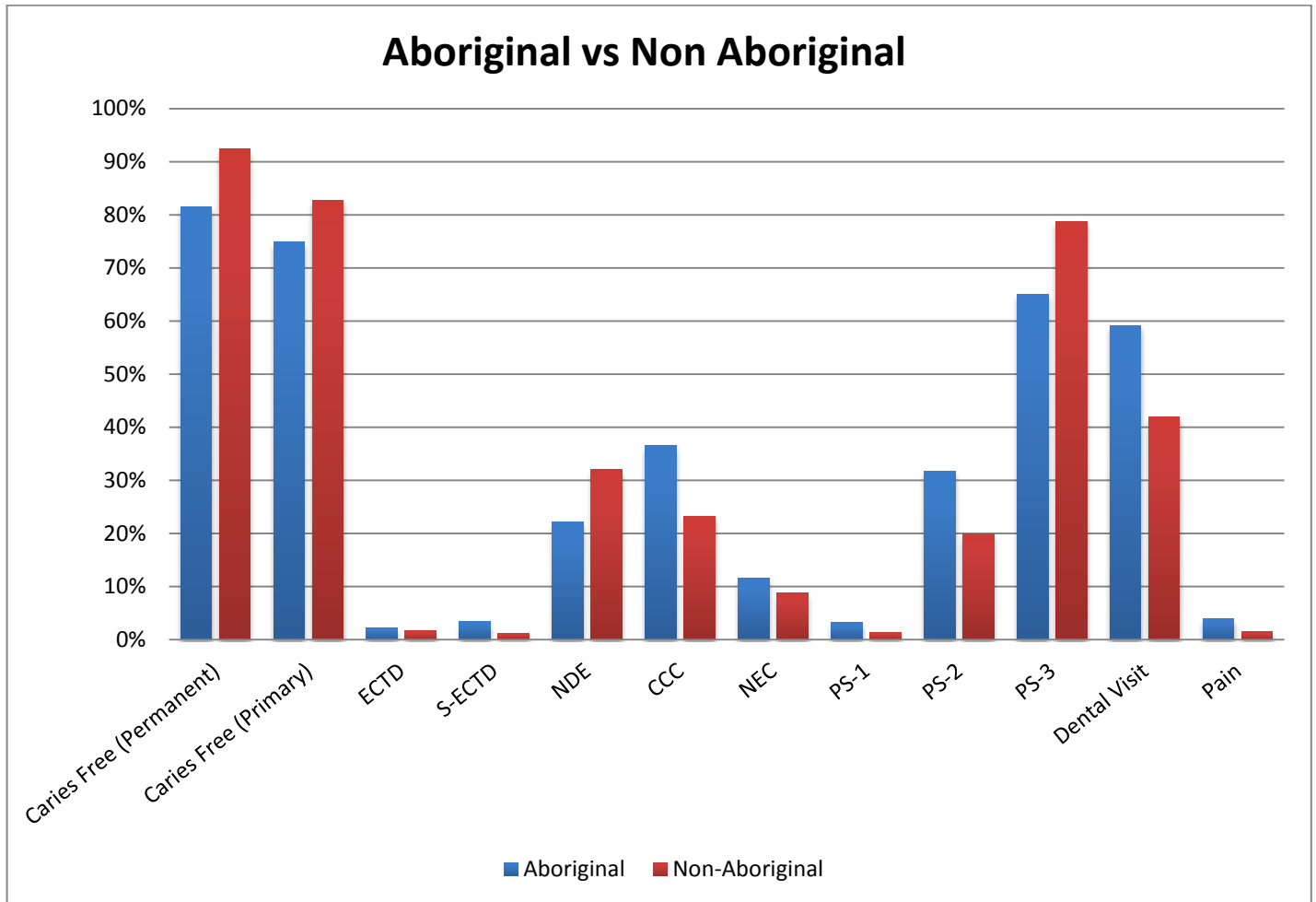


Table 27: Comparative Analysis; Hutterite vs. Non-Hutterite.

Hutterites are communal people which live in colonies consisting of, on an average, fifteen families throughout the prairies. They work within their colony and they have public schools on their own colony.

		Community		
		Hutterite	Non Hutterite	p-value
DMFT Score ^(a)		1.26	0.66	0.003
deft Score ^(a)		2.84	2.08	0.003
Caries Free - Permanent Dentition ^(b)		168 (87.96%)	17574 (92.19%)	0.038
Caries Free - Primary Dentition ^(b)		172 (90.05%)	19061 (82.45%)	0.006
Childhood Tooth Decay ^(c)	ECTD	3 (1.57%)	315 (1.65%)	0.930
	S-ECTD	2 (1.05%)	245 (1.28%)	0.771
Oral Health Status ^(b)	NDE	46 (24.08%)	6024(31.60%)	0.026
	CCC	107 (56.02%)	84 (0.44%)	< 0.001
	NEC	7 (3.66%)	4381 (22.98%)	< 0.001
Priority Scores ^(b)	1^(c)	0 (0.00%)	273 (1.43%)	0.096
	2	37 (0.19%)	3871 (20.31%)	0.749
	3	154 (80.63%)	14915(78.25%)	0.428
Pain ^(c)	Yes	0(0.00%)	305(1.60%)	0.078

(a) Independent two sample T-test. (b) Chi-square test. (c) Fisher's Exact test.

