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The Child Dental Health Survey, Tasmania 2001

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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 report also provides selected trends, highlighting differences between the years 1997 and 2001. However, no formal hypothesis tests have been undertaken and descriptions of differences between years are intended as a guide to the reader rather than as a formal statistical evaluation.

Sources of subjects and sampling

The data for this report were collected during the 2001 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 small number of cases with apparent errors that could not be reconciled were removed from the data set.

Data analysis

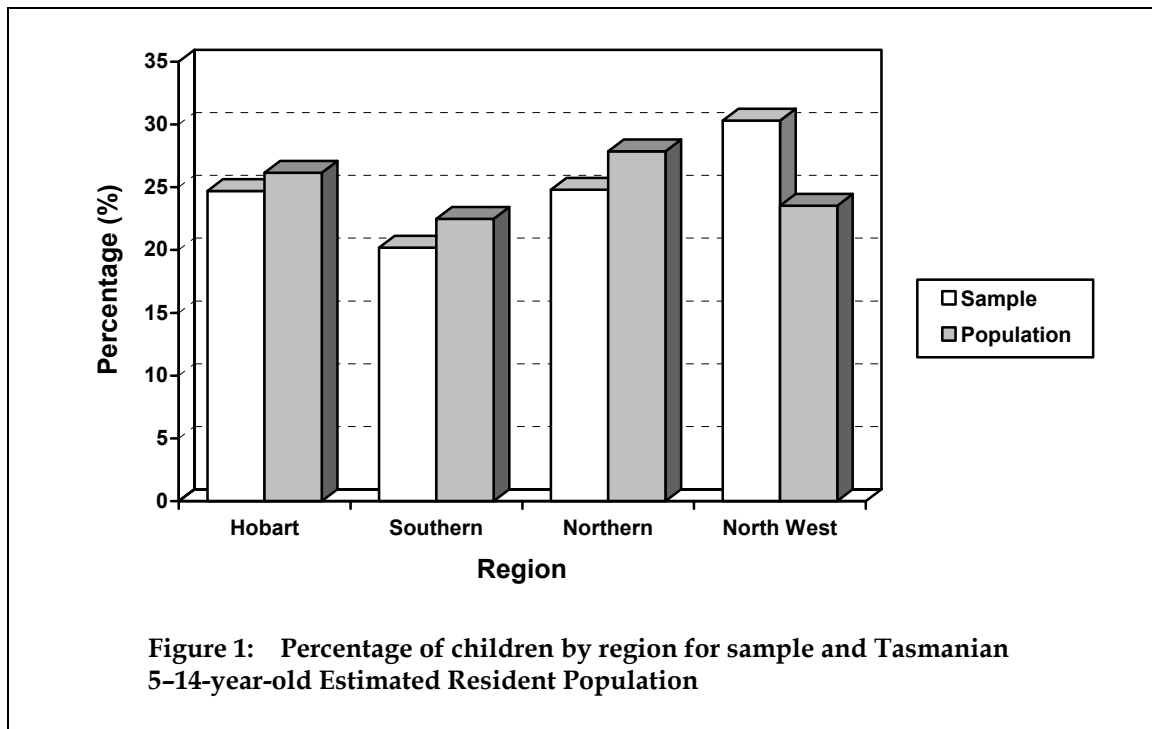
Data were weighted for all analyses to more accurately reflect the child population in Tasmania for 2001. Weights were applied according to region, as used by the Tasmanian Department of Health and Human Services. The Hobart region was taken to comprise the Statistical Local Areas of Hobart Inner, Hobart 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, Southern and Northern regions were initially under-represented in the sampling whereas children from the North West region 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 2001.

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).

The purpose of the weighting protocol is to produce estimates that are representative of the population covered by the School Dental Service for 2001. However, the estimates in this report cannot be applied to children who are not enrolled in the Tasmanian School Dental Service. Consequently, the results in this report do not represent the complete Tasmanian child population, but only that portion of the population that is enrolled in the Tasmanian School Dental Service.

