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Japan's dental care facing population aging: how universal coverage responds to the changing need for the elderly

Etsuji Okamoto[1*]

[1] University of Fukuchiyama
* Correspondence: okamoto-etsuji@fukuchiyama.ac.jp;

Abstract: Although the universal health coverage (UHC) is pursued by many countries, not all countries with UHC include dental care as their benefits. Japan, with its long-held tradition of UHC, has covered dental care as essential benefit and majority of dental care services are provided to all patients with minimal copayment. Being under the UHC, the scope of services as well as prices are regulated by the uniform fee schedule and dentists submit claims according to the uniform format and fee schedule. The author analyzed the publicly available dental health insurance claims data as well as a sampling survey on dental hygiene to illustrates how Japan's dental care is responding to the challenges from population aging. A marked improvement was found in dental health status in the elderly population as measured by improved tooth-specific survival. The improvement may be attributable to the universal coverage of dental care as evidenced by the steady increase of home-visits by dentists/dental hygienists as well as home oral rehabilitation services.

Keywords: universal health coverage; health insurance claims; administrative data; claims database

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1. Introduction

Oral health is indispensable for healthy aging because good nutrition cannot be sustained without healthy eating and digestion. This is particularly true for Japan, with its world-longest longevity (81.41 years for male and 87.45 years for females in 2019). To ensure healthy aging, the dental health status must be improved in proportion to the prolonged lifespan [1]. However, monitoring the dental health on a population level may not be feasible in all countries. Japan has advantages in that 1) it has universal health coverage including dental care and it is feasible to grasp the utilization of dental care on a national level using health insurance claims data and 2) it has conducted a national sampling survey to monitor the dental health of the entire nation periodically (Dental Hygiene Survey, DHS).

The research question of this article is two-fold: 1) to analyze how the dental health status has improved despite population aging and 2) how the utilization of dental care services changed to accommodate the changing need of the rapidly aging population.

In most countries, dental care is not covered by public insurance or the coverage, if any, may not be universal. On the other hand, dental care is covered by Japan's universal health insurance with some exceptions (e.g., orthodontics). Under Japan's universal health insurance, the prices of each procedure as well as medicines are regulated by government as a form of national uniform fee schedule. Because of such generous coverage, it is technically feasible to grasp utilization of dental care services as national statistics. Dentists submit itemized claims every calendar month for each patient. The submitted claims data are stored in the national claims database (NDB) and the itemized statistics in a month (typically every May) are published as the "Social Insurance Claims Survey (SICS)". Further, summary statistics of NDB also became available as "NDB open data

(NDBOD)" after 2014. By combining NDB open data and SICS, one can illustrate the utilization of dental care services.

2. Materials and Methods

In this study, the author relied on two kinds of data on dental health: a sampling survey on dental health status evaluated by dentists (the Dental Hygiene Survey, DHS) and administrative data of health insurance claims submitted by all dental offices. The latter is particularly unique to Japan's dental care because Japan has a universal health coverage and all dental care services are covered under a uniform fee schedule as well as a uniform claims format. Almost all insurance claims are submitted electronically and are accumulated in a large database known as the National Database (NDB), from which aggregate data are publicly available either as 1) Social Insurance Claims Survey (SICS) or 2) the NDB open data (NDBOD).

The time frame was inevitably limited by the data availability. Although, the DHS and the SICS has been conducted since 1957, it is only recently when these data are publicly available as Excel format (DHS is provided only after the 2006 survey and SICS became a population survey only after 2012. NDBOD became available only after 2014 and dental data were not included or very limited in the initial few years).

2.1. Dental Hygiene Survey

To survey the dental health status of the entire population, the DHS is conducted by the Ministry of Health, Labour & Welfare (MHLW) as a sampling survey at the interval of five to six years as part of the National Health & Nutrition Survey (The DHS has been conducted at the interval of six years since 1957 but the interval was shortened to five years after the 10th survey in 2011). The author analyzed tooth-specific and age-specific survival comparing the latest 2016 results and 2005 results [2].

