

# The Child Dental Health Survey, Australia 1997

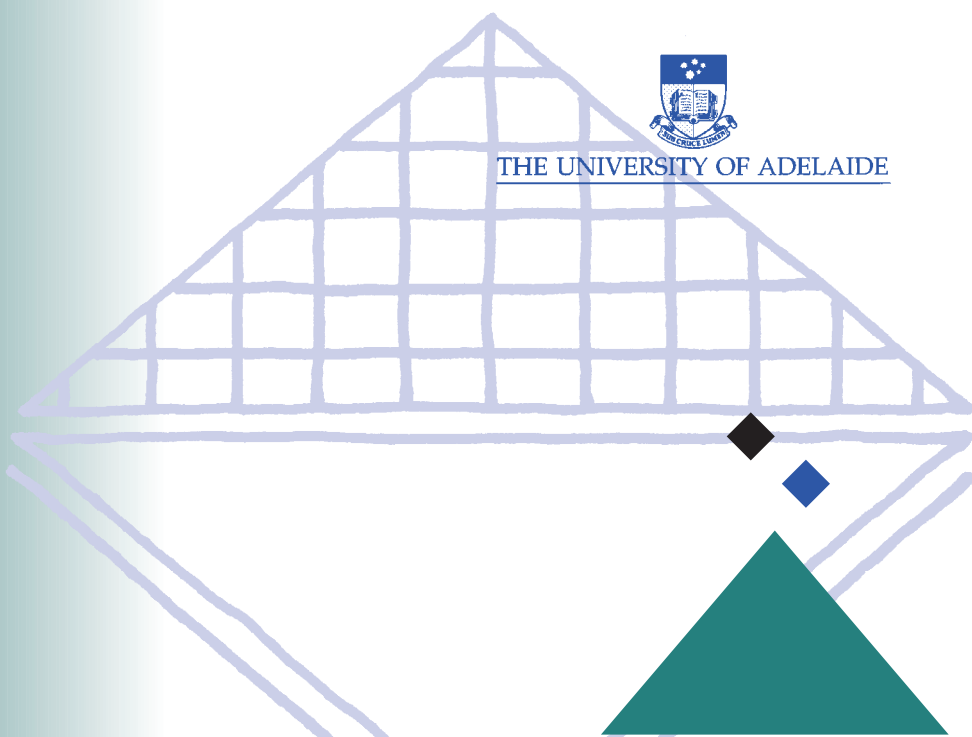
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**JM Armfield  
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**2000**

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# Abbreviations

d	deciduous decayed teeth
D	permanent decayed teeth
dift	deciduous decayed, indicated for extraction and filled teeth
dmft	deciduous decayed, missing (due to caries) and filled teeth
DMFT	permanent decayed, missing (due to caries) and filled teeth
f	deciduous filled teeth
F	permanent filled teeth
m	deciduous teeth missing due to caries
M	permanent teeth missing due to caries
SD	standard deviation



## **Purpose of the report**

This report provides descriptive epidemiological and service provision data concerning children's dental health in Australia. Data for the report have been derived from the Child Dental Health Survey which monitors the dental health of children in each State and Territory of Australia. The tables and figures contained in this report describe the demographic composition of the sample, deciduous and permanent caries experience, extent of immediate treatment needs, prevalence of fissure sealants and other relevant information. State/Territory comparisons follow the national tables and precede an examination of selected national trends. The report also presents a description of the Survey methods and discussion of the findings presented in the national tables.

## **Description of survey methods**

### **Source of subjects**

Data for the report have been derived from the Child Dental Health Survey, which monitors the dental health of children enrolled in school dental services operated by the health departments or authorities of Australia's six State and two Territory governments. In New South Wales the School Dental Service has adopted a targeted State-wide screening program termed Save Our Kids Smiles (SOKS). Whereas SOKS involves screening children every two years from Kindergarten to Year 8, the other school dental services provide dental care principally to primary school aged children. The care typically provided by the school dental services includes dental examinations, preventive services and restorative treatment as required. However, there are some variations among State and Territory programs with respect to priority age groups and the nature of services. As a consequence there are variations in the extent of enrolment in school dental services, with some jurisdictions serving more than 80% of primary school children and others serving lower percentages.

### **Sampling**

The data for the Child Dental Health Survey are derived for all States and Territories, except New South Wales, from the routine examinations of children enrolled in the school dental service. At the time of examination children are sampled at random by selecting those born on specific days of the month. Victoria and Tasmania adopt other systematic sampling procedures based on selecting every *n*th case. In New South Wales full enumeration of all available consenting children is carried out. To maintain consistency with previous Child Dental Health Survey reports, the sampling frame previously adopted for New South Wales is retained for the present analyses: that is, of the available children those born on either the 1st or the 30th day of the month have been selected.

Different sampling ratios, and consequently different days of birth, are used across the States and Territories according to the scheme presented in Table 1. National data for the Child Dental Health Survey therefore constitute a stratified random sample of children from the school dental services. Children not enrolled with the school dental service or not consenting to participate in the SOKS program are not represented in the sample. The intention of stratification is to provide approximately equivalent numbers of children from each State or Territory, although differences in administration and local data requirements of the services have created some variation.

It is necessary to be cautious in drawing inferences from age-related trends, particularly among those aged over 12 years. In most States and Territories, access to school dental services for those older children tends to be restricted in comparison with access for younger children. Often the older children must meet special eligibility criteria with the consequence that they may be less representative of their respective age groups within the Australian population than is the case for younger children. Also, in New South Wales and Victoria no children aged older than 14 years are included in the analysis, so current estimates for 15-year-old children do not take those States into account.

**Table 1: Sampling ratios for Australian States and Territories**

State	Sampling Ratio <sup>(a)</sup>	Days of Birth
New South Wales	1:16	1st and 30th
Victoria	1:8	Systematic
Queensland	1:5	1st to 6th <sup>(b)</sup>
	1:15	1st and 6th <sup>(c)</sup>
Western Australia	1:12.5	29th, 30th, 31st
South Australia	1:12	13th, 30th, 31st
	1:5	13th, 26th to 31st <sup>(d)</sup>
Tasmania	1:2.5	Systematic
Australian Capital Territory	1:2.5	1st to 16th
Northern Territory	1:1.9	1st to 16th <sup>(e)</sup>
	1:1	Any <sup>(f)</sup>

(a) Sampling ratios are approximate only.

(b) Includes Brisbane South and Wide Bay regions.

(c) Includes Brisbane North, Central, Darling Downs, Mackay, Northern, Sunshine Coast and West Moreton regions.

(d) From non-metropolitan clinics who have previously participated in the Child Fluoride Study.

(e) Includes Darwin.

(f) Includes all Northern Territory outside of Darwin.

## Data items

Data items in the Child Dental Health Survey are collected at the time of routine clinical examinations conducted by dental therapists and dentists. The recorded characteristics of sampled children encompass demographic information, including the child's age and sex and the birthplace of both child and mother.

The birthplace and the Indigenous status of both patient and mother are considered to be two items essential to a health monitoring survey (Health Targets and Implementation Committee, 1988) and were obtained here from information from the patient's treatment card or medical history. Birthplace categories have been derived from the Australian Bureau of Statistics (1994) in order to ensure the comparability of data obtained from this Survey and other sources such as the Census. Maternal birthplace was chosen as the preferred parental data item. However, birthplace data items are not yet recorded uniformly by each State and Territory: the data reported here for children have been obtained only from the Northern Territory, New South Wales and Queensland, while parental information has been obtained only in Queensland and the Northern Territory. Other States did not collect these data items in 1997.

Service provision information includes the date of current and previous examination (if the child had been examined previously within the school dental service) and is dealt with in detail within State- and Territory-specific reports. Information on last examinations was not collected in New South Wales (where screenings now take place every two years) or Western Australia.

The dental health status of sampled children covers the four areas listed below:

- 1) Deciduous caries experience is recorded as the number of deciduous teeth which are decayed, missing because of dental caries or filled because of dental caries, and is based on the coding scheme of Palmer et al. (1984).
- 2) Permanent caries experience is recorded as the number of permanent teeth which are decayed, missing because of dental caries or filled because of dental caries, and is based on the World Health Organization protocol (WHO, 1987).
- 3) Immediate treatment needs are designated if, in the opinion of the examiner, the child has, or is likely to develop within four weeks, pain, infection or a life-threatening condition (WHO, 1987). In New South Wales, immediate treatment needs are indicated for children assessed as requiring treatment within a 24–48 hour period. Data collected for the current study on immediate treatment needs do not include children from Victoria, Western Australia, Tasmania or the Australian Capital Territory.
- 4) Fissure sealants are recorded as the number of teeth, otherwise sound and not restored, which have a fissure sealant. This data item was introduced in most States and Territories in 1989.

Some data items are not collected uniformly by all States and Territories. Consequently, some of the tables in this report refer only to specific States and Territories.

The diagnostic criteria employed are based on the clinical judgement of the examining dental therapist or dentist. They follow written criteria for the data items described above; however, there are no formal sessions of calibration or instruction in diagnosis undertaken for the purpose of the Survey and there are no repeat examinations for the purpose of assessing inter- or intra-examiner reliability.