Comparative analysis of students attending Hutterite colony schools was carried out with those attending non-Hutterite colony schools. Generally, the students attending non-Hutterite colony schools seem to have better oral health as compared to those attending Hutterite colony schools with seven statistically significant indicators (as the p-value is less than 0.05 = α).

Figure 25: Dental Health of Students by Hutterite/Non-Hutterite Community, Saskatchewan, 2013-2014.

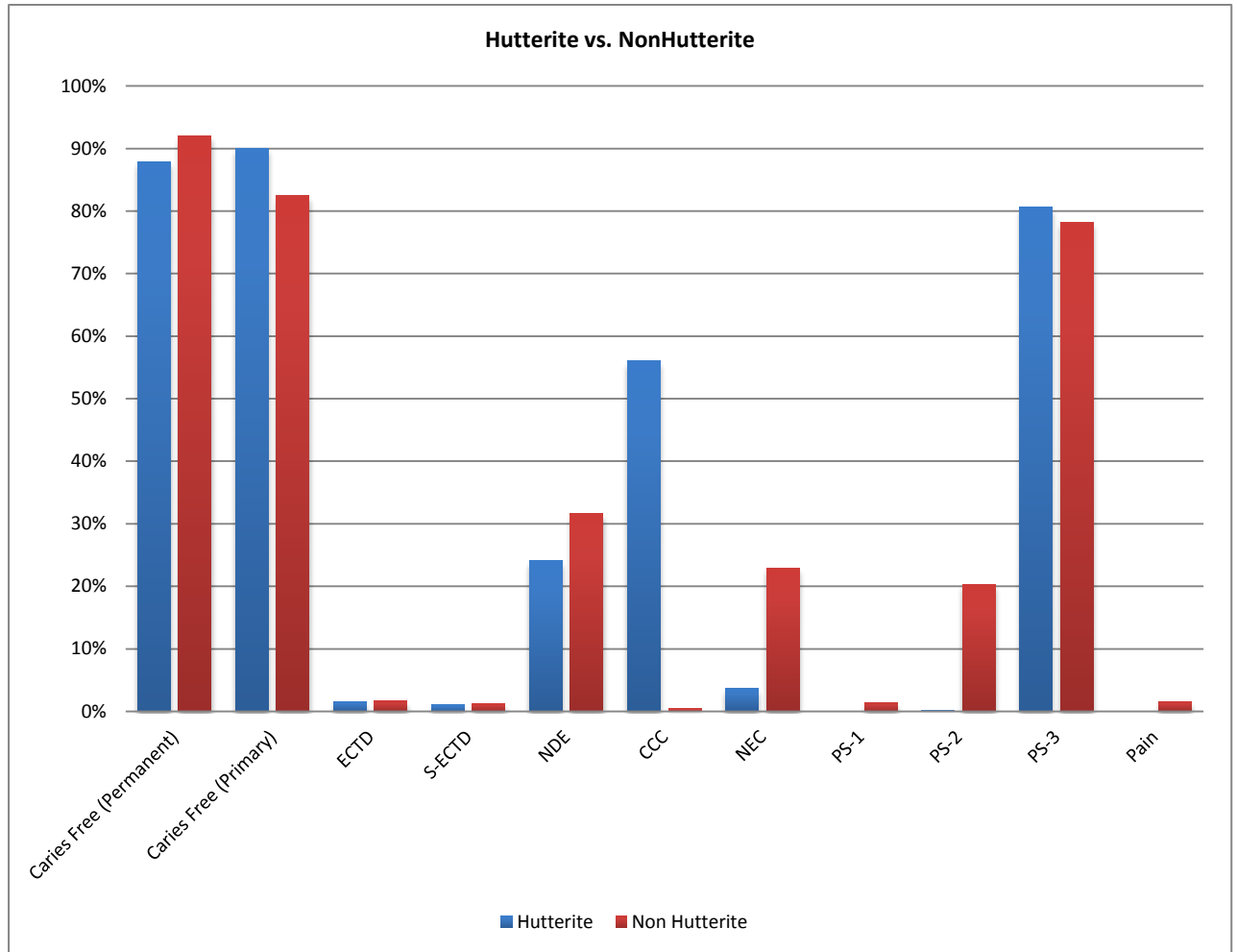


Table 28: Comparative Analysis; Dental Insurance (Yes vs. No).

		Dental Insurance		p-value
		Yes	No	
DMFT Score ^(a)		0.51	0.45	0.001
deft Score ^(a)		1.84	1.89	< 0.001
Caries Free - Permanent Dentition ^(b)		7753 (94.93%)	1126 (92.83%)	< 0.001
Caries Free - Primary Dentition ^(b)		7002 (85.72%)	933 (76.92%)	0.001
Childhood Tooth Decay ^(b)	ECTD	131 (1.60%)	27 (2.23%)	0.116
	S-ECTD	94 (1.15%)	12 (0.99%)	0.637
Oral Health Status ^(b)	NDE	4000 (48.97%)	574(47.32%)	0.283
	CCC	2682 (32.84%)	296 (24.40%)	< 0.001
	NEC	617 (7.55%)	202 (16.65%)	< 0.001
Priority Scores ^(b)	1	85 (1.04%)	23 (1.90%)	0.009
	2	1262 (15.45%)	293 (24.15%)	< 0.001
	3	6821 (83.51%)	897(73.95%)	< 0.001
Pain ^(b)	Yes	94(7.75%)	24(1.98%)	0.014
Dental Visit in Past Year	Yes	6732 (82.42%)	706(58.20%)	< 0.001

(a) Independent two sample T-test. (b) Chi-square test. (c) Fisher's Exact test.