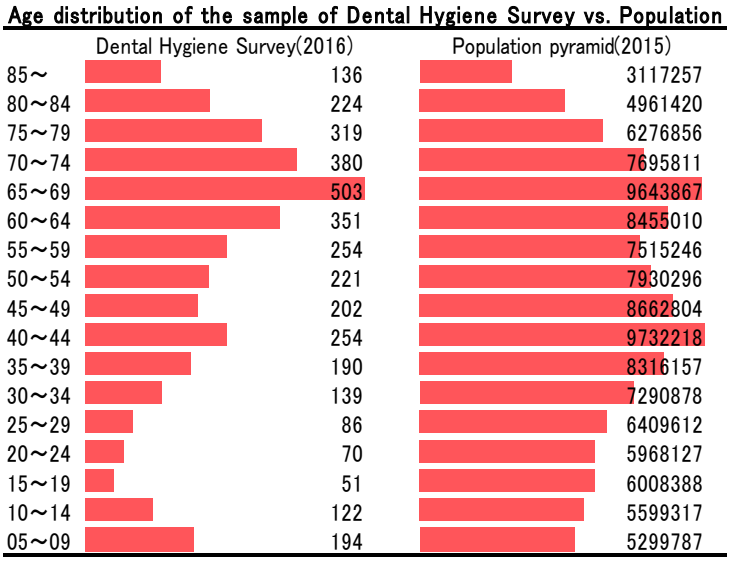
The sample was selected to reflect the dental health status of the entire population. A total of 150 National Census districts were selected and all residents were subjects of the survey. However, the sex-age distribution of the sample may not properly reflect Japan's population structure as shown in [Table 1,2].

[Table 1] The number of subjects of the Dental Hygiene Survey.

N of subjects (Dental Hygiene Survey)

	2005			2016		
	F	M	MF	F	M	MF
05～09	130	117	247	94	100	194
10～14	92	116	208	58	64	122
15～19	65	54	119	32	19	51
20～24	58	47	105	36	34	70
25～29	103	71	174	49	37	86
30～34	142	97	239	95	44	139
35～39	139	58	197	124	66	190
40～44	173	74	247	157	97	254
45～49	164	95	259	125	77	202
50～54	192	105	297	140	81	221
55～59	249	158	407	154	100	254
60～64	242	192	434	213	138	351
65～69	288	208	496	258	245	503
70～74	227	221	448	196	184	380
75～79	183	138	321	164	155	319
80～84	104	67	171	125	99	224
85～	46	26	72	72	64	136
TOTAL	2597	1844	4441	2092	1604	3696

[Table2] Age-distribution of the sample of the Dental Hygiene Survey vs. Population.



2.2. National Claims Database open data (NDBOD)

National Claims Database (NDB) is arguably one the largest administrative database in the world and started to accumulate the data of medical, dental and pharmaceutical claims since 2009 [3]. The dental data became publicly available as "open data" since 2014 and the data are aggregated by clinical diagnoses broken down by sex and five-year age groups. The limitation of the data is that it only provides the number of diagnoses and one claim may contain more than one diagnoses. Another limitation of the NDB is legal one: due to the strict privacy protection rule, data smaller than 10 are omitted (*one-digit suppression rule*). Therefore, one should be cautioned that the data provided by the NDBOD may underestimate the real figures.

2.3. Social Insurance Claims Survey (SICS)

SICS is another survey of claims data derived from NDB. The difference from the NDBOD is that 1) SICS contains a monthly data (typically May in the survey year) while the NDBOD provides annual data, 2) One-digit suppression rule does not apply. SICS contains data on the number of claims, the number of office visits and the monetary values for every clinical procedure.

