Summary of 2015-2017 Oral Health Screening: Results from Participating Ontario Health Units

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We thank the following Ontario Health Units for sharing their 2015/2016 and/or 2016/2017 school screening data:

Algoma Public Health Unit	Brant County Health Unit
Chatham-Kent Health Unit	Durham Region Health Department
Eastern Ontario Health Unit	Elgin-St. Thomas Health Unit
Grey Bruce Health Unit	Haldimand Norfolk Health Unit
Haliburton, Kawartha, Pine Ridge District Health Unit	Halton Region Health Department
City of Hamilton - Public Health Services	Hastings Prince Edward Public Health
Huron County Health Unit	Kingston, Frontenac and Lennox & Addington Public Health
Lambton Public Health	Leeds, Grenville and Lanark District Health Unit
Middlesex-London Health Unit	Niagara Region Public Health
Northwestern Health Unit	North Bay Parry Sound District Health Unit
Oxford County Public Health	Peel Public Health
Perth District Health Unit	Porcupine Health Unit
Simcoe Muskoka District Health Unit	Public Health Sudbury and Districts
Thunder Bay District Health Unit	Timiskaming Health Unit
Wellington Dufferin Guelph Public Health	Windsor-Essex County Health Unit
York Region Public Health	

DEFINITIONS

Item	Definition
JK	Junior Kindergarten
SK	Senior Kindergarten
General population	Denominator is the data from all children screened in that grade and year
Non-caries free	Denominator is the data from only children screened who had at least one tooth affected by caries (i.e. deft+DMFT was at least 1)
deft+DMFT	decayed, missing due to decay and filled primary teeth + Decayed, Missing due to Decay and Filled permanent Teeth
Average deft+DMFT	average of the Mean deft+DMFT's of the participating Health Units
%Caries Free	Average percentage of children who had no visible tooth decay from the participating Health Units
Weighted	A statistical technique where each value is assigned a value to bring the results more in line to reflect what is known about the population. In this case, weights were applied for either the number of children screened or the number of non-caries free children, depending on the calculation. This ensures that public health units with larger screening populations contribute more to the overall calculations than those with smaller populations.

Introduction

In the early 1970's, the Ontario Ministry of Health began the Ontario Dental Health Indices Survey. This survey was conducted every two years on school children by public health personnel, and was intended to address program planning, research, program evaluation and funding distribution. Though the frequency and sampling methodology for the survey changed over the years, a Dental Indices Survey (DIS) instrument was used by health units until at least 2008, when the implementation of the Ontario Public Health Standards no longer required this data collection as a mandatory component. As a result, OAPHD requested that all Ontario Health Units supply the following data for JK, SK and Grade 2 children:

- decayed, extracted/missing (due to decay) and filled primary teeth and permanent teeth
- the percentage of caries free children data

This data allowed OAPHD to obtain information on decay severity and prevalence on JK, SK and Grade 2 children in the province. The participating Ontario Health Units have voluntarily supplied data for the school years from 2009 to 2017, though some health units have not consistently participated in all years. OAPHD last published a summary of this data in November 2015 ("Summary of 2009-15 Oral Health Screening: Results from Participating Ontario Health Units"). However, due to changes in staffing, the previous analytic files are no longer available and therefore, the previous analysis methodology or data quality auditing process cannot be confirmed. As a result, the data presented in this report should not be used to compare with previous estimates, as the results may not be comparable.

The purpose of this report is to provide a summary of results from the 2015/2016 and 2016/2017 school years.

Background

The OPHS (2008) introduced the Oral Health Assessment and Surveillance protocol. This protocol was updated in 2016, and more recently changed again in 2018. The intent of the protocol was to:

2008	2016
"This protocol has been developed to standardize oral health assessment and surveillance practices and ensure consistent use of the Ministry of Health Promotion's Oral Health Information Support System (OHISS) or any other method specified by the Ministry of	*"This protocol has been developed to standardize oral health assessment and surveillance practices (which includes oral health screening) and ensure consistent use of the Ministry of Health and Long Term Care's Oral Health Information*

Health Promotion (the "ministry") to collect oral health assessment and surveillance data."	*Support System (OHISS) or any other method specified by the Ministry of Health and Long Term Care (the "ministry") to collect oral health assessment and surveillance data."*

As per these protocols, all children in JK, SK, and Grade 2 were screened by public health dental hygienists. The screening was done in schools during the school year. The screening protocol required the collection of the number of primary and permanent teeth with decay (d+D) as a mandatory data collection item. The number missing/extracted (due to decay) or filled primary or permanent teeth was specified in the Oral Health Guidance Document (2009) as an optional data collection item.

