

# Changes in oral health among children and adolescents in relation to public health programmes and individual preventive care in Germany

Annerose Borutta<sup>1</sup>

Jena, Germany

## Summary

The prevalence of dental caries among children and adolescents living in industrialised countries has declined dramatically since several decades. This phenomenon is referred to as caries decline in the literature and is attributed mostly to the widespread use of fluoridated toothpastes. Since the 90th of the last century this trend is also obtained in Germany. According to the latest representative data of Germany about the caries prevalence in 12-year-olds a DMFT-value of 0.7 could be analysed. Mostly the teeth were successfully filled. Approximately three quarters of children were found obviously as caries free. Despite this improvement there are still large differences between some Federal States of Germany. The oral health status in Western Germany is better than in Eastern Germany which is mostly related to a lower economical level in Eastern Germany.

The caries prevalence in preschool children has also improved over the time, although there are still deficits. One problem is the early childhood caries which affect about a quarter of small children. Another problem is the high caries related treatment need in preschool children.

To promote oral health in children and adolescents and to reduce the inequality of oral health, basic and intensive group prevention programmes exist in Germany for preschool and school children. In addition to group prevention as a collective form of preventive measures, dentists in private practices provide individual prevention under the statutory health insurance scheme for children and adolescents up to 18 years of age.

**Keywords:** oral health, caries prevalence, group prevention programme

## Introduction

A dramatic decline of dental caries in children and adolescents living in industrialised countries started in some countries already in the 1960s [1, 2, 3, 4]. Experts analysed this phenomenon and discussed possible reasons.

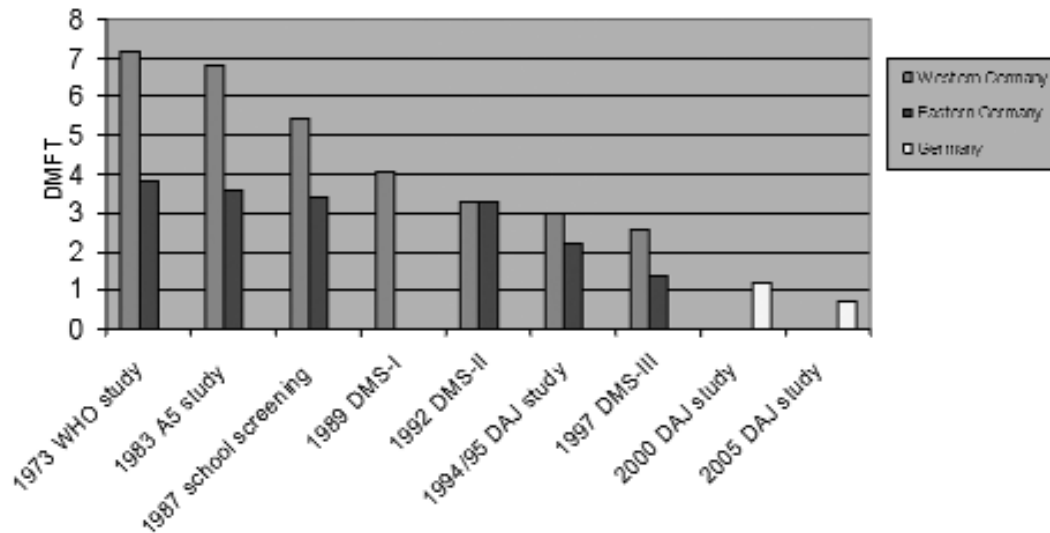
They came to the conclusion that the most important cause for the caries decline is the high availability of fluoride mostly of fluoride containing tooth pastes. Beside fluo-

ride this improvement has also come about as a result of changed norms of behaviour in the population as a whole, in relation to hygiene, diet, breast feeding and the alteration in food-manufacturing practices [5]. Additionally high developed dental health care systems and a good access for all people to the dentists contributed to this development.

The caries decline is more relevant in the permanent dentition than in the primary one. Till this time this trend is going on.

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<sup>1</sup> Prof. Dr. med. habil. Dr. h. c. Annerose Borutta, Friedrich-Schiller-University of Jena, Department of Preventive Dentistry, Bachstraße 1807740 Jena, Germany



**Figure 1.** Development of caries prevalence (DMFT) of 12-years-old German adolescents

### Changes in Oral Health in German Children and Adolescents

In Germany for the first time a caries decline was obtained in the nineties of the last century [6]. Whereas in the 70<sup>th</sup> of the last century the caries prevalence of 12-year-olds in Western Germany was about 7 DMFT and in Eastern Germany 3.8 DMFT and it has been reduced during the 80<sup>th</sup> to a moderate level in Western Germany to 4.1 and in Eastern Germany to 3.4 DMFT. (Figure 1)

During the following 10 years between 1994

and 2005 a further decline was observed. According to the nationwide representative data from 2005 12-year-old German children had on average 0.7 DMFT. Mostly the teeth were successfully filled (FT = 0.5). 70.1% were found obviously as caries free (DMFT = 0) [7] (Table 1).