Comparative analysis between students having dental insurance coverage and those not having dental insurance coverage was carried out. Out of the fourteen dental health indicators, students with dental coverage were better than those without dental coverage in ten indicators. Eleven indicators were statistically significant as well (as the p-value is less than $0.05 = \alpha$). Also, 82.42% of the students who had dental coverage answered 'Yes' for visiting dentist in past one year as compared to 58.20% of the students who answered 'No' to the same question. This advocates the importance of dental coverage for having access to dental care.

Figure 26: Dental Health of Students by Dental Insurance Yes vs. No, Saskatchewan, 2013-2014.

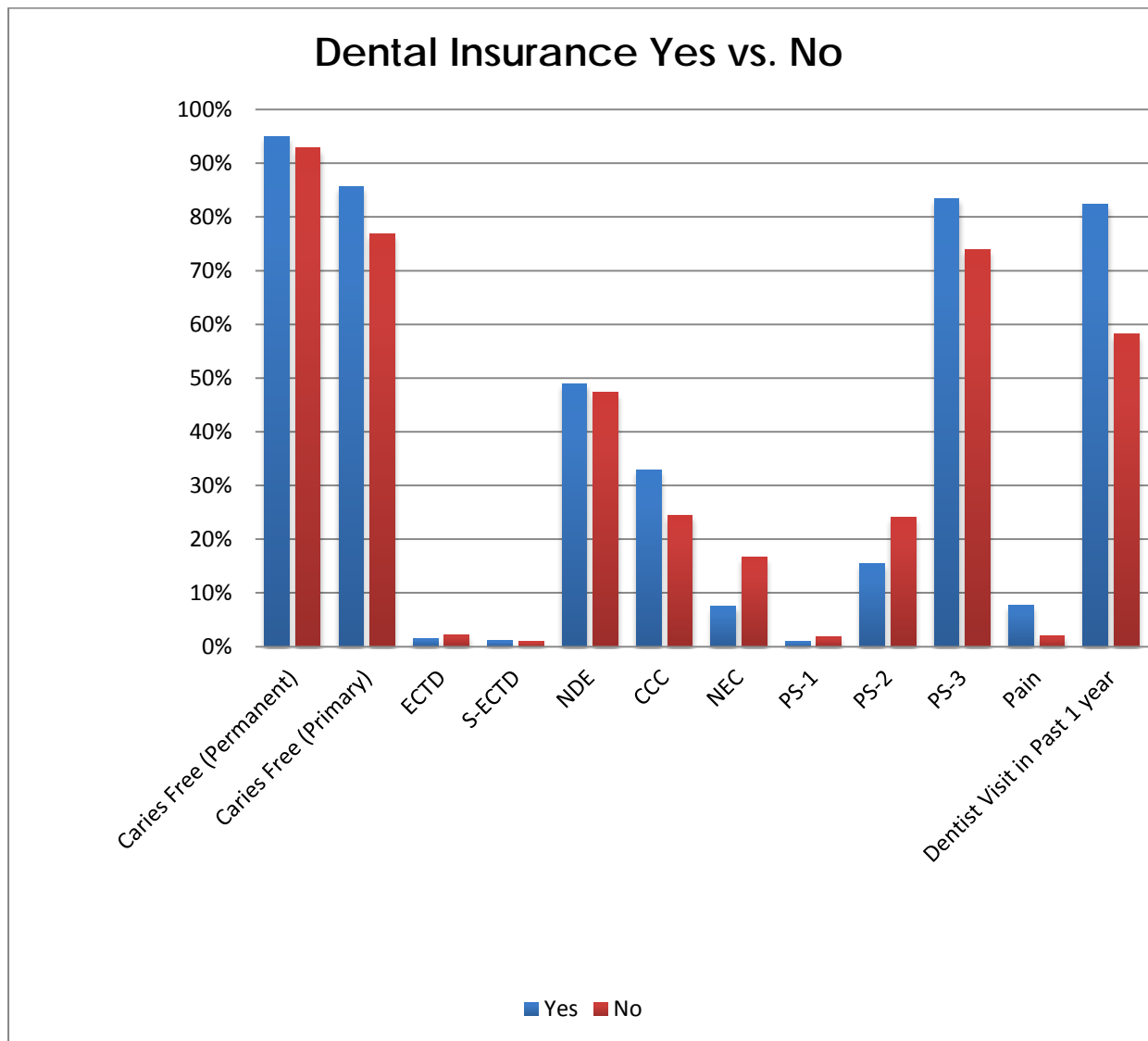


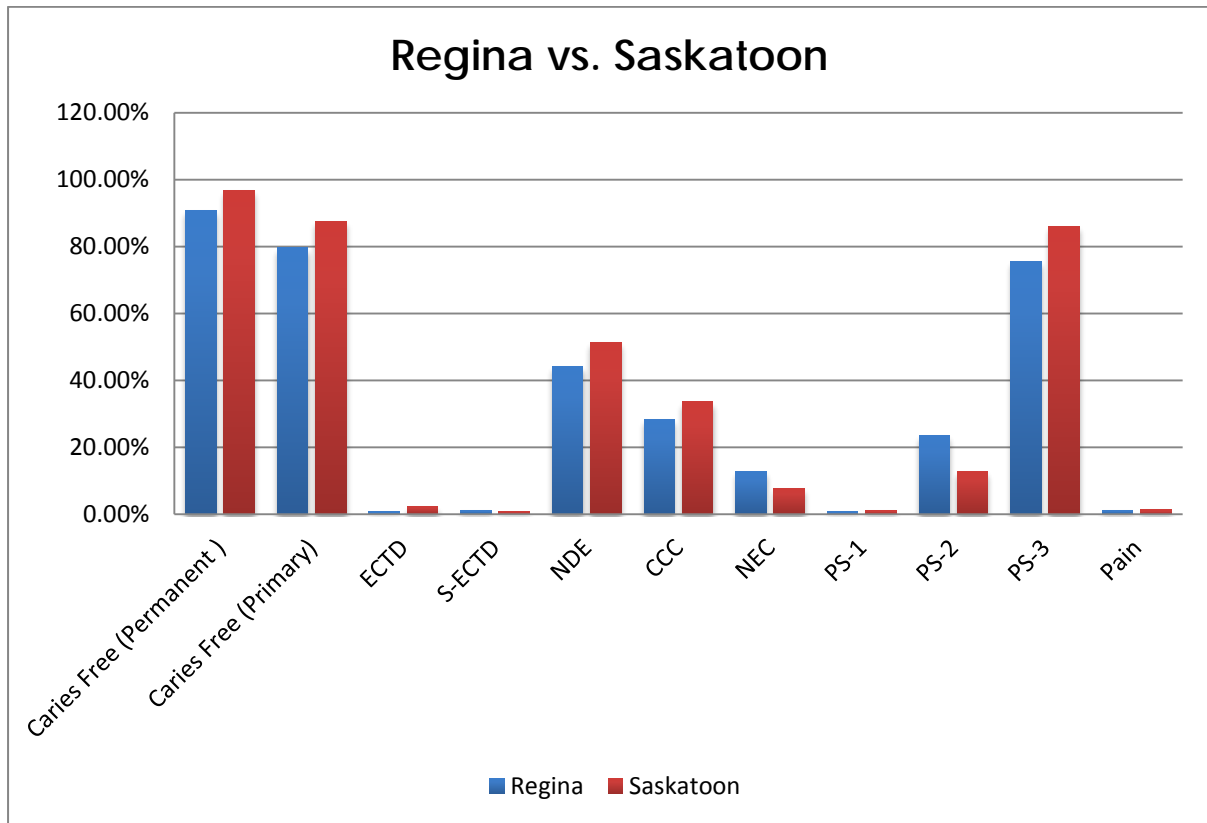
Table 29: Comparative Analysis; City (Regina vs. Saskatoon).

		City		p-value
		Regina	Saskatoon	
DMFT Score ^(a)		1.62	1.20	< 0.001
deft Score ^(a)		2.10	1.66	< 0.001
Caries Free - Permanent Dentition ^(b)		4079 (90.79%)	6400 (96.81%)	< 0.001
Caries Free - Primary Dentition ^(b)		3578 (79.63%)	5791 (87.60%)	< 0.001
Childhood Tooth Decay ^(b)	ECTD	33 (0.73%)	164 (2.48%)	< 0.001
	S-ECTD	51 (1.14%)	64 (0.97%)	0.394
Oral Health Status ^(b)	NDE	1983 (44.14%)	3404(51.49%)	< 0.001
	CCC	1277 (28.42%)	2221 (33.60%)	< 0.001
	NEC	576 (12.82%)	517 (7.82%)	< 0.001
Priority Scores ^(b)	1	36 (0.80%)	80 (1.21%)	0.038
	2	1058 (23.55%)	842 (12.74%)	< 0.001
	3	3390 (75.63%)	5689(86.05%)	< 0.001
Pain ^(b)	Yes	51(1.14%)	88(1.33%)	0.362