3. Results

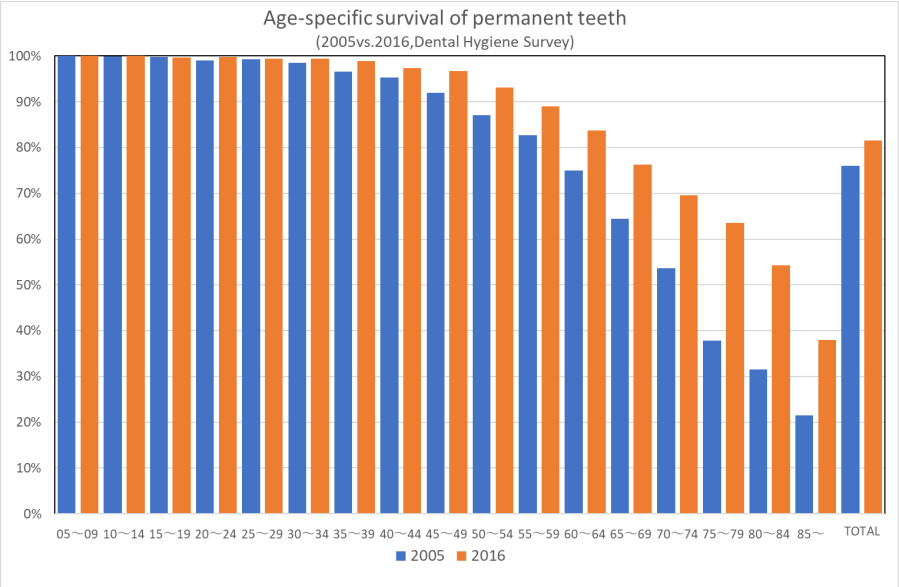
Analysis was conducted to answer the two research questions presented in the introduction section. The dental health status was evaluated using the DHS to illustrate how the dental health status changed over the survey period and the change of the utilization of dental care services was evaluated by health insurance claims data using SICS and NDBOD.

3.1. Change of dental health status

3.1.2. Survival of teeth of the elderly

Survival of teeth of the elderly (65 years or older) has improved even during such a short period of 11 years. As shown in [Figure1], age-specific survival of permanent teeth has improved markedly between the 2005 and 2016 surveys. The improvement is more prominent in the older age groups. Japan Dental Association launched the "80-20 campaign" in 1989, which means "maintaining at least 20 teeth at the age of 80" [4]. According to the Dental Hygiene Survey in 1999, 80-year-old persons had an average of eight teeth remaining and only 15% of them had 20 teeth or more remained. According

to the Dental Hygiene Survey in 2016, 51.2% of the elderly aged 80-year-old had 20 teeth or more remained.



[Figure 1] Age-specific survival of permanent teeth.

3.1.3. Tooth-specific survival of the elderly

The DHS surveys for each tooth. The following table illustrates the tooth-specific improvement in survival for the elderly (>=65-year-old). The most improvement in survival was found in the left lower second molar, which showed 1.54-fold improvement in survival (48.4% survival in 2016 as opposed to 31.5% in 2005). On the other hand, the least improvement was right lower canine, which showed 1.16-fold improvement in survival over 11 years interval. Lower canines have the highest survivals in all teeth (82.5% for right and 84.1% for left remaining in the elderly in DHS 2016) and the improvement was inevitably limited.

[Table 3] Tooth-specific survival rate of the elderly and improvement over 11 years (2005-16).

Tooth-specific survival rate of the elderly (>=65) and improvement over 11 years (2005-16)

			2005(N=1508)			2016(N=1562)			2016/2005
			present[P]	missing[M]	P/(P+M)	present[P]	missing[M]	P/(P+M)	
lower	R	median incisor	890	617	59.1%	1173	387	75.2%	1.27
		lateral incisor	940	563	62.5%	1215	341	78.1%	1.25
		canine	1068	438	70.9%	1288	274	82.5%	1.16
		first premolar	872	636	57.8%	1148	414	73.5%	1.27
		second premolar	723	785	47.9%	983	576	63.1%	1.32
		first molar	508	999	33.7%	781	781	50.0%	1.48
		second molar	518	987	34.4%	741	820	47.5%	1.38
		third molar	148			187			
	L	median incisor	895	613	59.4%	1188	372	76.2%	1.28
		lateral incisor	955	551	63.4%	1225	333	78.6%	1.24
		canine	1070	436	71.0%	1314	248	84.1%	1.18
		first premolar	884	624	58.6%	1182	378	75.8%	1.29
		second premolar	718	789	47.6%	968	594	62.0%	1.30
		first molar	494	1014	32.8%	746	816	47.8%	1.46
		second molar	473	1030	31.5%	755	806	48.4%	1.54
		third molar	136			168			
upper	R	median incisor	760	748	50.4%	1059	502	67.8%	1.35
		lateral incisor	773	732	51.4%	1062	495	68.2%	1.33
		canine	868	640	57.6%	1158	402	74.2%	1.29
		first premolar	712	795	47.2%	1008	550	64.7%	1.37
		second premolar	662	845	43.9%	964	597	61.8%	1.41
		first molar	596	912	39.5%	861	701	55.1%	1.39
		second molar	561	946	37.2%	817	744	52.3%	1.41
		third molar	73			82			
	L	median incisor	728	780	48.3%	1048	514	67.1%	1.39
		lateral incisor	733	774	48.6%	1051	509	67.4%	1.39
		canine	843	664	55.9%	1139	422	73.0%	1.30
		first premolar	716	792	47.5%	988	571	63.4%	1.33
		second premolar	667	841	44.2%	919	642	58.9%	1.33
		first molar	638	870	42.3%	881	681	56.4%	1.33
		second molar	540	968	35.8%	805	754	51.6%	1.44
		third molar	67			75			
			21229	21389	49.8%	28979	15224	65.6%	1.32

