6th German Oral Health Study (DMS · 6): rationale, study design, and baseline characteristics

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Objectives: With the First German Oral Health Study (DMS I) in 1989, the Institut der Deutschen Zahnärzte (IDZ) laid the foundation for a population-representative socioepidemiologic monitoring of oral health and care status in Germany. The objective of the sixth wave of the survey was to update the status of oral health. **Research questions:** The primary questions address cross-sectional data: 1. What are the current prevalence rates of oral diseases? 2. What associations exist between oral health and other participant characteristics? The third question is based on the comparison of cross-sectional data with previous German oral health studies (trend): 3. How has the oral health and care status in Germany developed from 1989 to 2023? The last two questions require longitudinal data: 4. How do oral diseases change over the course of a lifetime? 5. What individual characteristics influence the progression of (new) oral diseases? **Study design:** The DMS·6 is a combined cross-sectional and cohort study and therefore classified as an observational study. **Study participants:** The age groups for the cross-sectional study were selected following the World Health Organization (WHO) recommendations for oral epidemiologic studies. These include 12-year-olds as representatives for younger adolescents, 35- to 44-year-olds for younger adults, and 65- to 74-year-olds for younger seniors. An additional age group of 8- and 9-year-olds (younger children) was included to obtain information on oral health during the mixed dentition phase. In total, 3,377 study participants were included in the analyses for the cross-sectional questions (prevalences). Participant characteristics provide insights into their sociodemographic and behavioral parameters. *(Quintessence Int 2025;56 (Suppl):S4–S12; doi: 10.3290/j.qi.b5986173)*

Keywords: cross-sectional studies, dental care, dental health surveys, dentists, DMS 6, epidemiology, Germany, oral health, prevalence, research design

The Institut der Deutschen Zahnärzte (Institute of German Dentists, IDZ) established the foundation for a population-representative socioepidemiologic monitoring of oral health and dental care in Germany with the First German Oral Health Study (DMS I) in 1989.[1] Following German reunification, an additional study (DMS II) was conducted in the new federal states in 1992 to complete the data.[2] The Third German Oral Health Study (DMS III), carried out in 1997,[3] introduced a refined methodologic design that remained largely consistent in subsequent studies, including DMS IV in 2005[4] and DMS V in 2014.[5,6]

The 6th German Oral Health Study (DMS·6) is the first to be designed as a combined multicenter, nationally representative cross-sectional and longitudinal socioepidemiologic study in this series. Its primary objective is to assess the current status of oral health through clinical examinations while collecting information on oral health behaviors via social science surveys. For the first time, participants from 2014 were reexamined (DMS·6 cohort), enabling the analysis of individual disease trajectories and incidences. This approach facilitates causal inferences and addresses novel research questions.

The DMS·6 adhered to the methodologic recommendations of the Working Group for Epidemiology and Public Health of the German Society of Dental, Oral, and Maxillofacial Medicine (DGZMK) and complied with the "Principles of Good Epidemiological Practice" by the German Society for Epidemiology.[7,8]

Participatory health research and expert advisory board

In line with the principles of participatory health research, all relevant German dental scientific societies* were involved in the study planning process through a preliminary consultation and were asked about mandatory and optional examination endpoints.[9] The received proposals (response rate: 53%) were subsequently evaluated during discipline-specific consensus conferences by a dental expert advisory board. The dental expert advisory board for DMS•6 consists of 12 university professors from the German-speaking European region. This board encompasses key dental specialties, including cariology, orthodontics, pediatric dentistry, oral medicine, periodontology, prosthodontics, implantology, and geriatric dentistry, with most areas represented by at least two experts to ensure a balanced clinical examination program. In addition to the dental expert advisory board, an extended expert panel was established to address supplementary topics. This panel consists of 11 additional researchers from Germany, covering topics such as general medicine, nutrition, health economics, health care utilization behavior, quality of life, medical geography, migration history, oral hygiene behavior, prevention, smoking behavior, social medicine, and health care research.[10]

Study objectives and research questions

The DMS•6 is an oral epidemiology study with the main objective of reporting on the oral health situation in Germany. Therefore, it focuses on dentistry and aims to draw conclusions from the sample to the resident population of Germany. The study's primary goals relate to descriptive epidemiology, involving the documentation of oral health, oral health behaviors, and dental care status. The secondary goal encompasses analytical epidemiology, seeking explanations for observed phenomena.