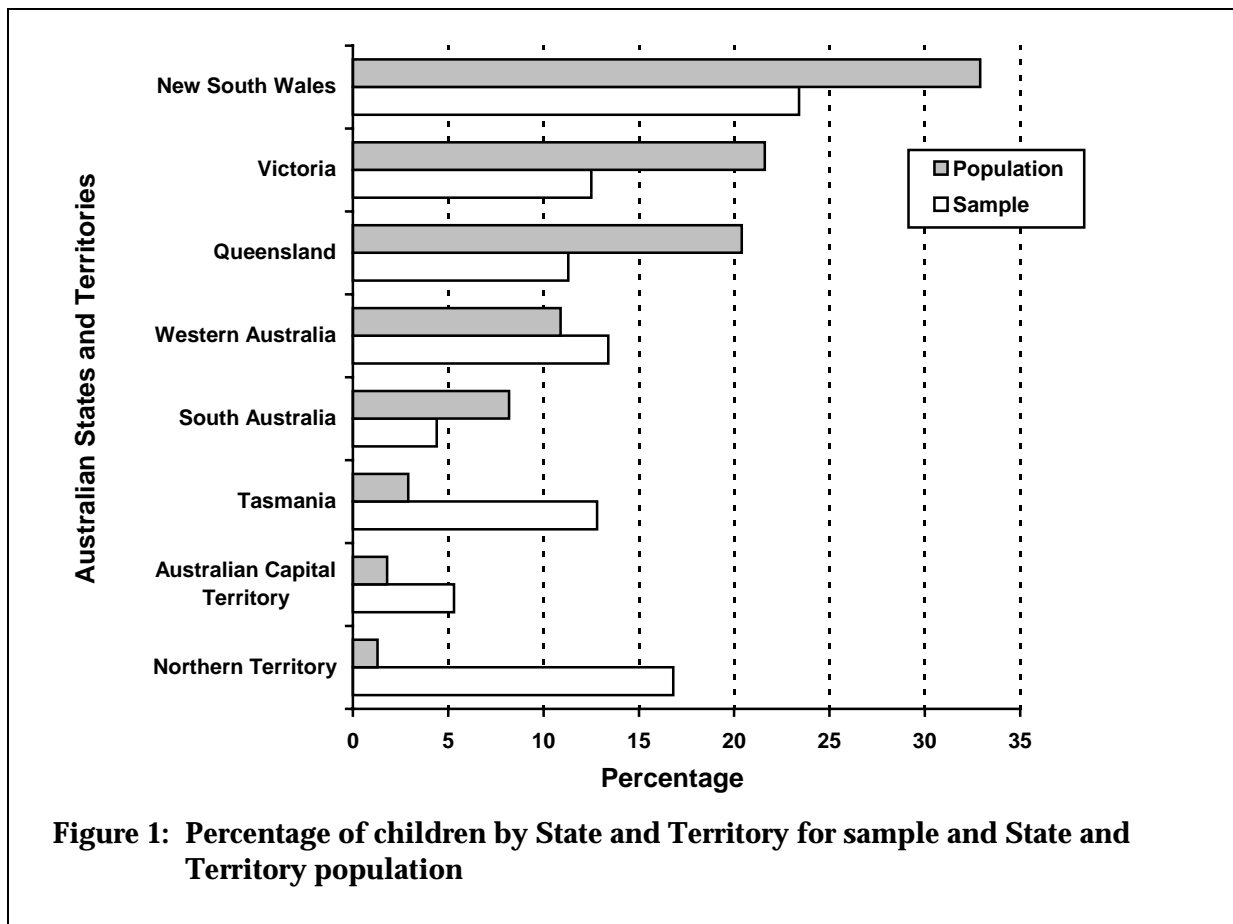
## **Data analysis and weighting of data**

National data contained in this report consist of counts, means, standard deviations and percentages which have been weighted to represent the relevant State/Territory-specific population of children aged 4–15 years inclusive. Where computed State or Territory age-specific indices resulted in a relative standard error exceeding 40% the age group for that jurisdiction was excluded from the analysis. As a result, 15-year-old children from New South Wales (sample  $n = 23$ ) were excluded, as were both 4-year-old and 15-year-old children from Victoria (sample  $ns = 12$  and 8 respectively).

The weighting procedure is necessary since the Australian sample is stratified by State/Territory to provide approximately equivalent numbers of cases in each jurisdiction. Unweighted estimates would result in over-representation by children from less populous States/Territories and under-representation by those from more populous jurisdictions. The relative sample sizes and population estimates by State and Territory as a percentage of the total sample and Australian population (4–15 years of age) are shown in Figure 1.

The weighting method follows standard procedures for weighting stratified samples using external data sources (Foreman, 1991). State/Territory estimates (ABS, 1998) of the 1997 Estimated Resident Population within individual ages are used to provide numerators for weights which are divided by the age-specific number of cases in the sample from respective States/Territories. Hence, observations from more populous States achieve relatively greater weight. The stratum-specific weights are further divided by the national Estimated Resident Population and total sample size to achieve numerical equivalence between the weighted sample and the original number of processed records.

Within each State and Territory, data were also weighted according to either sampling frame or region of sampling, this being consistent with statistical analyses presented in State- and Territory-specific reports. In 1997 data within Victoria, Queensland, South Australia, Tasmania and the Northern Territory were weighted on the basis of area of sampling and sampling frame so as to give a more representative result for that State or Territory. Details of these weighting procedures are provided in the relevant State and Territory reports.



Indices are calculated from data collected over a 12-month period. Where children received more than one examination during this period the information derived from examinations other than the first has been excluded.

### Administration of the Survey

The Child Dental Health Survey has been conducted since 1977. Between 1977 and 1988 it was managed centrally by the Commonwealth Department of Health as an evaluation of the Australian School Dental Scheme. In 1989 responsibility for the national data collection was transferred to the Australian Institute of Health and Welfare's Dental Statistics and Research Unit at The University of Adelaide.

# Description of national findings

## Number in sample and Estimated Resident Population

There was a total of 80,727 children aged between 4 and 15 years inclusive reported for the 1997 calendar year. Children aged 3 years or less and those aged 16 years or more were excluded from this sample as the small number of children receiving care in those age groups across Australia results in poor reliability of computed statistics for those ages. Furthermore, children in those ages are outside the main target group of many of the school dental services and it is likely that they have some special characteristics which make them less representative of their respective age groups within the Australian population.

The effects of the statistical weighting procedure can be appreciated from examining Table 2. The relatively large numbers of reported cases from Tasmania and the Northern Territory receive substantially lower weights compared with other States and Territories. Therefore, the weighted cases which were used for estimates listed in subsequent tables represent smaller numbers of children from those jurisdictions. Consequently, the national sample was representative of the relative populations of States and Territories, rather than the number of reported cases.

**Table 2: Number in sample and Estimated Resident Population**

State/ Territory	Processed cases	Estimated Resident Population (ERP)	Weight	Weighted cases
	<i>n</i>	<i>n</i>		<i>n</i>
New South Wales <sup>(a)</sup>	18,914	966,069.97	1.40	26,550.90
Victoria <sup>(b)</sup>	10,102	634,043.40	1.73	17,425.07
Queensland	9,130	598,337.24	1.80	16,440.07
Western Australia	10,810	320,225.49	0.81	8,798.57
South Australia	3,580	241,347.38	1.85	6,632.21
Tasmania	10,358	84,887.22	0.23	2,332.19
Australian Capital Territory	4,305	54,041.94	0.35	1,484.90
Northern Territory	13,528	38,864.27	0.08	1,063.09
<b>Total</b>	<b>80,727</b>	<b>2,937,816.91</b>	<b>1.00</b>	<b>80,727.00</b>

(a) Excludes 15-year-old children.

(b) Excludes 4-year-old and 15-year-old children.

## Birthplace of children and mothers

Information concerning the birthplace of children (see Table 3) was available only for New South Wales, Queensland and the Northern Territory, with 93.3% of these children being born in Australia. For children not born in Australia, the predominant regions of birth were South-East Asia (e.g., Indonesia, Philippines, Vietnam), other countries in Asia (e.g., China, Hong Kong, India) and other English-speaking countries (e.g., New Zealand, USA).

Birthplace of mothers was collected only in Queensland and the Northern Territory. A reported 94.6% of mothers were born in Australia. For mothers not born in Australia, the predominant regions of birth were the Middle East, the United Kingdom and Ireland, and other English-speaking countries, although none of these categories exceeded 1.6%.

**Table 3: Birthplace of children and mothers**

Birthplace	Children		Mothers	
	<i>n</i>	%	<i>n</i>	%
Australia	29,337	93.3	2,826	94.6
United Kingdom and Ireland	175	0.6	37	1.2
Other English-speaking	291	0.9	17	0.6
Southern Europe	132	0.4	11	0.4
Other Europe	103	0.3	1	0.0
Middle East	142	0.5	47	1.6
South-East Asia	396	1.3	16	0.5
Other Asia	629	2.0	9	0.3
Other	222	0.7	25	0.8
<b>Total</b>	<b>31,427</b>	<b>100.0</b>	<b>2,988</b>	<b>100.0</b>

## Indigenous status of children and mothers

Information concerning Indigenous status was available for New South Wales, Queensland and the Northern Territory, where for recipients of school dental service care, 2.9% of children were of Indigenous origin (see Table 4). Information on mothers (collected from Queensland and the Northern Territory only) shows that 29.9% were of Indigenous origin. The difference in percentages between children and mothers is principally due to the difference in the source of data, there being a relatively small percentage of Indigenous people within the NSW population compared to the Northern Territory (which was the source of most of the data for the Indigenous status of mothers).

