



The Child Dental Health Survey Tasmania 1999

AIHW Dental Statistics and Research Unit
The University of Adelaide

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Abbreviations

d	deciduous decayed teeth
m	deciduous missing teeth
f	deciduous filled teeth
dmft	deciduous decayed, missing and filled teeth
D	permanent decayed teeth
M	permanent missing teeth
F	permanent filled teeth
DMFT	permanent decayed, missing and filled teeth
SD	standard deviation

Purpose of this report

This report is part of the annual series providing descriptive statistics concerning child dental health in Tasmania. Information listed in the report includes the age and sex of children in the sample, their deciduous and permanent caries experience, frequency of fissure sealants, immediate treatment needs, history of school dental service examinations and regional analyses.

The sections below also provide a simple, summary statement highlighting differences between the 1999 and 1998 findings. However, no formal hypothesis tests have been undertaken and descriptions of differences between years are intended as a guide to the reader rather than an evaluation of the significance of any trends.

Sources of subjects and sampling

The data for this report were collected during the 1999 calendar year from patients of the Tasmania Dental Service by dental therapists and dentists. A random sampling procedure was used to select slightly less than one in two (1:1.9) patients. This was achieved by selecting those children whose birthday fell on the first sixteen days of any month.

Data preparation

Data were collected and hand entered in Tasmania before forwarding to the AIHW Dental Statistics and Research Unit (DSRU) for analysis.

The data were cleaned prior to analyses to correct data recording and data entry errors. In addition to a visual check of a number of cases with erroneous data, a series of linear regressions of age on the number of deciduous, permanent and total teeth revealed numerous outliers with standardised residuals greater than 3 standard deviations from the mean. A visual check allowed many of these cases to be corrected where it was evidently a data recording error. A number of cases with apparent errors that could not be reconciled were removed from the data set.

Data analysis

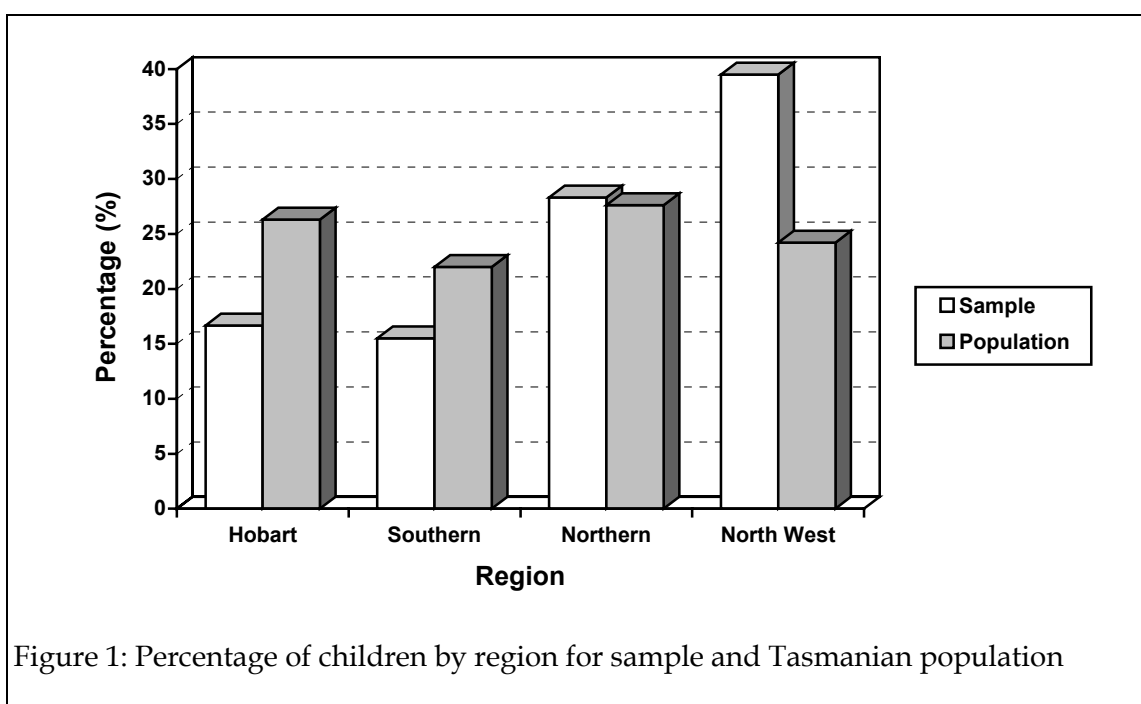
Data were weighted for all analyses to more accurately reflect the child population in Tasmania for 1999. Weights were applied according to region, as used by the Tasmanian Department of Health and Human Services. The Hobart region was taken to comprise the Statistical Local Areas of Hobart Inner, Hobart Remainder, Glenorchy and Clarence and included children from clinics in the Hobart, Glenorchy and Eastern Shore districts as well as several clinics from the Sorrel district.