The overarching research questions can be grouped into three categories—cross-sectional, trend, and longitudinal—requiring different types of data. The first two questions are based on cross-sectional data:

1. What are the current prevalence rates of oral diseases?

2. What associations exist between oral health and other participant characteristics?

The third question is based on the comparison of cross-sectional data with previous German oral health studies (trend):

3. How has the oral health and care status in Germany developed from 1989 to 2023?

The last two questions require longitudinal data:

4. How do oral diseases change over the course of a lifetime?

5. What individual characteristics influence the progression of (new) oral diseases?

Study design

DMS•6 is a combined cross-sectional and cohort study, conducted as a survey involving clinical examinations and interviews, classifying it as an observational study. Like its predecessors, it includes cross-sectional surveys representative of selected age groups in Germany (DMS•6 cross-section). The age groups were selected following the World Health Organization (WHO) recommendations for oral epidemiologic studies. These groups were: younger adolescents (12-year-olds), younger adults (35- to 44-year-olds), and younger seniors (65- to 74-year-olds), collectively referred to as WHO age groups.[11] In addition, the study included a group of younger children (8- and 9-year-olds) to address questions about malocclusions and oral health during the mixed dentition phase. This alignment with WHO standards enables both international comparisons and national comparisons with previous studies of similar design.

The current report focuses on the cross-sectional component of the study. Findings from the longitudinal component, involving participants reexamined from the DMS V (DMS•6 cohort), are planned for publication in 2026.

Sample size planning

The sample size for the cross-sectional component of DMS•6 was determined to address two primary goals. First, it needed to be sufficient to answer cross-sectional research questions regarding the current prevalences of oral diseases in Germany.