**Table 4: Indigenous status of children and mothers**

Indigenous status	Children		Mothers	
	<i>n</i>	%	<i>n</i>	%
Non-Indigenous	30,508	97.1	2,096	70.1
Indigenous	919	2.9	892	29.9
<b>Total</b>	<b>31,427</b>	<b>100.0</b>	<b>2,988</b>	<b>100.0</b>

## Deciduous teeth – age-specific caries experience

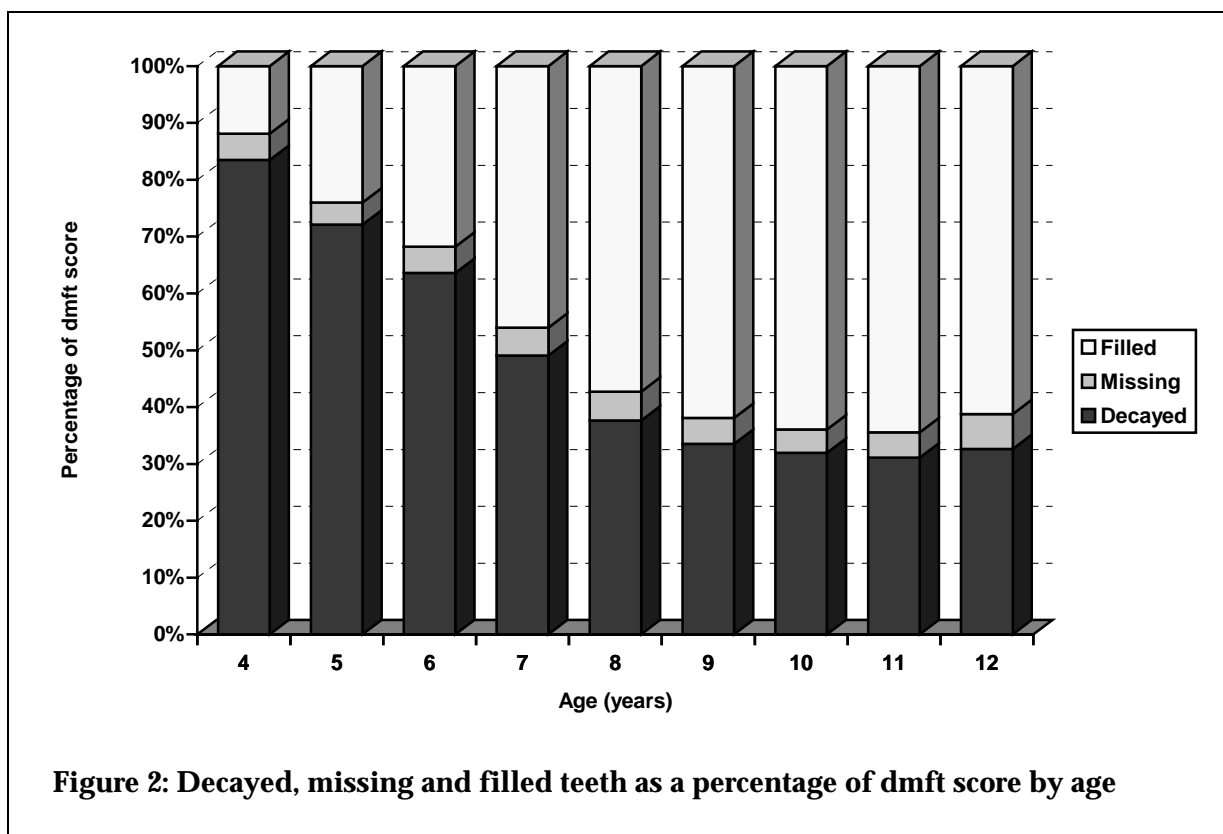
Caries experience in the deciduous dentition is expressed as the mean number of decayed, missing (due to caries) and filled teeth. The means and standard deviations for each of these components for the ages 4 to 12 are given in Table 5. Although there was a small initial increase in the presence of clinically detectable decay from 0.91 among 4-year-olds to 0.96 among 6-year-olds, there was a steady subsequent decline with increasing age. Across all age groups the number of teeth indicated as missing due to caries was small, with scores ranging from 0.03 to 0.09. A different pattern was shown by the mean number of filled teeth, increasing from 0.13 at 4 years of age to 1.09 at age 9, before declining rapidly to 0.30 for 12-year-old children.

The decayed, missing and filled components as a percentage of the dmft index are shown in Figure 2. In the youngest age groups the dmft score is composed principally of clinically detectable decay. However, with the accumulation of restorations placed over time, the majority of the dmft index from the age of 8 years is represented by the presence of fillings. Relative stability in the percentages of decayed, missing and filled teeth occurs between the ages of 9 and 12.



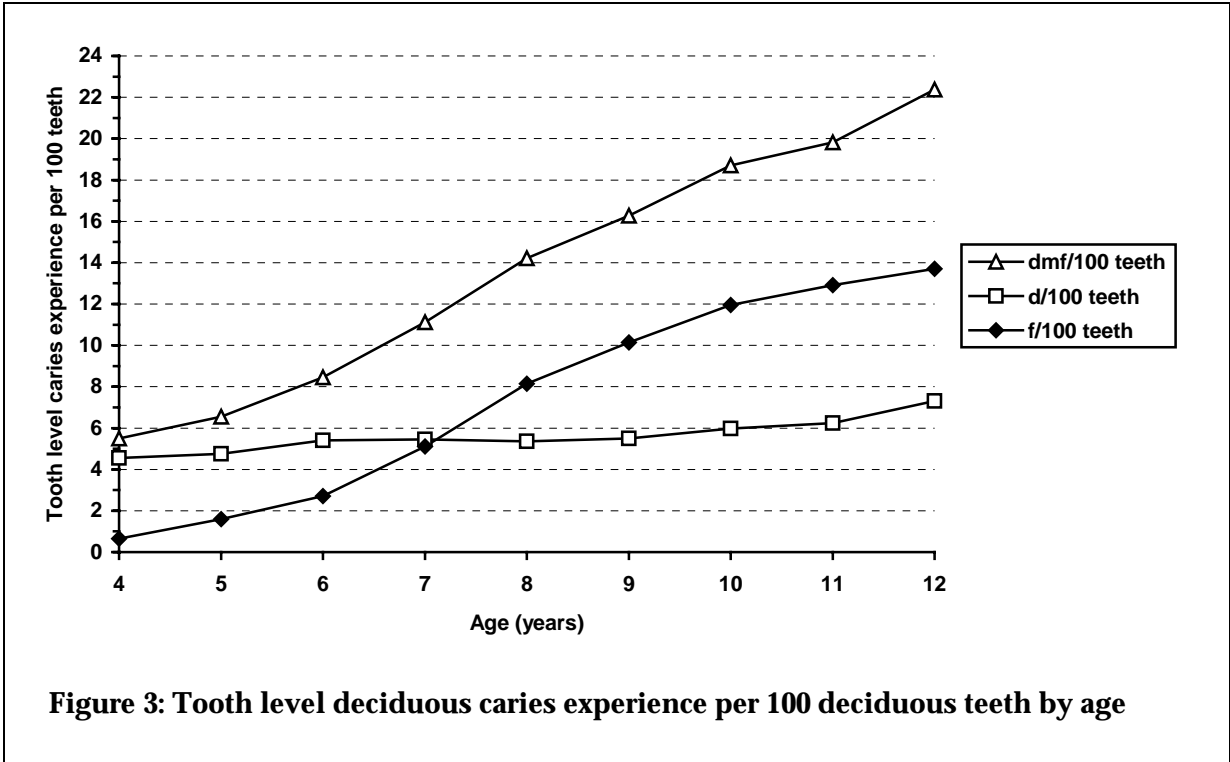
**Table 5: Deciduous dentition – decayed, missing and filled teeth**

Age (years)	Children in sample <i>n</i>	Teeth present mean	Decayed (d)		Missing (m)		Filled (f)	
			mean	SD	mean	SD	mean	SD
4	5,355	19.96	0.91	2.04	0.05	0.48	0.13	0.67
5	7,097	19.50	0.93	2.05	0.05	0.45	0.31	1.19
6	7,224	17.67	0.96	1.99	0.07	0.58	0.48	1.32
7	7,235	14.59	0.80	1.58	0.08	0.50	0.75	1.62
8	7,062	12.44	0.67	1.36	0.09	0.57	1.02	1.80
9	7,004	10.67	0.59	1.16	0.08	0.46	1.09	1.79
10	6,975	7.80	0.47	1.02	0.06	0.43	0.94	1.64
11	7,120	4.45	0.28	0.78	0.04	0.42	0.58	1.27
12	7,065	2.16	0.16	0.56	0.03	0.52	0.30	0.89



Patterns in deciduous caries experience must be interpreted in light of the exfoliation of deciduous teeth with age. Table 5 shows the steady decline in the mean number of deciduous teeth present as children increase in age. From the age of 5 years, children exfoliate on average 2 to 3 deciduous teeth per year, reducing from 19.50 teeth on average at age 5 to an average of 2.16 teeth at age 12.

Figure 3 shows caries experience, expressed in terms of clinically detectable decay, fillings and the mean dmft score, after controlling for the number of deciduous teeth present. Although the mean number of clinically decayed teeth was shown to decrease consistently with age, Figure 3 indicates that this is a product of the exfoliation of deciduous teeth. Indeed, the rate of untreated decay increases with age, from 4.5 teeth per 100 teeth at age 4 to 7.3 teeth per 100 teeth at age 12. The percentage of deciduous teeth with fillings also increases with age and together these caries experience indicators combine to produce a dramatic increase in the dmft index per 100 teeth. The percentage of deciduous teeth which were decayed, missing or filled increased from 5.5% at age 4 to 22.4% for 12-year-old children.



The mean number of decayed, missing (due to caries) and filled teeth (dmft) increased from 1.10 to 1.78 between the ages of 4 to 8 years before declining to 0.49 for 12-year-olds (see Table 6). The d/dmft ratio was highest among younger children and declined to 33.7% for children aged 11 years old. The percentage of children with no deciduous caries experience (dmft=0) also steadily declined across the age range 4 to 9 years, from 70.1% to 49.1%; however, this increased again and at 12 years of age 80.1% of children had no evidence at their examination of caries experience in their deciduous dentition.

The patterns in deciduous caries experience suggest that children enter their school years with moderate caries experience in the deciduous dentition – a large proportion of it manifested as clinically detectable untreated decay (approximately 80% at 4 years of age). With continued treatment in the school dental services, decay experience becomes predominantly represented by past experience, indicated by the presence of fillings, rather than current experience. Despite increasing rates of decay and the accumulation of fillings with age, the exfoliation of teeth results in a reduction in the absolute number of untreated decayed teeth with age and increased numbers of children presenting with no deciduous caries experience.