※all differences between 2005 and 2016 are statistically significant at p=0.01

3.1.4. Conditions of teeth of the elderly

Although, the survival of teeth showed a marked improvement over the 11-year interval, the conditions of teeth of the elderly (>=65-year-old) did not show much difference over the same period. It is remarkable that the percent of complete dentures among the missing teeth declined from 50.7% in 2005 to 39.7% in 2016. Also remarkable was that the percent of implant increased from 0.3% of missing teeth in 2005 to 1.3% in 2016 [Table 4].

[Table 4] Status of teeth of the elderly.

Status of teeth of the elderly (>=65, Dental Hygiene Survey)			
	2005(N=1508)	2016(N=1562)	
present teeth	21229 (100%)	28979 (100%)	
sound teeth	8035 (37.8%)	11924 (41.1%)	**
with dental sealant	2 (0.0%)	5 (0.0%)	ns
colored	366 (1.7%)	325 (1.1%)	**
not colored	7667 (36.1%)	11594 (40.0%)	**
filled teeth			
Crown, not bridge abutment	2411 (11.4%)	2677 (9.2%)	**
Crown, bridge abutment	6143 (28.9%)	6861 (23.7%)	**
Root cap		58 (0.2%)	NA
filling	3165 (14.9%)	6101 (21.1%)	**
decayed teeth			
Caries incipient	774 (3.6%)	750 (2.6%)	**
Caries high grade	701 (3.3%)	608 (2.1%)	**
missing teeth	21389 (100%)	15253 (100%)	
implant	62 (0.3%)	192 (1.3%)	**
bridges	1394 (6.5%)	1585 (10.4%)	**
no prosthesis	2341 (10.9%)	2646 (17.3%)	**
complete denture	10849 (50.7%)	6060 (39.7%)	**
partial denture	6743 (31.5%)	4741 (31.1%)	ns
removal for orthodontics	0 (0.0%)	29 (0.2%)	**
	42618	44232	

ns: not significant, *: significant at p=0.05, **: significant at p=0.01

3.2. Analysis of diagnoses contained in health insurance claims

Health insurance claims contain diagnoses, which reflect the changing pattern of utilization of dental care services by different age groups. NDBOD provides diagnoses and was used for analysis. However, NDBOD does not include the data on the number of claims and the data from another source (Medical Care Benefit Survey, MCBS) was supplemented to calculate the number of diagnoses per claim. The MCBS is another survey on health insurance claims providing only aggregate data on the number of claims or health care expenditures.

3.2.1. N of diagnoses by diagnostic categories

The number of diagnoses contained in dental claims stored in NDB has increased steadily. However, one should be cautioned that the NDB stores only electronically submitted claims and the computerization of claims was not well developed in the early years. Also, the latest 2018 data include approximately 213 million dental claims. There is an increasing trend in the number of diagnoses contained in a claim. The number of diagnoses per claim increased from 1.32 diagnoses per claim in 2014 to 1.63 in 2018 [Table 5].