*Deutsche Gesellschaft für Zahn-, Mund- und Kieferheilkunde (DGZMK), Deutsche Gesellschaft für Alterszahnmedizin (DGAZ), Arbeitsgemeinschaft Zahnmedizin für Menschen mit Behinderung oder besonderem medizinischem Unterstützungsbedarf (AG ZMB), Deutsche Gesellschaft für Funktionsdiagnostik und -therapie (DGFDT), Deutsche Gesellschaft für Implantologie (DGI), Deutsche Gesellschaft für Kieferorthopädie (DGKFO), Deutsche Gesellschaft für Kinderzahnheilkunde (DGKiZ), Deutsche Gesellschaft für Parodontologie (DG PARO), Deutsche Gesellschaft für Prothetische Zahnmedizin und Biomaterialien (DGPro), Deutsche Gesellschaft für Zahnerhaltung (DGZ), Deutsche Gesellschaft für orale Epidemiologie und Versorgungsforschung (DGoEV), Arbeitskreis Psychologie und Psychosomatik (AK PP), Interdisziplinärer Arbeitskreis Oralpathologie und Oralmedizin (AK OPOM), Deutsche Gesellschaft für Präventivmedizin (DGPZM), Deutsche Gesellschaft für Restaurative und Regenerative Zahnerhaltung (DGR2Z), Deutsche Gesellschaft für Endodontologie und zahnärztliche Traumatologie (DGET).
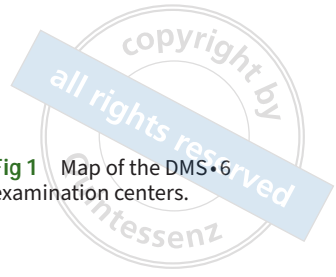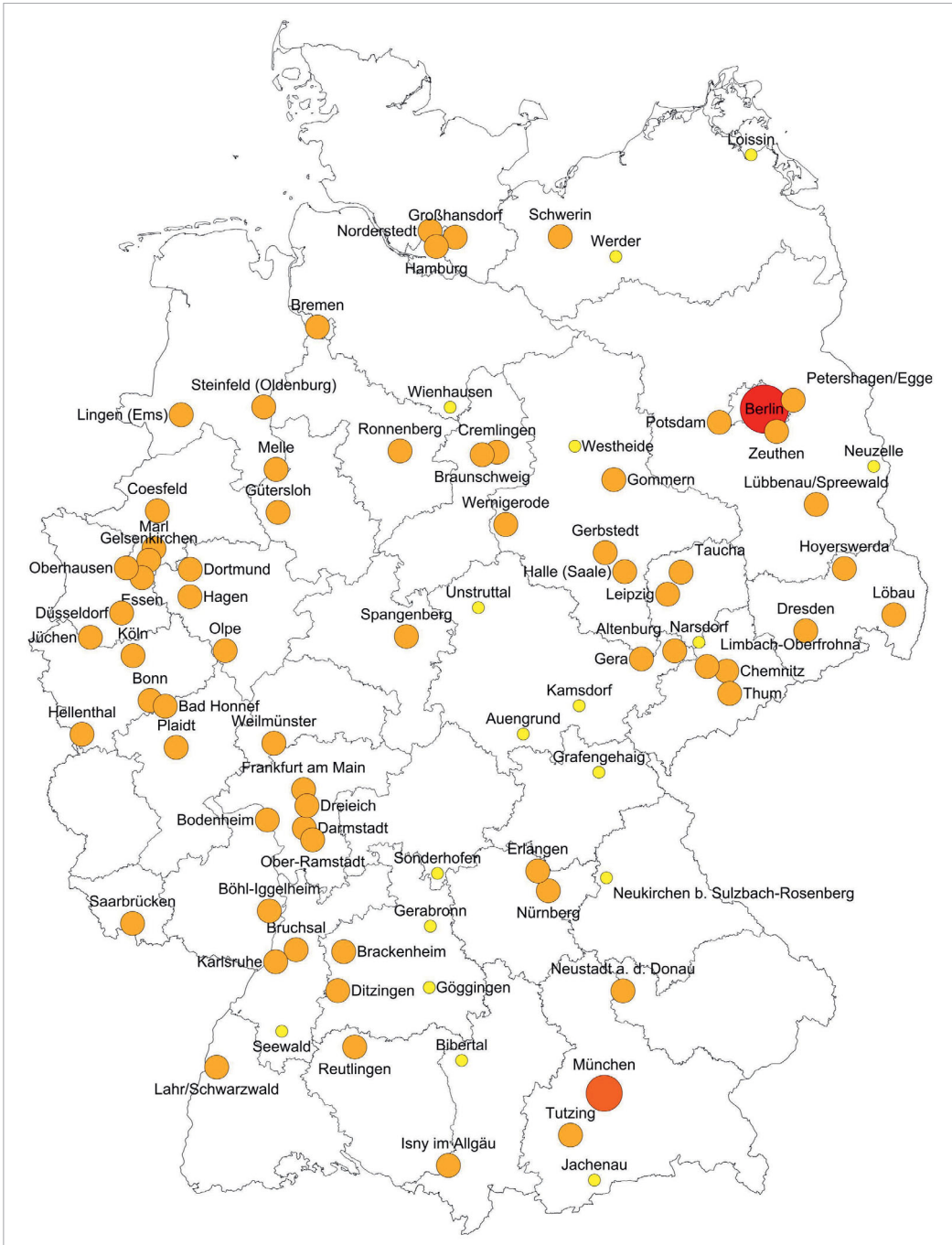
Fig 1 Map of the DMS•6 examination centers.

Second, it was essential to ensure enough participants for a potential follow-up survey (DMS•7), planned for around 2030. Initially, the target sample sizes for the WHO age groups mirrored those of previous oral health studies, aiming to recruit 1,000 new participants per age group. However, due to significant recruitment challenges, the target sample sizes were adjusted during the field phase to ensure successful study completion.

The revised sample size goals were:

- younger children (8- and 9-year-olds): 670 participants
- younger adolescents (12-year-olds): 900 participants
- younger adults (35- to 44-year-olds): 900 participants
- younger seniors (65- to 74-year-olds): 750 participants.

Further details regarding the sample size calculations are provided in Appendix 1.