Children from the Hobart and Southern regions were initially under-represented in the sampling whereas children from the Northern and North West regions were over-represented relative to actual population distribution (see Figure 1). Weighting was carried out so that the regional contributions for the study were proportional to the distribution of children aged 5–14 years in Tasmania as at 30 June 1999. Children aged 5–14 years of age comprised 85.2% of the 1999 sample.

All data were also weighted by months since last visit (which was used due to the under-representation of students on longer recall schedules in the sample). Again, this weighting protocol was adopted in order to obtain a sample with characteristics representative of those of the student population covered by the School Dental Service of Tasmania for 1999.

Prior to 1998, Tasmanian Child Dental Health Survey reports have included children with no deciduous teeth in the analyses of deciduous caries experience, effectively giving these children scores of 0 for decayed, missing and filled teeth. Including children with no deciduous teeth in analyses understates the total level of caries experience of children aged between 10 and 12. Similarly, children with no permanent teeth have previously been included in analyses of permanent caries experience, understating the level of permanent caries experience in younger children. As a result, these children are no longer included in the respective analyses.

All indices are calculated from data collected over a 12-month period. Age-specific indices denoted with an asterisk (*) are those in which the relative standard error exceeds 40% and population estimates of these indices may be considered to be statistically unreliable and should be interpreted with due care.



Demographic composition of the sample

There were a total of 5,622 people in the sample for 1999 (see Table 1). The majority of the children were aged between 4 and 15 years of age (96.1%) with the highest frequencies being for children aged between 5 and 11 years of age. This corresponds to the predominant ages of the primary school population. For all subsequent analyses children aged 1–4 years old were collapsed into a single group. Due to the very small number of children aged 16–18 years, statistics were not reported for these ages.

Males and females were represented in approximately equal proportions across the age. Weighting of the data did not produce appreciable differences in the age and sex composition of the sample, although there was a tendency for older children to be weighted up and for younger children to be weighted down in the analysis.

Changes in demographic composition since 1998

There was a small decrease ($n = 299$) in the number of children sampled in 1999, following on from the considerable drop of 4,580 fewer children sampled between 1997 and 1998. The sex distribution across years was comparable.

Table 1: Demographic composition of the sample

Age	Children in sample				Children in sample (weighted)			
	Males	Females	Unknown	Persons	Males	Females	Unknown	Persons
	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>
1	7	5	0	12	5	4	0	9
2	31	29	1	61	26	23	1	50
3	65	80	1	146	56	70	1	127
4	149	155	4	308	144	134	3	282
5	241	259	5	505	234	250	5	488
6	284	239	10	533	269	232	11	512
7	259	274	3	536	264	270	2	537
8	284	283	3	570	292	270	3	565
9	264	259	5	528	248	262	4	515
10	286	240	3	529	281	253	3	538
11	239	241	3	483	241	248	4	492
12	209	188	0	397	210	189	0	399
13	166	183	0	349	178	185	0	364
14	168	190	2	360	182	195	2	378
15	133	168	2	303	168	194	2	365
16	0	0	0	0	0	0	0	0
17	1	0	0	1	2	0	0	2
18	1	0	0	1	2	0	0	2
Total	2,787	2,793	42	5,622	2,802	2,779	41	5,622