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 8,941 children in the sample for 2001 (see Table 1). There was a relatively even distribution of children aged between 4 and 15 years of age. For all subsequent analyses children aged 2–3 years old were collapsed into a single group. No children aged 16–18 years were sampled in 2001.

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.

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>
2	69	80	0	149	61	73	0	134
3	174	175	1	350	162	160	1	322
4	301	316	2	619	283	297	2	582
5	406	400	2	808	390	378	2	770
6	446	412	2	860	409	378	2	789
7	400	436	1	837	385	421	1	807
8	432	423	2	857	417	403	2	822
9	349	347	1	697	342	365	1	708
10	405	346	1	752	407	338	1	746
11	361	382	3	746	386	398	3	787
12	346	321	1	668	361	331	1	693
13	305	253	0	558	334	285	0	619
14	259	258	0	517	289	281	0	570
15	259	263	1	523	311	281	1	593
Total	4,512	4,412	17	8,941	4,536	4,388	17	8,941

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 1.36 among the 4-year-olds to 0.38 among 12-year-olds. In contrast, the mean number of filled teeth increased with age, from 0.10 for the youngest children to 1.07 for 7- and 8-year-olds, before declining to 0.59 for 12-year-olds due to the exfoliation of deciduous teeth. At age 11, children retained on average only about one-third of the deciduous teeth that were present at age 4. Mean dmft increased to 2.17 for 7-year-olds, before declining into the older age groups.

The ratio of untreated decayed teeth to the total count of decayed, missing, and filled teeth serves as an indicator of how well a child's dental needs are being met. This is presented in Table 3 as the mean of individual children's d/dmft index. For those children up to the age of 3, 87.9% of their dmft score could be attributed to untreated decay. This figure declined systematically with increasing age so that by 11 years of age only 31.5% of children's dmft score was attributable to decay. The percentage of children up to the age of 8 with a dmft score of 0 declined with age. Approximately three-quarters of children up to the age of 3 had dmft = 0 while only 44.5% of children aged 8 had no clinically detectable caries experience.

The ratio of untreated decayed teeth to the total count of decayed, missing, and filled teeth can also be expressed as the ratio of total decay in the population to total decayed, missing or filled teeth in the population (d/dmft ratio), and this is presented in Figure 2. Unlike the mean d/dmft index, the d/dmft ratio refers to the proportion of teeth with caries in the population. Thus, the ratio for 6-year-olds indicates that, among 100 teeth with caries experience among 6-year-olds, 55.1% had untreated decay. The d/dmft ratio shows a similar pattern to that of the mean dmft index, with the percentage d/dmft reducing across increasingly older age groups, declining from 85.1% for the youngest children to 32.2% among 11-year-olds. The percentage of dmft accounted for by filled teeth shows the opposite trend, increasing from 9.9% for children aged up to including 3 years old to 67.0% for 11-year-olds.

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

Age	Children <i>n</i>	Teeth mean	Decayed (d)		Missing (m)		Filled (f)		dmft	
			mean	SD	mean	SD	mean	SD	mean	SD
≤3	456	19.50	0.86	2.00	0.05*	0.67*	0.10	0.67	1.01	2.32
4	581	19.77	1.36	2.46	0.11	0.67	0.23	0.96	1.71	2.85
5	769	19.33	1.05	2.10	0.08	0.55	0.40	1.23	1.53	2.76
6	787	17.20	0.98	1.80	0.13	0.87	0.66	1.48	1.78	2.79
7	804	14.03	0.91	1.55	0.20	1.07	1.07	1.89	2.17	2.92
8	816	12.17	0.86	1.42	0.08	0.50	1.07	1.82	2.01	2.52
9	696	10.59	0.58	1.03	0.04	0.29	0.98	1.70	1.60	2.17
10	677	8.66	0.51	0.94	0.03	0.24	0.91	1.51	1.45	1.93
11	557	6.50	0.37	1.19	0.02	0.18	0.77	1.36	1.15	1.97
12	334	4.89	0.38	0.93	0.01*	0.09*	0.59	1.13	0.98	1.62