**Table 6: Deciduous dentition – age-specific caries experience indices**

Age (years)	Children <i>n</i>	Teeth present mean	dmft		d/dmft	dmft=0
			mean	SD	%	%
4	5,355	19.96	1.10	2.36	86.6	70.1
5	7,097	19.50	1.28	2.60	77.6	66.3
6	7,224	17.67	1.50	2.71	67.7	60.2
7	7,235	14.59	1.63	2.54	54.1	54.7
8	7,062	12.44	1.78	2.56	42.1	50.7
9	7,004	10.67	1.75	2.39	38.0	49.1
10	6,975	7.80	1.47	2.19	35.4	54.4
11	7,120	4.45	0.89	1.74	33.7	68.1
12	7,065	2.16	0.49	1.32	35.6	80.1

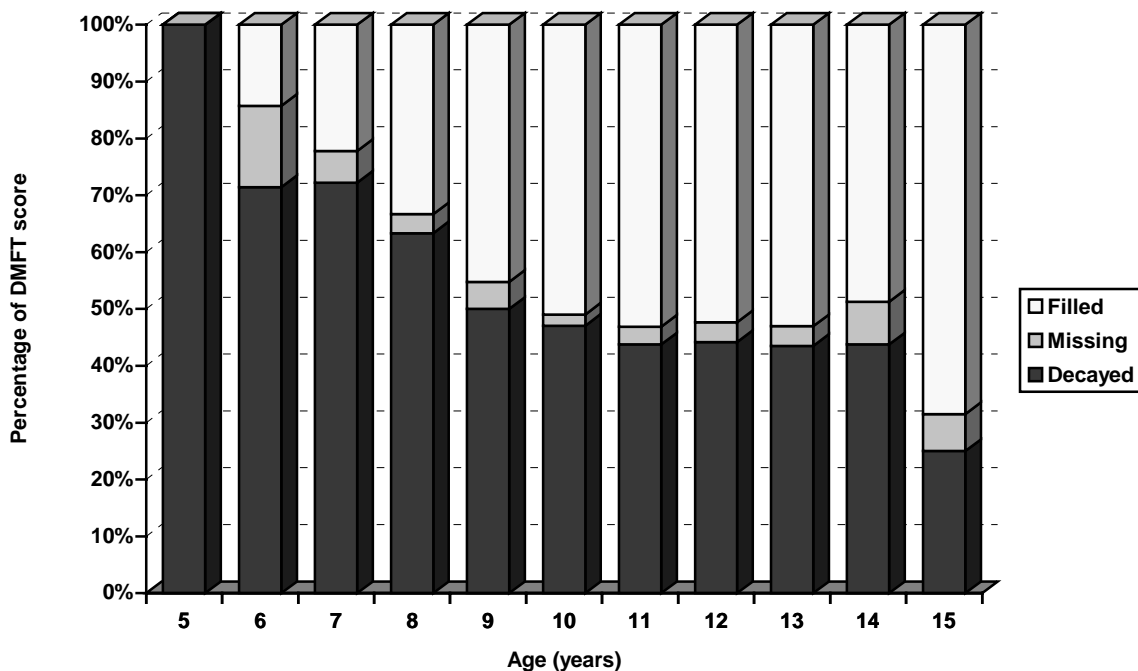
## Permanent teeth – age-specific caries experience

The mean numbers of clinically detectable untreated decayed permanent teeth were smaller than the corresponding means for deciduous teeth across the range of 5 to 10 years (see Table 7). This primarily reflects reduced time-at-risk of those teeth present and, at younger ages, the low number of permanent teeth present. Mean decay for permanent teeth increased with age and continued to increase among older ages (with the exception of 15-year-olds) even though the number of permanent teeth present stabilised by about 13 years of age. The mean number of teeth indicated as missing due to caries was very low for most ages but showed an appreciable increase for 14- and 15-year-old children. The pattern with filled teeth was a more consistent increase across the age ranges, although there was a large increase for 15-year-old children.

The mean number of decayed, missing and filled permanent teeth expressed as percentages of the DMFT index is shown in Figure 4. The pattern is similar to that shown in the deciduous dentition. In the youngest ages the DMFT score is primarily represented by the presence of clinically detectable decay. By the age of 10 years, however, more than 50% of the DMFT score was attributable to filled teeth.

**Table 7: Permanent dentition – decayed, missing and filled teeth**

Age (years)	Children in sample	Teeth present	Decayed (D)		Missing (M)		Filled (F)	
			mean	SD	mean	SD	mean	SD
5	7,097	0.90	0.01	0.23	0.00	0.06	0.00	0.10
6	7,224	4.16	0.05	0.30	0.01	0.44	0.01	0.18
7	7,235	8.41	0.13	0.48	0.01	0.43	0.04	0.28
8	7,062	11.01	0.19	0.58	0.01	0.44	0.10	0.44
9	7,004	12.96	0.21	0.63	0.02	0.45	0.19	0.59
10	6,975	16.21	0.24	0.70	0.01	0.23	0.26	0.70
11	7,120	20.56	0.28	0.74	0.02	0.31	0.34	0.86
12	7,065	23.94	0.38	0.92	0.03	0.30	0.45	1.04
13	7,255	26.20	0.50	1.21	0.04	0.33	0.61	1.26
14	7,241	27.12	0.70	1.73	0.12	0.55	0.78	1.37
15	2,975	27.44	0.50	1.15	0.13	0.65	1.37	2.10



**Figure 4: Decayed, missing and filled teeth as a percentage of DMFT score by age**

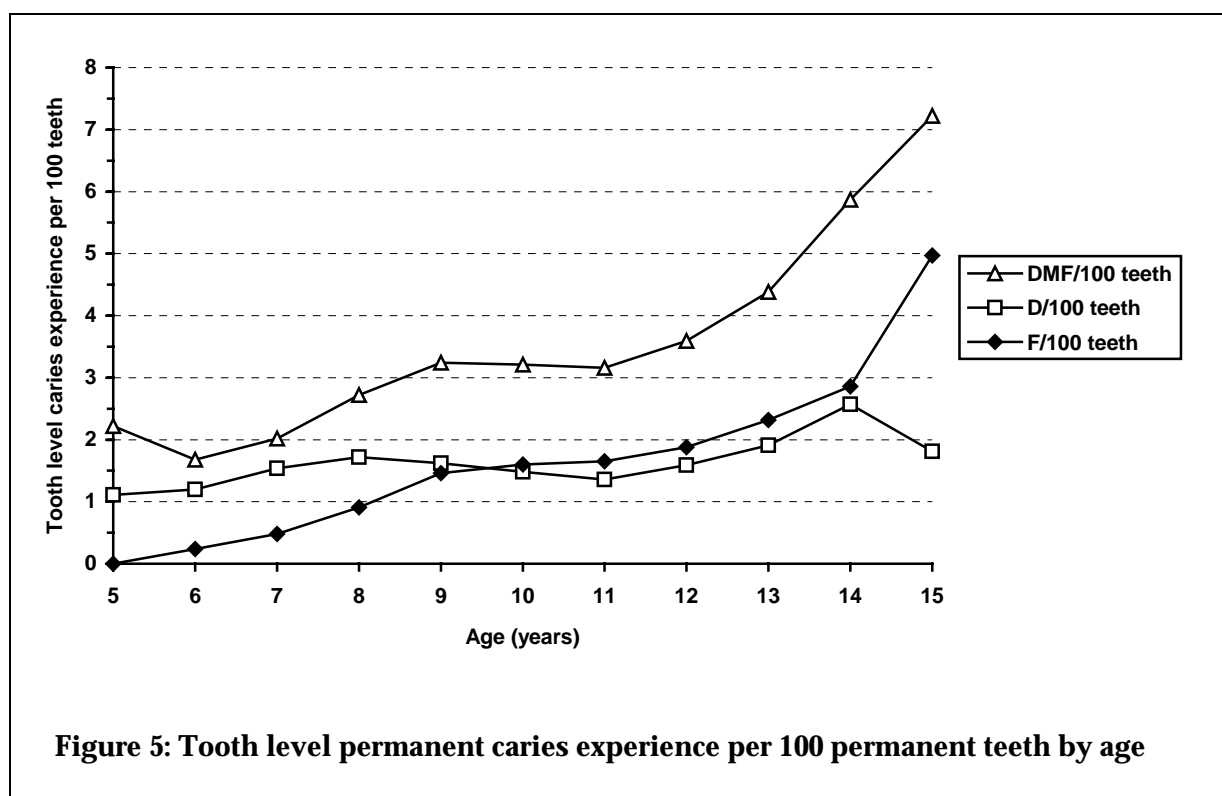
Mean DMFT scores (shown in Table 8) increased consistently with age, from 0.02 at age 5 (when less than 1 permanent tooth on average was present) to 1.99 at age 15 (when an average of 27.44 teeth were present). The mean DMFT score for 12-year-old children was 0.86.

Over 80% of children in each age group 8 years old or less had no permanent tooth caries experience (DMFT=0) and even by the end of their primary school years 61.9% of 12-year-olds had no permanent caries experience (see Table 8). However, by the age of 15 only 41.0% of children presented as caries-free in their permanent dentition.

After controlling for the number of permanent teeth present there is an increase in the rate of caries experience with age, although the trend is not consistent (see Figure 5). Between the ages of 8 and 11, clinical detection of new decay decreases from 1.72 to 1.36 teeth per 100 permanent teeth present. From the age of 11 years DMFT per 100 teeth begins to climb sharply, increasing from 3.16% to 7.22% of teeth at age 15.

**Table 8: Permanent dentition – age-specific caries experience indices**

Age (years)	Children	Teeth present	DMFT		D/DMFT	DMFT=0
	<i>n</i>	mean	mean	SD	%	%
5	7,097	0.90	0.02	0.28	73.6	99.3
6	7,224	4.16	0.07	0.57	89.1	96.5
7	7,235	8.41	0.17	0.71	79.7	89.9
8	7,062	11.01	0.30	0.87	67.1	83.0
9	7,004	12.96	0.42	1.00	53.3	76.8
10	6,975	16.21	0.52	1.05	48.0	72.4
11	7,120	20.56	0.65	1.24	45.4	68.1
12	7,065	23.94	0.86	1.51	45.2	61.9
13	7,155	26.20	1.15	1.90	43.5	56.6
14	7,241	27.12	1.60	2.33	41.5	47.9
15	2,975	27.44	1.99	2.71	25.4	41.0



## All teeth– age-specific caries experience

Table 9 combines components of caries experience from the deciduous and permanent dentition to provide an indicator of the total burden of disease among children receiving care within school dental services.