Methodology

All of the 36 Ontario Health Units were asked in 2008 by the OAPHD to participate in collecting and sharing mean deft+DMFT and percent caries free data for each of their JK, SK and Grade 2 populations starting in the 2009-10 school year. OAPHD has repeated this request annually since then. The data collection tool used for the two years captured by this report is shown in appendix 1.

Surveys were collected via email and on paper, and results were entered into Excel. Data quality review was conducted, and individual health units were followed up for outliers or suspected values for confirmation.

Data Quality Review

As the data requested calculated fields be provided, the data points could be used to verify that all the values submitted were in line with one another. For example, both # non-caries free and # children surveyed were collected, which could be used to verify the submission of the % caries free value. Similar triangulation was done for the DMF and non-caries free DMF numbers. Where calculated values were not the same as submitted values, the submitting health unit was followed up with to confirm their submission. This resulted in a number of corrections to data after it had been submitted. Data quality review highlighted issues with:

- Data entry
- Calculating specific values
- Ensuring data was drawn from the correct reports on OHISS

Analysis

Data was analyzed using SPSS version 25.

Results

Response Rate and Descriptive Statistics

The number of health units participating in the OAPHD survey has gradually increased from the lows of 13 to 16 in 2010-11 to 25 to 26 in the 2014-15 school year. Response rate reached a record high for this updated report, reflecting 30 health units for 2015/2016 and 31 health units for 2016/2017.

However, though the response rate was excellent, the population of the non-participating health units represented a significant portion of the age 4, 5 and 7 children in Ontario. As a result, the survey data captures approximately 50-60% of children in those age groups in Ontario, depending on the survey year and grade (Table 1).

Table 1. OAPHD survey response rate by number of children surveyed by participating health units and the percentage of children in Ontario this represents

Grade[1]	2015-2016		2016-2017	
	Number of children surveyed	% of children (in Ontario) surveyed	Number of children surveyed	% of children (in Ontario) surveyed
JK	69489	48%	78276	54%
SK	73336	49%	82373	55%
2	79491	55%	89603	62%
Total	223832	51%	251869	57%

Citation: Population Estimates [2015 and 2016], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario, Date Extracted: [January 22, 2018].

The average deft+DMFT scores for each grade ranged from 0.50 to 4.34, and for the non-caries free population, between 3.12 to 6.97. The percentage of caries free children for each grade ranged from 38 to 85%. Full descriptive statistics for submitted data are available in Appendix 2 and 3.

Weighted Results – General population

Despite the fact that dental disease is largely preventable, large numbers of children are affected by tooth decay. The weighted results for the prevalence and severity of tooth decay in the general population (i.e. among all children screened in selected grades) for submitting health