* relative standard error ≥ 40%

Table 3: Deciduous teeth – caries experience indices by age

Age	Teeth	Mean d/dmft index		dmft = 0	
		mean	n	%	n
≤3	19.50	117	87.9	456	74.4
4	19.77	231	81.9	581	60.3
5	19.33	296	72.9	769	61.4
6	17.20	355	60.8	787	54.9
7	14.03	443	48.5	804	44.9
8	12.17	453	47.2	816	44.5
9	10.59	342	41.8	696	50.9
10	8.66	346	40.8	677	48.9
11	6.50	229	31.5	557	58.9
12	4.89	123	36.4	334	63.2

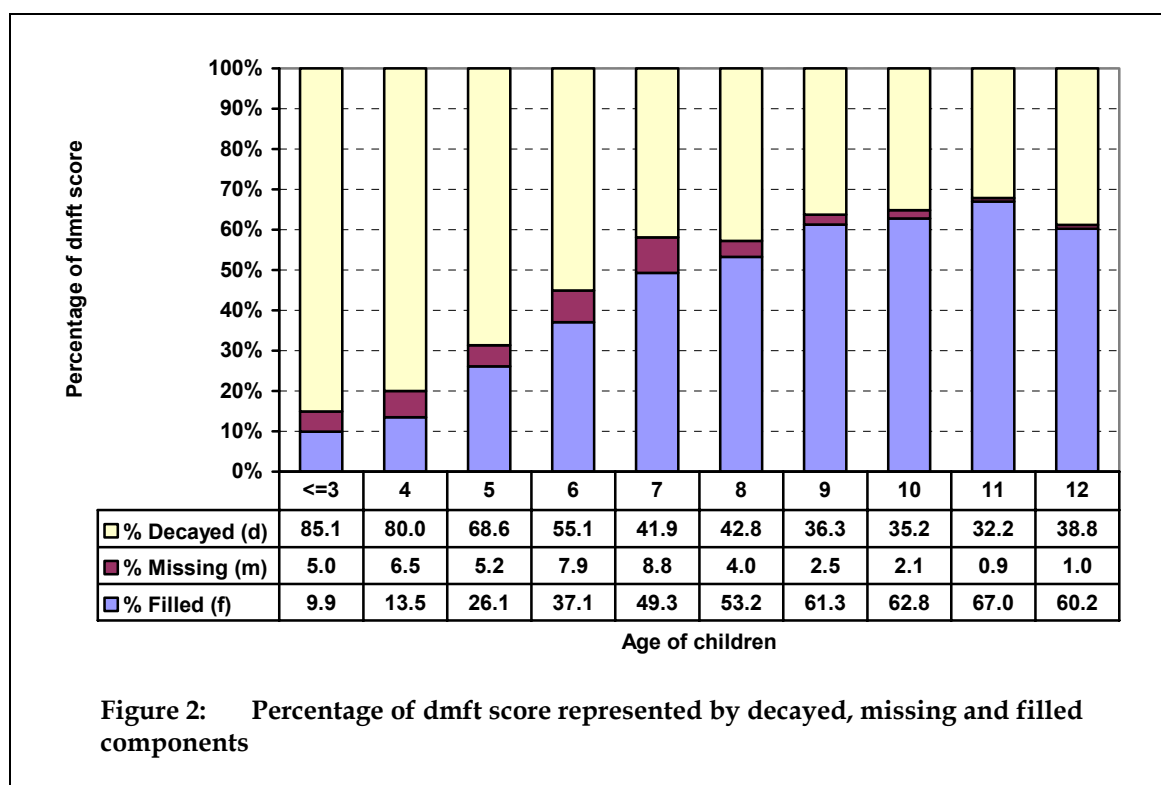


Figure 2: Percentage of dmft score represented by decayed, missing and filled components

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 1.27. The percentage of DMFT due to decay (mean D/DMFT index) declined across age groups, reducing to 46.0% for 15-year-olds (see Table 5). The percentage of 'caries free' children (DMFT = 0) declined regularly with increasing age, from 99.0% for children aged 5 to 49.6% for 12-year-olds, further reducing to 31.8% for 15-year-olds.