Communities with Fluoridated Water ^(b)		1 (0.02%)	5369 (81.21%)	< 0.001

(a) Independent two sample T-test. (b) Chi-square test.

Comparative analysis of students attending schools in cities of Regina and Saskatoon was carried out on thirteen different indicators. The students in Saskatoon showed better oral health on ten of the thirteen indicators analyzed and eleven indicators were statistically significant as well (as the p-value is less than $0.05 = \alpha$).

Figure 27: Dental Health of Students by City (Regina vs. Saskatoon), Saskatchewan, 2013-2014.



Dental Health Status by Region

The following table illustrates a summary of dental health status indicators by Health Region.

Table 30: Dental Health of Students by Health Region. 2013-2014, Saskatchewan

Dental Health Status				
Location of School	Average 'deft/DMFT'	% Cavities Free	% with No Evidence of Dental Care	Pain
Cypress	2.47	77.05%	10.58%	1.66%
Five Hills	2.55	74.40%	9.04%	0.60%
Heartland	2.74	75.655%	9.89%	1.73%
Keewatin	6.05	38.06%	17.91%	0.75%
Kelsey Trail	3.3	72.48%	10.98%	2.71%
Mamawetan	5.53	43.05%	13.64%	0.53%
Prairie North	3.43	75.26%	8.23%	2.70%
Prince Albert	4.35	65.78%	12.32%	3.35%
Regina	2.77	72.29%	12.82%	1.14%
Saskatoon	2.11	84.99%	7.82%	1.33%
Sun Country	2.18	76.99%	10.72%	1.80%
Sun Rise	2.93	73.96%	12.79%	1.71%

Epidemiological Studies:

An odds ratio (OR) is a measure of association between an exposure and an outcome. It quantifies how strongly the presence or absence of an exposure is associated with presence or absence of outcome.

