



# **BC Dental Survey of Kindergarten Children 2012-2013**

**A Provincial and Regional Analysis**

**Ministry of Health  
Population and Public Health  
Healthy Development and Women's Health Directorate  
May 2014**

## Executive Summary

In the 2012-2013 school year, 40,323 children participated in the provincial kindergarten dental survey (91.8% of all those enrolled). This survey was administered in public schools, independent schools, and participating First Nations schools. Within these schools, a total of 3427 children who participated in the survey self-identified as Aboriginal, representing 89.7% of enrolled Aboriginal children.

### Across BC in 2012-2013:

- **67.3%** of kindergarten children were caries free<sup>1</sup> (no visible decay or broken enamel);
- **18.1%** of kindergarten children had treated caries (no visible decay but existing restorations); and
- **14.6%** of kindergarten children had evidence of visible decay.

### Since 2006-07:

- the percentage of kindergarten children who are caries free has increased by 6.2%; and
- the percentage of kindergarten children who have visible decay has decreased by 2.7%.

From 2006-2007 to 2012-2013, the oral health of kindergarten children has improved across the province. This trend points to the success of early intervention programs aimed at improving the oral health of young children. To further support early prevention of dental caries, universal and enhanced dental public health service statements were developed in 2013 to outline the services that should be offered during the prenatal period and from birth to age six years (see Appendix A). These service statements reflect the concept of proportionate universality: some services are provided universally, and others at a scale and intensity appropriate to need.

While there has been an overall improvement in the oral health of children surveyed in BC, there are significant regional disparities. The Northwest has the highest percentage of visible decay (23.5%), followed by Richmond (21.5%), and Fraser South (19.7%). These Health Service Delivery Areas are well above the provincial average for visible decay (14.6%).

In addition to regional disparities in children's oral health, there is a significant gap between the oral health of Aboriginal and non-Aboriginal children:

- the percentage of Aboriginal children who were caries free was **26.2%** lower than that of non-Aboriginal children; and
- the percentage of Aboriginal children with visible decay was **11.1%** higher than that of non-Aboriginal children.

Although there is an ongoing disparity between the oral health of Aboriginal and non-Aboriginal children, the oral health of Aboriginal children has improved since 2009-2010:

- The percentage of Aboriginal children who are caries free has increased by 4.0%
- The percentage of Aboriginal children with visible decay has decreased by 3.7%

Work is underway to address this disparity in oral health for Aboriginal children. An oral health strategy has been developed to guide the delivery of collaborative public health and community services that are focused on improving the oral health of First Nations and Aboriginal children aged 0-18 and their families in BC. *Healthy Smiles for Life: BC's First Nations*

*and Aboriginal Oral Health Strategy* provides a comprehensive, evidence-based and multi-level set of recommendations that will inform public health and community planning, policy development and program implementation.

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## Introduction

In 1990, a standardized public health dental survey was implemented in British Columbia to assess the dental health of kindergarten aged children. This dental survey is conducted by public health dental professionals (registered dental hygienists and certified dental assistants) in school settings. Public health dental staffs who have been evaluated in screening competencies and have achieved calibration perform a visual inspection using a pen light and tongue depressor to assess each child's dental health.

During the survey, kindergarten children are assessed for:

- no evidence of visible dental decay/no broken enamel (caries-free<sup>1</sup>)
- no evidence of visible decay but evidence of existing restorations;
- evidence of pain or infection at the time of screening;
- evidence of visible dental decay (caries) in one or more teeth; and
- number of quadrants affected.

Oral health is a fundamental component of overall health and well-being. Early childhood caries is preventable. Caries is an infectious and transmissible disease which children often acquire through a primary caregiver before age three. Prevention strategies are especially important in the early years to promote healthy development and establish a foundation for dental health throughout one's life.

In March 2005, government announced a commitment to improve early childhood development. The dental health initiative was one part of an integrated cross-ministry strategy for addressing dental, hearing, and vision concerns in the early childhood years (birth to five years of age). Health Authorities received increased funding to enhance early childhood dental health programs. The goal was to provide programs that would offer the best opportunity to improve the dental health and well-being of infants and children. The Early Childhood Dental Health initiative included:

1. Provision of increased public health dental health services through registered dental hygienists and certified dental assistants, allowing health authorities to increase prevention of early childhood caries and improve identification of higher risk, more vulnerable segments of the population
2. Increased access to dental treatment, especially for low-income families
3. Public awareness and education programs aimed at reducing early childhood caries

Health authority early intervention dental programs include: provision of information about oral health care and oral hygiene practices to families and care providers; screening for caries risk behaviours; application of fluoride varnish for children identified at risk of caries; promotion of healthy eating as it relates to dental health; and applying a dental health lens to policy development (e.g. dental health messaging is considered during the development of healthy food guidelines, sugar sweetened beverage policies, school food sales guidelines, etc.). In addition, dental public health staffs work with community organizations, schools, and pregnancy outreach programs to support vulnerable populations and improve oral health.

Health authority dental staffs have continued to monitor the impact of early intervention programs on dental health through an ongoing dental survey of kindergarten children every three years. The survey does not replace a regular dental exam. Rather, its purpose is to determine the prevalence of obvious or visible dental decay, to identify trends in dental health, and where possible, to obtain a measure of the effectiveness of early childhood dental public health initiatives. In 2012-2013, this province wide dental survey was conducted by health authority public health dental staff to assess the dental health of kindergarten children.

This survey was administered in public schools, independent schools, and participating First Nations schools. In the 2012-2013 school year, 40,323 children participated in the provincial dental survey (91.8% of all those enrolled). Within these schools, a total of 3427 children who participated in the survey self-identified as Aboriginal, representing 89.7% of enrolled Aboriginal children.

This report provides compares the 2012-2013 survey results to 2009-2010 and 2006-2007 survey results. The rationale for limiting comparisons to these screening years is that for this time period there was greater consistency of screening practices and data recording practices.

This report includes some findings specific to Aboriginal children; however, more detailed findings for this group are presented in the report titled *BC Dental Survey of First Nations and Aboriginal Kindergarten Children 2012-2013*.

## BC Public Health Dental Screening Criteria and Definitions

Caries Free	No evidence of visible decay (no broken enamel) and no existing restorations
Treated Caries	No evidence of visible decay but evidence of existing restorations
Visible Decay	Evidence of obvious decay in one or more teeth
Decay in Quadrants	Evidence of decay in one or more teeth in 1,2,3, or 4 quadrants
Urgent referrals	Children who were referred for further treatment due to the urgency of their conditions
Non-urgent referrals	Children who did not have urgent conditions but were referred for further treatment

### Target Population

The population for this survey is kindergarten children between the ages of 4 and 6 across the province.

## Provincial Analysis

In the 2012-2013 school year, 40,323 children participated in the provincial dental survey (91.8% of all those enrolled). Table 1 includes the number of children screened in 2009-2010 and 2012-2013 for each Health Authority.

**Table 1. Number and percentage of children screened by Health Authority<sup>2</sup>**

HA	2009-2010			2012-2013		
	Enrolled	Screened	Percentage Screened	Enrolled	Screened	Percentage Screened
Fraser	15,060	13,660	90.7	17,812	16,661	93.5
Interior	6,146	5,574	90.7	6,946	6,212	89.4
Island	5,922	5,320	89.8	6,610	5,839	88.3
Northern	3,135	3,002	95.8	3,504	3,332	95.1
Vancouver Coastal	8,616	7,864	91.3	9,067	8,279	91.3
<b>BC</b>	<b>38,879</b>	<b>35,420</b>	<b>91.1</b>	<b>43,939</b>	<b>40,323</b>	<b>91.8</b>

Across BC in 2012-2013

- **67.3%** of kindergarten children were caries free;
- **18.1%** of kindergarten children had treated caries (no visible decay but existing restorations);
- **14.6%** of kindergarten children had evidence of visible decay;
- **85.4%** of children had no evidence of decay at the time of the survey.