The D/DMFT ratio, which refers to the proportion of teeth in the population with caries experience having untreated decay, showed a similar trend to the mean D/DMFT index, declining from 90.9% for 6-year-olds to 46.0% for children aged 15 years old (Figure 3). Both the D/DMFT and F/DMFT ratios stayed relatively constant between the ages of 9 and 15.

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

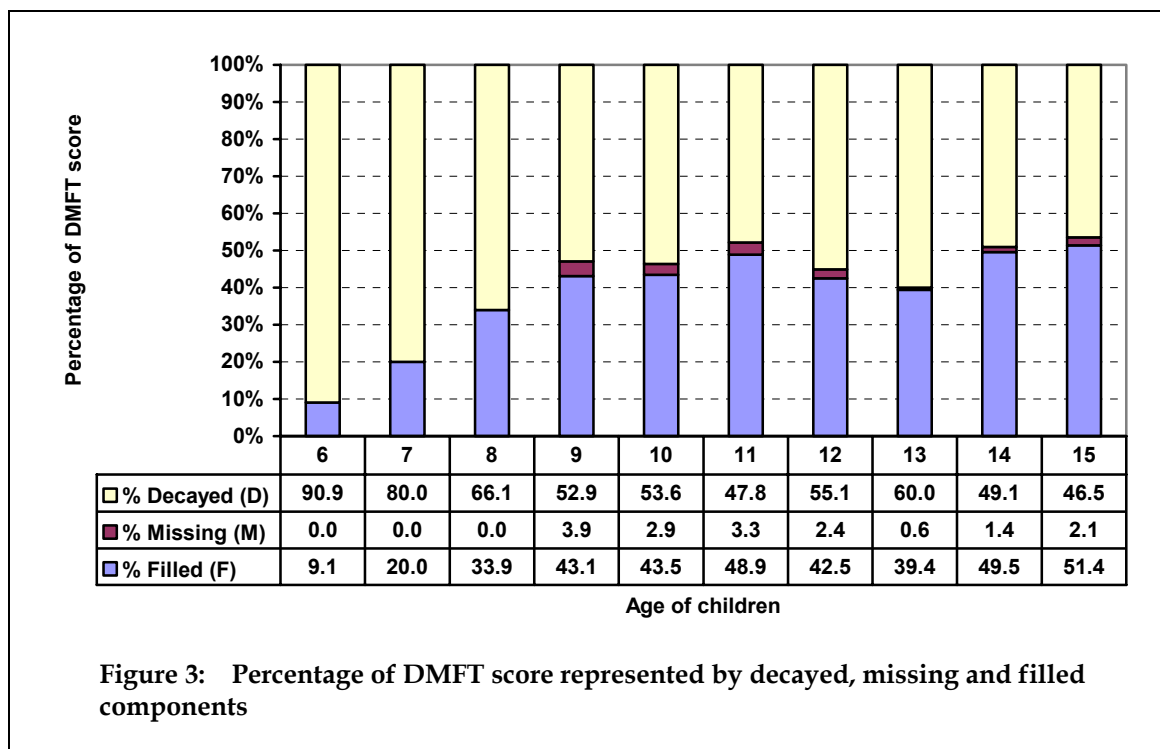
Age	Children <i>n</i>	Teeth mean	Decayed (D)		Missing (M)		Filled (F)		DMFT	
			mean	SD	mean	SD	mean	SD	mean	SD
5	210	3.57	0.00	0.06*	–	–	0.02*	0.29*	0.03*	0.30*
6	611	5.65	0.10	0.42	–	–	0.01*	0.16*	0.11	0.46
7	790	8.85	0.20	0.65	–	–	0.05	0.29	0.25	0.73
8	819	11.23	0.37	0.82	–	–	0.19	0.62	0.56	1.04
9	704	13.27	0.27	0.66	0.01*	0.13*	0.22	0.65	0.51	0.95
10	743	16.16	0.37	0.82	0.01*	0.24*	0.30	0.77	0.69	1.18
11	781	20.67	0.44	0.84	0.03	0.29	0.45	0.92	0.92	1.33
12	689	23.74	0.70	1.26	0.03*	0.31*	0.54	1.02	1.27	1.75
13	617	26.36	1.05	1.80	0.01	0.12	0.69	1.23	1.75	2.24
14	568	27.07	1.07	1.93	0.03*	0.33*	1.08	1.69	2.18	2.76
15	591	27.45	1.33	2.07	0.07	0.47	1.47	2.15	2.86	3.19