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[1] **Note**: Population estimates data are not available at the grade level, but by age level. Therefore, for the purpose of estimating the % of children surveyed, the denominator for JK children was 4 year olds, SK children was 5 year olds and grade 2 was 7 year olds.
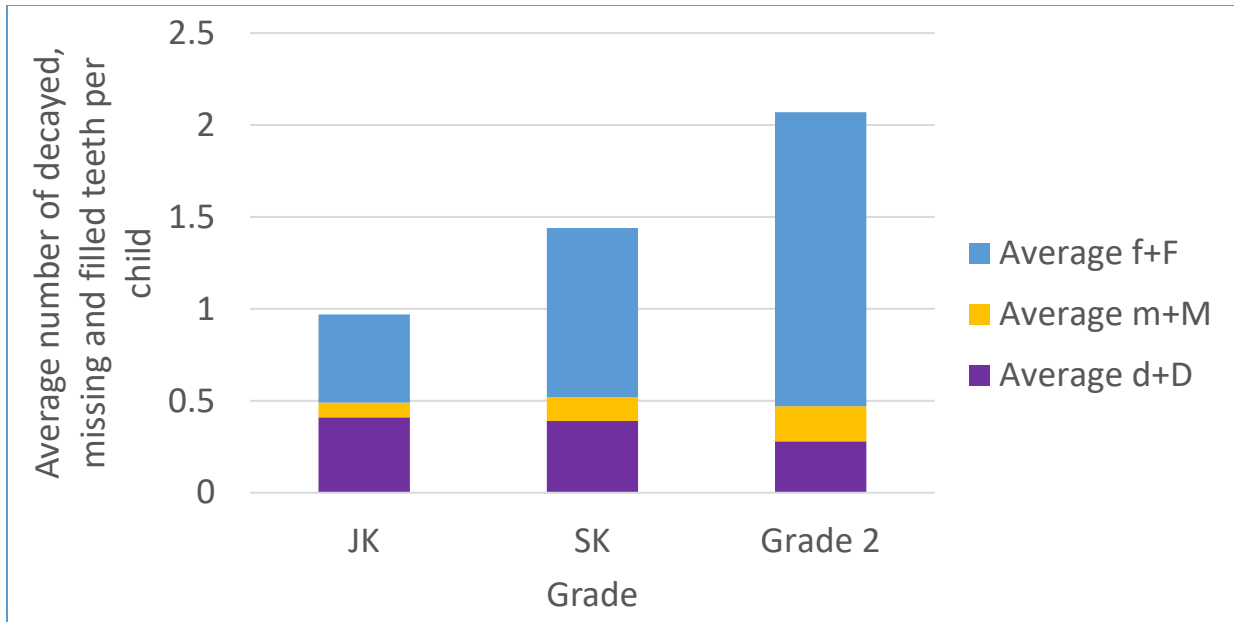
units are shown in table 2. These results were weighted by the number of children screened per health unit.

The prevalence of tooth decay is measured through the proportion of cavity free children. Cavity free children are those who have no decayed teeth, no fillings, and no missing teeth (due to cavities) at the time of screening. For participating health units during the two survey years, the percentage of cavity free children declines from 76-77% in JK children, to 67% in SK children to 54-55% in Grade 2 children. The teeth in Grade 2 children have been in the mouth longer than the teeth in a JK or SK child, and have had a longer period of time to develop cavities, therefore, fewer children in grade 2 are cavity free compared to younger grades.

The severity of tooth decay is measured through the average number of teeth which are decayed, filled, or missing (due to cavities) in a population. Similar to the prevalence of decay by age, the severity of cavities increases significantly from JK to Grade 2. For participating health units during the two survey years, JK children had on average 0.91-0.97 teeth affected by cavities (decayed, missing or filled), while SK children had 1.43-1.44 and Grade 2 children had 2.08. As demonstrated in Figure 1, this is largely because of an increase in filled teeth – the number of teeth with untreated decay at time of screening in the general population does not show a large difference between JK to grade 2. Only one year was graphed due to the similarity in results between survey years.

Table 2. Weighted screening results for the general population

		JK		SK		Grade 2	
		2015/2016	2016/2017	2015/2016	2016/2017	2015/2016	2016/2017
All children	**Average d+D**	0.41	.40	0.39	.40	0.28	.30
	Average m+M	0.08	.07	0.13	.12	0.19	.18
	Average f+F	0.48	.44	0.92	.91	1.60	1.59
	Average deft+DMFT	0.97	.91	1.44	1.43	2.08	2.08
	% caries free	77%	77%	68%	68%	56%	56%

Figure 1. Average deft+DMFT for the general population, 2015-2016

Weighted Results – Non-caries free population

The weighted results for the prevalence and severity of tooth decay in the non-caries free population (i.e. only among children who have been affected by caries) for submitting health units are shown in table 2. These results were weighted by the number of non-caries free children (i.e. the number of children with at least 1 tooth which was decayed, missing/extracted due to decay, or filled).