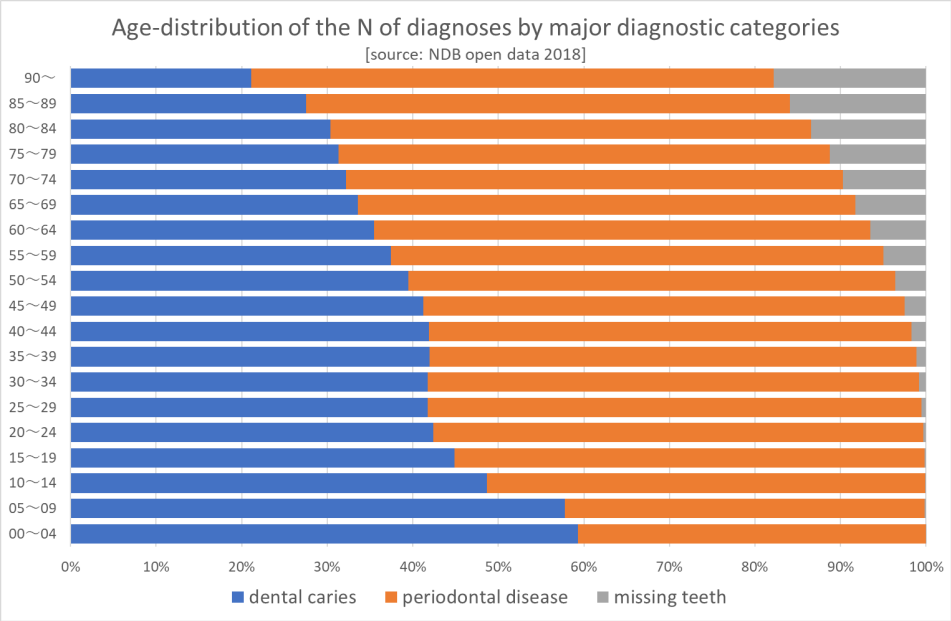
[Table5] N of dental claims by major diagnostic categories.

N of dental claims by major diagnostic categories

	dental caries	periodontal disease	missing teeth	total N of diagnoses	N of claims (*)
					N of diagnoses/claim
2014	107549905	140143615	16389285	264082805	200612846
	40.7%	53.1%	6.2%	100%	1.32
2015	128939230	169719402	19330067	317988699	204865945
	40.5%	53.4%	6.1%	100%	1.55
2016	130172602	174024015	19215128	323411745	210679509
	40.2%	53.8%	5.9%	100%	1.54
2017	132611007	184154163	19024386	335789556	212878244
	39.5%	54.8%	5.7%	100%	1.58
2018	134161234	193685587	18840620	346687441	212916550
	38.7%	55.9%	5.4%	100%	1.63

source: NDB open data, (*N of claims: Medical Care Benefit Survey)

The following graph shows a declining share of dental caries with ageing possibly reflecting the declining number of remaining teeth. On the other hand, the share of periodontal diseases remains constant over ageing. However, one should be cautioned in interpreting the NDB data. According to the "one-digit suppression (numbers less than 10 will not be displayed)", the number of claims may be substantially underestimated [Figure 2].



[Figure2] Age-distrubution of the number of diagnoses by major diagnostic categories.

When broken down by ICD10-level diagnoses, two diagnoses (periodontitis and dental caries) account for 57.2% of the total number and top ten diagnoses account for 82.8% of the total diagnoses [table 6].

[Table6] Ten most common diagnoses of dental claims.

Ten most common diagnoses of dental claims

	N of diagnoses	% diagnoses	cumulative %
periodontitis	135915272	39.2%	39.2%
dental caries	62368855	18.0%	57.2%
gingivitis	15891362	4.6%	61.8%
missing teeth	13615550	3.9%	65.7%
pulpitis	13253313	3.8%	69.5%
chronic periodontitis	12653681	3.6%	73.2%
apical perodontitis	12303356	3.5%	76.7%
dental caries of 2nd degree	7958861	2.3%	79.0%
dental caries treated	7357028	2.1%	81.1%
acute purulent periodontiti	5868951	1.7%	82.8%
.	.		
.	.		
.	.		
TOTAL	346687441	100%	100%

source: NDB open data 2018

3.3. Analysis of the change of utilization of dental care services

The SICS has been conducted every year since 1957. It was conducted as a sampling survey when health insurance claims were submitted in paper form. Since 2012, it started to extract data from NDB and became a population survey instead of a sampling survey.

The SICS data covers only one month period (May in the survey year) and is therefore affected by seasonal variation. Also, one should be reminded that the latest data in 2020 is severely affected by the COVID19 epidemic.