* relative standard error \geq 40%

Table 5: Permanent dentition – caries experience indices by age

Age	Teeth mean	Mean D/DMFT index		DMFT = 0	
		<i>n</i>	%	<i>n</i>	%
5	3.57	2	35.0*	210	99.0
6	5.65	42	89.9	611	93.1
7	8.85	113	77.5	790	85.7
8	11.23	244	68.2	819	70.2
9	13.27	202	57.7	704	71.3
10	16.16	252	55.8	743	66.0
11	20.67	342	51.1	781	56.2
12	23.74	347	55.2	689	49.6
13	26.36	354	58.1	617	42.6
14	27.07	352	46.5	568	37.9
15	27.45	404	46.0	591	31.8

* relative standard error \geq 40%



All teeth

It can be seen from Table 6 that between 53.2% and 76.5% of children in any age group were free of untreated clinical decay in the combined deciduous and permanent dentitions ($d+D = 0$). The greatest likelihood of untreated decay occurred for 8-year-olds. However, the most extensive levels of untreated clinical decay ($d+D = 5$ or more) occurred in the younger children.

While more than 95% of children in any age group did not have any deciduous or permanent teeth missing due to caries, considerably lower percentages presented without fillings. The percentage of children without fillings decreased to 57.8% for 8-year-olds, increased to 61.8% for 13-year-olds, and then decreased 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 74.4% among the youngest children to 35.9% at age 8. The percentage varied between 31.4% and 43.7% among the older ages.

Table 6: All teeth – age-specific caries experience

Age	Children <i>n</i>	d + D =						m+M = 0	f+F = 0	dmft+ DMFT = 0
		0	1	2	3	4	5+			
		%	%	%	%	%	%	%	%	
≤3	456	76.5	5.7	3.7	5.2	2.6	6.2	99.1	96.3	74.4
4	582	63.8	8.0	7.2	4.7	6.0	10.3	96.4	91.3	60.2
5	770	67.3	9.7	6.7	5.9	3.2	7.2	97.0	85.7	61.4
6	789	61.6	13.1	9.3	5.7	4.3	6.1	96.4	75.7	53.3
7	807	56.2	16.8	10.7	6.7	4.3	5.3	95.1	62.8	42.2
8	822	53.2	15.2	13.8	7.4	4.0	6.4	96.2	57.8	35.9
9	708	58.1	20.0	11.0	4.9	3.7	2.4	97.1	59.8	41.3
10	746	60.2	16.1	12.8	5.4	3.1	2.4	97.6	59.4	40.1
11	787	63.0	19.7	10.1	3.5	2.0	1.8	97.3	60.4	43.7
12	693	60.1	15.9	11.6	6.1	3.5	2.7	98.4	61.0	41.1
13	619	54.4	18.4	12.0	5.3	2.9	7.1	98.4	61.8	36.5
14	570	60.1	14.1	10.7	5.2	3.7	6.2	98.8	56.6	36.9
15	593	53.8	14.9	11.3	5.9	6.8	7.3	96.8	49.1	31.4

* relative standard error ≥ 40%

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, 23.2% of 12-year-olds with permanent caries experience (DMFT ≥ 1) had fissure sealants, compared with 11.1% among those with DMFT = 0.