**Figure 1. Provincial dental survey results, 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

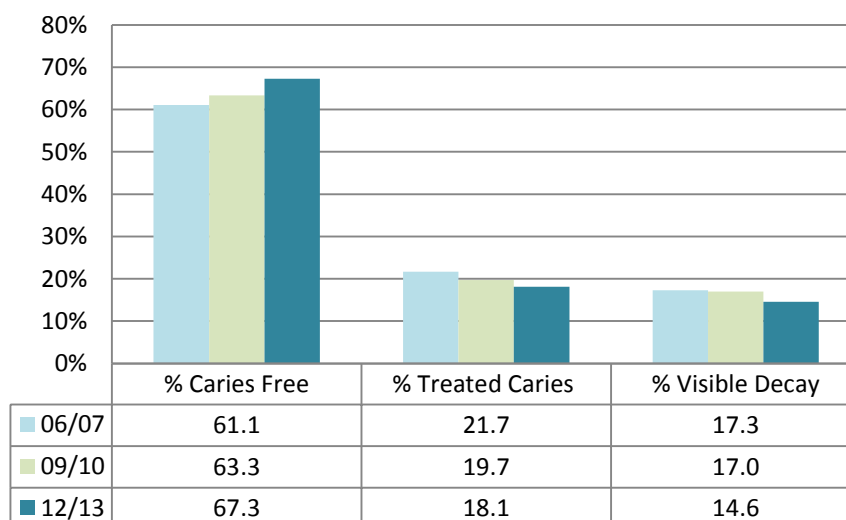




Figure 1 compares the provincial survey results across three survey years. Since 2006-07:

- the percentage of kindergarten children who are caries free has increased by 6.2%; and
- the percentage of kindergarten children who have visible decay has decreased by 2.7%.

In 2012-2013, 3427 children self-identified as Aboriginal participated in the survey (89.7% of Aboriginal children enrolled in all participating schools). Figure 2 compares the dental survey results for Aboriginal children to those of non-Aboriginal children.

**Figure 2. Provincial dental survey results, Aboriginal and non-Aboriginal, 2012-2013<sup>2</sup>**

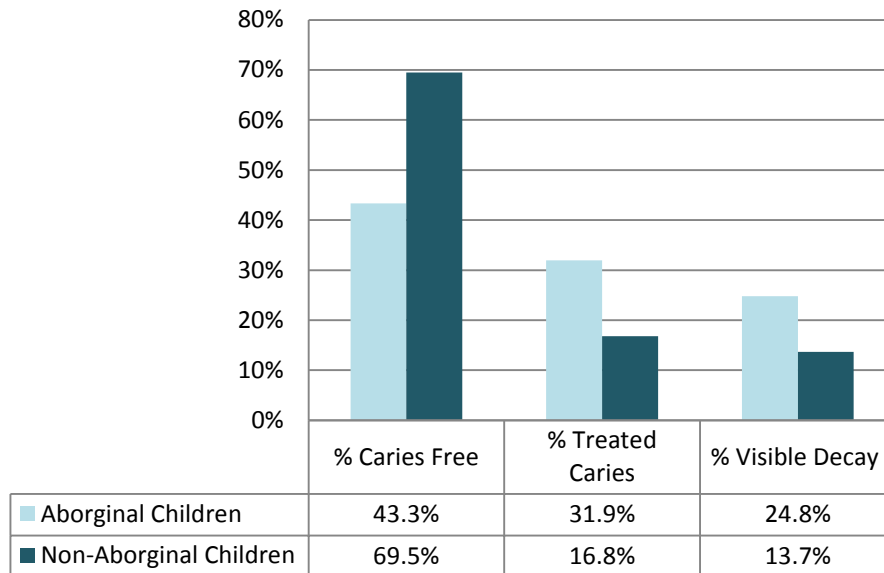


Figure 2 demonstrates the disparity in oral health between Aboriginal children and non-Aboriginal children:

- the percentage of Aboriginal children who were caries free was **26.2%** lower than that of non-Aboriginal children; and
- the percentage of Aboriginal children with visible decay was **11.1%** higher than that of non-Aboriginal children.

**Figure 3. Aboriginal provincial dental survey results, 2009-2010 and 2012-2013<sup>2</sup>**

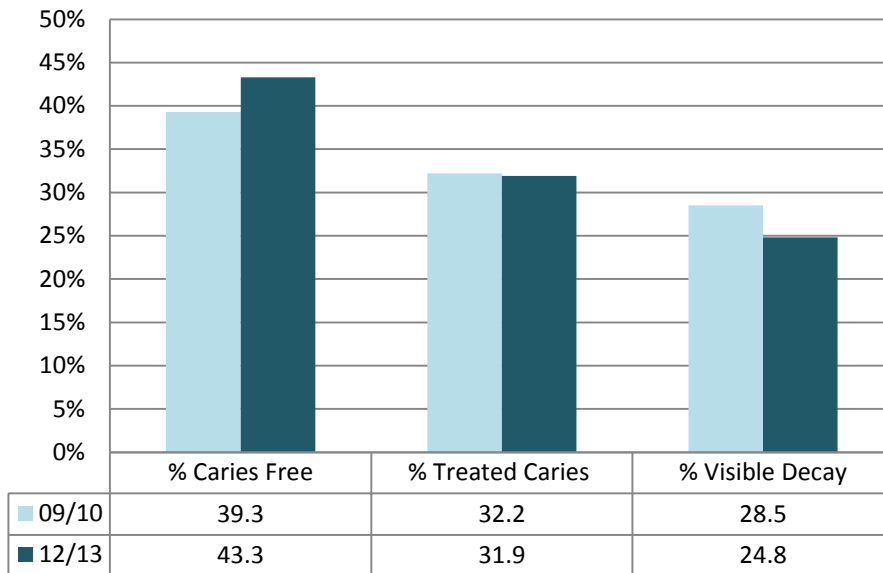


Figure 3 shows that oral health has improved for Aboriginal children since 2009-2010:

- The percentage of Aboriginal children who are caries free has increased by 4.0%
- The percentage of Aboriginal children with visible decay has decreased by 3.7%

More detailed findings for Aboriginal children are presented in the report titled *BC Dental Survey of Aboriginal Kindergarten Children 2012-2013: A Provincial and First Nations Schools Analysis*.

**Figure 4. Dental survey results by Health Authority, 2012-2013<sup>2</sup>**

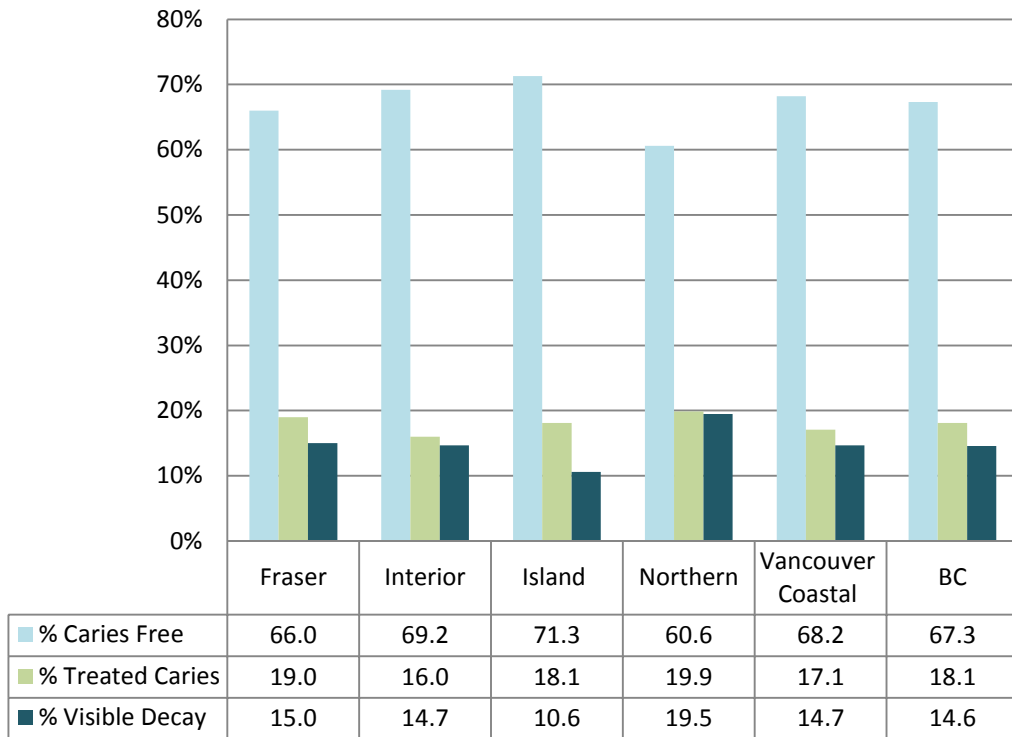


Figure 4 compares the dental survey results by Health Authority. Island Health had the highest percentage of children who were caries free (71.3%), and the lowest percentage of children who had visible decay (10.6%). Northern Health had the lowest percentage of children who were caries free (60.6%), and the highest percentage of children with visible decay (19.5%).