Deciduous teeth

Table 2 shows the age-specific caries experience in deciduous teeth for children up to 12 years of age. The mean number of clinically detectable decayed deciduous teeth decreased consistently, from 1.06 among children aged 5 years old to 0.19 among 12-year-olds. In contrast, the mean number of filled teeth increased with age, from 0.17 for the youngest children to 1.20 for 9-year-olds, before declining for 11- and 12-year-olds due to the exfoliation of deciduous teeth. At age 11, children retained on average only 30% of the deciduous teeth present at age 5. Mean dmft increased from 1.14 at age ≤ 4 to 1.81 for 9-year-olds, before declining into the older age groups.

For those children up to the age of 4, 84.9% of their dmft score could be attributed to untreated decay (see Table 3). This figure declined systematically with increasing age so that by 12 years of age only 26.6% of children's dmft score was attributable to decay. The percentage of children up to the age of 9 with a dmft score of 0 declined with age. Just over 70% of children up to the age of 4 had dmft = 0 while only 54.1% of children aged 10 had no clinically detectable caries experience.

Table 2: Deciduous dentition – decayed, missing and filled teeth by age

Age	Children <i>n</i>	Teeth			Decayed (d)		Missing (m)		Filled (f)		dmft	
		mean	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
≤ 4	467	19.64	0.95	2.10	0.03*	0.42*	0.17	0.85	1.14	2.43		
5	488	19.65	1.06	2.10	0.11	0.74	0.43	1.23	1.60	2.87		
6	511	17.49	0.80	1.51	0.10*	0.87*	0.68	1.52	1.58	2.58		
7	537	14.47	0.81	1.40	0.04*	0.41*	0.82	1.67	1.68	2.45		
8	564	12.37	0.62	1.19	0.05	0.34	1.04	1.83	1.71	2.49		
9	506	10.90	0.57	1.14	0.05	0.36	1.20	1.80	1.81	2.35		
10	496	8.94	0.47	1.08	0.02*	0.25*	0.92	1.69	1.41	2.15		
11	363	6.80	0.36	0.80	0.01*	0.12*	0.77	1.38	1.14	1.71		
12	213	4.69	0.19	0.51	–	–	0.68	1.26	0.86	1.41		

* relative standard error $\geq 40\%$

Table 3: Deciduous teeth – caries experience indices by age

Age	Teeth			d/dmft		dmft = 0	
	mean	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
≤ 4	19.64	139	84.9	467	70.3		
5	19.65	189	67.3	488	61.3		
6	17.49	228	55.6	511	55.3		
7	14.47	258	56.3	537	52.0		
8	12.37	284	40.6	564	49.6		
9	10.90	265	34.1	506	47.7		
10	8.94	228	37.1	496	54.1		
11	6.80	164	36.8	363	54.8		
12	4.69	84	26.6	213	60.7		

Changes in deciduous caries experience since 1998

There were no consistent changes in any computed statistic for the deciduous dentition between 1998 and 1999. In 1999, compared to 1998, the mean number of teeth with clinically detectable decay decreased for children aged ≤ 4 , 8 and 12 but increased for children aged 7, 10 and 11. Five age groups showed an increase in the mean number of filled teeth with only the youngest children and 10-year-olds showing a decline. Mean dmft scores also increased for some age groups and was especially apparent for the youngest children. There were inconsistent changes in both d/dmft and the percentage of children with no history of caries experience (dmft = 0).

Permanent teeth

The mean number of decayed, filled and DMF teeth all increased in a fairly consistent manner across increasing age groups (see Table 4). The 12-year-old DMFT was 1.15. The percentage of DMFT due to decay (D/DMFT) declined across age groups before stabilising between 35 and 50% from the age of 10 (see Table 5). The percentage of caries free children (DMFT = 0) declined regularly with increasing age, from 99.1% for children aged 5 to 57.6% for 12-year-olds, further reducing to 34.4% for 15-year-olds.