In this section, the Odds Ratio measures the association of the outcome (Dental Decay) and the following exposures:

- 1) Location of the School.
- 2) Community Water Fluoridation.
- 3) Hutterite Communities

1) Location of School:

Table 31: Calculation of Odds Ratio for being Cavity free between Urban and Rural communities in Saskatchewan, 2013-2014

ODDS RATIO	Dental Decay	Decay free	Total
Rural	935	9233	10168
Urban	602	8509	9111
Total	1537	17742	19279

Odds Ratio: **1.4** (p-value = <0.0001)

As the value is greater than 1, a student residing in Rural community is more likely to have "Dental Decay"(Caries) than a student residing in Urban community in Saskatchewan.

2) Community Water Fluoridation:

Table 32: Calculation of Odds Ratio for being Cavity free between Schools that have access to Community Water Fluoridation and Schools that do not have access in Saskatchewan, 2013-2014

ODDS RATIO	Dental Decay	Decay free	Total
Fluoridated	451	7477	7928
Non-Fluoridated	1086	10265	11351
Total	1537	17742	19279

Odds Ratio: **0.6** (p-value = <0.0001)

As the value is less than 1, a student who has access to Community Water Fluoridation is less likely to develop "Dental Decay"(Caries) than a student who *does not* access to Community Water Fluoridation in Saskatchewan.

Table 33: Calculation of Odds Ratio for being Cavity free between Hutterite Schools and Non-Hutterite Schools in Saskatchewan, 2013-2014

ODDS RATIO	Dental Decay	Decay free	Total
Hutterite	23	168	191
Non-Hutterite	1514	17574	19088
Total	1537	17742	19279

Odds Ratio: **1.6** (p-value = 0.0386)

As the value is greater than 1, a student who attends a Hutterite School is more likely to develop "Dental Decay"(Caries) than a student who *does not* attend Hutterite School in Saskatchewan.

The above calculation of Odds Ratio is in contrast to Dental Health Screening, Saskatchewan, 2008-2009.

Interpretation for both Relative Risk (RR) and Odds Ratio (OR):

RR / OR Interpretation

If RR/OR = 1 No association.

If RR/OR > 1 Positive association; possibly causal.

If RR/OR < 1 Negative association; possibly protective.

Discussion

The overall participation rate of students in Dental Health Screening, Saskatchewan was 84.37% while 15.63% were either absent on the day of screening, or did not return signed consent forms from their parents/guardians in time or stated "NO" to the dental screening. They are not included in analysis. The percentage of students screened represents hidden morbidity, as they might have cavities. The number of Grade One students screened was higher than those screened in 2008-2009 while the number of Grade Seven students screened was lower than that of 2008-2009. It is required to take in consideration the barriers that exist which might prevent a child from receiving a screening.

The majority of the schools included in the analysis were from Saskatoon Health Region (34.29%), Regina Qu'Appelle Health Region (23.31%), and the rest were from other health regions in Saskatchewan. Saskatoon Health Region and Regina Qu'Appelle Health Region together constitute 57.6% of the students screened in Saskatchewan. The gender distribution was similar for Grade One students while proportion of males was slightly higher than those of females among Grade Seven students.

The dental health needs were assessed using factors like malocclusion, staining, gingivitis and the presence of calculus. Grade Seven students had higher dental health needs except for staining. For instance, 25.35% of Grade Seven students experience malocclusion as compared to 12.70% of Grade One students. Malocclusion not only affects facial esthetics but can also lead to psychological disturbances and increased risk of cavities. Malocclusion also poses hindrance to proper cleansing of teeth resulting in poor oral hygiene, gingivitis and periodontitis due to plaque/calculation accumulation. The screening did not record the severity or classification of the malocclusion to establish the need to take immediate action. It calls for emphasis on the preventive aspect of orthodontics rather than interceptive orthodontics.

In 2013-2014, Early Childhood Tooth Decay (ECTD) was recorded in contrast to Early Childhood Caries recorded in 2008-2009. ECTD is a rapid form of tooth decay which was previously measured as Early Childhood Caries and S-ECTD is an extreme form of ECTD. In 2013-2014, 2.76% Grade One students had ECTD while 2.17% experienced S-ECTD.

The 'deft' and DMFT indices were recorded to assess the prevalence of dental decay in primary and permanent dentition. Tooth decay is significant health problem among the Grade One and Grade Seven children. The proportion of Grade One students that had visible tooth decay was 27.62% and that of Grade Seven students was 14.23% at the time of examination. The prevalence of dental caries for primary dentition among Grade One students in Saskatchewan, 2013-2014, was 60.69% (See Table 8B). There were 27.95% Grade One students with at least one decayed primary tooth while 4.19% students had at least one or more decayed permanent tooth. The prevalence of dental caries in permanent dentition among Grade Seven students was 43.28% (Table 11B). Also, 3.95% Grade Seven students had at least one decayed primary tooth while 12.79% students had at least one or more decayed permanent tooth.