**Figure 5. Percentage of caries free kindergarten children by Health Authority, 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

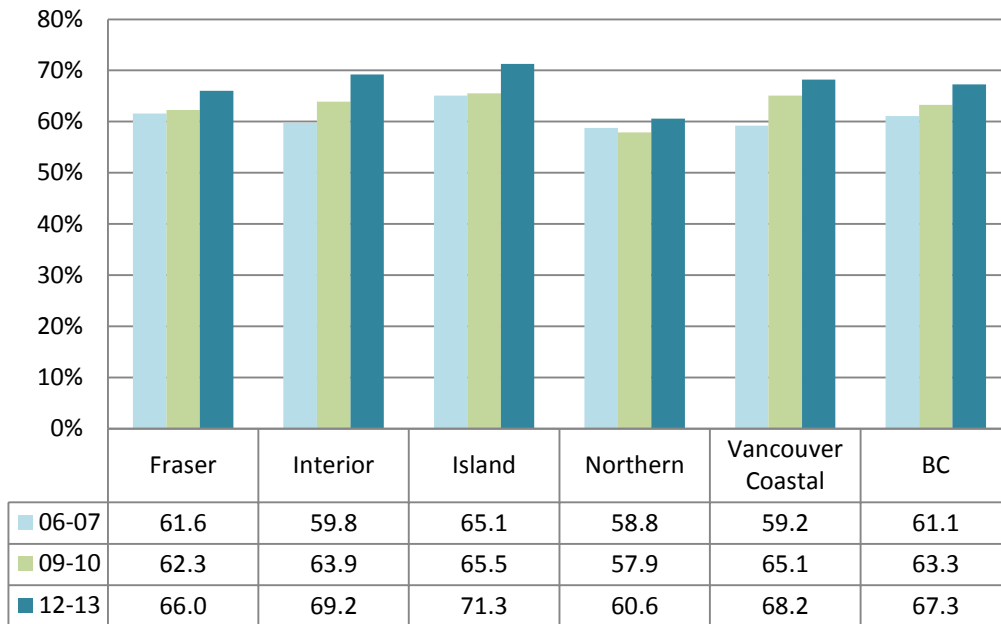


Figure 5 compares the percentage of caries free kindergarten children in each health authority across three survey years. Since 2006-2007, the percentage of caries free children has increased in all five health authorities.

**Figure 6. Percentage of kindergarten children with treated caries by Health Authority, 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

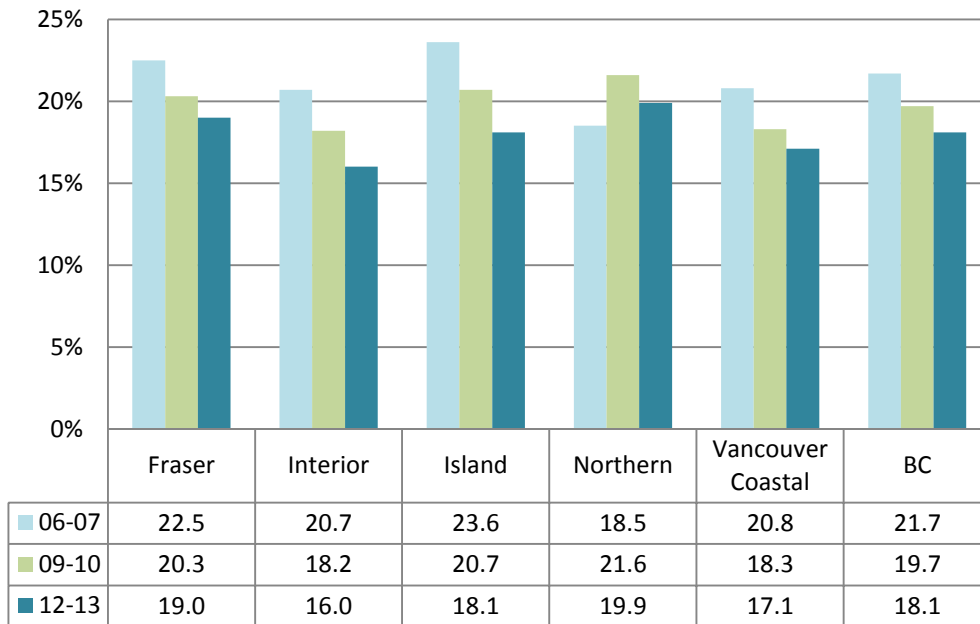


Figure 6 compares percentage of kindergarten children with treated caries in each health authority across three survey years. Since 2006-2007, the percentage of kindergarten children who have treated caries has decreased in all Health Authorities except Northern Health. The reduction in treated caries corresponds with improved rates for caries free children and reduction in rates of visible decay. However some treated caries may be missed due to tooth coloured fillings that may be difficult to identify using a pen light. Decay between teeth may also be missed.

**Figure 7. Percentage of kindergarten children with visible decay by Health Authority, 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

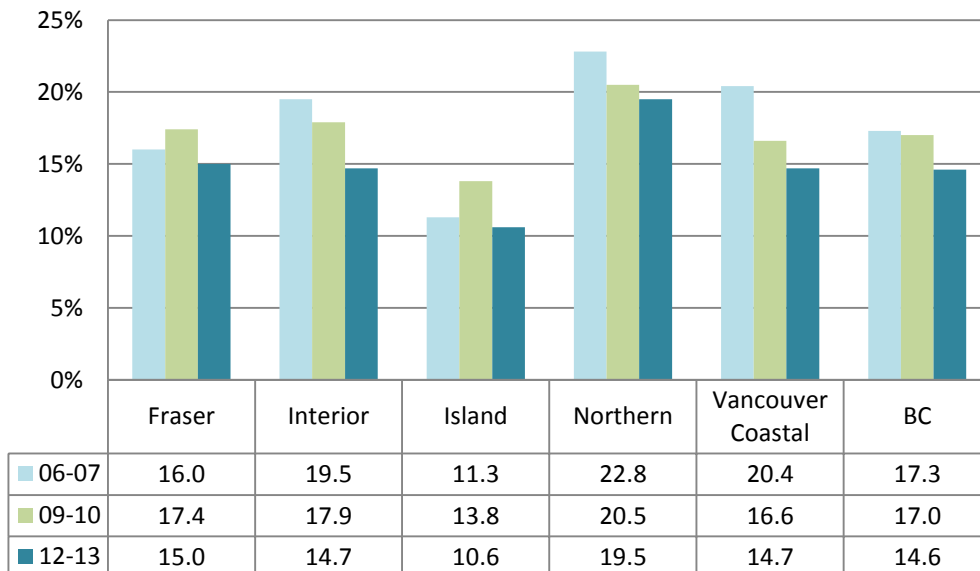
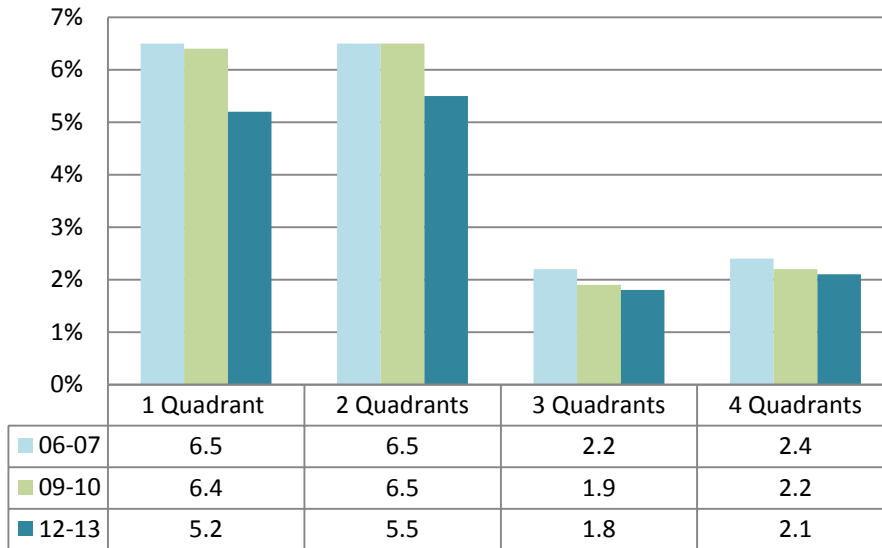


Figure 7 compares percentage of kindergarten children with visible decay in each health authority across three survey years. Since 2006-2007, the percentage of kindergarten children with visible decay has decreased in all five health authorities.