Population and inclusion/exclusion criteria

The target population of DMS·6 consisted of individuals registered as residents in Germany, who belong to the specified birth cohorts, have sufficient proficiency in the German language to participate in the study, and are both mentally and physically capable of completing the study protocol.

To be included in the cross-sectional survey, participants had to meet all the following inclusion criteria:

- The individual was registered in one of the selected sampling municipalities
- The individual was born in one of the following years:
  - 2011–2012 (younger children, 8- and 9-year-olds)[†] OR
  - 2010 (younger adolescents, 12-year-olds) OR
  - 1978–1987 (younger adults, 35- to 44-year-olds) OR
  - 1948–1957 (younger seniors, 65- to 74-year-olds)
- The individual or their legal representatives provided written informed consent.

Participants were excluded if they met any of the following exclusion criteria:

- The individual or their legal representatives lacked sufficient German language proficiency to participate in the study
- The study could not proceed due to legal constraints.

Sampling model

The objective of the sampling model was to represent the selected population groups in Germany as accurately and unbiasedly as possible. To achieve this, a two-stage sampling method using a disproportionate stratified random sample was employed.

In the first stage, municipalities were selected. For DMS·6, the 90 municipalities from DMS V were retained. In DMS V, all municipalities in Germany were stratified by federal state, administrative region, and district, as well as by BIK community types (classification 0 to 9). An allocation calculation was then conducted based on the distribution of the target population at the time of DMS V sampling in September 2013, covering four age groups (12-year-olds; 35- to 44-year-olds; 65- to 74-year-olds; 75- to 100-year-olds). This ensured a representative selection of 90 municipalities based on geographic criteria, reflecting the distribution of Germany's population across
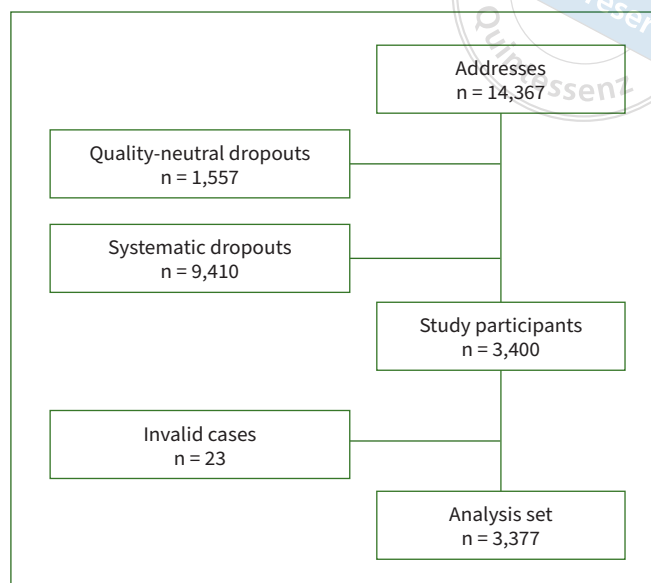

Fig 2 Flow chart of study participants.

urban and rural areas. To ensure representativeness for specific age groups in the new federal states, 30 sampling points were allocated to these states and 60 to the old federal states (Fig 1). For the group of younger children (8- and 9-year-olds), 16 municipalities—one per federal state—were additionally included.[12]

In the second stage, individual participants were randomly selected from the registers of residents in the identified municipalities. This selection process was managed by the internationally contracted field institute, Cerner Enviza (now Oracle Life Sciences). The institute contacted local registration offices to request addresses, explaining the legitimate public interest and specifying the parameters and criteria for selection. Address selection occurred approximately 3 to 6 months before the start of fieldwork.

To determine the number of addresses to request per age group, an expected response rate of 36% was assumed. For 1,000 interviews per age group, 2,778 addresses needed to be contacted (1,000 / 0.36 = 2,778). Since a random selection from the delivered addresses was required, twice this number of addresses was requested. For each of the three WHO age groups, 6,050 addresses were initially requested, divided between 31 large cities (100 addresses per age group) and 59 smaller munic-

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[†]The examination of the 8- and 9-year-olds was conducted from January to March 2021.

