

# Treatment Provided in the Public Dental Service and by Private Dentists in Finland

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## Abstract

**Aims:** Dental treatment measures provided in the public and private sectors in 2009 were compared. **Methods:** Data on all treatment measures were collected from the municipal Public Dental Service (PDS) databases and the reimbursement register of the Social Insurance Institution, after ethical approval of the study. Registers group the patients by age (<18, 18-64, 65+) and the treatment measures by 12 main categories. **Results:** Altogether 8.9 million treatment measures were provided for 1.7 million public sector visitors and 5.2 million treatment measures for the one million private visitors in 2009. The young in the PDS received examinations, orthodontics and preventive care. In private sector they received more endodontics and fillings. For the working aged, the private sector provided more periodontal (797), preventive (259) and restorative treatment measures (1,743) per 1000 patients than the PDS (455, 193, 1,457), and fewer examinations (720) and surgery (200) than the PDS (1,142, 308). In both sectors the elderly received more fillings and surgery than the working aged. **Conclusions:** In the public sector more effort went to examinations and emergency care than in the private sector where more comprehensive care was emphasized. Filling therapy dominated adult care in both sectors and prevention was not common, nor did periodontal treatment correspond to patients' needs.

*Key Words: Dental treatment measures, Public dental service, Private practice, Register study*

## Introduction

The first public dental clinic in Europe was established in Strasburg (Germany) in 1902 in order to provide free dental care for schoolchildren in a time when practically all children had severe caries problems and care provision was poor. Among the Nordic countries, Sweden started a public school dental service in the 1930s and Finland 20 years later [1]. Treatment was free, financed by tax revenues and organised by regional or municipal authorities using salaried staff. Besides public health related socio-political ambitions, getting dental services to sparsely populated areas in the geographically large Nordic countries was an important argument for expanding the public services to adults, in subsequent years. In Finland, adult care in the Public Dental Service (PDS) started with young adults in 1980 and expanded slowly to include those born after 1956 in the late 1990s. In 2002, all adults were given access to the PDS. Partial reimbursement of private dental care by the Social Insurance Institution (SII) was also extended to cover the older adults. The subsidised PDS fees have been lower than the private fees after reimbursement, and the PDS has had long waiting lists [2].

Since its start, the PDS has catered for most children and adolescents. During recent decades, their oral health has improved greatly. Adults' oral health has been monitored by national epidemiological studies in 1980, 2000 and 2011 and their oral health improvement has been much more modest, even poor, as regards periodontal diseases and replacement of missing teeth [3-5]. Adults with higher education or income have used private dental services to a greater extent than poorer people, who have more often used public services [6,7]. It has also been shown that adults who earn more are willing to spend more on comprehensive dental care than people with lower earnings, who may choose emergency care only [8].

Similar findings have been made in other parts of the world. In Australia, adults using public dental services had worse oral health than adults who visited private clinics [9]. In Brazil, those with low family income, living in small towns and having great treatment needs were more likely to use public dental services [10]. In Lithuania, older low-income persons preferred public clinics [11]. This indicates that the public and private sectors have different patients.

In Finland, both sectors are expected to use state of the art treatment measures as used in dental education and recommended in the national best practice guidelines according to their patients' needs and it is generally expected that the quality of treatment in the public and private sectors are equivalent.

## Aims

Using register data, the aim of this study was to compare at national level treatment measures provided on children and adults in the PDS and in the private sector in Finland. A further aim was to discuss the service profiles and the possible differences in them between the two sectors against findings from national epidemiological studies on treatment needs and other relevant surveys.

## Materials and Methods

Data on patients and treatment provided in the PDS in 2009 were collected from 166 municipal databases as described in a previous paper [12]. Data on all private dental visitors that were reimbursed in 2009 were obtained from the central reimbursement register of the SII. Approval to collect the data from the PDS was given by the R&D Centre of Welfare and Health (STAKES) and the SII approved the data collection from its register. The material included all persons registered to have used the public and private dental services in Finland in 2009. Prosthetic treatment is not reimbursed in the private

sector and it was excluded from the PDS data. Treatment by dentists and dental hygienists could not be separated.

Registers group the patients by age (<18, 18-64, 65+) and the treatment measures by 12 main categories: clinical examinations, complementary examinations (radiology, laboratory tests), anaesthesia (local anaesthesia, sedatives, nitrous oxide), preventive care (oral hygiene instruction, dietary advice, fluoride varnish, fissure sealants, etc.), endodontics, periodontics, oral surgery, orthodontics, restorative care (permanent and temporary fillings and crowns), treatment of temporomandibular disorders (TMD), certificates (e.g. for insurance companies) and other treatment (removal of sutures, local medications, etc.). For analysis the data were also grouped geographically, e.g. as Southern (including the Southern and Western parts of the country) and Northern (including the Eastern and Northern parts).