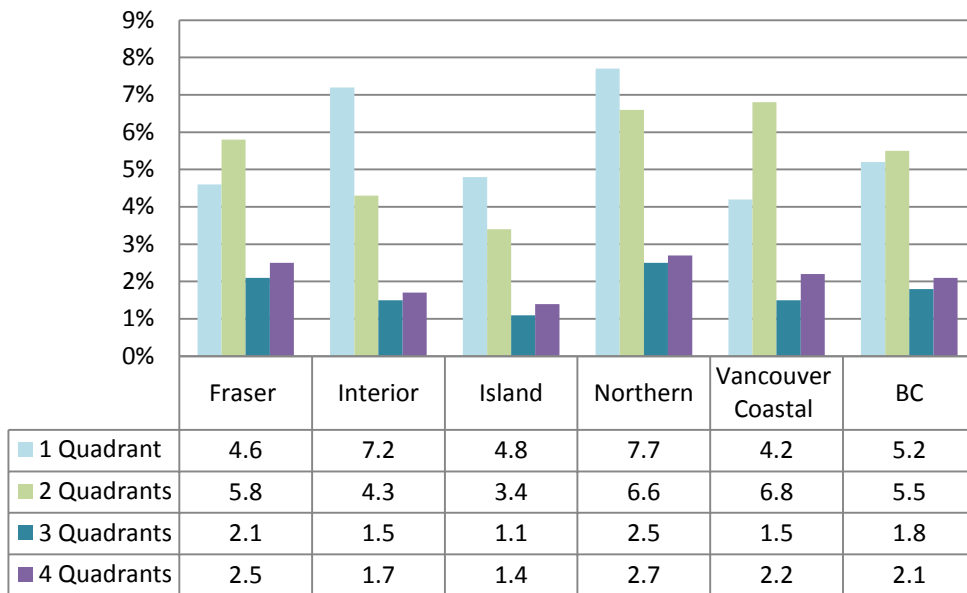
**Figure 8. Provincial percentage of kindergarten children with visible decay in 1, 2, 3, or 4 quadrants, 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**



At the time of the survey, the number of quadrants in the mouth affected by visible decay was determined. Figure 8 compares the provincial percentage of visible decay within one, two, three, three, or four quadrants across three screening years. The provincial percentage of visible decay has decreased in all four quadrants since 2006-07.

Figure 9 includes the percentage of visible decay by number of quadrant for each Health Authority in 2012-2013. Northern Health had the highest percentage of decay in 1, 3, and 4 quadrants (7.7%, 2.5%, and 2.7%) and Vancouver Coastal had the highest percentage of decay in 2 quadrants (6.8%). The number of quadrants affected with visible decay may reflect the number of dental appointments needed to provide treatment. However, the number of quadrants does not indicate the number of teeth in each quadrant affected by decay, nor does it indicate the seriousness of decay.

**Figure 9. Percentage of kindergarten children with visible decay in 1, 2, 3, or 4 quadrants, by Health Authority, 2012-2013<sup>2</sup>**



Children who did not have urgent conditions but were referred for further treatment were categorized as non-urgent. Across BC, 12.9% of kindergarten children were referred for non-urgent conditions. Island Health had the lowest percentage of non-urgent referrals (9.3%), while Northern Health had the highest (16.5%).

Across BC, 2.1% of kindergarten children were referred for urgent conditions (e.g. pain, swelling and/or visible infection present). Vancouver Coastal Health had the lowest percentage of urgent referrals (1.7%), while Northern Health had the highest (3.7%).

**Table 2. Percentage of Non-Urgent and Urgent Referrals by Health Authority, 2012-2013<sup>2</sup>**

HA	Non-Urgent	Urgent
Fraser	13.3	1.9
Interior	12.7	2.7
Island	9.3	1.9
Northern	16.5	3.7
Vancouver Coastal	13.5	1.7
BC	12.9	2.1

## Regional Analysis

**Table 3. Percentage caries free, treated caries, and visible decay, 2009-2010 and 2012-2013, by Health Service Delivery Area<sup>2</sup>**

		2009-2010			2012-2013		
HA	HSDA	Caries Free	Treated Caries	Visible Decay	Caries Free	Treated Caries	Visible Decay
Fraser	Fraser East	63.3	23.2	13.5	68.9	22.0	9.1
	Fraser North	65.0	21.1	13.9	68.5	19.9	11.6
	Fraser South	59.8	18.6	21.6	63.1	17.3	19.7
<b>Total</b>		<b>62.3</b>	<b>20.3</b>	<b>17.4</b>	<b>66.0</b>	<b>19.0</b>	<b>15.0</b>
Interior (for 09/10 East Kootenay and Kootenay Boundary are combined)	East Kootenay	67.7	16.1	16.1	72.3	16.5	11.2
	Kootenay Boundary				68.5	13.7	17.7
	Okanagan	66.8	16.9	16.3	70.9	15.7	13.4
	Thompson Cariboo	56.8	21.8	21.4	65.3	17.2	17.5
<b>Total</b>		<b>63.9</b>	<b>18.2</b>	<b>17.9</b>	<b>69.2</b>	<b>16.0</b>	<b>14.7</b>
Island	Central Van Island	62.0	23.0	14.9	67.8	19.3	12.9
	North Van Island	62.3	22.8	14.7	69.4	18.6	12.0
	South Van Island	69.1	18.2	12.7	74.9	16.9	8.2
<b>Total</b>		<b>65.5</b>	<b>20.7</b>	<b>13.8</b>	<b>71.3</b>	<b>18.1</b>	<b>10.6</b>
Northern	Northeast	57.8	21.4	20.7	62.6	20.5	16.9
	Northern Interior	60.8	19.5	19.7	63.6	17.7	18.7
	Northwest	53.7	24.8	21.5	53.3	23.2	23.5
<b>Total</b>		<b>57.9</b>	<b>21.6</b>	<b>20.5</b>	<b>60.6</b>	<b>19.9</b>	<b>19.5</b>
Vancouver Coastal	North Shore Coast G	78.7	14.2	7.2	80.5	13.1	6.4
	Richmond	57.1	20.7	22.2	60.2	18.2	21.5
	Vancouver	59.9	19.8	20.3	64.2	18.9	17.0
<b>Total</b>		<b>65.1</b>	<b>18.3</b>	<b>16.6</b>	<b>68.2</b>	<b>17.1</b>	<b>14.7</b>
<b>BC</b>		<b>63.3</b>	<b>19.7</b>	<b>17.0</b>	<b>67.3</b>	<b>18.1</b>	<b>14.6</b>



Table 3 compares the percentage of caries free, treated caries, and visible decay in kindergarten children in 2009-2010 and 2012-2013 by Health Service Delivery Area (HSDA). Key findings for 2012-2013 include the following:

- Since 2009-2010 improvements in the percentage of caries free and visible decay were seen in all HSDAs except Northwest.
- North Shore Coast Garibaldi had the highest percentage of caries free (80.5%), followed by South Vancouver Island (74.9%) and East Kootenay (72.3%).
- Northwest had the highest percentage of visible decay (23.5%) and treated caries (23.2%).
- Other HAs with a percentage of visible decay higher than the provincial average included Richmond, Fraser South, Kootenay Boundary, Thompson Cariboo Shuswap, Northeast, Northern Interior, and Vancouver.

Table 4 shows the percentage of visible decay in 1, 2, 3, or 4 Quadrants by Health Service Delivery Area, 2012-2013. The number of quadrants affected with visible decay may reflect the number of dental appointments needed to provide treatment. However, the number of quadrants does not indicate the number of teeth in each quadrant affected by decay, nor does it indicate the seriousness of decay.