For non-caries free children, the severity of cavities increases from JK to Grade 2, however, by a lesser amount than in the general population. For participating health units during the two survey years, non-caries free JK children had on average 3.90-3.95 teeth affected by cavities (decayed, missing or filled), while SK children had 4.33-4.38 and Grade 2 children had 4.56-4.57. Again, this is largely because of an increase in filled teeth, however, in this case, the number of teeth with untreated decay at time of screening actually declines between JK to grade 2 (Figure 2). As with the general population, only one year was graphed due to the similarity in results between survey years.

Table 3. Weighted screening results for the general population

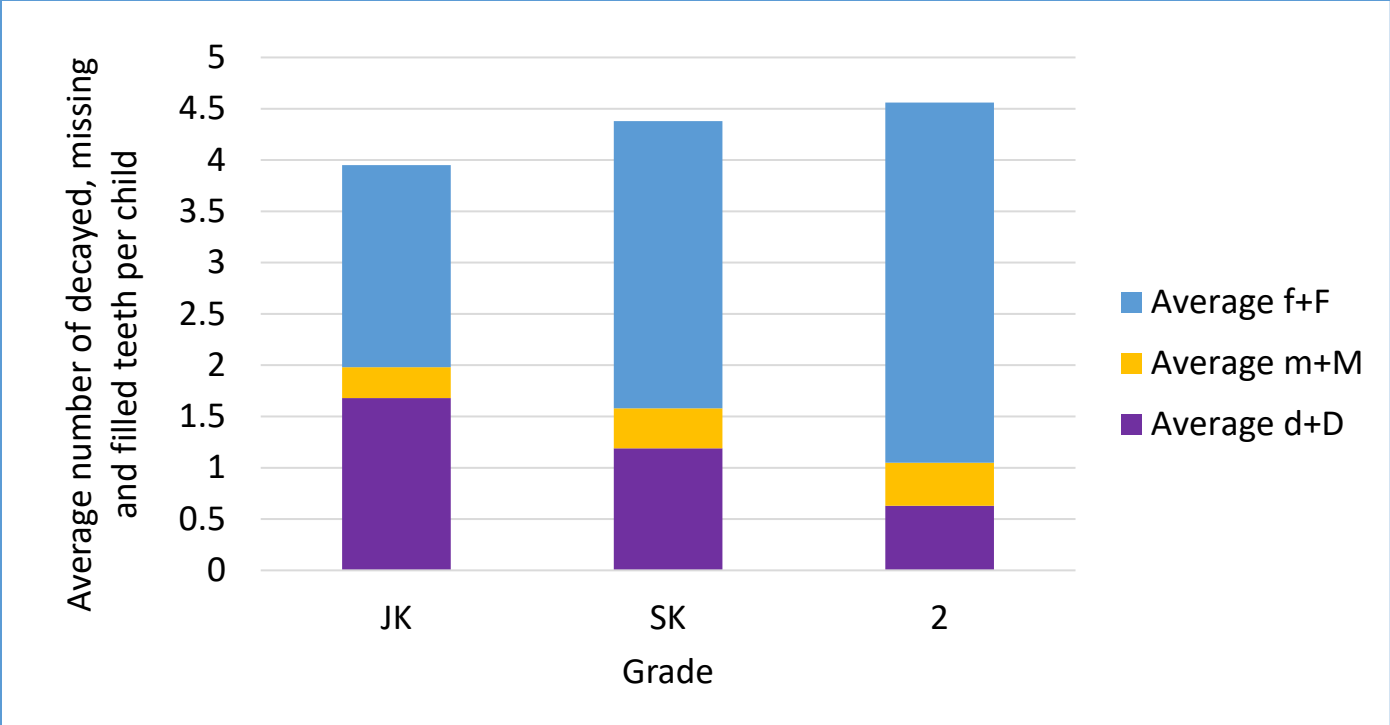|		JK		SK		Grade 2	
		2015/2016	2016/2017	2015/2016	2016/2017	2015/2016	2016/2017
Non-caries free children	**Average d+D**	1.68	1.70	1.19	1.20	0.63	.67
	Average m+M	0.30	.30	0.39	.37	0.42	.39
	Average f+F	1.97	1.90	2.80	2.77	3.51	3.50
	Average deft+DMFT	3.95	3.90	4.38	4.33	4.57	4.56