Treatment patterns were compared between the two sectors, age groups, and geographical areas. Data were processed using the SAS 9.3 software. The results were based on the total eligible population and statistical testing was not appropriate.

## Results

The material consisted of 8.9 million treatment measures in the public and 5.2 million in the private sectors (*Table 1*). Slightly more than half (53.2%) of all treatment measures (prosthetics excluded) in the PDS were provided for working aged adults, 36.6% for children and 10.2% for elderly. In the private sector, 76.6% of treatment measures were provided for the working aged, 22.7% for elderly and 0.7% for children.

**Table 1.** Numbers of Finnish Public Dental Service and private treatment measures classified according to main treatment disciplines (prosthetics excluded) provided for children and adolescents, working-age adults and the elderly in 2009.

Numbers of treatment measures by age group and treatment sector								
Main treatment disciplines	0 – 17 years		18 – 64 years		65+ years		All	
	Public	Private	Public	Private	Public	Private	Public	Private
Number of patients treated	N	N	N	N	N	N	N	N
	690 462	9 860	841 844	794 236	171 920	226 758	1 700 758	1 030 854
Anaesthesia	229 965	3 696	698 326	425 697	82 907	66 229	1 011 198	495 622
Prevention	547 135	2 250	162 453	206 035	37 480	61 111	747 068	269 396
Endodontics	31 281	1 431	275 920	234 838	33 694	57 581	340 895	293 850
Periodontics	89 606	1 993	382 712	632 808	93 615	207 898	565 933	842 699
Oral surgery	114 347	1 894	275 121	159 220	71 688	68 526	461 156	229 640
Other treatment	86 861	681	117 180	26 475	23 552	8 988	227 593	36 144
Orthodontics	695 533	150	20 240	2 458	68	12	715 841	2 620
Restorative treatment	382 457	7 901	1 226 583	1 384 649	268 442	454 401	1 877 482	1 846 951
Treatment of temporomandibular disorders	8 811	571	29 924	53 447	2 682	11 608	41 417	65 626
Certificates	96 330	1 295	176 666	25 978	34 234	7 706	307 230	34 979
Examinations	873 285	6 035	961 759	572 042	202 081	161 988	2 037 125	740 065
Complementary examinations including radiology	92 857	2 488	398 163	225 014	61 313	66 978	552 333	294 480
All treatment measures	3 248 468	30 385	4 725 047	3 948 661	911 756	1 173 026	8 885 271	5 152 072

The PDS had provided care for almost all (98.6%) the young who had had dental visits that year. Almost the same numbers of adults were treated in the public (1.010.296) and in the private sector (1.030.858). The total number of basic treatment measures for them was slightly greater in the PDS (5.6 million) than in the private sector (5.1 million). In the PDS a greater proportion of adults were in working age than in the private sector, where the share of elderly was greater (*Table 1*).

Although the private sector treated low numbers of children and adolescents, there were great differences in the sectors' treatment profiles; per 1000 patients the private sector provided more endodontic and periodontal treatment and more fillings than the public sector, whereas the public sector conducted considerably more examinations, orthodontics and preventive measures (*Table 2*).

**Table 2.** Numbers of Finnish Public Dental Service and private treatment measures (prosthetics excluded) in 2009 per 1,000 treated patients by age: children and adolescents, working-age adults and elderly for each class of treatment.

Numbers of treatment measures per 1000 treated patients by treatment sector and age group								
Main treatment disciplines	0 – 17 years		18 – 64 years		65+ years		All adults	
	Public	Private	Public	Private	Public	Private	Public	Private
Anaesthesia	333	375	830	536	482	292	595	482
Prevention	792	228	193	259	218	269	439	262
Endodontics	45	145	328	296	196	254	200	286
Periodontics	130	202	455	797	545	917	333	823
Oral surgery	166	192	308	200	417	302	271	223
Other treatment	126	69	139	33	137	40	134	35
Orthodontics	1 007	15	24	3	0.4	0	421	2
Filling therapy/ cariology	554	769	1457	1717	1561	1973	1475	1801
Treatment of temporomandibular disorders	13	58	36	67	16	51	24	64
Certificates	140	131	210	33	199	34	181	33
Examinations	1 265	612	1 142	720	1 175	714	1 198	719
Complementary examinations including radiology	134	252	473	283	357	295	325	286
All treatment measures	4705	3080	5613	4972	5303	5173	5224	5016

**Table 3.** Numbers of Finnish Public Dental Service and private treatment measures in 2009 per 1,000 treated adult patients (working-age and elderly) by treatment sector and geographical region: Southern and Northern Finland.