Table 7: Fissure sealants – age-specific experience

Age	Children <i>n</i>	Sealants		Students with sealants			
		mean	SD	DMFT = 0		DMFT ≥ 1	
				<i>n</i>	%	<i>n</i>	%
6	611	0.05	0.39	568	1.3	42	9.3
7	790	0.16	0.69	676	5.1	113	14.2
8	819	0.32	0.95	575	10.6	244	17.7
9	704	0.42	1.10	502	10.7	202	24.3
10	746	0.41	1.10	491	11.1	252	22.2
11	781	0.48	1.19	439	15.3	342	21.3
12	689	0.44	1.12	342	11.1	347	23.2
13	617	0.58	1.34	263	13.2	354	27.2
14	568	0.55	1.49	215	10.8	352	21.8
15	591	0.72	1.55	188	20.4	404	23.9

* relative standard error ≥ 40%

Immediate treatment needs

As shown in Table 8, only a small number of children were indicated as being in immediate need of treatment (less than 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.

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	%	%	%	%	%
≤3	10	2.2	3.47	3.85	–	–	7.7*	48.2	0.0	11.0*	33.1
4	9	1.6	3.14	2.11	–	–	8.3*	24.2*	22.9*	12.1*	32.5
5	12	1.6	4.04	4.30	–	–	16.1*	24.2	7.2*	18.1*	34.5
6	16	2.1	4.59	3.75	–	–	19.7	10.9*	11.8*	23.4	34.2
7	15	1.8	3.11	1.64	0.36*	1.47*	16.9*	33.7	35.7	7.7*	5.9*
8	12	1.5	2.75	3.14	1.10	1.20	7.7*	45.4	13.6*	18.5*	14.7*
9	14	1.9	2.12	1.79	0.93	1.27	24.1	34.5	0.0	5.6*	35.8
10	9	1.2	2.20	2.21	0.99*	1.36*	37.6	56.5	5.9*	0.0	0.0
11	14	1.8	0.56*	1.55*	1.10	0.78	0.0	87.6	12.4*	0.0	0.0
12	8	1.1	0.38*	0.74*	2.01	1.69	38.6	0.0	28.4*	33.0	0.0
13	7	1.1	0.16*	0.58*	2.11	1.40	21.6*	45.0	33.5*	0.0	0.0
14	3	0.5*	0.78*	1.20*	1.93	1.03	0.0	31.7*	29.3*	39.0*	0.0
15	11	1.9	–	–	3.71	2.52	9.8*	40.8	26.0	0.0	23.3*

* relative standard error ≥ 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 (5 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 10 refers only to children with previous examinations and indicates the time since their last dental examination. Approximately 25–40% 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 39.9% and 50.2% 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 11.39 months for the youngest children to 18.16 months for 15-year-olds.

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

Age	Children examined	Previous examination in School Dental Service		
		Yes	No	Unknown
	<i>n</i>	%	%	%
≤3	478	29.3	70.7	0.0
4	621	44.7	55.3	0.0
5	819	56.3	43.5	0.2*
6	864	82.2	17.6	0.2*
7	837	89.9	9.9	0.2*
8	859	93.4	5.9	0.7
9	698	95.2	4.6	0.2*
10	754	95.5	4.5	0.0
11	752	95.6	4.3	0.1*
12	668	95.5	3.7	0.8
13	559	96.5	3.5	0.0
14	514	97.2	2.8	0.0
15	518	96.1	3.7	0.2*