Table 1 Response rate and sample utilization by age groups (DMS•6 cross-section)

	Total, n (%)	8- and 9-year-olds, n (%)	12-year-olds, n (%)	35- to 44-year-olds, n (%)	65- to 74-year-olds, n (%)
Unadjusted gross sample	14,367	1,892	3,102	5,287	4,086
Adjusted gross sample	12,810 (100.0%)	1,759 (100.0%)	2,834 (100.0%)	4,567 (100.0%)	3,650 (100.0%)
Valid realized examinations / net sample (RR2 according to AAPOR*)	3,400 (26.5%)	714 (40.6%)	959 (33.8%)	929 (20.3%)	798 (21.9%)

*Response rate 2 according to the American Association for Public Opinion Research.[14]

ipalities (50 addresses per age group). As the fieldwork progressed, it became clear that the assumed response rate of 36% was not achievable. Therefore, the total number of addresses was incrementally increased. In total, 1,892 younger children, 3,102 younger adolescents, 5,287 younger adults, and 4,086 younger seniors were contacted. This resulted in adjusted response rates of 40.6% (714 participants, younger children), 33.8% (929 participants, younger adolescents), 20.3% (929 participants, younger adults), and 21.9% (798 participants, younger seniors).

Details on the geographic sampling process for DMS V and the sampling model for younger children have been published elsewhere.[12,13]

From the gross sample to the analysis set

In total, 14,367 individuals were initially contacted and invited to participate in the study (Fig 2). This number represents the unadjusted gross sample. Of these, 1,557 individuals were excluded and classified as quality-neutral dropouts (14.2% of all exclusions, 10.8% of the gross sample). Additionally, there were 9,410 systematic dropouts (85.8% of all exclusions, 65.5% of the gross sample). The distribution of these dropouts is detailed in Appendix 2. After excluding the quality-neutral and systematic dropouts, 23 additional cases were removed from the statistical data analysis, resulting in a final analysis set of 3,377 cases. The data analysis included participants for whom at least three central dental outcome measures (caries, periodontitis, and edentulism) were recorded. In the age group of younger adolescents (12-year-olds), only two central outcomes (caries and edentulism) were required. Missing data from the social-science survey did not lead to the exclusion of participants from the analysis.

The response rate was calculated in alignment with the American Association for Public Opinion Research's Response Rate 2[14] standard and mirrored the methodology used in the second wave of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS Wave 2).[15] The response rate represents the ratio of participants included in the analysis set (n = 3,400) to the gross sample adjusted for quality-neutral dropouts (n = 12,810) (Table 1).

Characterization of the study participants

A total of 3,400 participants from the age groups of younger children, younger adolescents, younger adults, and younger seniors were examined, with 3,377 cases included in the analyses.[12,16] These participants were distributed as follows:

- younger children (8- and 9-year-olds): n = 695
- younger adolescents (12-year-olds): n = 958
- younger adults (35- to 44-year-olds): n = 927
- younger seniors (65- to 74-year-olds): n = 797.

The characteristics of the study participants are presented in Tables 2 (younger children and younger adolescents) and 3 (younger adults and younger seniors).

Further methodologic information

Detailed information on fieldwork, data collection, and quality assurance is described by Ohm et al.[16] Detailed information on data handling and statistical methods is described by Kuhr et al.[17]

The DMS•6 was approved by the Institutional Review Board of the Witten/Herdecke University, Witten, Germany (registration number S-249/2021). Prior to the start of fieldwork, the study was registered at the German Clinical Trials Register (registration number DRKS00028701).

Table 2 Characteristics of the study participants for younger children (8- and 9-year-olds) and younger adolescents (12-year-olds)