Changes in permanent caries experience since 1998

Similar to that shown in the deciduous teeth, changes in computed statistics for permanent dentition showed no consistent trends. Mean decay scores increased for four age groups and decreased for four age groups while mean DMFT scores increased for three age groups yet decreased for children aged 8, 9, 11, 12, 14 and 15. Mean decay in 12-year-olds was 36.7% lower in 1999 than in 1998. However, the percentage of people with DMFT = 0 changed little between 1998 and 1999, increasing only for children aged between 10 and 12.

Table 4: Permanent dentition – decayed, missing and filled teeth by age

Age	Children	Teeth	Decayed (D)		Missing (M)		Filled (F)		DMFT	
			mean	SD	mean	SD	mean	SD	mean	SD
5	118	2.90	0.01*	0.10*	–	–	–	–	0.01*	0.10*
6	392	5.60	0.12	0.49	–	–	0.01*	0.15*	0.12	0.52
7	521	8.60	0.16	0.56	–	–	0.04	0.28	0.20	0.63
8	563	11.16	0.20	0.59	–	–	0.12	0.51	0.32	0.84
9	515	13.06	0.25	0.64	0.01*	0.19*	0.21	0.59	0.47	0.92
10	538	15.84	0.32	0.87	0.01*	0.22*	0.31	0.80	0.64	1.21
11	492	20.03	0.32	0.83	0.03*	0.39*	0.46	0.92	0.81	1.40
12	399	23.54	0.43	0.99	0.06	0.38	0.66	1.30	1.15	1.77
13	364	26.32	0.83	1.54	0.02*	0.25*	0.78	1.23	1.63	2.26
14	378	27.51	0.82	1.40	0.02*	0.18*	1.02	1.73	1.86	2.32
15	365	27.45	0.75	1.40	0.06	0.33	1.21	1.76	2.02	2.47

* relative standard error $\geq 40\%$

Table 5: Permanent dentition – caries experience indices by age

Age	Teeth	D/DMFT		DMFT = 0	
	mean	n	%	n	%
5	2.90	1	100.0	118	99.1
6	5.60	25	97.8	392	93.7
7	8.60	60	81.7	521	88.6
8	11.16	103	65.5	563	81.7
9	13.06	140	55.8	515	72.9
10	15.84	159	48.3	538	70.4
11	20.03	177	39.4	492	64.0
12	23.54	169	41.6	399	57.6
13	26.32	196	46.1	364	46.1
14	27.51	231	46.7	378	38.8
15	27.45	239	35.9	365	34.4

* relative standard error \geq 40%

All teeth

It can be seen from Table 6 that untreated clinical decay in the combined deciduous and permanent dentitions ($d+D \geq 1$) existed for between 27.2% and 41.2% of children in any age group. The greatest likelihood of untreated decay occurred for 7-year-olds. However, the most extensive levels of untreated clinical decay ($d+D = 5$ or more) occurred in the youngest children.

Table 6: All teeth – age-specific caries experience

Age	Children	d + D =						m+M = 0	f+F = 0	dmft+ DMFT = 0
		0	1	2	3	4	5+			
	n	%	%	%	%	%	%	%	%	%
≤ 4	467	72.8	6.7	5.4	5.3	3.7	6.2	99.2	94.4	70.1
5	488	67.5	9.3	7.0	6.3	1.7	8.2	97.1	84.3	60.7
6	512	64.3	12.8	9.9	5.9	3.5	3.6	97.8	74.1	53.7
7	537	58.8	15.8	11.7	5.1	3.6	5.0	98.3	70.7	48.2
8	565	62.9	14.4	12.5	5.6	1.8	2.9	96.9	60.3	43.2
9	515	62.4	16.2	10.6	5.4	2.5	2.8	97.5	51.5	40.2
10	538	67.8	14.9	7.8	3.2	3.3	3.0	98.4	59.9	45.1
11	492	69.3	15.6	8.1	3.8	1.8	1.3	98.6	59.4	46.1
12	399	70.9	15.2	8.1	2.9	2.2	0.7*	97.1	61.1	47.2
13	364	62.2	16.7	7.8	4.1	4.3	4.9	98.4	53.4	40.7
14	378	60.4	19.3	9.6	5.0	2.8	2.9	98.6	58.0	38.1
15	365	65.5	14.2	9.8	4.2	3.2	3.2	95.7	47.8	33.1

* relative standard error \geq 40%

While fewer than 5% of children aged up to 15 had at least one deciduous or permanent tooth missing due to caries, considerably higher percentages presented with fillings. The percentage of children with fillings increased to 48.5% for 9-year-olds, decreased to 38.9% for 12-year-olds, and then increased again.