The author focuses on home care because it reflects the population ageing. As shown in [Table 7], home care is provided mainly to the elderly population. The rapid proliferation of home visits/home care management provided by dental offices is illustrated by the % increase between 2015 and 2019. In only four years, the utilization of home visits increased by 37.9% and home care management by 51.1%. The age distribution of home care services provision shows a sharp contrast to that of initial office visits indicating that home care services are provided predominantly to the disabled elderly at home.

[Table7] Age distribution of home care/visits and initial office visits (2015&19).

Age distribution of home care management/visits and initial office visits (2015&19)

	dental home care management			Dental home visits			initial office visits		
	2015	2019	2019/15	2015	2019	2019/15	2015	2019	2019/15
00～04	60	78	130.0%	121	250	206.6%	245093	235314	96.0%
05～09	106	155	146.2%	201	379	188.6%	549344	518384	94.4%
10～14	115	174	151.3%	251	348	138.6%	319308	313197	98.1%
15～19	228	301	132.0%	553	620	112.1%	152345	149726	98.3%
20～24	574	786	136.9%	1268	1743	137.5%	186978	193072	103.3%
25～29	807	1033	128.0%	1934	2130	110.1%	247407	238322	96.3%
30～34	997	1420	142.4%	2301	2989	129.9%	299769	280451	93.6%
35～39	1576	1747	110.9%	3761	3781	100.5%	358134	327538	91.5%
40～44	2167	2753	127.0%	5566	6362	114.3%	408947	388877	95.1%
45～49	2222	3719	167.4%	5839	8952	153.3%	362846	428651	118.1%
50～54	2407	3849	159.9%	6814	9703	142.4%	347693	388702	111.8%
55～59	2795	4209	150.6%	8698	11887	136.7%	345556	370018	107.1%
60～64	4259	5316	124.8%	15003	16325	108.8%	407955	381468	93.5%
65～69	6704	8450	126.0%	27775	30838	111.0%	471160	465311	98.8%
70～74	10890	13690	125.7%	48519	53301	109.9%	417259	460625	110.4%
75～79	18528	25711	138.8%	85367	106754	125.1%	323419	398915	123.3%
80～84	32005	43829	136.9%	157923	190088	120.4%	217166	258361	119.0%
85～89	38508	60312	156.6%	196367	278578	141.9%	101746	131748	129.5%
90～	41996	74662	177.8%	189865	320775	168.9%	33003	48203	146.1%
total	166944	252194	151.1%	758126	1045803	137.9%	5795128	5976883	103.1%

source: Social Insurance Claims Survey

3.3.1. Dental home visits

Dental home visits are provided to the patients who cannot visit dental clinics for physical handicap and the number of dental home visits is increasing steadily [Table 8]. For the elderly who are living in nursing homes or long-term care facilities, dentists can visit more than one patient at a time. Considering the time saving for such cases, the fee for dental home visits is set considerably lower for multiple patients in a building [11000 yen for one patient and 3610 yen for the second or more patients in a building. The fee is further reduced to 1850 yen for ten or more patients in a building].

[Table 8] The number of dental home visits.

The number of dental home visits

	one patient in a building	2～9 patients in a building	10 or more patients in a building	total
2012	205646	568505		774151
2013	175332	430464		605796
2014	228198	277838	421356	927392
2015	245716	356415	544678	1146809
2016	270419	382967	597183	1250569
2017	305904	430549	648807	1385260
2018	361446	628846	615724	1606016
2019	370991	667835	642843	1681669
2020	295306	467573	447467	1210346