Variable		8- and 9-year-olds	12-year-olds
No. of participants (n)		695	958
Age, years		8.5 ± 0.5	12.7 ± 0.5
	Missing	0	0
Gender	Male	366 (52.7%)	484 (50.5%)
	Female	329 (47.3%)	473 (49.4%)
	Diverse	NA	1 (0.1 %)
	Missing	0	0
Education group	Low	54 (7.8 %)	84 (9.5%)
	Medium	353 (51.1%)	420 (47.4%)
	High	284 (41.1%)	383 (43.2%)
	Missing	4	71
Socioeconomic status	Low	99 (16.2%)	161 (20.6%)
	Medium	399 (65.4%)	458 (58.7%)
	High	112 (18.4%)	161 (20.6%)
	Missing	85	178
Monthly net equivalent income, Euro		2,007 ± 1,380	2,033 ± 1,094
	Missing	78	162
Migration history	People with migration history	160 (23.2%)	220 (24.6%)
	People without migration history	531 (76.8%)	676 (75.4%)
	Missing	4	62
Body mass index, kg/m²		NA	19.5 ± 3.9
	Underweight or normal weight	NA	693 (85.6%)
	Overweight	NA	70 (8.6%)
	Obesity	NA	47 (5.8%)
	Missing	NA	148
Self-assessment of general health status	Very poor	0 (0.0%)	2 (0.2%)
	Poor	1 (0.1%)	0 (0.0%)
	Moderate	61 (8.8%)	47 (5.0%)
	Good	310 (44.7%)	470 (49.8%)
	Very good	322 (46.4%)	425 (45.0%)
	Missing	1	14
Self-assessment of oral health status	Very poor	2 (0.3%)	0 (0.0%)
	Poor	8 (1.2%)	12 (1.3%)
	Moderate	217 (31.4%)	204 (21.7%)
	Good	355 (51.4%)	512 (54.4%)
	Very good	108 (15.7%)	214 (22.7%)
	Missing	5	16
Locus of control*	None	NA	1 (0.1%)
	Little	NA	30 (3.2%)
	Some	NA	199 (21.2%)
	Much	NA	496 (52.9%)
	Very much	NA	211 (22.5%)
	Missing	NA	21
Dental service utilization	Regular check-ups	567 (81.6%)	848 (90.0%)
	Occasional check-ups	69 (9.9%)	37 (3.9%)
	Complaint-oriented	59 (8.5%)	57 (6.1%)
	Missing	0	16

Variable		8- and 9-year-olds	12-year-olds
Dental visits (frequency)	Only in case of problems	54 (7.8%)	40 (4.3%)
	< once a year	38 (5.5%)	7 (0.7%)
	≥ once a year	187 (26.9%)	166 (17.8%)
	≥ once every 6 months	416 (59.9%)	721 (77.2%)
	Missing	0	24
Health insurance status	Statutory health insurance	580 (84.9%)	663 (74.8%)
	Statutory health insurance + supplementary health insurance	30 (4.4%)	104 (11.7%)
	Private health insurance	73 (10.7%)	115 (13.0%)
	Other	0	2 (0.2%)
	No health insurance	0	2 (0.2%)
	Missing	12	72
Tooth brushing (frequency)	< once daily	12 (1.7%)	24 (2.5%)
	Once daily	120 (17.3%)	124 (13.1%)
	2 times daily	544 (78.3%)	744 (78.7%)
	> 2 times daily	19 (2.7%)	53 (5.6%)
	Missing	0	13
Interdental cleaning (frequency)	≥ once daily	NA	141 (14.9%)
	≥ once a week	NA	93 (9.8%)
	< once a week	NA	113 (12.0%)
	Never	NA	598 (63.3%)
	Missing	NA	13
Current cleaning by parents	Yes	245 (35.8%)	NA
	No	439 (64.2%)	NA
	Missing	11	NA
Fluoride toothpaste use	Yes	608 (94.9%)	827 (95.9%)
	No	33 (5.1%)	35 (4.1%)
	Missing	54	96
Fluoridated salt use	Usually no	NA	125 (16.4%)
	Occasionally	NA	144 (18.9%)
	Usually yes	NA	493 (64.7%)
	Yes	448 (65.3%)	NA
	No	188 (27.4 %)	NA
	Don't know	50 (7.3%)	NA
	Missing	9	196
Intake of fluoride tablets	Yes	11 (1.6%)	NA
	No	675 (97.7%)	NA
	Don't know	5 (0.7%)	NA
	Missing	4	NA
Fluoride gel use for oral hygiene	Yes	103 (15.8%)	NA
	No	550 (84.2%)	NA
	Missing	42	NA

Data are presented as number (percentage) or mean ± standard deviation based on unweighted data.
*How much can you do yourself to maintain or improve your dental health?
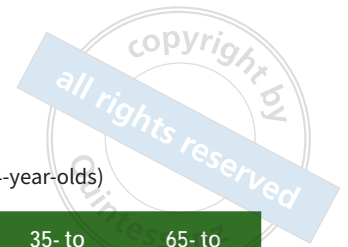NA, not available.