Untreated clinically detectable decay (d+D of 1 or more) in the combined deciduous and permanent dentition was present for between 26.9% and 37.6% of children in the age range 5 to 15 years. The highest prevalence of untreated decay was observed among 9-year-olds (where only 62.4% had d+D=0) while the greatest severity of clinically detectable untreated decay occurred in the youngest ages (e.g., 9.1% of 5-year-olds had 4 or more teeth with clinically detectable untreated decay). Based on observations from previous tables the largest contribution to caries experience among younger children came from deciduous teeth.

Missing teeth due to caries were relatively uncommon among children aged 5 to 15 years. The percentage of children with no fillings (f+F=0) and no caries experience (dmft+DMFT=0) showed a bimodal distribution, driven by changes in caries experience resulting from the exfoliation of deciduous teeth and the subsequent eruption of the permanent dentition. Among the key age range of 5 to 12 years old, at least 42% of children in any age group had no caries experience in either dentition.

**Table 9: All teeth – age-specific caries experience**

Age (years)	Children <i>n</i>	d+D=						m+M=0	f+F=0	dmft+ DMFT=0
		0	1	2	3	4	5+			
		%	%	%	%	%	%	%	%	%
5	7,097	70.3	9.4	7.4	3.7	2.5	6.6	98.2	89.8	65.9
6	7,224	66.3	11.6	7.9	4.6	3.3	6.3	96.8	82.5	59.1
7	7,233	63.4	14.3	9.2	5.1	3.3	4.7	96.3	72.5	51.7
8	7,062	63.4	15.8	9.3	4.9	2.6	4.1	95.4	62.6	46.2
9	7,004	62.4	17.6	9.9	4.6	2.6	3.0	95.5	57.4	42.4
10	6,975	65.1	16.9	9.2	4.2	2.2	2.4	96.3	57.3	43.5
11	7,120	70.5	15.6	7.5	3.0	1.7	1.7	97.2	63.3	49.8
12	7,065	71.6	15.2	7.0	3.0	1.6	1.6	97.8	66.3	51.6
13	7,147	71.6	13.7	8.7	2.7	1.3	2.0	98.1	68.3	52.2
14	7,238	69.2	14.7	7.0	3.5	2.0	3.6	93.8	63.7	46.0
15	2,975	73.1	14.6	7.0	2.5	1.1	1.7	95.2	49.5	39.8

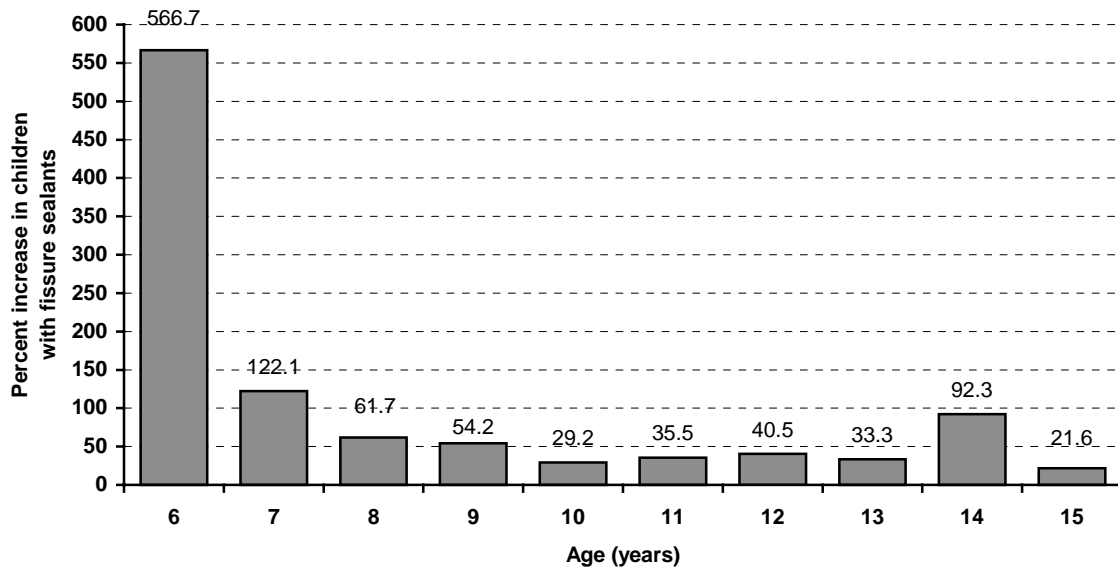
## Fissure sealants – age-specific experience

The mean number of fissure sealants present increased with increasing age (see Table 10) and from the age of 7 years exceeded the mean number of decayed permanent teeth for each respective age group. Children aged 6–14 years with permanent caries experience (DMFT $\geq$ 1) were from 21.6% to 566.7% more likely to have a fissure sealant than children with no permanent caries experience (DMFT=0), and this is presented graphically in Figure 6. As an example, 40.6% of 12-year-old children with DMFT $\geq$ 1 had fissure sealants compared with 28.9% among those with DMFT=0. This can be interpreted as a tendency towards the preferential provision of fissure sealants to children deemed to have a greater likelihood of developing dental caries.

**Table 10: Fissure sealants – age-specific experience**

Age (years)	Children	Sealants		DMFT=0		DMFT $\geq$ 1	
				Children	With fissure sealants	Children	With fissure sealants
	<i>n</i>	mean	SD	<i>n</i>	%	<i>n</i>	%
6	7,224	0.03	0.32	7,004	1.2	256	8.0
7	7,233	0.21	0.80	6,539	6.8	730	15.1
8	7,062	0.48	1.16	5,894	15.4	1,204	24.9
9	7,004	0.72	1.36	5,408	22.9	1,631	35.3
10	6,973	0.85	1.46	5,077	27.7	1,932	35.8
11	7,118	0.90	1.50	4,873	29.0	2,281	39.3
12	7,065	0.97	1.69	4,396	28.9	2,705	40.6
13	7,145	0.96	1.64	4,073	27.9	3,107	37.2
14	7,238	0.98	1.79	3,485	20.9	3,789	40.2
15	2,975	1.01	1.86	1,225	31.0	1,765	37.7





**Figure 6: Percent increase in number of children with fissure sealants between children with DMFT=0 and children with DMFT≥1**

### Immediate treatment needs – age-specific distribution

Immediate treatment need was not recorded in Victoria, Western Australia, Tasmania or the Australian Capital Territory in 1997. Additionally, the protocol for assigning immediate treatment needs in New South Wales differs from other States and Territories with a more imminent expectation of pain required for this classification (24–48 hours, in contrast to a four-week period adopted in other States and Territories). The percentage of children with immediate needs was highest for 13-year-olds (12.1%) and 4-year-olds (12.0%) and lowest for children aged in the middle years of those sampled (see Table 11).

Children with immediate treatment needs were found to have greater caries experience in comparison to children judged not to be in immediate need. Age-specific means for dmft and DMFT tended to be approximately 1½ to 2 times higher than the national averages listed in previous tables. For example, 5-year-olds with immediate treatment needs had a mean dmft of 2.73 (compared with 1.28 in Table 6) and 16.5% had d+D≥5 (compared with 6.6% in Table 9).

**Table 11: Immediate treatment needs – age-specific distribution**

Age (yrs)	Children in need of immediate treatment											
	Children		dmft		DMFT		d+D=					
	<i>n</i>	<i>n</i>	%	mean	SD	mean	SD	1	2	3	4	5+
4	1,376	165	12.0	1.58	2.53	0.00	0.02	4.8	9.3	0.0	9.3	11.8
5	1,410	148	10.5	2.73	3.67	0.01	0.10	11.1	13.4	8.8	5.6	16.5
6	1,393	148	10.6	2.73	3.65	0.10	0.50	16.7	13.2	8.7	1.8	10.1
7	1,395	147	10.6	2.74	3.36	0.20	0.68	18.8	13.7	10.1	10.5	6.5
8	1,355	128	9.4	2.59	2.94	0.43	0.92	18.8	8.2	7.3	4.9	9.7
9	1,340	116	8.7	2.34	2.68	0.68	1.26	19.3	16.6	2.6	0.2	1.7
10	1,299	112	8.6	2.15	2.65	0.82	1.26	24.9	5.5	6.5	2.6	2.7
11	1,381	118	8.5	1.60	2.50	1.21	1.52	19.8	8.6	2.9	2.5	2.6
12	1,370	136	9.9	0.66	1.79	1.52	2.35	21.7	10.5	3.3	3.3	2.3
13	1,409	171	12.1	0.38	1.11	1.46	1.91	21.5	6.7	1.6	1.5	2.9
14	1,481	156	10.5	0.10	0.35	2.14	2.50	12.6	2.0	6.5	0.6	7.9
15	1,406	128	9.1	0.06	0.28	2.60	3.90	28.0	8.6	0.0	0.0	8.6

It should be emphasised that the proportion of those deemed to be requiring immediate treatment reflects both the accumulated amount of dental disease and the methods of targeting and delivering school dental services. For example, clinics which provide care for a relatively small proportion of a population and which assign priority to treating those with symptoms will almost certainly record higher percentages of immediate treatment need than other clinics which have universal coverage of all children on a constant recall basis.

Perhaps the most important interpretation of Table 11 is that a sub-group of children with a substantial burden of dental caries can be identified within school dental services. Their state of poor dental health contrasts with the previous observation that approximately 40–60% of 5- to 14-year-olds have no caries experience.