Key findings include the following:

- Northwest had the highest percentage of decay in one quadrant (8.9%) and three quadrants (3.6%)
- Richmond had the highest percentage of decay in two quadrants (10.1%)
- Fraser South had the highest percentage of decay in four quadrants (4.0%)

**Table 4. Percentage of visible decay in 1, 2, 3, or 4 quadrants by Health Service Delivery Area, 2012-201<sup>2</sup>**

HA	HSDA	1 Quadrant	2 Quadrants	3 Quadrants	4 Quadrants
<b>Fraser</b>	Fraser East	3.9	3.4	1.3	0.6
	Fraser North	3.6	5.2	1.4	1.4
	Fraser South	5.6	7.1	2.9	4.0
<b>Total</b>		<b>4.6</b>	<b>5.8</b>	<b>2.1</b>	<b>2.5</b>
<b>Interior</b>	East Kootenay	5.0	5.0	0.7	0.5
	Kootenay Boundary	8.8	4.0	2.5	2.5
	Okanagan	6.5	4.0	1.5	1.3
	Thompson Cariboo Shuswap	8.7	4.7	1.5	2.5
<b>Total</b>		<b>7.2</b>	<b>4.3</b>	<b>1.5</b>	<b>1.7</b>
<b>Island</b>	Central Vancouver Island	5.7	3.6	1.5	2.1
	North Vancouver Island	5.4	4.3	1.1	1.2
	South Vancouver Island	3.9	2.8	0.7	0.8
<b>Total</b>		<b>4.8</b>	<b>3.4</b>	<b>1.1</b>	<b>1.4</b>
<b>Northern</b>	Northeast	6.6	6.3	1.5	2.6
	Northern Interior	7.6	6.3	2.4	2.4
	Northwest	8.9	7.6	3.6	3.4
<b>Total</b>		<b>7.7</b>	<b>6.6</b>	<b>2.5</b>	<b>2.7</b>
<b>Vancouver Coastal</b>	North Shore Coast Garibaldi	2.4	2.6	0.5	0.9
	Richmond	5.3	10.1	2.8	3.3
	Vancouver	4.9	7.9	1.7	2.5
<b>Total</b>		<b>4.2</b>	<b>6.8</b>	<b>1.5</b>	<b>2.2</b>
<b>BC</b>		<b>5.2</b>	<b>5.5</b>	<b>1.8</b>	<b>2.1</b>

Table 5 shows the percentage of non-urgent and urgent referrals by HSDA for 2012-2013. Northwest had the highest percentage of non-urgent referrals (20.6%), followed by Richmond (20.4%) and Fraser South (17.9%). Northwest also had the highest percentage of urgent referrals (4.0%), followed by Northern Interior (3.9%) and Kootenay Boundary (3.7%).

**Table 5. Percentage of non-urgent and urgent referrals by Health Service Delivery Area, 2012-2013<sup>2</sup>**

HA	HSDA	Non-Urgent	Urgent
Fraser	Fraser East	8.3	0.9
	Fraser North	9.5	2.4
	Fraser South	17.9	1.9
Total		13.3	1.9
Interior	East Kootenay	9.6	1.6
	Kootenay Boundary	14.5	3.7
	Okanagan	11.2	3.1
	Thompson Cariboo Shuswap	15.7	2.1
Total		12.7	2.7
Island	Central Vancouver Island	11.0	2.4
	North Vancouver Island	11.6	1.3
	South Vancouver Island	7.0	1.7
Total		9.3	1.9
Northern	North East	14.0	2.9
	Northern Interior	15.6	3.9
	Northwest	20.6	4.0
Total		16.5	3.7
Vancouver Coastal	North Shore Coast Garibaldi	6.1	0.4
	Richmond	20.4	1.8
	Vancouver	15.1	2.4
Total		13.5	1.7
BC		12.9	2.1

## Fraser Health

**Figure 10. Percentage of kindergarten children caries free, with treated caries, and with visible decay, Fraser Health , 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

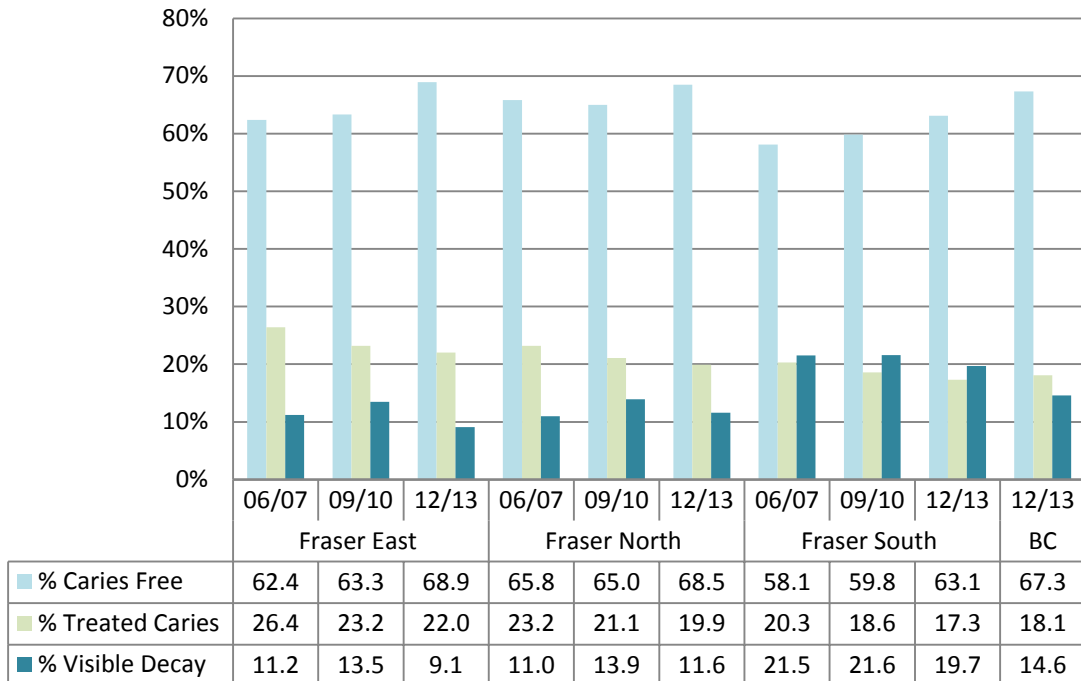


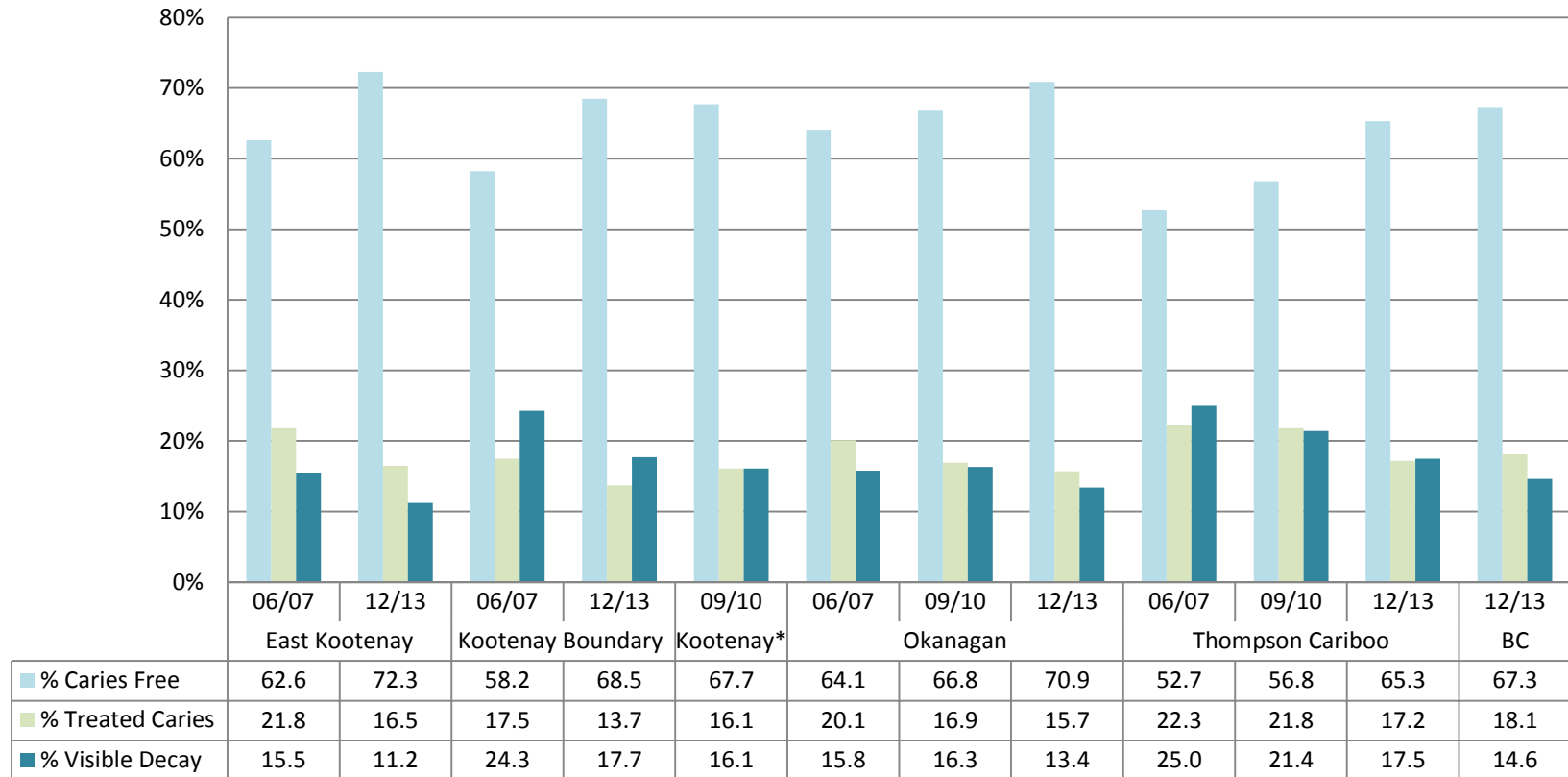
Figure 10 compares the percentage of caries free children, children with treated caries, and children with visible decay in Fraser Health across three screening years.