There was a reasonably consistent decline in the percentage of children with no caries experience in either the deciduous or permanent dentition ($dmft+DMFT = 0$), from 70.1% among the youngest children to 40.2% at age 9. The percentage varied between 47.2% and 33.1% among the older ages.

Changes in caries experience for all teeth since 1998

Given the inconsistent changes in the caries experience of both the deciduous and permanent teeth, the percentage of children with $d+D = 0$ increased for some age groups while decreasing for others, with half the age groups demonstrating only small changes. Overall, there was little change in the percentage of children with $d+D \geq 4$ between 1998 and 1999. Children aged 9 years and older showed changes in the percentage $f+F = 0$ although these changes were again inconsistent, with increases for children aged 10, 12 and 14 and decreases for children aged 9, 11, 13 and 15. The percentage of children with $dmft+DMFT = 0$ increased for 3 age groups (≤ 4 , 10 and 12 years) and decreased for 3 age groups (6, 9 and 13 years).

Fissure sealants

Data for fissure sealants are presented in Table 7. The mean number of fissure sealants increased with increasing age. In all age groups there was evidence of preferential use of fissure sealants among those with caries experience. For example, 28.0% of 12-year-olds with permanent caries experience ($DMFT \geq 1$) had fissure sealants, compared with 18.1% among those with $DMFT = 0$.

Table 7: Fissure sealants – age-specific experience

Age	Children <i>n</i>	Sealants		Students with sealants			
				DMFT = 0		DMFT ≥ 1	
		mean	SD	<i>n</i>	%	<i>n</i>	%
6	392	0.00*	0.03*	367	0.1*	25	0.0
7	521	0.14	0.66	461	4.1	60	10.7
8	563	0.28	0.91	460	7.4	103	21.9
9	515	0.42	1.09	375	11.4	140	27.8
10	538	0.35	0.97	378	10.6	159	22.2
11	492	0.48	1.10	315	14.4	177	28.3
12	399	0.61	1.46	230	18.1	169	28.0
13	364	0.52	1.33	168	17.9	196	22.8
14	378	0.67	1.46	147	17.0	231	28.1
15	365	0.96	2.14	125	16.7	239	34.3

* relative standard error $\geq 40\%$

Changes in fissure sealant experience since 1998

There were decreases in the number of children with fissure sealants across most age groups between 1998 and 1999. There were also decreases in the mean number of sealants placed per child for many of the age groups, with differences increasing in magnitude among the older age groups. Decreases in fissure sealant placement were seen both in those children with DMFT = 0 and those with DMFT \geq 1.

Immediate treatment needs

As shown in Table 8, only a small number of children were indicated as being in immediate need of treatment (2.0% of the total sample). This classification is accorded to children who have, or who are likely to develop within four weeks, oral pain or infection. The mean dmft or DMFT of all children indicated for immediate treatment was appreciably higher than for the respective age group in the sample total.

Changes in immediate treatment needs since 1998

In 1998, only 1.1% of children were classified as being in need of immediate treatment. Comparisons between years are not reliable due to the small number of children classified as being in immediate need.