Numbers of treatment measures per 1000 treated adult patients by treatment sector, geographical region and age												
Main treatment disciplines	18 - 64 years				65+ years				All adults			
	South		North		South		North		South		North	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Anaesthesia	833	523	817	595	500	289	417	312	776	469	751	543
Prevention	189	259	206	261	216	273	225	250	194	262	209	259
Endodontics	329	297	322	287	206	262	160	207	308	289	296	273
Periodontics	459	813	440	723	563	937	478	795	476	841	447	737
Oral surgery	324	197	338	214	425	305	386	287	341	222	346	228
Other treatment	141	33	133	34	142	40	117	35	141	35	131	35
Orthodontics	23	3	27	3	0.4	0	0.5	0	19	2	23	3
Restorative treatment	1437	1737	1529	1771	1611	2042	1379	1771	1467	1807	1504	1771
Treatment of temporomandibular disorders	35	66	39	75	16	52	14	45	31	63	35	69
Certificates	220	35	173	23	214	36	143	23	219	35	168	23
Examinations	1150	721	1117	715	1194	711	1108	733	1157	719	1116	719
Complementary examinations including radiology	486	281	426	296	383	297	260	284	468	284	399	294
All treatment measures	5626	4965	5567	4997	5470	5244	4687	4742	5597	5028	5425	4954

The most common treatment categories for the working aged adults were, in the public sector, examinations (including complementary examinations and radiographs), 1601 per 1000

patients and fillings therapy 1457 per 1000 patients. The private sector produced more fillings therapy, 1743 per 1000 patients, and fewer examinations, 1003 per 1000 patients (Table 2). For the elderly, the most common treatment

measures were the same, fewer examinations, 1532 per 1000 patients and the same amount of fillings, 1561 per 1000 patients in the PDS. In the private sector, fillings were even more common for the elderly, 2004 per 1000 patients, whereas examinations were almost as frequent as for the younger adults (1009 per 1000 patients; *Table 2*).

As regards the working aged, the private sector produced almost twice as many periodontal treatment measures and clearly more preventive measures and fillings than the public sector, and less surgical treatment measures and fewer examinations (*Table 2*). Among the elderly, periodontal treatment measures were also almost twice as usual and preventive measures, endodontic treatment and fillings slightly more common in the private sector than in the public sector where, again, oral surgery and examinations were more usual than in the private sector. It can also be seen from *Table 2* that, in both sectors, more anaesthesia and endodontics were provided for the working aged than for the elderly and vice versa as regards periodontics, oral surgery and to a minor extent fillings therapy.

When treatment for adults is compared over both adult age groups it is obvious that the public sector provided one and a half times (1.6x) more examinations and oral surgery measures (1.5x) per 1000 adults than the private sector and the private sector provided almost twice (1.8x) as many periodontal and 1.2 times more restorative treatment measures than the public sector.

In the age group 18-64 years, treatment profiles in the public sector were rather similar in Southern and Northern Finland except somewhat higher numbers of fillings per 1000 patients in the North. In the private sector, slightly less periodontal treatment was provided in the North than in the South (*Table 3*). In the age group 65+ years, differences between Southern and Northern Finland were bigger. In the public sector, clearly fewer fillings and somewhat lower numbers of periodontal and endodontic treatment measures were provided in the North than in the South. In the private sector, considerably fewer fillings and slightly less periodontal treatment measures were provided in Northern than in Southern Finland.

## Discussion

In 2009, it was for the first time possible to obtain comprehensive register data on dental treatment measures provided in the public and private sectors in Finland. The material was huge, 2.7 million patients (50.5% of the population) and 14.0 million treatment measures. The limited special arrangements of dental care in the Armed Forces, hospitals, Universities, and treatment by denturists were not included. All data used were recorded in the municipal patient registration systems or delivered to the SII reimbursement register by oral health care professionals as part of their ordinary tasks. Recording is mandatory and part of public dentists' salary and all reimbursements for patients in the private sector are based on recorded treatment measures. The reliability of the data can be considered good. However, the register data are crude: the age of the patients is recorded at group level only, and gender and socioeconomic background are not recorded at all. The PDS register data have mainly

been used locally for calculating productivity-based salaries for dentists and the SII register data for follow up and calculating reimbursements.