***The percentage of caries free children has increased in all three Fraser HSDAs; however, Fraser South remains below the provincial average for caries free.***

- Fraser East has the highest percentage of caries free (68.9%) and the lowest percentage of visible decay (9.1%).
- Fraser South has the highest percentage of children with visible decay (19.7%). Fraser South also has higher rates of decay in 1, 2, 3 and 4 quadrants and non-urgent referrals than the provincial average (see Tables 4 and 5).
- The rate of visible decay has decreased since 2009-2010 in all three HSDAs.

## Interior Health

Figure 11. Percentage of kindergarten children caries free, with treated caries, and with visible decay, Interior Health , 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>



\*For 2009-2010, results from East Kootenay and Kootenay Boundary were reported together as one HSDA (Kootenay).

Figure 11 compares the percentage of caries free children, children with treated caries, and children with visible decay in Interior Health across three screening years.

Key findings for 2012-2013 include the following:

***The percentage of caries free children has increased in all four Interior HSDAs; however, Thompson Cariboo Shuswap remains below the provincial average for caries free.***

- East Kootenay has the highest percentage of caries free (72.3%) and the lowest percentage of visible decay (11.2%).
- The rate of visible has decreased since 2006-2007 in all four HSDAs.
- Kootenay Boundary and Thompson Cariboo Shuswap have higher rates of decay in either 3 or 4 quadrants than the provincial average (see table 4).
- Kootenay Boundary and Thompson Cariboo Shuswap have higher rates of non-urgent referrals than the provincial average (see table 5).
- Kootenay Boundary and Okanagan have higher rates of urgent referrals than the provincial average (see table 5).

## Island Health

**Figure 12. Percentage of kindergarten children caries free, with treated caries, and with visible decay, Island Health , 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

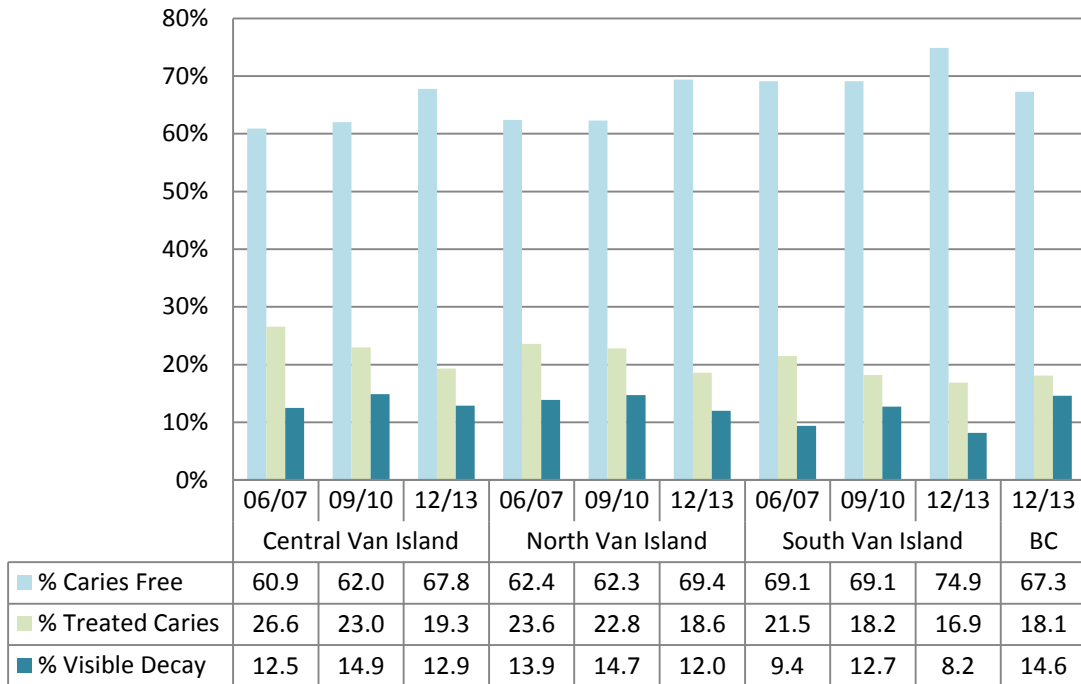


Figure 12 compares the percentage of caries free children, children with treated caries, and children with visible decay in Island Health across three screening years.

Key findings for 2012-2013 include the following:

***The percentage of caries free children has increased in all three Island HSDAs, and all are above the provincial average for caries free.***

- South Vancouver Island has the highest percentage of caries free (74.9%) and the lowest percentage of visible decay (8.2%).
- The rate of visible decay has decreased since 2006-2007 in North Vancouver Island and South Vancouver Island.
- Central Vancouver Island has higher rates of urgent referrals than the provincial average (see table 5).

## Northern Health

**Figure 13. Percentage of kindergarten children caries free, with treated caries, and with visible decay, Northern Health , 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

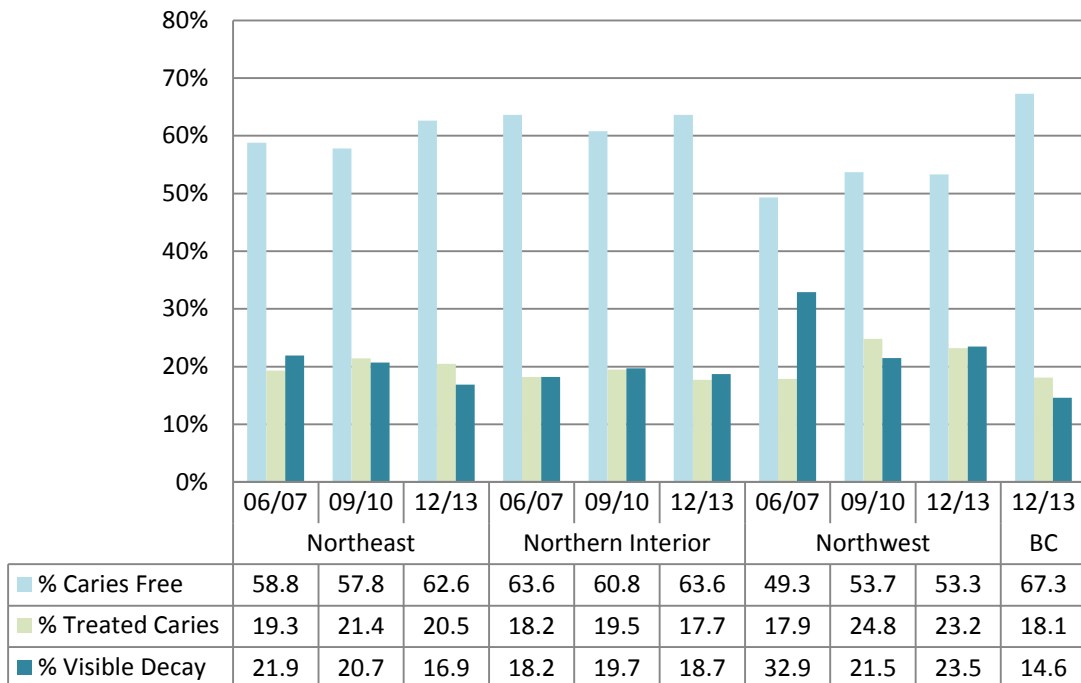


Figure 13 compares the percentage of caries free children, children with treated caries, and children with visible decay in Northern Health across three screening years.