Table 8: Immediate treatment needs: age-specific distribution

Age	Children		dmft		DMFT		d+D =				
							0	1	2	3	4+
	<i>n</i>	%	mean	SD	mean	SD	%	%	%	%	%
\leq 4	15	3.2	4.00	5.78	–	–	42.5	13.2*	9.8*	0.0	34.5
5	13	2.7	4.38	5.25	–	–	29.8	20.6*	11.9*	9.2*	28.6
6	7	1.4	3.15*	3.73*	–	–	28.0*	18.6*	19.4*	12.1*	21.9*
7	11	2.1	2.50	1.67	0.19*	0.41*	8.7*	39.2	37.9	7.9*	6.3*
8	12	2.1	2.70	2.61	0.64*	1.13*	39.7	31.2	6.0*	6.0*	17.2*
9	13	2.6	2.97	2.29	0.98	1.08	5.3*	28.6	38.3	22.5	5.3*
10	6	1.1	1.72	1.63	1.33	1.12	27.2*	25.5*	16.8*	0.0	30.6*
11	7	1.3	2.45	1.72	1.11*	1.39*	0.0	48.2	30.0*	10.9*	10.9*
12	4	0.9	–	–	4.01*	3.08*	12.4*	0.0	68.8	0.0	18.8*
13	6	1.6	0.15*	0.40*	3.32	2.42	15.5*	0.0	45.4	26.8*	12.4*
14	9	2.5	0.05*	0.23*	3.16	2.52	13.9*	63.6	13.1*	9.4*	0.0
15	12	3.2	–	–	3.27	2.39	31.0	27.2	22.7*	0.0	19.1*

* relative standard error \geq 40%

School Dental Service examinations

Table 9 describes the percentage of children who were new patients (having had no previous dental examination) in the Tasmanian School Dental Service. The figure was highest for the youngest ages (6 years or less) while no more than 6% of those aged 8 years or more had had no previous examination. This pattern is expected and indicates that most patients are enrolled during their early school years.

Table 9: School Dental Service examinations – age-specific distribution

Age	Children examined <i>n</i>	Previous examination in School Dental Service		
		No %	Yes %	Unknown %
≤4	484	77.0	22.9	0.1*
5	509	48.9	50.9	0.2*
6	543	15.1	84.6	0.3*
7	547	9.7	89.9	0.5*
8	574	4.9	95.0	0.1*
9	528	2.9	96.4	0.7*
10	528	4.6	94.4	0.9
11	494	3.7	96.1	0.2*
12	401	4.4	94.8	0.8*
13	354	2.5	97.1	0.4*
14	348	6.0	93.6	0.4*
15	309	3.5	95.7	0.8*

* relative standard error ≥ 40%

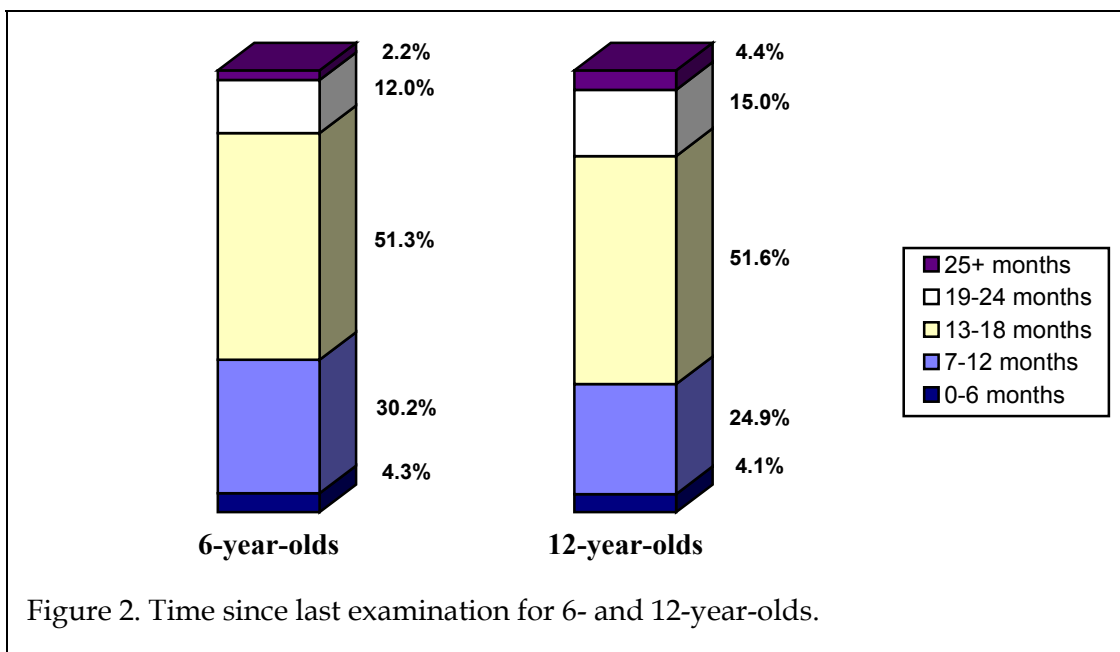
Table 10: School Dental Service examinations – time since last visit