Table 3 Characteristics of study participants for younger adults (35- to 44-year-olds) and younger seniors (65- to 74-year-olds)

Variable		35- to 44-year-olds	65- to 74-year-olds
No. of participants (n)		927	797
Age, years		40.1 ± 2.9	69.8 ± 2.8
	Missing	1	1
Gender	Male	459 (49.5%)	375 (47.1%)
	Female	467 (50.4%)	422 (52.9%)
	Diverse	1 (0.1%)	0 (0.0%)
	Missing	0	0
Education group	Low	80 (9.2%)	158 (20.9%)
	Medium	408 (46.8%)	367 (48.6%)
	High	383 (44.0%)	230 (30.5%)
	Missing	56	42
Socioeconomic status	Low	154 (19.9%)	112 (19.2%)
	Medium	435 (56.1%)	345 (59.2%)
	High	186 (24.0%)	126 (21.6%)
	Missing	152	214
Monthly net equivalent income, Euro		2,433 ± 1,406	1,996 ± 1,042
	Missing	128	144
Migration history	People with migration history	201 (23.3%)	105 (13.9%)
	People without migration history	662 (76.7%)	648 (86.1%)
	Missing	64	44
Body mass index, kg/m²		26.2 ± 5.5	27.4 ± 5.0
	< 25	414 (47.9%)	242 (32.4%)
	25 – < 30	287 (33.2%)	311 (41.7%)
	≥ 30	164 (19.0%)	193 (25.9%)
	Missing	62	51
Smoking status	Never smoked	503 (54.6%)	380 (48.0%)
	Former smoker	182 (19.7%)	299 (37.8%)
	Occasional smoker	54 (5.9%)	12 (1.5%)
	Daily smoker	183 (19.8%)	101 (12.8%)
	Missing	5	5
Cardiovascular disease	Yes	39 (4.2%)	216 (27.3%)
	No	883 (95.8%)	575 (72.7%)
	Missing	5	6
Diabetes mellitus	Type 1 diabetes	4 (0.4%)	1 (0.1%)
	Type 2 diabetes	19 (2.1%)	124 (15.7%)
	No diabetes or gestational diabetes	896 (97.5%)	664 (84.2%)
	Missing	8	8
Self-assessment of general health status	Very poor	8 (0.9%)	7 (0.9%)
	Poor	18 (2.0%)	43 (5.4%)
	Moderate	86 (9.3%)	184 (23.2%)
	Good	469 (50.9%)	435 (54.9%)
	Very good	340 (36.9%)	123 (15.5%)
	Missing	6	5
Self-assessment of oral health status	Very poor	13 (1.4%)	12 (1.5%)
	Poor	32 (3.5%)	56 (7.1%)
	Moderate	204 (22.2%)	218 (27.6%)
	Good	492 (53.5%)	430 (54.4%)
	Very good	178 (19.4%)	75 (9.5%)
	Missing	8	6
Locus of control*	Very much	314 (34.2%)	192 (24.6%)
	Much	450 (49.0%)	382 (49.0%)
	Some	137 (14.9%)	193 (24.7%)
	Little	15 (1.6%)	10 (1.3%)
	None	2 (0.2%)	3 (0.4%)
	Missing	9	17