As prosthetic treatment in the private sector is not reimbursed, this information was absent. Our previous paper showed that only 0.5% of all treatment measures in the PDS included prosthetics [12]. The most obvious explanation is that the PDS has catered for the young and younger adults for several decades and the dentists have little experience in prosthetics. In addition, there are clinical dental technicians who provide full dentures at lower cost. Thus, most fixed prosthetic constructions, implants and partial dentures must be provided by private dentists. According to the Association of Dental Laboratory Technicians, about 2,70,000 prosthetic devices were produced in 2013 (Personal communication). Assuming the number was about the same in 2009 and a prosthetic construction takes two to four visits, it would mean 500 000 to 1.1 million prosthetic treatment measures in the private sector. A crude estimate would be that on average about 10-15% of a private dentists' treatment measures would be related to prosthetics. This means that the private sector in total produced slightly more treatment measures for adults (5.7 – 6.2 million) than the public sector (5.6 million).

Comparison of the treatment patterns of adults between the two sectors showed differences. In the public sector more effort went to examinations and emergency care than in the private sector where more traditional, comprehensive care was provided (including prosthetics as discussed previously). For adults, the public sector provided considerably more examinations and clearly more surgical treatment measures than the private sector. This might follow from the tradition of frequent examinations and tight follow up of the young. Another likely explanation is that the PDS, after the most recent Dental Care Reform in 2002, got responsibility for organizing emergency care for the whole population, also private visitors [1]. The high numbers of examinations in this study included emergency examinations. On the other hand, the SII reimbursed only one examination per year in the private sector. The regional differences in treatment patterns between southern and northern Finland reflected differences in oral health (better in the South) due to historical circumstances.

Both sectors provided relatively few preventive treatment measures for adults, especially when taking into consideration that treatment by dental hygienist was included in the data and it is well known that adults' oral health habits are not good [4,5]. The private sector provided almost three times more periodontal treatment measures than the public sector where dentists feel their competence is weak in this field [13]. Also, more fillings therapy was provided in the private sector. Compared with treatment provided in the private sector on adults in Denmark [14], the numbers of examinations and periodontal treatment measures were lower and restorative treatment measures, extractions and endodontic treatment measures much higher in the Finnish private sector, reflecting the better oral health in Denmark following from the long tradition of risk-oriented preventive interventions and individual instructions in self-care, even for adults.

Long waiting lists, scarce personnel resources not very experienced with adult care, and the requirement to give new patients a first appointment within six months of the first contact (Care Guarantee legislation), has created a situation where most PDS units have not offered recall appointments for adults after the Dental Care Reform in 2002. Annual or biannual visits for the young have been the norm in the PDS and annual visits for adults in the private sector. Adults in the PDS have had a much more irregular attendance pattern although their treatment needs have been greater [15,16]. An Australian study concluded that “socio-economically disadvantaged persons who faced barriers to accessing dental care in the private sector suffered further oral health disadvantage from a pattern of services received at public clinics that had more emphasis on extraction of teeth and less emphasis on preventive and maintenance care” [17]. This is likely to happen in Finland, too, especially as regards adults and elderly.

In both sectors, restorative therapy dominated adult dental care. Provision and replacement of composite fillings has been shown to occupy the dentists [18]. Since 1994, when restricting the use of amalgam was recommended for environmental reasons, composite materials have been increasingly used and large restorations and whole crowns of composite are not uncommon. Reasons given by dentists for frequent semi-urgent replacements of broken or lost fillings by new composite fillings instead of more durable constructions e.g. prosthetic crowns, are lack of skills to make prosthetic crowns, lack of local specialists to whom they can refer patients and high costs for patients [19]. The reimbursement by the SII of the patient cost (around 30%) in the private sector as well as the salary bonus for filling therapy for public dentists made fillings an easy and profitable treatment choice. A further drawback in this vicious circle of repetitive restorations is that periodontal and preventive treatment becomes neglected, as illustrated by this study and the nationwide clinical population studies [4,5].

The public and private sectors had treated almost the same number of adult patients, about a million each. In addition, the public sector had catered for almost 700,000 children and adolescents. The dentist work force, expressed as full time equivalents, was roughly the same in the two sectors and the dental hygienist work force somewhat greater in the PDS. To sum up, the PDS catered to a great extent for the young. Younger adults have generally good oral health while the private patients were typically older. They were also wealthier (able to pay), were mostly recall patients and had better oral health than older adults who attended the PDS, who were more often irregular or emergency cases. Thus different types of patients certainly explain part of the differences in treatment measures provided by the two sectors. Other likely explanations may be sector specific obligations/tasks (emergency care), low political interest for dental care leading to vague management and little supervision and, of course, differences in dentists’ skills and experience. Finally, the remuneration systems were different: salary and productivity compensation in the PDS and fee for service in private practice [20] creates different incentives to provide treatment measures.

## Conclusion

Treatment profiles of the two sectors were different. The public sector provided more examinations and emergency care and the private sector more comprehensive care: fillings, periodontics and prevention. In a general picture, examinations and restorative treatment measures dominated, prevention and periodontal treatment measures played a minor role in the care provided.

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