Age	Children <i>n</i>	Months since last visit					mean	SD
		0–6 %	7–12 %	13–18 %	19–24 %	25+ %		
≤4	111	11.3	45.5	35.0	7.1	1.2*	11.92	4.62
5	259	2.7	44.0	42.5	7.4	3.4	13.73	6.35
6	459	4.3	30.2	51.3	12.0	2.2	14.25	4.57
7	492	3.0	30.3	45.8	16.5	4.4	15.09	5.40
8	546	2.9	25.9	49.3	16.0	5.9	15.23	5.38
9	509	2.2	25.3	54.2	14.9	3.4	15.10	4.91
10	498	2.4	24.3	49.9	17.1	6.2	15.92	7.28
11	474	2.4	21.9	52.9	17.2	5.6	15.66	4.88
12	380	4.1	24.9	51.6	15.0	4.4	15.38	7.18
13	344	1.1	27.3	46.4	16.6	8.6	16.14	6.25
14	326	3.8	27.1	43.6	13.3	12.1	16.92	8.69
15	296	3.0	21.7	39.6	15.8	19.8	18.85	9.89

* relative standard error ≥ 40%

Table 10 refers only to children with previous examinations and indicates the time since their last dental examination. Approximately 22–30% of children in most ages received examinations within 7 to 12 months of their previous examination. A re-examination interval of 13–18 months years occurred for the majority of children (between 39.6% and 54.2% of 5–15 year-olds). Re-examination within 6 months was uncommon for all age groups while re-examination after a period of more than 18 months occurred increasingly among older children. Mean time since last examination ranged from 11.92 months for the youngest children to 18.85 months for 15-year-olds.

Average recall periods for 6- and 12-year-old children are shown in Figure 2.



Changes in dental service examination patterns since 1998

There was little difference in 1999 compared to 1998 in the percentages of children who had had a previous examination with the School Dental Service. Of those school-aged children who had received a previous examination, there was an increase for all age groups in the mean time since last examination. This was reflected in an increase in the percentages of children who had had their last examination 19–24 months previously.

Percentage of children with dmft = 0, DMFT = 0 and d+D ≥ 4

Figure 3 presents data contained in Tables 3, 5 and 6 and summarises percentage of children with no caries experience and the extent of more extensive untreated decay, represented by the percentage with d+D=4 or more.