Figure 2. Average deft+DMFT for the non-caries free population, 2015-2016

Regional Trends

Participating public health units were assigned a region according to the Association of Local Public Health Agencies map[2] to analyze regional trends in average deft+DMFT (for both the general and non-caries free populations), as well as the percentage of children who are non-caries free. In general, the northern health units show higher prevalence and severity of decay for all ages and years. This is consistent with historical data and may be a result of a number of factors, including high proportions of the population with low socioeconomic status, poorer access to care, fewer population centres to fluoridate water and large numbers of high caries risk individuals travelling from isolated northern communities.

Table 4. Results by Region, 2015-2016

Region	# Health Units Participating	Average deft+DMFT (General population)			Average deft+DMFT (Non-caries free children)			% caries free		
		JK	SK	Grade 2	JK	SK	Grade 2	JK	SK	Grade 2
Central East	5	0.95	1.38	1.90	3.97	4.36	4.52	76%	68%	58%
Central West	5	0.96	1.41	2.17	4.00	4.39	4.57	76%	68%	52%
Eastern	4	0.94	1.42	2.13	4.21	4.80	5.00	75%	67%	51%
North East	5	0.90	1.39	2.16	3.89	4.23	4.48	77%	67%	52%
North West	2	2.06	3.10	3.81	5.37	6.31	6.22	61%	51%	39%
South West	9	0.88	1.41	2.18	3.81	4.24	4.57	77%	67%	53%

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[2] https://cdn.ymaws.com/alphaweb.site-ym.com/resource/resmgr/images/alphaontario2.pdf)

Table 5. Results by Region, 2016-2017

Region	# Health Units Participating	Average deft+DMFT (General population)			Average deft+DMFT (Non-caries free children)			% caries free		
		JK	SK	Grade 2	JK	SK	Grade 2	JK	SK	Grade 2
Central East	5	0.95	1.45	1.95	3.99	4.46	4.63	75%	66%	56%
Central West	6	0.75	1.26	2.07	3.88	4.27	4.62	81%	71%	56%
Eastern	4	0.85	1.24	1.89	3.97	4.36	4.47	75%	68%	51%
North East	5	0.94	1.48	2.25	4.04	4.39	4.65	76%	66%	51%
North West	2	2.07	2.79	3.53	5.97	6.03	6.19	64%	54%	40%
South West	9	0.91	1.50	2.22	3.87	4.29	4.63	77%	65%	52%

Conclusion

This summary contains aggregated data for def+DMFT and % caries free children in Ontario, however, care should be taken in using these results as data from a number of health units in Ontario were not submitted and/or could not be used in the calculations. As a result, while this data represents the best current picture of school dental surveillance data in Ontario, it may not be representative of the entire population. The usefulness of these results would be improved with the participation of all Ontario Health Units in collecting and reporting mean deft+DMFT scores and % Caries Free children. However, among the participating health units, we can conclude:

- The deft+DMFT for JK, SK and Grade 2 children appears to be relatively stable between survey years at about 0.95 for JK, 1.4 for SK and 2.1 for Grade 2.
- The non-caries free deft+DMFT for JK,SK, and Grade 2 children also appears to be relatively stable between survey years, at approximately 1.9 for JK children, 2.8 for SK children and 3.5 for Grade 2 children.
- The percentage caries free also appears to be relatively stable at about 77% for JK, 68% for SK and 56% for Grade 2 in both survey years.
- The d+D component contributes a smaller proportion of the deft+DMFT index in JK than in in Grade 2, largely due to the increase in filled teeth.
- There may be some regional differences in caries experience.

Appendix 1. Sample Data Collection Tool

Oral Health Survey of JK, SK, G2 Children for the 2016-17 School Year

Who is being surveyed?
- All children in JK, SK, and Grade 2 who are being screened by public health dental hygienists as part of the oral health screening requirement of the Ontario Public Health Standards.