### **Interstate comparison – 5–6-year-old dmft**

Combined 5- and 6-year-olds represent a standard age group (cited, for example, within World Health Organization publications); this group is, moreover, a useful one to consider in relation to school dental services since it represents, predominantly, the dental health status of children new to these services. Table 12 shows that considerable differences existed across the States and Territories between the lowest mean dmft (New South Wales, mean=0.89) and the highest mean dmft score (Victoria, mean=1.88). In assessing these differences it should be noted that there are historical differences in caries prevalence, as well as marked variations in

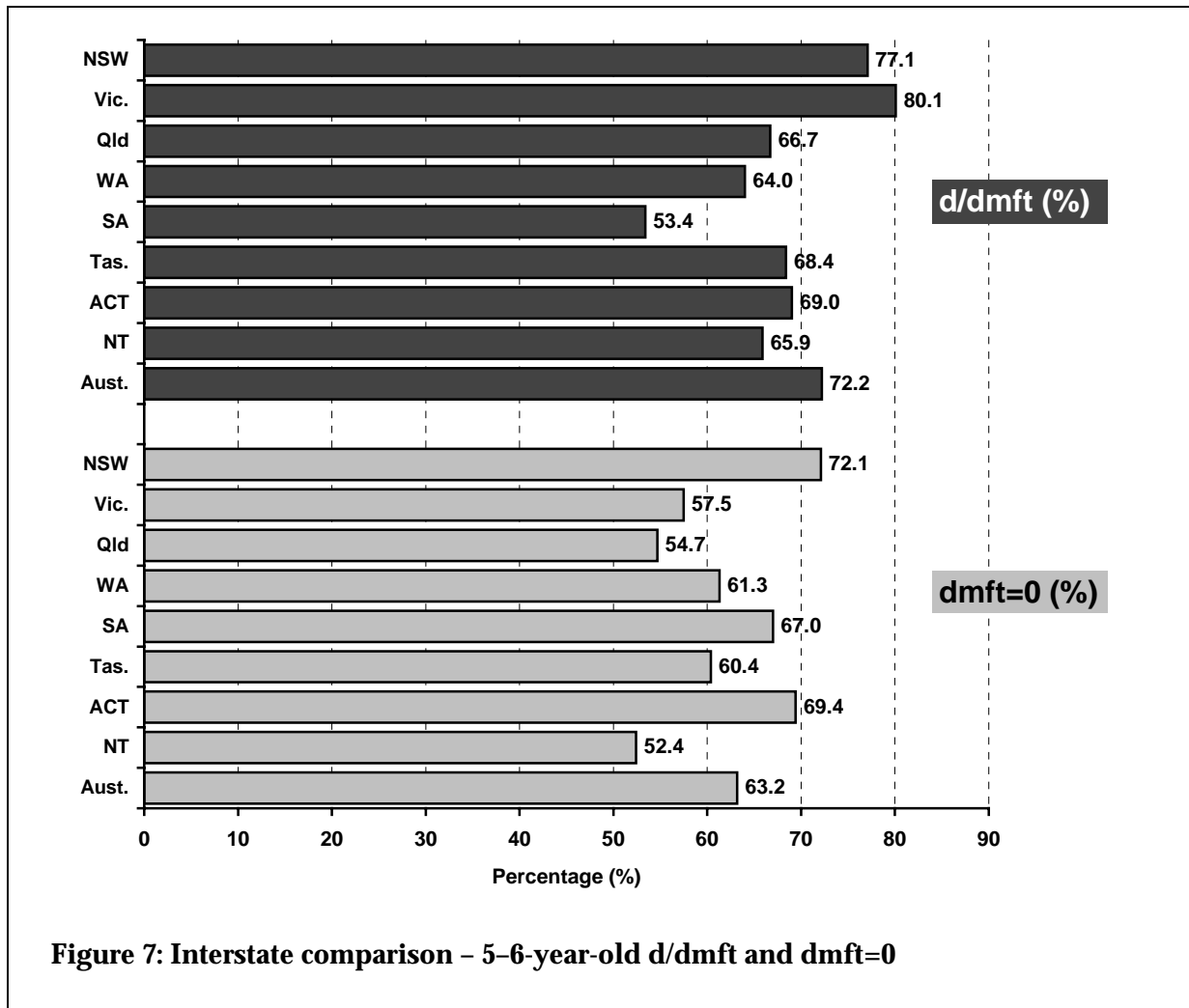
population density, demography and levels of water fluoridation between these two States. As well, there are differences in the organisation and delivery of school dental services between jurisdictions and these differences have grown with the introduction of the SOKS program in New South Wales. All of these factors also affect other State and Territory comparisons.

There are other notable characteristics of the statistics contained in Table 12. In general, the mean dmft was correlated with the mean number of deciduous teeth with clinically detectable untreated decay but not with the mean number of fillings present.

Variation existed in the percentage of dmft attributable to clinically detectable untreated decay, ranging from a low of 53.4% in South Australia up to 80.1% in Victoria (see Figure 7). The variation in the percentage of children with no caries experience (dmft=0), while representing to some degree the converse of mean dmft, showed less variation than that for mean dmft, ranging from 52.4% for the Northern Territory to 72.1% for New South Wales. In other words, while less than one-half of 5- to 6-year-old children in any jurisdiction had caries experience, the amount of accumulated disease (mean dmft) was variable across jurisdictions.

**Table 12: Interstate comparison – 5–6-year-old dmft**

State/ Territory	Children <i>n</i>	Decayed (d)		Missing (m)		Filled (f)		dmft	
		mean	SD	mean	SD	mean	SD	mean	SD
NSW	4,887	0.65	1.57	0.05	0.53	0.19	0.78	0.89	1.95
Vic.	3,532	1.40	2.60	0.09	0.55	0.39	1.34	1.88	3.26
Qld	2,659	1.12	2.11	0.05	0.43	0.62	1.54	1.79	2.89
WA	1,438	0.80	1.77	0.02	0.26	0.48	1.33	1.31	2.41
SA	1,010	0.51	1.34	0.09	0.84	0.61	1.68	1.21	2.58
Tas.	382	0.90	1.82	0.04	0.35	0.45	1.28	1.39	2.48
ACT	234	0.71	1.74	0.01	0.15	0.33	1.01	1.06	2.23
NT	178	1.19	2.27	0.07	0.49	0.58	1.50	1.85	2.97
<b>Australia</b>	<b>14,321</b>	<b>0.94</b>	<b>2.02</b>	<b>0.06</b>	<b>0.52</b>	<b>0.39</b>	<b>1.26</b>	<b>1.39</b>	<b>2.66</b>



**Figure 7: Interstate comparison – 5–6-year-old d/dmft and dmft=0**

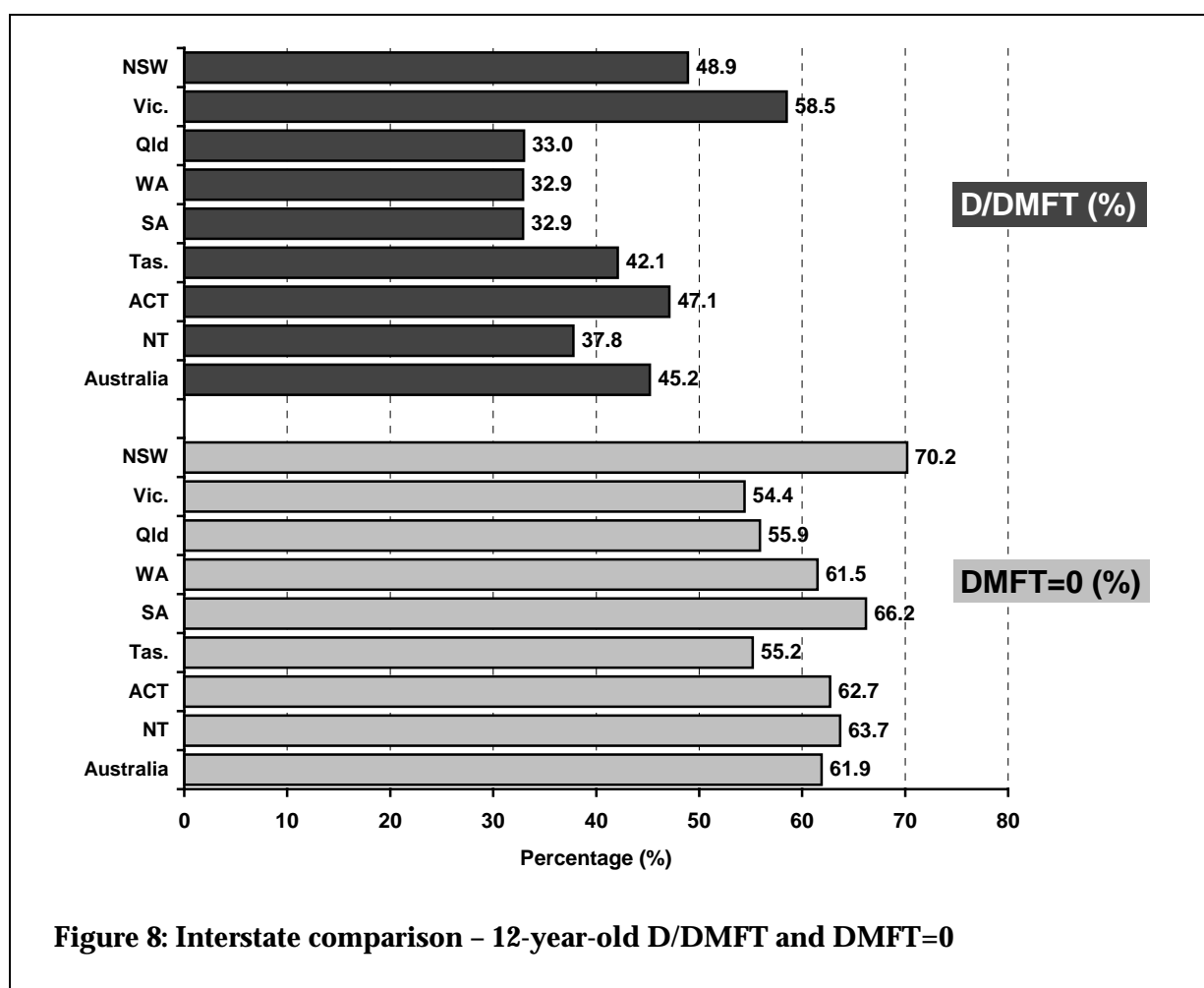
### Interstate comparison – 12-year-old DMFT

There was substantial variation in the mean DMFT scores between jurisdictions (see Table 13) with the highest mean score (1.14 in Queensland) being almost twice that of the lowest (0.58 in South Australia). This was similar to the extent of variation observed for deciduous teeth. In the case of permanent teeth there was only moderate correspondence between mean DMFT and the mean number of decayed teeth. Consequently, there were quite large variations in the ratio of D/DMFT, from 32.9% in Western Australia and South Australia to 58.5% in Victoria (see Figure 8).