Variable		35- to 44-year-olds	65- to 74-year-olds
Dental service utilization	Regular check-ups	732 (79.4%)	662 (83.7%)
	Occasional check-ups	68 (7.4%)	26 (3.3%)
	Complaint-oriented	122 (13.2%)	103 (13.0%)
	Missing	5	6
Health literacy†	Never	826 (89.6%)	721 (91.0%)
	Rarely	39 (4.2%)	30 (3.8%)
	Sometimes	22 (2.4%)	18 (2.3%)
	Often	16 (1.7%)	11 (1.4%)
	Always	19 (2.1%)	12 (1.5%)
	Missing	5	5
Scheduling difficulties‡	Yes	47 (5.2%)	35 (4.5%)
	No	852 (94.8%)	740 (95.5%)
	Missing	28	22
Dental visits (frequency)	Only in case of problems	84 (9.2%)	80 (10.2%)
	< once a year	39 (4.3%)	17 (2.2%)
	≥ once a year	368 (40.2%)	265 (33.7%)
	≥ once every 6 months	425 (46.4%)	424 (53.9%)
	Missing	11	11
Periodontal treatment (utilization)	Yes	116 (12.7%)	255 (32.3%)
	No	776 (84.7%)	503 (63.8%)
	Don't know	24 (2.6%)	31 (3.9%)
	Missing	11	8
Professional tooth cleaning (frequency)	Never	193 (21.2%)	165 (21.9%)
	Usually no professional tooth cleaning	108 (11.9%)	94 (12.5%)
	< once a year	115 (12.6%)	76 (10.1%)
	≥ once a year	318 (34.9%)	223 (29.7%)
	≥ once every 6 months	176 (19.3%)	194 (25.8%)
	Missing	17	45
Health insurance status	Statutory health insurance	523 (61.2%)	461 (62.1%)
	Statutory health insurance + supplementary health insurance	240 (28.1%)	168 (22.6%)
	Private health insurance	85 (9.5%)	110 (14.8%)
	Other	6 (0.7%)	3 (0.4%)
	No health insurance	1 (0.1%)	0
	Missing	72	55
Use of bonus booklet	Yes	460 (50.3%)	291 (37.0%)
	No	455 (49.7%)	495 (63.0%)
	Missing	12	11
Tooth brushing (frequency)	< once daily	26 (2.8%)	30 (4.0%)
	Once daily	139 (15.1%)	93 (12.5%)
	2 times daily	711 (77.1%)	535 (72.1%)
	> 2 times daily	46 (5.0%)	84 (11.3%)
	Missing	5	55
Interdental cleaning (frequency)	≥ once daily	224 (24.3%)	283 (38.1%)
	≥ once a week	199 (21.6%)	125 (16.8%)
	< once a week	190 (20.6%)	62 (8.4%)
	Never	309 (33.5%)	272 (36.7%)
	Missing	5	55
Fluoride toothpaste use	Yes	800 (95.9%)	647 (93.6%)
	No	34 (4.1%)	44 (6.4%)
	Missing	93	106
Fluoridated salt use	Usually no	146 (19.4%)	149 (22.0%)
	Occasionally	129 (17.1%)	91 (13.5%)
	Usually yes	479 (63.5%)	436 (64.5%)
	Missing	173	121

Data are presented as number (percentage) or mean ± standard deviation based on unweighted data.
*How much can you do yourself to maintain or improve your dental health?
†How often do you need help from someone when reading instructions, patient information leaflets, or other written materials from your doctor or pharmacist?
‡Difficulties with scheduling an appointment with the dentist in the last 12 months.

Disclosure

ARJ, CO, FZ, DS, and KK are employed by the National Association of Statutory Health Insurance Dentists (KZBV). The authors declare that there are no conflicts of interest according to the Uniform Requirements for Manuscripts Submitted to Biomedical Journals. The interpretation of data and presentation of information is not influenced by any personal or financial relationship with any individual or organization.

Author contributions

All authors listed in the paper have contributed sufficiently to fulfill the criteria for authorship according to Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations). All authors read and approved the final manuscript. ARJ is the principal investigator of the DMS•6, responsible for developing the clinical examinations, and the author of the manuscript. NFB is the former deputy principal investigator and responsible for the social science study setting. CO is project manager for DMS•6 and a co-author of the manuscript. FZ is responsible for the social science analysis and a co-author of the manuscript. DS is the data manager of DMS•6 and jointly responsible for statistical data preparation and analysis. CCB was responsible for the organization of the fieldwork and is a co-author of the manuscript. MK was responsible for the data review and preparation as well as the analysis of the current field progress and is a co-author of the manuscript. KK is the deputy principal investigator of DMS•6, responsible for the data analysis, and a co-author of the manuscript.

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Appendix 1 and 2

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