Compared with a corresponding survey from 1997, there has been a caries decline in 12-year-olds of 58.8%. The number of children in the high risk group has been reduced by approximately 50 % [8]. In spite of encouraging improvements in the overall

	Germany				
	Total	Western Germany	Eastern Germany	male	female
	n = 1383	n = 1221	n = 162	n = 708	n = 675
	%	%	%	%	%
caries free	70.1	72.4	52.5	71.4	68.7
Chi <sup>2</sup> -Test (p)		< 0.001		0.991	

Source: IDZ 2006

**Table 1.** Percentages of caries free 12-years-old children in Germany 2005

Federal State	1994		1997		2000		2004	
	dmft	%	dmft	%	dmft	%	dmft	%
Schleswig-Holstein	2.5	42.6	1.9	53	1.6	59.1	1.7	59.4
Bremen	3.1	37.4	2.7	41.7	3.3	38.9	2.8	40.9
Hamburg	2.7	40.3	2.2	53.7	2.2	47.1	1.8	52.2
Hessen	2.8	42	2.2	48.3	2.0	51.6	2.1	50.8
Rheinland-Pfalz	2.8	39.2	2.3	49.4	2.1	52.4	2.0	54.4
Baden-Württemberg	2.4	45.9	1.9	53.9	1.7	56.9	1.6	59.6
Nordrhein-Westfalen	2.9	38.5	2.6	43.7	2.3	50.2	2.1	52.9
Westfalen-Lippe	3.0	37.7	2.9	42.1	2.3	46.5	2.3	47.3
Niedersachsen	no data available				2.4	48.1	2.1	50.7
Berlin	3.1	36.4	2.6	41.3	2.3	46.6	2.7	40.0
Mecklenburg-Vorpommern	4.0	20.0	3.0	32.8	3.0	36.2	2.6	42.7
Thüringen	3.8	20.5	2.9	31.3	2.4	42.0	2.8	39.1
Sachsen-Anhalt	3.8	20.4	3.2	30.7	3.1	33.0	2.9	34.9
Brandenburg	no data available		2.5	39.8	2.4	43.7	2.8	41.5

Source: DAJ 2005

**Table 2.** Changes in caries prevalence (dmft) and in percentage (%) of 6- to 7-years-old children in different Federal States of Germany

prevalence of caries over recent years there are still large differences as well as between German Federal States as well as among children within the same State. In general the oral health status in Eastern Germany is worse than in Western Germany which is mostly caused by lower social economic conditions in the new Federal States.

Usually children from lower social status have a higher caries experience. In Germany 10.2 % of the 12-year-olds showed a DMFT-value above 2 [7].

The oral health status for the **primary dentition** shows still some deficits. Although the caries incidence has been reduced from

1995 to 2004 in 6- to 7-year-olds, the dmft-values in the different Federal States between 1.7 and 2.9 were still high. The index of coverage was low. About 50% of the children showed an actual caries related treatment need [9] (*Tabel 2*). Between 1994 and 2004 the caries prevalence reduced on 11 to 34.1%.

In some States the caries prevalence has actually slightly increased since the year 2000. In 2004 the percentages of caries free 6- to 7-year-old children was between 34.9 and 59.6%.

One of the most reasons for unsatisfactory oral health in preschool children is the so

called early childhood caries. According to the results of a social and clinical survey in 30 months old children 61.2% were free of caries experience (dmft = 0), 22% of them showed initial carious lesions whereas 16.8% had already developed dentinal caries [10]. Mothers of 22.6 % of children confirmed that their children get still the baby bottle up to 6 times a day and night with cariogenic drinks. To promote oral health in children and adolescents and to reduce the inequality of oral health, group prevention programmes exist in Germany for preschool and school children.