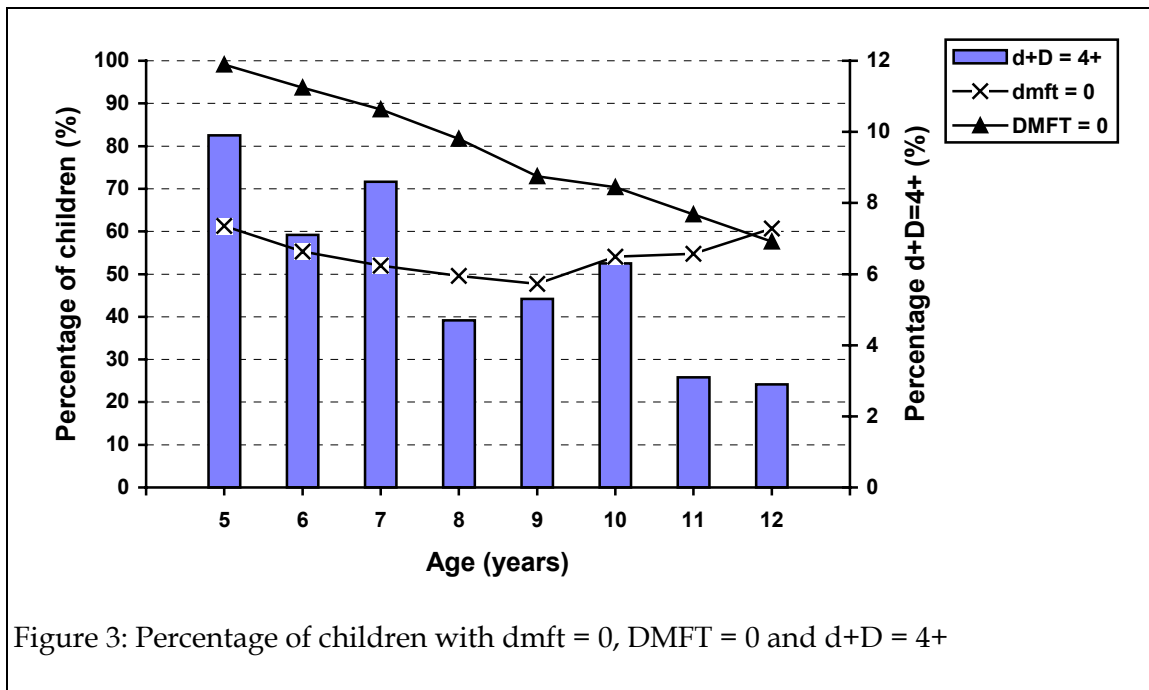


Figure 3: Percentage of children with dmft = 0, DMFT = 0 and d+D = 4+

Caries experience by geographical region

Table 11 presents deciduous caries experience data for each of the regions used in this report. Considerable variation can be seen in caries experience for the selected 5–6-year-old age group across geographical areas. Among these children, mean decay scores in the deciduous dentition ranged from 0.57 in Hobart to 1.16 in the Northern region. The mean number of teeth missing due to caries was highest in the Southern region while the mean number of filled teeth was highest in the North West region, the lowest being in Hobart. Mean dmft scores in the Southern, North West and Northern regions were approximately twice those found in Hobart. Consistent with these findings, the highest percentage of 5-6-year-olds with no recorded caries experience was in Hobart while the lowest was in the Southern and North West regions.

Table 11: Deciduous caries experience for 5–6-year-old children by region

	Children	Decayed (d)		Missing (m)		Filled (f)		dmft		dmft = 0
	<i>n</i>	mean	SD	mean	SD	mean	SD	mean	SD	%
Hobart	165	0.57	1.45	0.02	0.31	0.30	0.91	0.89	1.78	68.5
Southern	187	0.99	1.87	0.17	1.16	0.62	1.39	1.79	2.85	55.6
Northern	289	1.16	2.02	0.08	0.70	0.57	1.38	1.81	2.77	52.9
North West	391	0.90	1.78	0.08	0.58	0.84	1.87	1.82	3.06	55.5

The mean number of clinically detectable decayed teeth in 12-year-olds (see Table 12) was also highest in the Northern region, with mean scores again lowest in the Hobart region. The mean number of filled teeth was highest in the North West (mean = 0.88) and Northern (mean = 0.85) regions and lowest in Hobart (mean = 0.44) and this pattern was repeated in mean DMFT scores, being 1.39 and 1.45 in the North West and Northern regions respectively and 0.74 in Hobart. Seventy-four percent of 12-year-olds in the Hobart region had no history of caries experience in their permanent dentition, while only 46.9% and 46.0% of 12-year-old children in the Northern and North West regions had a DMFT score of zero.

Table 12: Permanent caries experience for 12-year-old children by region

	Children	Decayed (D)		Missing (M)		Filled (F)		DMFT		DMFT = 0
	<i>n</i>	mean	SD	mean	SD	mean	SD	mean	SD	%
Hobart	77	0.27	0.72	0.03	0.16	0.44	1.20	0.74	1.60	74.0
Southern	60	0.38	1.09	0.13	0.60	0.55	1.24	1.07	1.89	60.0
Northern	98	0.57	1.03	0.03	0.30	0.85	1.30	1.45	1.75	46.9
North West	161	0.50	1.01	0.01	0.16	0.88	1.43	1.39	1.80	46.0