Key findings for 2012-2013 include the following:

**All Northern HSDAs remain below the provincial average for percentage of caries free children.**

- Since 2006-2007, the percentage of children who are caries free has increased in Northeast and the Northwest, and remained stable in Northern Interior.
- The Northwest has the lowest percentage of caries free children (53.3%) and the highest rate of visible decay (23.5%).
- The rate of visible has decreased since 2006-2007 in Northeast and Northwest.
- All three Northern HAs have higher rates of decay in either 3 or 4 quadrants than the provincial average (see table 4).
- All three Northern HAs have higher rates of both non-urgent and urgent referrals than the provincial average (see table 5).



## Vancouver Coastal Health

**Figure 14. Percentage of kindergarten children caries free, with treated caries, and with visible decay, Vancouver Coastal Health , 2006-2007, 2009-2010, & 2012-2013<sup>2</sup>**

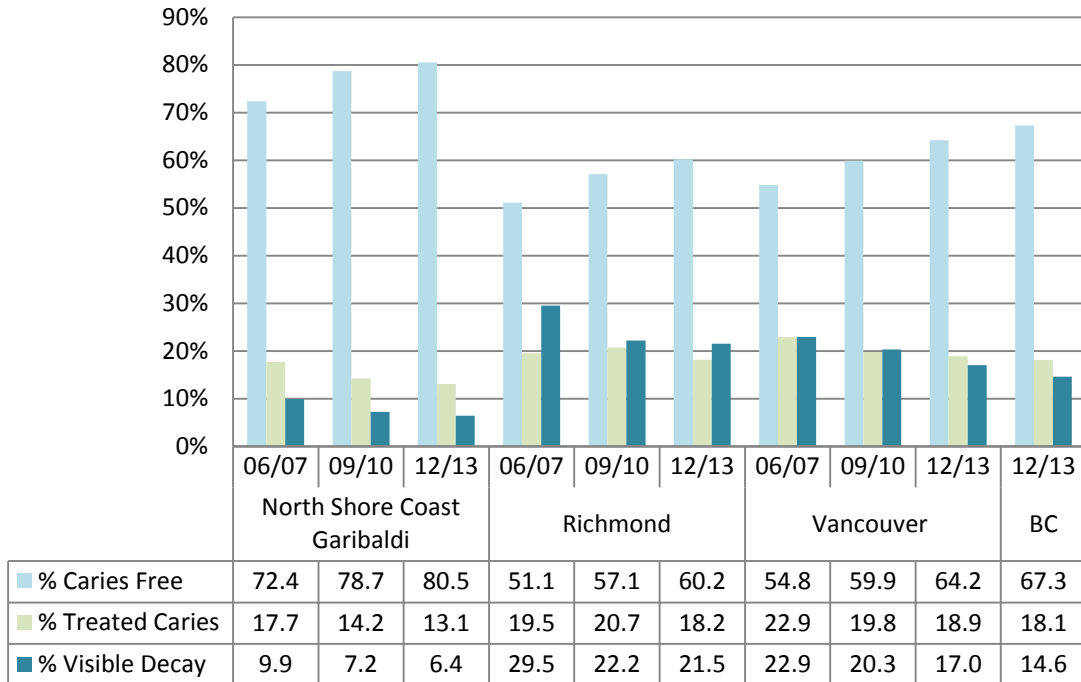


Figure 14 compares the percentage of caries free children, children with treated caries, and children with visible decay in Vancouver Coastal Health across three screening years.

Key findings for 2012-2013 include the following:

***The percentage of caries free children has increased in all three Vancouver Coastal HSDAs; however, both Richmond and Vancouver remain below the provincial average for caries free.***

- North Shore Coast Garibaldi has the highest percentage of caries free (80.5%) and the lowest percentage of visible decay (6.4%).
- Richmond had the lowest rate of caries free (60.2%) and the highest percentage of children with visible decay (21.5%).
- The rate of visible decay has decreased since 2006-2007 in all three Vancouver Coastal HSDAs.
- Both Richmond and Vancouver have higher rates of decay in either 3 or 4 quadrants than the provincial average (see table 4).
- Both Richmond and Vancouver have higher rates of non-urgent referrals than the provincial average. Vancouver has a higher rate of urgent referrals than the provincial average (see table 5).

## Discussion

Oral health is a fundamental component of overall health and well-being and a determinant factor for quality of life. From 2006-2007 to 2012-2013, the oral health of kindergarten children has improved across the province. This trend points to the success of early intervention programs aimed at improving the oral health of young children. Public health early childhood dental programs include caries risk assessments, parent education, fluoride varnish application for children at risk for caries, dental health promotion among community organizations and early childhood education providers, and public awareness campaigns.

National findings on dental health from the Canadian Health Measures Survey 2007-2009<sup>3</sup> indicate that 53.4% of Canadian 6 year olds did not have a least one decayed, missing, or filled primary or permanent tooth. BC's caries free rate appears to be above that national average; however, it is important to keep in mind that different survey methods and definitions were used. In 2012-13, 67.3% of 5-6 year olds in BC were caries free. Federal, Provincial and Territorial Dental Directors have suggested a Canadian goal of 60% of children at age 5-6 be caries free.<sup>4</sup> The provincial dental survey results indicate that this target has been attained in BC in 2006-2007, 2009-2010, and 2012-2013.

The BC kindergarten survey results shows an overall improvement in the oral health of children surveyed, however regional disparities exist. The Northwest has the highest percentage of visible decay (23.5%), followed by Richmond (21.5%), and Fraser South (19.7%). These HSDAs are well above the provincial average for visible decay (14.6%) and suggest potential barriers to accessing oral health promotion, prevention and treatment services, such as socioeconomic, geographic, or cultural factors. Other HSDAs where the percentage of visible decay is above the provincial average include Kootenay Boundary, Thompson Cariboo Shuswap, Northeast, Northern Interior, and Vancouver.

In addition to considering regional differences in visible decay rates, it is important to consider regional differences in the percentage of children with the most severe unmet need. Kootenay Boundary, Okanagan, Northern Interior, and the North West have the highest percentages of children with urgent needs. These higher percentages may reflect barriers to access, such as financial, geographical or cultural challenges, as well as the influences of other social determinants of health. Understanding where needs are highest may inform program planning.

A number of policy actions have resulted from use of the findings of the provincial kindergarten dental survey. These include the development of *Healthy Smiles for Life: BC's First Nations and Aboriginal Oral Health Strategy* to address a significant gap between the oral health of Aboriginal and non-Aboriginal children. Implementation planning for this strategy is currently underway and fits within a larger tripartite effort to improve health for First Nations and Aboriginal peoples across BC, as identified in the 10-year *Tripartite First Nations Health Plan*.

As well, in 2013, dental public health service statements were developed to outline services that should be offered during the prenatal period and from birth to six years of age (see Appendix A). These statements define universal and enhanced services to support oral health promotion and prevention. The dental public health service statements create consistency in

service delivery across all five health regions, yet support the flexibility required to implement at the regional and/or community level taking into consideration the variation of geography, population size, ethnicity, vulnerability, and resources in each region.

Future kindergarten dental surveys will help measure the potential impact of the implementation of the dental service statements and *Healthy Smiles for Life: BC's First Nations and Aboriginal Oral Health Strategy*.

Health Authorities and the Ministry of Health continue to monitor the oral health of kindergarten children in BC through this provincial dental survey. The survey results inform public health program planning and allocation of resources to those areas with identified need, where those needs can be addressed through preventative programs. This provincial survey is conducted every three years; subsequent kindergarten surveys will be important for monitoring ongoing trends, identifying inequities, and informing policy and program planning aimed at improving the oral health of all children in BC.

## Appendix A – Excerpt from Healthy Start Initiative: Provincial Perinatal, Child and Family Dental Public Health Services

### Prenatal Dental Public Health Services

#### 1.1a) Universal Service Statement

All pregnant women have access to oral health promotion and education supported by resources such as the Pregnancy Passport, Baby's Best Chance, or HealthLinkBC files and referral as needed for dental assessment.