### **Organization and content of group prevention programmes and individual preventive care in Germany**

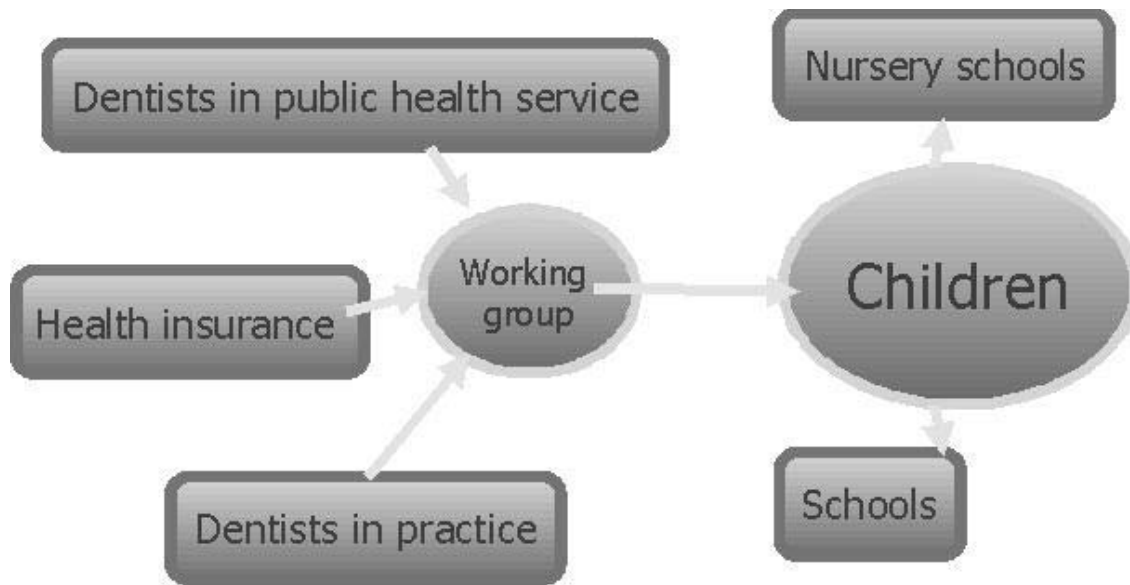
The statutory health insurance scheme has increasingly been directed towards prevention, and recent legislation has accordingly assigned more and more priority to the prevention of oral diseases. Under Section 21 of Social Security Code V, the health insurance funds, in collaboration with dentists and the States authorities, are required to adopt measures for the diagnosis and prevention of oral diseases in their insured members under the age of 12 years. These measures are to be carried out preferentially in groups, especially at schools and kindergartens. They are to cover in particular oral examination, determination of dental status, fluoride application, dietary advice and oral hygiene. For children with high risk of caries specific programmes are to be developed which cover children till an age of 16 years. The statutory system, which is based on many years of initiatives by the regional dental corporate bodies themselves, provides for framework agreements between State associations of health insurance funds, the dentists and the competent authorities in the States. The central associations of the health insurance funds are responsible for the content, funding and evaluation of these

measures. In addition to group prevention as a collective form of preventive measures, section 22 of Social Security Code V specifies that individual prevention shall be provided under the statutory health insurance scheme. Insured individuals over 6 and under 18 years of age may have an oral examination once every calendar half-year for the prevention of oral diseases. The preventive dental care cover oral examinations, oral health education, caries risk assessment, motivation and instruction on oral hygiene, fluoride applications, and fissure sealants of the permanent first and second molars. The social Security Code V also focuses on individual preventive dental care for insured children up to 6 years of age. This includes early diagnosis of oral diseases, determination of caries risk, advices on diet and oral hygiene, and topical fluoride application in children with high caries risk [11].

To organize and realise the group prevention on regional level Dental Academies for Paediatric Dentistry (Arbeitsgemeinschaften für Jugendzahnpflege) exist in all Federal States of Germany. Public dentists (they are employed in Public health centres), dentists from private practices as well as nurses specialised in prevention of oral diseases who are employed in Academies for Paediatric Dentistry perform group prevention in kindergartens and schools

(Figure 2).

Guidelines are given to them to make sure that the content of programmes could be implemented in the right way. These guidelines may be varying between the Federal States depend on availability of staff and financial condition. Usually dentists/specialised nurses had to visit the children in kindergartens and schools at least two times a year (in some States 4 times a year). They have to motivate and instruct children on oral hygiene, to give them diet recommendations and inform nursery teachers, school teachers and parents how to prevent oral dis-



**Figure 2.** Structure of group prevention

eases. Beside this daily tooth brushing exercises with fluoride containing tooth paste (500 ppm F) are carried out in kindergartens under the supervision of nursery teachers. Once a year public dentists perform oral examinations in all children using the dmft/DMFT criteria [12]. If there is diagnosed an actual treatment need these children are referred to a dentist for treatment. In kindergartens and schools where the percentages of children with high caries risk is above average intensive preventive programmes are recommended which based mostly on topical applications of varnishes or weekly tooth brushing with fluoride gel (1.250 ppm F) according to the German guidelines for fluoride measurements [13]. Fluoride varnishes have been used in dental community programmes for over 40 years. They are generally used to provide fluoride delivery to specific at risk surfaces in the mouth. The most widely used is Duraphat® varnish. It contains 5% sodium fluoride (22.600 ppm F) in suspension in alcohol with a resin system that sets on contact with saliva. nless a clinical study in kindergartens

has been conducted, starting with 2 to 4 year old children who got Duraphat® (Colgate-Palmolive GmbH, Hamburg) applications twice a year. After two years of observation the caries reduction was about 50% [14]. The authors recommended biannual fluoride varnish applications for preschool children with high caries risk.

### Discussion and conclusion

During the last two decades an improvement in oral health could be stated in German children and adolescents. Compared with internationally published data [15] the actual DMFT value in 12-year-old German children of 0.7 is very low. Mostly the DMF teeth are filled and the treatment need is very low. Two third of children in this age group are free of dentinal caries [7, 9].

In contrast to this the oral health status of preschool children shows still deficits. Unsatisfactory high is the caries related treatment need in primary teeth.

Despite a general improvement of oral health it is necessary to continue basic prevention for all children. This should be done

in the frame of public oral health programmes (group prevention) combined with individual preventive care offered by dentists in private practices and self care. For

children with high caries risk intensive preventive care is important to improve their oral health behaviour and reduce the inequality of health.

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