source: Social Insurance Claims Survey

3.2.2. Dental home care management

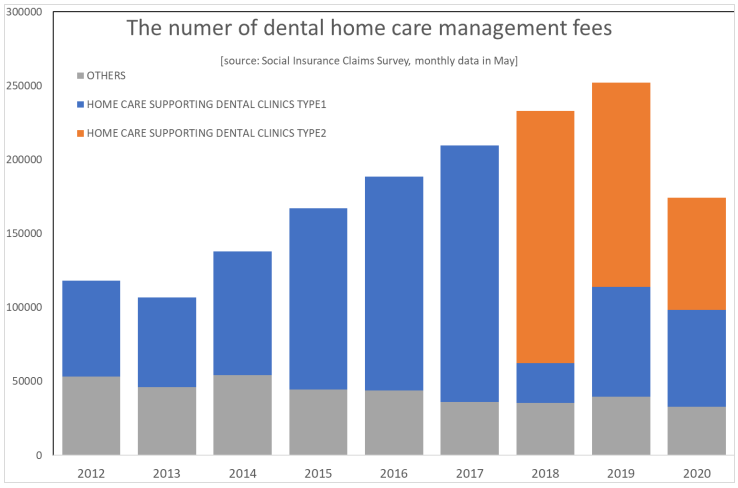
Dental home care management (DHCM) is a surcharge to home visit fees. While home visit fees are reimbursed on every visit, dental home care management is considered to be professional services by dentists involving a planned, scheduled and long-term management of patients to maintain their oral health and nutrition. Therefore, DHCM is reimbursed once a month while home visits may be provided by any dental practitioners, dental home care management expects to be provided by specially designated dental clinics called "home care supporting dental clinics (HCSDC)".

There are certain conditions for dental clinics to be designated a HCSDC. To qualify as HCSDC type1, the clinic must provide 15 times or more home visits per year, and for type 2, 10 times or more.

In addition to the requirement for the number of home visits. The following conditions must be met [5]:

1. must have at least one dentist who completed a training course on geriatric dentistry as well as risk management for emergencies
2. must have at least one dental hygienist
3. provide patients and/or family members information on home visits in writing
4. must be affiliated with other HCSDCs for back-up
5. must have provided at least five home visits in response to the requests from long-term care facilities (nursing homes, care managers, visiting nursing stations, etc.)

As shown in [Figure3], the number of DHCM has been increasing. Since 2018, the HCSDCs have been divided into two categories: type 1 and 2. Type 1 HCSDCs are entitled to higher management fee (3200 yen per month per patient) than type 2 (2500 yen) because it must meet the more stringent conditions than type 2 HCSDCs. There is no difference between the two types as to the function and role of the dental clinics and the distinction is intended to provide economic incentives by way of differential level of financial reimbursement to encourage more clinics to contribute to home care to the elderly.



[Figure 3] The number of dental home care management fees.

3.2.3. Home visits by dental hygienists

A study analyzing the data on dental clinics and patients' behavior demonstrated the importance of dental hygienists in influencing the patients' behavior [6] and tooth loss [7]. Home visits by dental hygienists are also covered by health insurance. Conditions for reimbursement includes: 1) dental hygienists must spend at least 20 minutes per visit and 2) reimbursement is capped at 4 times per month.

There has been a major revision in the fee schedule for dental hygienists in 2018. Until then, the fee for dental hygienists were two categories: simple (1200 yen) and complicated (3000 yen). However, 2018 and onward, the fee schedule was revised to the same structure of dentists: 3600 yen for the 1st patient in a building, 3280 yen for the 2nd to 9th patient in a building and 3000 yen for the 10th patient or more.

[Table 9] The number of home visits by dental hygienists.

N of home visits by dental hygienists

	simple	complicated	one patient in a building	2～9patients in a building	10 or more patients in a building	total
2012	82621	224294				306915
2013	77292	190608				267900
2014	101178	225424				326602
2015	99210	270097				369307
2016	107608	299310				406918
2017	115556	333746				449302
2018			16961	54203	379964	451128
2019			17263	58139	415659	491061
2020			11165	35785	282732	329682

source: Social Insurance Claims Survey

3.2.4. Home oral rehabilitation services

Home oral rehabilitation was added to the health insurance benefit in 2016 as a surcharge to dental home visits. The fee is reimbursed when dentists provide oral rehabilitation services to the patients who are charged "dental home visits". The conditions for reimbursement are 1) patients must have eating disorder requiring a constant dental management, 2) dentists must develop long-term dental management plan and 3) dentists spend at least 20 minutes on site [8].

Since this fee is a surcharge to dental home visits, the fee is categorized by the number of teeth under management, and not by the number of patients in a building.

[Table 10] The number of home oral rehabilitation services.