* relative standard error ≥ 40%

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

Age	Children	Months since last visit					mean	SD
		0–6	7–12	13–18	19–24	25+		
	<i>n</i>	%	%	%	%	%		
≤3	138	14.7	40.4	35.5	6.8	2.5*	11.39	5.98
4	270	11.3	42.3	38.2	4.9	3.3	12.57	5.15
5	455	6.6	39.5	41.6	7.2	5.0	13.51	5.55
6	704	6.6	35.3	46.3	8.8	3.0	13.53	4.86
7	749	5.9	31.6	45.6	8.9	8.0	14.67	6.73
8	798	6.3	32.6	45.8	8.5	6.8	14.58	7.48
9	660	3.7	28.9	46.5	10.2	10.7	15.86	8.18
10	720	2.6	31.8	45.8	10.4	9.3	15.51	7.55
11	719	3.9	27.6	47.9	9.6	10.9	16.36	10.38
12	634	3.1	25.5	50.2	9.7	11.5	16.31	10.06
13	539	1.7	26.8	43.6	11.3	16.7	17.67	9.54
14	498	2.5	25.3	42.9	11.6	17.7	17.54	9.24
15	495	2.7	28.4	39.9	12.5	16.6	18.16	11.08

* relative standard error ≥ 40%

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 0.70 in Hobart to 1.08 in the North West region. The mean number of teeth missing due to caries was highest in the Northern region while the mean number of filled teeth was highest in the Northern and North West regions, the lowest being in Hobart. Mean dmft scores in the Southern, North West and Northern regions were approximately 30–75% higher than those 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 Northern 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	387	0.70	1.51	0.08	0.66	0.35	1.07	1.13	2.16	68.0
Southern	365	1.02	1.87	0.07	0.45	0.41	1.15	1.50	2.56	57.8
Northern	450	1.07	2.00	0.14	0.92	0.75	1.66	1.96	3.07	53.3
North West	466	1.08	2.17	0.09	0.53	0.76	1.61	1.93	2.99	54.7

The mean number of clinically detectable decayed teeth in 12-year-olds (see Table 12) was highest in the North West region, with mean scores lowest in the Northern region. The mean number of filled teeth was again highest in the North West (mean = 0.74) region and lowest in the Southern (mean = 0.46) and Hobart (mean = 0.47) regions. Mean DMFT scores were highest in the North West (mean = 1.47) and lowest in the Southern region (mean = 1.04). Approximately 56% of 12-year-olds in the Southern and Hobart regions had no caries experience in their permanent dentition, while only 44.8% of 12-year-old children in the North West region 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	169	0.65	1.21	0.05	0.44	0.47	0.93	1.17	1.67	56.2
Southern	138	0.58	1.07	0.00	0.00	0.46	0.98	1.04	1.71	56.5
Northern	160	0.54	1.29	0.01	0.16	0.64	1.20	1.19	1.85	53.1
North West	201	0.68	1.22	0.04	0.41	0.74	1.18	1.47	1.93	44.8

Selected trends, 1997–2001

Presented below is a table and a series of figures of selected 5-year trends across the period 1991–2001. Trends are provided for sample size, deciduous and permanent caries experience, fissure sealants and time since last visit.

Table 13: Sample size and percentage of total sample by region, 1998–2001

Region	1998		1999		2000		2001	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Hobart	1193	20.1	938	16.7	1688	25.7	2209	24.7
Southern	1186	20.0	872	15.5	992	15.1	1804	20.2
Northern	1724	29.1	1592	28.3	1439	21.9	2216	24.8
North-West	1818	30.7	2220	39.5	2443	37.2	2707	30.3
<i>Total</i>	<i>5921</i>	<i>100.0</i>	<i>5622</i>	<i>100.0</i>	<i>6562</i>	<i>100.0</i>	<i>8936</i>	<i>100.0</i>