New South Wales had the highest percentage of children with no caries experience, having over 70% of children with DMFT=0 (see Figure 8). By contrast, Victoria, Tasmania and Queensland had the lowest percentages of children with DMFT=0, with 54.4%, 55.2% and 55.9% respectively.

**Table 13: Interstate comparison – 12-year-old DMFT**

State/ Territory	Children <i>n</i>	Decayed (D)		Missing (M)		Filled (F)		DMFT	
		mean	SD	mean	SD	mean	SD	mean	SD
NSW	2,397	0.32	0.91	0.01	0.14	0.31	0.81	0.64	1.28
Vic.	1,722	0.57	1.05	0.03	0.28	0.45	1.01	1.04	1.57
Qld	1,290	0.38	0.94	0.05	0.40	0.72	1.30	1.14	1.83
WA	739	0.27	0.75	0.10	0.53	0.51	1.31	0.87	1.67
SA	529	0.19	0.50	0.01	0.08	0.38	0.80	0.58	1.01
Tas.	200	0.43	1.00	0.01	0.15	0.53	0.96	0.97	1.44
ACT	110	0.40	1.00	0.03	0.33	0.39	1.00	0.82	1.48
NT	78	0.30	0.85	0.06	0.44	0.42	0.91	0.78	1.38
<b>Australia</b>	<b>7,065</b>	<b>0.38</b>	<b>0.92</b>	<b>0.03</b>	<b>0.30</b>	<b>0.45</b>	<b>1.04</b>	<b>0.86</b>	<b>1.51</b>



## Interstate comparison – all teeth age-standardised caries experience

Age-standardised data were used for Table 14 in order to bring together data from all ages (children aged between 5 and 12 inclusive) in all jurisdictions. This is useful in the event that any age-specific statistics (for example, for 5- to 6-year-olds) provide an unrepresentative picture of conditions in a specific State or Territory. The purpose of age-standardisation is to adjust among States for possible differences in the proportion of specific age groups, which is important because of the age-relatedness of most dental caries measures.

Table 14 illustrates further areas of interstate variation in caries experience. For example, there are appreciable differences in the percentage of children with 5 or more decayed teeth ( $d+D \geq 5$ ). Victoria, Tasmania, Queensland and the Northern Territory have the highest levels of untreated decay ( $d+D$ ) whereas South Australia, the Australian Capital Territory, Western Australia and New South Wales have the lowest levels of clinically detectable untreated decay. The percentage of children with no caries experience ( $dmft+DMFT=0$ ) was highest in New South Wales (62.7%), which may be at least partly attributable to the change to dental screenings in that State. Consistent with Tables 12 and 13, the lowest percentage of children with no caries experience was found in Victoria (42.2%).

**Table 14: Interstate comparison – all teeth age-standardised caries experience**

State/ Territory	Children <i>n</i>	Children with $d+D=$						$dmft+$ $DMFT=0$		
		0	1	2	3	4	5+	$m+M=0$	$f+F=0$	$DMFT=0$
		%	%	%	%	%	%	%	%	%
NSW	19,304	73.5	12.1	6.6	3.0	2.0	2.6	97.8	79.8	62.7
Vic.	13,946	54.4	16.3	11.7	6.4	3.9	7.3	93.3	66.3	42.2
Qld	10,381	64.8	15.7	9.0	4.5	2.5	3.6	97.2	59.3	44.1
WA	5,881	70.8	15.6	7.3	2.6	1.6	2.1	98.5	62.9	49.0
SA	4,128	74.1	14.7	5.9	2.7	1.5	1.2	97.9	63.4	52.0
Tas.	1,548	64.0	16.5	9.2	4.7	2.5	3.1	98.1	63.7	46.5
ACT	916	71.9	14.0	6.9	3.2	1.5	2.5	99.3	70.4	55.9
NT	675	65.5	14.5	8.4	4.0	2.7	4.9	96.7	65.6	46.3
<b>Australia</b>	<b>56,780</b>	<b>66.6</b>	<b>14.5</b>	<b>8.4</b>	<b>4.1</b>	<b>2.5</b>	<b>3.8</b>	<b>96.7</b>	<b>69.1</b>	<b>51.3</b>

## National summary

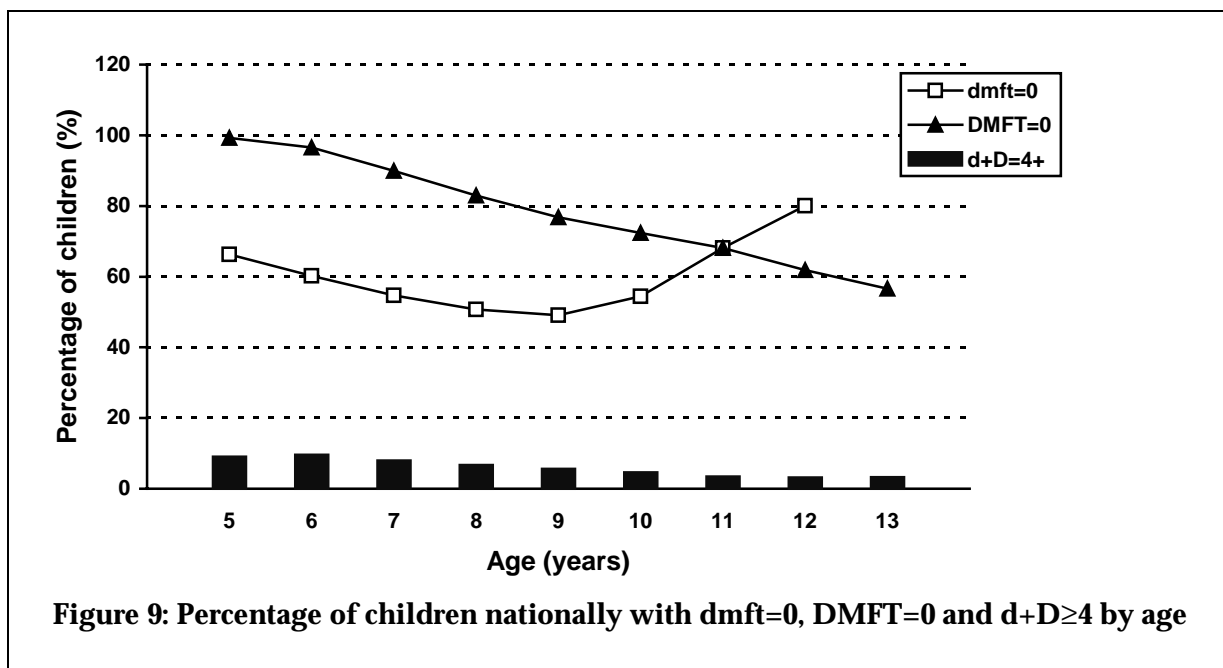
Age-standardised data were used for Table 15 in order to bring together data from all children aged between 5 and 12 inclusive in all jurisdictions.

The data in Table 15 reveal different profiles of caries experience among the States and Territories. Again, Victoria is shown to have the highest levels of caries experience for deciduous teeth (mean dmft = 1.88, 54.4% dmft=0), while children in New South Wales were found to have the least caries experience (mean dmft = 0.83, 70.8% dmft=0). The highest levels of permanent caries experience were found in Queensland (mean DMFT = 0.49, 77.5% DMFT=0), Victoria (mean DMFT = 0.47, 76.3% DMFT=0) and Tasmania (mean DMFT=0.46, 77.0% DMFT=0). In comparison, the lowest levels were seen in South Australia (mean DMFT = 0.24, 84.6% DMFT=0), the Australian Capital Territory (mean DMFT = 0.27, 84.6% DMFT=0) and New South Wales (mean DMFT = 0.27, 86.1% DMFT=0).

Figure 9 uses Australia-wide data to describe the combined dmft and DMFT indices and their components for individual age groups. It should be noted that the rate of decline and subsequent increase across age groups in the percentage of children free of caries in the deciduous dentition is set against a pattern of exfoliation of deciduous teeth.

**Table 15: National summary of caries experience of 5–12-year-old children**

State/ Territory	Children in sample	dmft			DMFT			d+D=0
		mean	SD	%	mean	SD	%	
NSW	19,304	0.83	1.72	70.8	0.27	0.80	86.1	73.5
Vic.	13,946	1.88	2.82	51.5	0.47	1.08	76.3	54.4
Qld	10,382	1.72	2.65	54.3	0.49	1.32	77.5	64.8
WA	5,881	1.22	2.04	59.7	0.37	1.01	80.1	70.8
SA	4,128	1.29	2.23	60.0	0.24	0.68	84.6	74.1
Tas.	1,549	1.36	2.18	57.4	0.46	1.05	77.0	64.0
ACT	916	1.01	1.89	65.2	0.27	0.79	84.6	71.9
NT	675	1.51	2.44	55.6	0.34	0.92	82.8	65.5
<b>Australia</b>	<b>56,782</b>	<b>1.35</b>	<b>2.34</b>	<b>60.5</b>	<b>0.37</b>	<b>1.01</b>	<b>81.1</b>	<b>66.6</b>