The Combination Index was calculated from deft/DMFT to assign every student with a Dental Health status. The Database automatically calculated the status from the information. Grade One students were shown to have caries experience with 15.97% partial caries care (PCC) and 13.54% students had no evidence of care (NEC). Grade Seven students were shown to have caries experience with 9.26% partial caries care (PCC) and 6.44% students had no evidence of care (NEC).

Depending on the urgency of their dental health needs, students were scored for treatment priority. Of the Grade One Students, 72.33% did not require any immediate treatment. However, the percentage of unmet dental needs among Grade One students of Saskatchewan is 27.67% while that of Grade Seven is 14.02%. Optional information was also collected about dental insurance, history of dental visit from the students.

Regular dentist visits are important for maintaining good health. Based on the 2013-2014 screening results, nearly 80.2% of children visited the dentist in the past year. However, the reason for the dental visit was not recorded, if it was for preventive, diagnostic or treatment.

The Dental Health Trends in Saskatchewan outlines the decline in oral health of Saskatchewan students as measured from factors like average deft+DMFT, current cavities and caries free. The percentage Grade One students with cavities was highest (29.71%) and cavity free (39.2%) was found to be lowest in 2013-2014 as compared to previous year dental screenings since 1993-1994. However, Grade One students have shown improvement in fewer number of students presenting with pain and those who have no evidence of care from the previous dental screenings. On the other hand, Grade Seven students showed improvement only in the case of fewer students who presented with pain while depicting decline in other factors when compared to 2008-2009.

Public health dental clinics must be utilized to full potential to meet the needs of children in Saskatchewan. There is a need to recognize and understand barriers to accessing preventive dental care that originate on the basis of location, community water fluoridation, dental insurance and attending Hutterite schools. 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 and adults in Saskatchewan.

APPENDIX

Appendix-1

Dental Screening Program Definitions 2013-2014.

deft/DMFT:

- index used to measure disease experience. 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.

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).

Broken/Fractured/Lost:

- a tooth that has been restored where the restoration (i.e.: crown, amalgam) has failed and there is **no obvious decay**.

Restored/Fractured:

- fracture of the crown involving the dentin. The tooth is restored.

Non-restored/Fractured:

- fracture of the crown involving the dentin. The tooth is not restored or the restoration has been lost.

Appendix-2

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.

Notes:

- **Supernumerary Teeth:**
 - supernumerary teeth are not counted. You must decide which tooth is the legitimate occupant of the space.
- **Overretained:**
 - where both primary and permanent teeth occupy the same tooth space only the permanent tooth is considered.
- **Non-vital Teeth:**
 - are to be scored as if they are vital.

Appendix-3

Priority 1:

- pain and/or infection present
- **urgent**, requires immediate attention

Priority 2:

- ECC or S-ECC
- visible decay in 1-4 quadrants
- treatment required as soon as possible

Priority 3:

- no visible decay

Note: Suspicious areas recorded 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 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:

$d\text{eft}/DMFT = 0$

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-4

List of Hutterite Schools

School Name	School Name
Abbey Hutterite School	Hillsvale Colony School
Arm River Hutterite School	Hulbert Hutterite School
Baildon Colony Hutterite Elementary School	Lajord Colony School
Barr Colony School	Lakeside Colony School
Belle Plain Hutterite School	Leask Colony School
Bone Creek Hutterite	Lost River Hutterite Colony School
Box Elder Hutterite School	McMahon Colony School
Butte Hutterite School	Norfolk Hutterite School
Capeland Hutterite School	Pelletier Hill Hutterian School
Carmichael Hutterite School	Pennant Colony School
Clear Springs Hutterite School	Riverbend Hutterite Colony School
Clelland Hutterite Colony School	Riverview Hutterite School
Creston Bench Hutterian School	Rose Valley Hutterian
Cypress Hutterite School	Ruskin Hutterian School
Downie Lake Hutterite School	Sand Lake Hutterite Elementary
Earview Hutterian School	Sask. Central Hutterite School
East Fairwell Hutterian School	Spring Creek Hutterite School
Estuary Hutterite School	Spring Lake Hutterite School
Friesen Hutterite School	Webb Hutterite School
Haven Hutterite School	Wheatland Hutterite School
Hillcrest Hutterite School	Wymark Hutterite Colony

Appendix-5

List of Community Schools in Saskatchewan

Community Schools	
Albert	McDermid
Argyle	Mayfair Community School
Balcarres	McKitrick
Beauval - Valleyview	Minahik Waskahigan – Elementary
Big River Community Public High School	Minahik Waskahigan - High
Buffalo Narrow – Twin Lakes	Pleasant Hill Community School
Cando Community School	PreCam School Elementary
Canwood Community Public School	Prince Arthur Community School
Caroline Robins Community School	Princess Alexandra Community School
Caswell Community School	Punnichy Elem
Centennial	Queen Mary Community Public School
Cole Bay – Lake view	Riverside Community Public School
Cole Bay	Rosemont
Confederation Park Community School	Sacred Heart
Connaught	Sandy Bay –Hector Thiboutot Community School
Coronation Park	St. Frances
Creighton	St. Georges Hill Community School
Dr. Brass	St. Goretta Community School
Elsie Mironuck	St. John Community School
Empire Community School	St. John Community School
Father Gorman	St. Louis Community Public School
Fort Qu’Appelle Elem	St. Mark Community School
Glen Elm	St. Mary Community School
Gordon Denny	St. Mary Community School
Gordon Denny School Community School	St. Mary’s
Gordon Denny School Community School	St. Michael Community School
Green Lake – St. PASCAL	St. Michael Community School
Green Lake	St. Augustine
Grenfell Elem	St. Catherine
Grenfell High	St. Francis
Holy Rosary	St. Michael
Ile-a-la-Crosse	Stobart Community School (Duck Lake)
Imperial	Thompson
Jack Kemp	Turtleford School
Jans Bay	Twin Lakes Valley View Ducharme & Highschool
Jans Bay	Victoria School
Jonas Sampson Jr High	Vincent Massey Community Public School
Jubilee Elementary	Vincent Massey Community School
King George Community Public School	W.P. Bate Community School
King George Community School	Wascana