#### This universal service statement could be accomplished by:

- Providing oral health information during routine prenatal contact with any public health staff.
- Informing clients about the importance of a dental visit during pregnancy when reviewing the Pregnancy Passport or Baby's Best Chance.
- Providing information about daily oral care during pregnancy (HealthLinkBC file #38b).

### Family Health: Dental Public Health Services from 6 Months Up to 6 Years of Age

#### 3.1a) Universal Service Statement

At routine contact, families with children aged 6 months up to 6 years will be offered screening for caries risk behaviours, oral health promotion and education and referral as needed for dental assessment.

#### This universal service statement could be accomplished by:

- Providing oral health information during routine contact by any public health staff (e.g. daily oral care, first dental visit, and access to care (Healthy Kids Program)).
- Providing accessible oral health information through social media or resources (e.g. Baby's Best Chance, Toddler's First Steps, HealthLinkBC files, Health Authority and Ministry websites).
- Screening for caries behavioural risk factors as early as possible:
  - Parent not brushing the child's teeth twice daily;
  - No daily exposure to fluoride; and
  - Frequent exposure to sugar between meals.
- Referral for enhanced services if concern/issue identified.
- Kindergarten Dental Survey every 3 years as provincial surveillance tool.

#### 3.4a) Enhanced Service Statement

All families with children aged 6 months up to 6 years identified through screening or referral will be offered a dental assessment, health promotion, education and more intensive follow-up including referral as needed.

#### This enhanced statement could be accomplished by:

- Assessment of caries behavioural risk factors.
- Visual assessment of the mouth.
- Health promotion and education.
- Referral to appropriate dental preventive and treatment services for intervention.

- Application of fluoride varnish.
- Support to access dental treatment (Save-A-Smile, Healthy Kids Program, and Non-Insured Health Benefits (NIHB)).
- Kindergarten case finding and referral as needed.

## Appendix B – School Districts by Health Service Delivery Area

### Fraser Regional School Districts

HSDA	S.D#	School District Name	Communities
Fraser East	33	Chilliwack	Chilliwack
	34	Abbotsford	Abbotsford
	75	Mission	Mission
	78	Fraser Cascade	Agassiz, Boston Bar, Harrison Hot Springs, Hope, North Bend
Fraser South	35	Langley	Aldergrove, Langley
	36	Surrey	Surrey, Whiterock
	37	Delta	Delta
Fraser North	40	New Westminster	New Westminster
	41	Burnaby	Burnaby
	42	Maple Ridge	Maple Ridge, Pitt Meadows
	43	Coquitlam	Anmore, Belcarra, Coquitlam, Port Coquitlam, Port Moody

### Interior Regional School Districts

HSDA	S.D#	School District Name	Communities
Kootenay	5	South East Kootenay	Cranbrook, Elkford, Fernie, Sparwood, Grasmere, Jaffrey
	6	Rocky Mountain	Edgewater, Golden, Invermere, Kimberly, Windermere, Field, Canal Flats, Radium Hot Springs
	8	Kootenay Lake	Canyon, Crawford Bay, Creston, Kaslo, Nelson, Salmo, South Slokan, Yahk
	10	Arrow Lakes	Burton, Edgewood, Nakusp, New Denver
	20	Kootenay Columbia	Castlegar, Fruitvale, Robson, Rossland, Trail
	51	Boundary	Big White, Beaverdell, Christina Lake, Grand Forks, Greenwood, Midway, Rock Creek
Okanagan	22	North Okanagan	Coldstream, Cherryville, Lumby, Vernon
	83	North Okanagan/Shuswap	Armstrong, Falkland, Enderby, Grindrod, Sicamous, Malakwa
	23	Central Okanagan	Kelowna, Lake Country, Peachland, West Kelowna,
	53	Okanagan-Similkameen	Cawston, Hedley, Keremeos, Okanagan Falls, Oliver, Osoyoos
	58	Nicola-Similkameen	Princeton
	67	Okanagan-Skaha	Kaleden, Naramata, Penticton, Summerland,
Thompson Cariboo Shuswap	19	Revelstoke	Revelstoke
	27	Cariboo Chilcotin	100 Mile, 108 Mile, 150 Mile, Alexis Creek, Anahim Lake, Big Lake, Bridge Lake, Horsefly, Lac La Hache, Likely, Lone Butte, Nemiah Valley, Tatla Lake, Williams Lake
	58	Nicola-Similkameen	Merritt
	73	Kamloops/Thompson	Barriere, Blue River, Clearwater, Chase, Kamloops, Logan Lake, Pinantan Lake, Savona, Vavenby, Westwold
	74	Gold Trail	Ashcroft, Cache Creek, Clinton, Gold Bridge, Lillooet, Lytton
	83	North Okanagan/Shuswap	Celista, Canoe, Salmon Arm, Tappen

## Island School Districts

HSDA	S.D#	School District Name	Communities
South Vancouver Island	61	Victoria	Esquimalt, Victoria
	62	Sooke	Port Renfrew, Sooke
	63	Saanich	Saanich
	64	Gulf Islands	Gulf Islands
Central Vancouver Island	68	Nanaimo-Ladysmith	Gabriola Island, Ladysmith, Nanaimo,
	69	Qualicum	Bowser, Parksville, Qualicum, Lasqueti
	70	Alberni	Bamfield, Port Alberni, Tofino, Ucluelet
	79	Cowichan Valley	Chemainus, Crofton, Duncan, Lake Cowichan, Mill Bay, Penelakut, Shawnigan Lake
North Vancouver Island	71	Comox Valley	Black Creek, Comox, Courtenay, Cumberland, Denman Island, Hornby Island, Union Bay
	72	Campbell River	Campbell River, Cortes Island, Quadra Island, Sayward
	84	Vancouver Island West	Gold River, Zeballos
	85	Vancouver Island North	Alert Bay, Port Alice, Port Hardy, Port McNeil, Sointula, Woss



### Northern Regional School Districts

HSDA	S.D#	School District Name	Communities
Northwest	50	Queen Charlotte Island	Masset, Port Clements, Queen Charlotte City, Sandspit
	52	Prince Rupert	Port Edward, Prince Rupert
	54	Buckley Valley	Houston, Quick, Smithers, Telkwa
	82	Coast Mountain	Hazelton, Kitimat, Kitwanga New Hazelton, South Hazelton, Stewart, Terrace
	87	Stikine	Atlin, Dease Lake
	92	Nisga'a	Gitwinksihlkw, Laxgalts'ap
Northern Interior	28	Quesnel	Quesnel
	57	Prince George	Bear Lake, Hixon, Mackenzie, McBride, McLeod Lake, Prince George, Valemount
	91	Nechacko Lakes	Burns Lake, Fort Fraser, Fraser Lake, Fort St James, Granisle, Vanderhoof
Northeast	59	Peace River South	Chetwynd, Dawson Creek, Tumbler
	60	Peace River North	Fort St. John, Hudson's Hope, Taylor
	81	Fort Nelson	Fort Nelson

### Vancouver Coastal School Districts

HSDA	S.D#	School District Name	Communities
Richmond	38	Richmond	Richmond
Vancouver	39	Vancouver	Vancouver
Coastal	44	North Vancouver	North Vancouver
	45	West Vancouver	Bowen Island, Lions Bay, West Vancouver
	46	Sunshine Coast	Cedar Grove, Gibsons, Halfmoon Bay, Madeira Park, Roberts Creek, Seschelt
	47	Powell River	Powell River
	48	Howe Sound	D'Arcy, Pemberton, Squamish, Whistler
	49	Central Coast	Bella Bella, Bella Coola, Hagensborg

## Endnotes

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<sup>1</sup> It is difficult to determine if someone is truly caries free. The term is used to indicate that there was no visible decay or broken enamel.

<sup>2</sup> BC Ministry of Health. (2013). K Dental Screening 2012-13 data and figures (excel file). Healthy Development and Women's Health Branch. Population and Public Health.

<sup>3</sup> Health Canada. (2010). Report on the findings of the oral health component of the Canadian Health Measures Survey 2007-2009. p. 31. Retrieved from <http://www.fptdwg.ca/assets/PDF/CHMS/CHMS-E-tech.pdf>

<sup>4</sup> BC Ministry of Health (2006). Core Public health Functions for BC: Evidence Review. Dental Public Health. Retrieved from [http://www.health.gov.bc.ca/public-health/pdf/Dental\\_Health\\_Evidence\\_Review.pdf](http://www.health.gov.bc.ca/public-health/pdf/Dental_Health_Evidence_Review.pdf)