## National trends

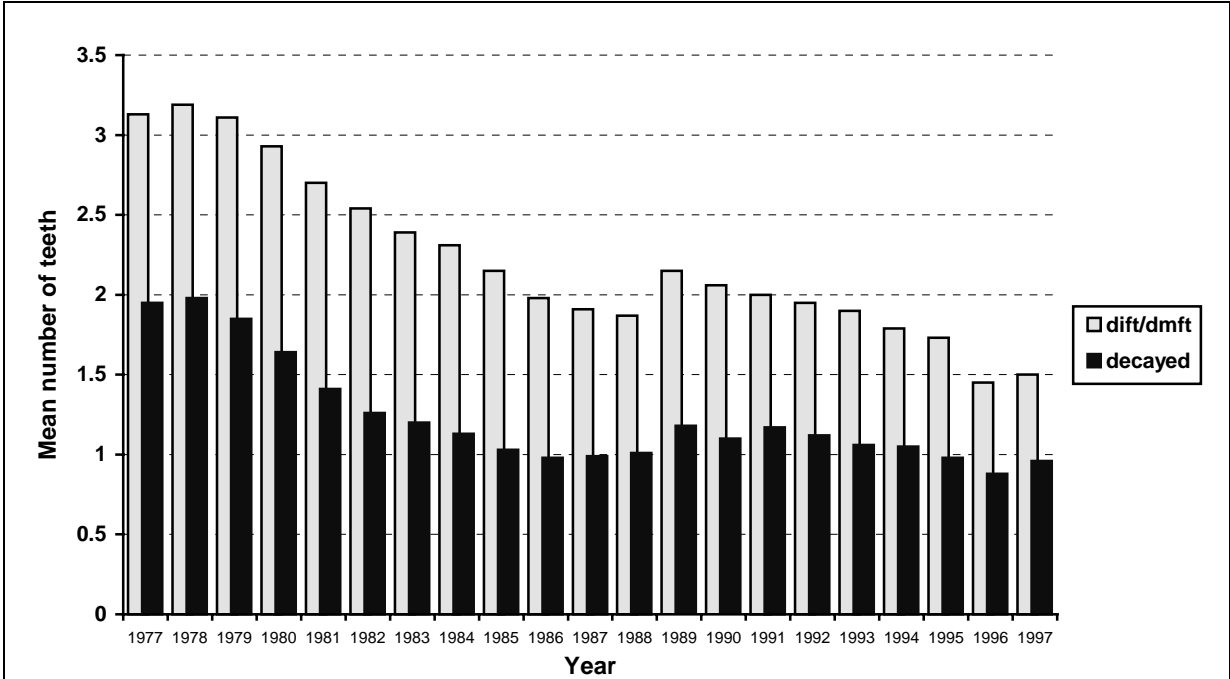
### Mean decayed and dmft/DMFT indices, 1977–1997

Figures 10 and 11 show the trends in national dift/dmft and DMFT scores across the 20-year period from 1977 to 1997. Over this time period mean dift/dmft scores for 6-year-old children have reduced by 52.1% from 3.13 in 1977 to 1.50 in 1997. This trend has been mirrored by a reduction in clinically detectable decay across the same period from 1.95 to 0.96, a reduction of 50.8%. The disruption of the downwards trend in caries experience evidenced in 1989 can be seen as representing a change in reporting of caries experience from dif teeth (decayed, indicated for extraction due to caries and filled) to dmft teeth (decayed, missing due to caries and filled). The observed increase in caries experience between 1988 and 1989 may also reflect a change in statistical analyses (especially the use of weighting by State and Territory) following from the Dental Statistics and Research Unit taking over administration of the survey from the Commonwealth Department of Health in 1989.

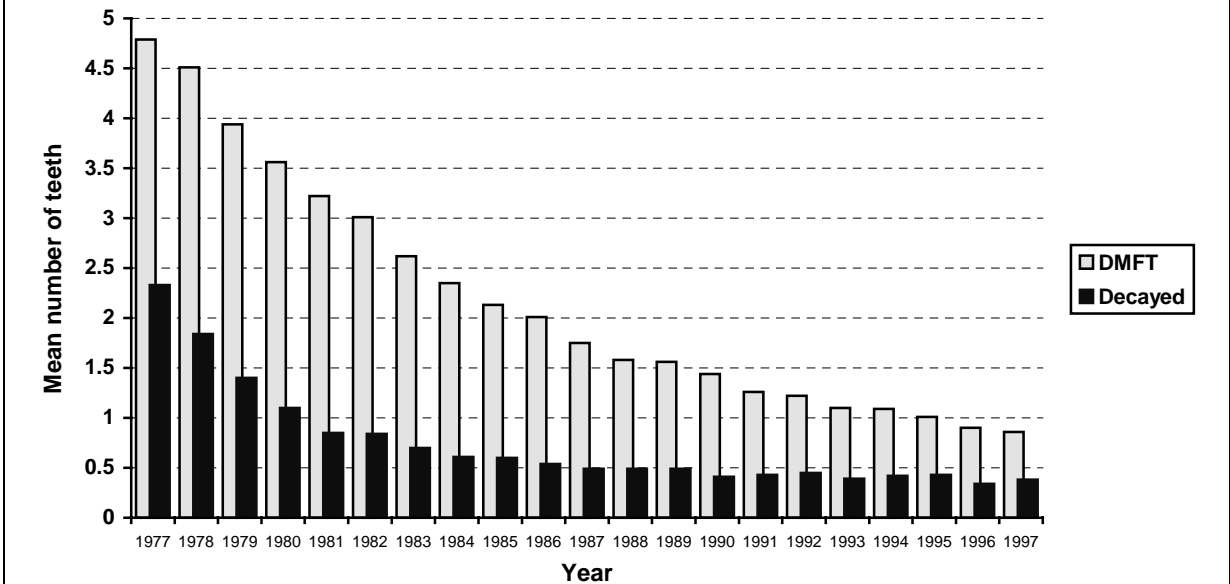
There has also been a dramatic decrease in caries experience in the permanent dentition with mean DMFT scores falling consistently between 1977 and 1996. Mean DMFT for 12-year-old children has fallen by 82.0% between these years, from 4.79 in 1977 to 0.86 in 1997. A similar pattern is observable in the decline in clinically detectable decay, although since 1987 reductions in decay levels have generally been small. The decayed component of the mean DMFT score has fallen from 2.33 in 1977



to 0.38 in 1997; however the period between 1990 and 1997 has seen mean detectable decay scores fairly stable at around 0.4 mean decayed teeth per child.



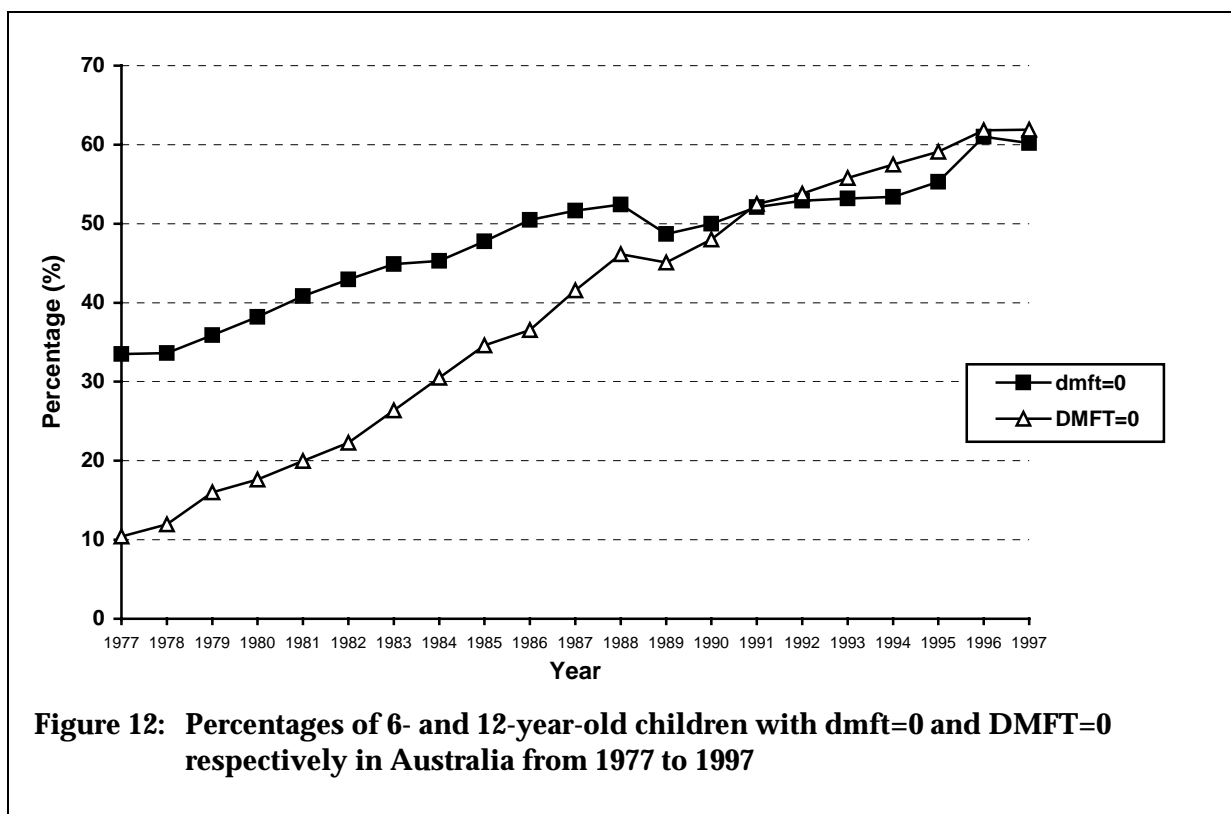
**Figure 10: Mean dift/dmft and decayed component for 6-year-old children in Australia from 1977 to 1997**



**Figure 11: Mean DMFT and decayed component for 12-year-old children in Australia from 1977 to 1997**

## Children presenting with no caries experience, 1977–1997

Figure 12 shows the national trends in the percentage of 6-year-old children without caries experience in the deciduous dentition (dmft=0) and the percentage of 12-year-old children without caries experience in the permanent dentition (DMFT=0) between 1977 and 1997. In 1977, 33.5% of 6-year-olds presented with no caries experience in their deciduous teeth while only 10.4% of 12-year-old children were indicated as having DMFT=0. By 1987 the percentage of 6-year-old children with dmft=0 had increased to 51.7% and in 1997 it was 60.2%. In 12-year-old permanent dentition, the percentage of children without caries experience was 41.4% in 1987, an increase of 298%, and 61.9% in 1997, an increase of approximately 495%. Again, a disruption of the general upwards trend can be seen when the Dental Statistics and Research Unit took over administration of the survey from the Commonwealth Department of Health in 1989.



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# DENTAL STATISTICS & RESEARCH SERIES

This report by the AIHW Dental Statistics and Research Unit presents the results of the Child Dental Health Survey 1997 and highlights the continued reduction in the average burden of dental decay among Australia's school-age children.

*The Child Dental Health Survey, Australia 1997* describes the state of oral health in Australia's school-age children, including age-specific and age-standardised measures of dental decay and treatment by State and Territory, and national estimates of these measures for 1997.