The number of home oral rehabilitation services

	<10teeth	10～20teeth	20=<teeth	total
2016	1931	952	1441	**4324**
2017	2696	1608	2392	**6696**
2018	4798	2541	3931	**11270**
2019	6352	3645	5686	**15683**
2020	4623	2891	4408	**11922**

source: Social Insurance Claims Survey

4. Discussion

Oral health of the elderly population in Japan has improved considerably as evidenced by the Dental Hygiene Surveys. The share of the elderly who maintain 20 or more teeth has increased from 15% in 1999 to 51.2% in 2016 [9]. Tooth-specific survival has improved by 32% over the eleven years interval. A non-systemic review of dental health of the elderly concluded that "the epidemiological literature on oral health in the elderly is not very encouraging, and it indicates profound imbalances among countries

and regions"[10]. If so, Japan may be viewed as one of the few successful countries [11]. However, it is difficult to identify factors contributing to the improvement of dental health status. Improved dental care targeting middle-aged population with periodontal diseases must have been a major factor [12], but such measure alone will not accommodate the ever-increasing number of elderly patients who cannot visit dental clinics without assistance.

Japan is one of the rare examples of countries which not only cover dental care in its universal health insurance system but expand the coverage to home dental care to accommodate elderly patients at home. Since Japan has universal health coverage and dental care has been included in the benefit, it was possible to illustrate the utilization of dental services as well as the number of diagnoses contained in a claim particularly after the full computerization was achieved and a national database accumulating the claims data was established. Previous studies analyzing home dental care services relied on questionnaire surveys on practicing dentists in limited areas [13][14][15]. The present study has methodological advantages over preceding ones in that it used health insurance claims data, more accurate and reliable data source than questionnaires to illustrate the proliferation of home dental care services. Health insurance claims contain not only procedures but also diagnoses. This enabled researchers to illustrate how prevalence of diseases had shifted over the population aging. Reflecting the aging of the entire population, the prevalence of major diagnostic categories has shifted gradually with increasing share of periodontal diseases while the share of missing teeth has decreased due to the improved survival of teeth of the elderly.

Japan's uniform fee schedule is revised every two years and serves as a policy implementation tool for the government [16]. The government has increased the coverage of home care services in both medical and dental care. Utilization of home care services has increased steadily in recent years and is expected to increase further reflecting the ageing population (there was a sharp drop in the year 2020. This reflects the impact of the COVID19 epidemic and may be viewed as a temporary phenomenon).

The author analyzed publicly available data source including sampling surveys on dental status as well as health insurance claims data. However, one should be cautioned the limitations and drawbacks of the data. Although Japan's claims data are uniform and comprehensive, it lacks the information on socio-economic status of patients. For example, one recent study revealed "a pro-rich inequality for both income and wealth" in dental care use under universal public coverage [17]. This is a research question the present study failed to answer.

Monitoring the socio-economic disparity in oral health status would be the future challenge for researchers.

5. Conclusions

Japan has covered dental care as benefit of its universal health coverage. Thanks to such generous coverage, people can receive dental care with a minimal copayment. The dental health status as measured by survival of teeth has improved considerably particularly for the elderly population. In response to the rapidly ageing population, an increasing trend of home dental care services for the elderly patients has been observed. Although, the overall performance of Japan's dental care for the elderly has been satisfactory, some questions such as socio-economic disparity remains unanswered and leaves room for future research.

Supplementary Materials: Tables and Figures (including figure's data) are available in Excel file [URL]

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Institutional Review Board Statement: IRB review was not sought because this study relied solely on publicly available data.

Informed Consent Statement: Same as above.

Data Availability Statement:

・Dental Hygiene Survey
2005 Survey
https://www.e-stat.go.jp/stat-search/file-download?statInfId=000031411439&fileKind=0
https://www.e-stat.go.jp/stat-search/file-download?statInfId=000031411440&fileKind=0
2016 Survey
https://www.e-stat.go.jp/stat-search/file-download?statInfId=000031607230&fileKind=0
・NDB open data
2014 data: https://www.mhlw.go.jp/file/06-Seisakujouhou-12400000-Hokenkyoku/0000139460.xlsx
2015 data: https://www.mhlw.go.jp/file/06-Seisakujouhou-12400000-Hokenkyoku/0000177285.xlsx
2016 data: https://www.mhlw.go.jp/content/12400000/000347784.xlsx
2017 data: https://www.mhlw.go.jp/content/12400000/000711946.xlsx
2018 data: https://www.mhlw.go.jp/content/12400000/000539792.xlsx
・Social Insurance Claims Survey
https://www.e-stat.go.jp/stat-search/files?page=1&toukei=00450048&tstat=000001029602

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