Kitchener	Westmount Community School
Lakeview Elementary	Westview Community Public School
LaLoche – Dene High Community School	Weyakwin - Kiskahikan
LaLoche – Ducharme School Community School	WFA Turgeon Catholic Community School
Leask Community Public School	

Appendix-6: Dental Screening Information Letter'2013-2014



Dental Screening Program Grade 1 and 7 Students

Dear Parent or Guardian,

A licensed oral health professional will provide a dental screening for your child on _____.

The dental screening will include the use of a small flashlight and tongue depressor or a sterilized mouth mirror. After the dental screening has been done, a letter will be sent home with your child. This screening does not replace regular checkups at your dental office.

The information collected from the screening will be used to plan and develop preventive program services based on the needs of your community.

Your child will receive a dental screening unless you contact: _____.

Your child's Personal Health Services number is required for statistical purposes.

Complete the bottom portion of this letter and return to the school by: _____.

Dental Screening Program Enter your child's Personal Health Services Number here		Saskatchewan Health Services <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		
Health Region: _____				
School: _____			Grade: _____	
Child's Name: _____ (Last) (First)				
Birthdate: _____/_____/_____ (day) (month) (year)		Male: <input type="checkbox"/> Female: <input type="checkbox"/>		
Address: _____ Street Town/City Postal Code				
Home Phone: _____		Cell phone: _____		Email: _____
Answer the following questions (optional):				
1. Does your child have a family dentist that they see regularly?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure		
2. Has your child been to the dentist in the past year?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure		
3. Does your child have dental insurance/coverage?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure		
If Yes to question 3, what type of insurance does your child have?				
<input type="checkbox"/> First Nations Inuit Branch (Non-insured Health Benefits Program)				
<input type="checkbox"/> Family Health Benefits/Supplementary Health				
<input type="checkbox"/> Private Insurance (example: insurance through work plan)				
4. Has your child immigrated to Canada in the past 2 years?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure		
If yes to question 4, from what country? _____				


Office Use Only

17	16	15	14	13	12	11	21	22	23	24	25	26	27
		55	54	53	52	51	61	62	63	64	65		
		85	84	83	82	81	71	72	73	74	75		
47	46	45	44	43	42	41	31	32	33	34	35	36	37

- | | |
|---|---|
| <input type="checkbox"/> Existing Pain | <input type="checkbox"/> Tobacco (smoke/chew) |
| <input type="checkbox"/> Infection | <input type="checkbox"/> Non-Restored fractures |
| <input type="checkbox"/> Caries requiring tx | <input type="checkbox"/> Broken/ lost/ redecaied fillings |
| <input type="checkbox"/> Stain/material alba/ supra cal | <input type="checkbox"/> Malocclusion |
| <input type="checkbox"/> Gingivitis | <input type="checkbox"/> S-EDTD |
| <input type="checkbox"/> ECTD | |

Comments/Recommendations/Observations:

Appendix-7: Dental Screening Results Letter'2013-2014 (Ministry of Health, Govt. of SK)


Saskatchewan
Ministry of
Health

Dental Health

Dental Screening Results

Dear Parent/Guardian: Date: _____

Today I did a dental screening for _____ at _____
(Name of Site)

If you have questions, call _____ at _____
(Oral Health Professional) (Phone Number)

(Address)

- No obvious cavities seen. If your dentist takes x-rays, hidden cavities between the teeth may be seen.
- Pain and/or infection is present. Your child needs to see a dentist **urgently**.
- Cavity/cavities on _____side(s) of your child's mouth. Your child needs to see a dentist **soon**.
- Cavity/cavities seen on your child's front **baby** teeth. These teeth will fall out around age 6, but if there is pain or infection see a dentist immediately.
- Broken or lost filling, or lost crown. Your child needs to see a dentist **soon**.
- Suspicious areas on your child's teeth may be cavities. Your child needs to see a dentist.
- Space maintainer/appliance/retainer requires attention. Your child needs to see a dentist.

- Dental sealants are needed, if not already done. Dental sealants are plastic coatings that are applied to the chewing surfaces of permanent molars to prevent cavities. See a dentist if your child is not receiving dental sealants at school.
- Early signs of gum disease (gingivitis/bleeding gums). Your child needs to see a dentist.
- Crooked or crowded teeth and/or poor bite. You may already know about this. Your child needs to see a dentist.
- Tartar or stains on the teeth. Your child needs to see a dentist.
- Daily flossing and brushing: Brush two times a day with a fluoride toothpaste and floss once a day. (see back)
- Fluoride varnish application provided today.**

Comments: _____

Note to Parents: If your child needs dental treatment, take this letter with you to the dental office. The dental office will return the letter to the oral health professional named above. The follow-up for your child will then be complete and you will help your child's smile last a lifetime!