When is the survey occurring?
- The survey will take place during the 2016-17 school year.

What information is being collected for OAPHD?
- d+D = number of primary teeth + permanent teeth with decay
- m+M = number of primary teeth extracted + permanent teeth missing, due to decay
- f+F = number of primary teeth+ permanent teeth that are filled

- % of children who are caries free = (number of children with deft + DMFT =0) divided by (number of children screened) x 100%

How should this information be recorded?
- Information can be recorded on paper or by using laptops. Templates for the paper form and the Excel spreadsheet are provided with this email.
- Information can also be collected using the OHISS Mobile application.

What information should I send to OAPHD?
- OAPHD is requesting that each health unit send the following information by September 15, 2017 to _____

	Number of children surveyed	Average d+D	Average m+M	Average f+F	% caries free
JK					
SK					
Grade 2					

	Number of non-caries free children (NCF)*	Average d+D for NCF	Average m+M for NCF	Average f+F for NCF
JK				
SK				
Grade 2				

*number of children in each grade who have deft + DMFT of 1 or higher

Appendix 2. Descriptive Statistics for Submitted Data for 2015-2016

			JK	SK	Grade 2
General population	**Average d+D**	Minimum	0.16	0.16	0.14
		Maximum	0.89	0.85	0.55
		Median	0.40	0.38	0.29
	Average m+M	Minimum	0.04	0.06	0.13
		Maximum	0.38	0.68	0.71
		Median	0.07	0.14	0.20
	Average f+F	Minimum	0.27	0.55	0.61
		Maximum	1.31	2.04	3.27
		Median	0.49	0.96	1.87
	Average deft+DMFT	Minimum	0.50	0.87	1.09
		Maximum	2.18	3.16	4.34
		Median	1.0	1.43	2.27
Non-caries free population	**Average d+D**	Minimum	0.88	0.59	0.30
		Maximum	2.54	1.71	0.91
		Median	1.49	1.09	0.57
	Average m+M	Minimum	0.17	.016	0.25
		Maximum	1.00	1.37	1.17
		Median	0.29	0.39	0.42
	Average f+F	Minimum	1.55	2.04	1.56
		Maximum	3.20	4.23	5.25
		Median	2.08	2.94	3.73
	Average deft+DMFT	Minimum	3.25	3.33	3.12
		Maximum	5.73	6.55	6.97
		Median	3.96	4.35	4.64
% Caries free		Minimum	54%	51%	38%
		Maximum	85%	77%	66%
		Median	75%	66%	51%

Appendix 3. Descriptive Statistics for Submitted Data for 2016-2017

			JK	SK	Grade 2
General population	**Average d+D**	Minimum	0.12	0.19	0.08
		Maximum	0.83	0.83	0.53
		Median	0.35	0.37	0.28
	Average m+M	Minimum	0.02	0.04	0.11
		Maximum	0.36	0.63	0.71
		Median	0.07	0.13	0.20
	Average f+F	Minimum	0.30	0.63	1.08
		Maximum	1.38	1.74	3.06
		Median	0.48	0.97	1.72
	Average deft+DMFT	Minimum	0.51	0.96	1.40
		Maximum	2.46	2.81	3.80
		Median	0.92	1.48	2.14
Non-caries free population	**Average d+D**	Minimum	0.69	0.62	0.17
		Maximum	2.34	1.80	0.88
		Median	1.53	1.05	0.61
	Average m+M	Minimum	0.11	0.17	0.26
		Maximum	0.97	1.36	1.17
		Median	0.86	0.37	0.43
	Average f+F	Minimum	1.14	2.28	2.75
		Maximum	3.64	3.89	5.37
		Median	2.07	2.93	3.64
	Average deft+DMFT	Minimum	3.17	3.60	4.00
		Maximum	6.46	6.09	6.68
		Median	3.81	4.25	4.59
% Caries free		Minimum	62%	54%	38%
		Maximum	85%	77%	66%
		Median	75%	65%	54%