September 2012 DH 003	Population Health 3475 Albert St Regina, SK S4S 6X6	1-800-667-7766 (306) 787-0146	www.health.gov.sk.ca HealthLine 1-877-800-0002 www.healthlineonline.ca
--------------------------	---	----------------------------------	--

Dental Health

If your child needs dental treatment you can:

- Visit your family dentist, at your own expense.
 - If you do not have a family dentist, you can visit a dentist in your area. You can call the College of Dental Surgeons of Saskatchewan at **(306) 244-5072** for more information about dentists in your area.
- Dental students at the following locations can provide treatment at reduced rates:
 - **Saskatchewan Institute of Applied Science & Technology**
Dental Clinic, Regina
Tel: **(306) 775-7531**
 - **University of Saskatchewan**
College of Dentistry Dental Clinic, Saskatoon
Tel: **(306) 966-5056**
 - **Saskatoon West Dental – Westside Community Clinic**
College of Dentistry
1528 20th Street West, Saskatoon
Tel: **(306) 384-6363**

Dental Coverage

- **Supplementary Health Program:** Children automatically qualify for full benefits. The initial dental coverage for adults is limited to pain relief and controlling infection. If you are an employable adult receiving Supplementary Health benefits, you and your spouse are eligible for emergency dental benefits **only** for the first six months. After six months, you are eligible for full dental benefits. For more information call **1-888-488-6385**.
- **Family Health Benefits Program:** Dental coverage is provided for children 0-17. The program is available to families that receive the Saskatchewan Child Benefit, Employment Supplement, Provincial Training Allowance, or Social Services Allowance. For more information call **1-888-488-6385**.
- **Non-insured Health Benefits Program:** Health Canada provides eligible First Nations and Inuit people with a range of dental care when they are **not** covered through private insurance plans or provincial/territorial health programs. For more information call **1-800-267-1245**.
- **Private Insurance:** You may have dental coverage through your employment benefit plan. Call your employer for more information.
- **Personal Insurance:** You can purchase other dental insurance. Ask your dental office for more information.

Brush twice a day – In the morning and at bedtime – Children need help brushing until about the age of 8.

Outside



Angle brush, place half on teeth, half on gums, vibrate side to side

Inside



Brush the inside surfaces of the front and the back teeth

Chewing surfaces



Vibrate back and forth

Floss once a day - Children younger than 9 will need a parent's help.



Wrap floss around middle fingers (about 1/2 meter or 18 inches)



Gently guide floss between teeth



Move floss up and down, sliding under gumline, on both adjacent teeth

Appendix - 8

Community Water Fluoridation (CWF) 2010	
Aberdeen	Luseland
Allan	Martensville
Annahaim	McTaggart
Assiniboia	Meadow Lake
Baildon Colony	Melfort
Balgonie	Melville
Beatty	Milden Colony
Bradwell	Moose Jaw
Bruno	Moosomin
Canora	Muenster
Carnduff	Osler
Clavet	Outlook
Corman Park	Quill Lake
Cudworth	RM of Kinistino
Dalmeny RM	Rosetown
Dinsmore Colony	Saskatoon
Domremy	St. Isidore de Bellevue
Elstow	St. Louis
Eston	Star City
Gronlid	Star City Colony
Gull Lake	Swift Current
Hague	Tisdale
Humbolt	Wadena
Indian Head	Wakaw
Kindersley	Warman
Kinistino	Watson
La Ronge	Weldon
Lake Lenore	Weyburn
Langenburg	Wynyard

References

1. Federal, Provincial and Territorial Dental Working Group. (2005). *Canadian Oral Health Strategy*. Montreal. Retrieved from <http://www.fptdwg.ca/assets/PDF/Canadian%20Oral%20Health%20Strategy%20-%20Final.pdf>
2. Federal, Provincial and Territorial Dental Working Group. (2012). *Reducing Dental Disease*. Retrieved from <http://www.caphd.ca/sites/default/files/FrameworkOctober15FINALEnglish.pdf>
3. Canadian Dental Association. (2014). *About Us: Canadian Dental Association*. Retrieved from Canadian Dental Association Web site: https://www.cda-adc.ca/en/oral_health/index.asp
4. World Health Organization. (2014). *About Us: World Health Organization*. Retrieved from World Health Organization Web site: http://www.who.int/topics/oral_health/en/
5. World Health Organization. (2012, April). *About Us: World Health Organization*. Retrieved from World Health Organization Web site: <http://www.who.int/mediacentre/factsheets/fs318/en/>
6. Centers for Disease Control and Prevention. (2013, July 10). *About Us: Centers for Disease Control and Prevention*. Retrieved from Centers for Disease Control and Prevention Web site: http://www.cdc.gov/oralhealth/publications/factsheets/dental_caries.htm
7. American Academy of Pediatric Dentistry. (2008). Policy on Early Childhood Caries (ECC): Classifications, Consequences, and Preventive Strategies. *Oral Health Policies*, 32(6), 41-44. United States of America. Retrieved from http://www.aapd.org/assets/1/7/P_ECCClassifications.pdf
8. World Health Organization. (2001). *About Us: World Health Organization*. Retrieved from World Health Organization Web site: http://www.who.int/water_sanitation_health/oralhealth/en/index2.html