

Global Burden of Sugar-Related Dental Diseases in 168 Countries and Corresponding Health Care Costs

T. Meier, P. Deumelandt, O. Christen, G.I. Stangl, K. Riedel, and M. Langer

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Formulas and effect sizes used in the model

As regards caries and periodontal diseases the MDS-related attributable disease burdens were calculated using the following formula:

$$DALY(MDS_x)_i = \sum_{i=1}^n DALY(total)_i \times PAF_m \times \frac{MDS_i}{MDS} \quad (1).$$

The corresponding direct MDS-related oral healthcare costs were calculated as follows:

$$DOHC(MDS_x)_i = \sum_{i=1}^n DOHC(total)_i \times PAF_m \times \frac{MDS_i}{MDS} \quad (2).$$

As regards MDS-related edentulism and severe tooth loss (caused by caries and periodontal diseases), the following formulas were applied:

$$DALY(MDS_y)_i = \sum_{i=1}^n DALY(MDS_x)_i \times (1 - OHC_i) \quad (3)$$

$$DOHC(MDS_y)_i = \sum_{i=1}^n DOHC(MDS_x)_i \times OHC_i \quad (4).$$

Whereas in formula (3) the term (1-OHC) was used to calculate the corresponding oral disease burden as a consequence of non-treatment of MDS-related caries and periodontal diseases, in formula (4) we used the OHC-fraction to calculate corresponding costs as a consequence of treatment.

DALY (MDS) ... disability-adjusted life years, MDS-related

DALY (total) ... total disability-adjusted life years due to oral disorders

DOHC (MDS) ... direct oral healthcare costs, MDS-related

DOHC (total) ... total direct oral healthcare costs

x ... due to caries or periodontal diseases

y ... due to edentulism and severe tooth loss caused by caries or periodontal diseases

MDS_i ... supply of mono- and disaccharides in n-countries

\overline{MDS} ... weighted average supply of MDS on global level

OHC ... oral healthcare coverage, treated; 1-OHC non-treated

PAF_m ... population attributable fraction (= population attributable risk) of MDS-related caries and/or periodontal diseases

n ... 168 countries i in formula (1) and (3), 31 OECD countries and country group "rest of the world" i in formula (2) and (4)

The PAF was calculated as follows:

$$PAF = 1 - \frac{1}{p(RR - 1) + 1} \quad (5) \text{ (according to Spiegelman et al 2007}^{(1)}).$$

PAF ... population attributable fraction (= population attributable risk)

RR ... relative risk (risk ratio)

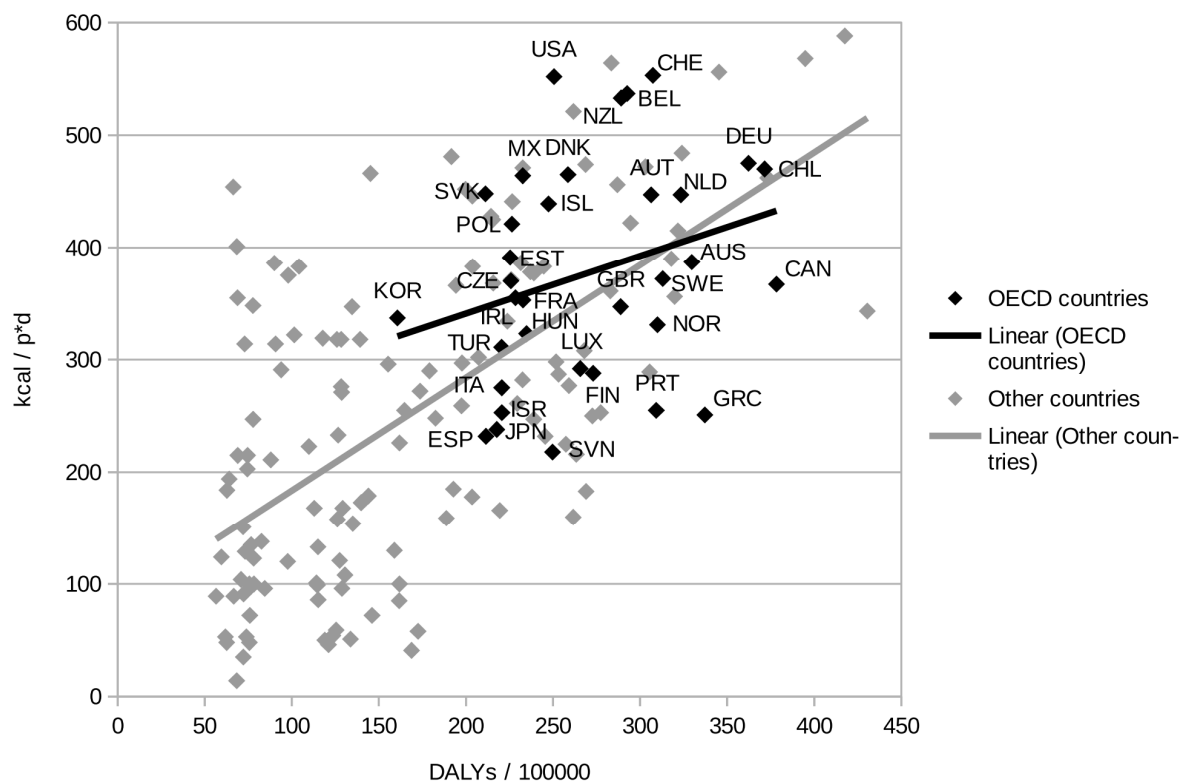
p ... prevalence of the risk factor (MDS) in the population (p=1)

According to Moynihan and Kelly (2013)⁽²⁾ – concerning higher and lower sugar intake (> and < 10% daily caloric energy uptake) and the prevalence of caries – and Lula et al. (2014)⁽³⁾ – concerning the intake of added sugar and the prevalence of periodontal diseases – the relative risks (risk ratios) and calculated population attributable fractions used in the model are as follows:

	Relative risk/risk ratio (95CI%)	Population attributable fraction (95CI%)	Comments
Moynihan and Kelly (2013) ⁽²⁾	7.15 (2.82-18.14)	86.01 (64.54-94.49)	Based on a pooled meta-analysis
Lula et al. (2014) ⁽³⁾	1.39 (1.02-1.89)	28.06 (1.96-47.09)	Adjusted prevalence ratio based on NHANES III

Results of the sensitivity analysis

To quantify the impacts resulting from limitations of the FAO food supply data⁽⁵⁾, in a quantitative sensitivity analysis all calculations with formulae (1) and (2) were conducted without the factor $\frac{MDS_i}{MDS}$. Although an association between the supply of MDS and dental diseases can be observed (Appendix Fig. 1), FAO supply levels tend to be roughly one third higher than actual intake levels. In the standard scenario this variable is used as a proxy for the intake of MDS at country level. The results of the sensitivity analysis show that the global MDS-related disease burden was +6.1% (+252 k DALYs) higher than in the standard scenario, with a higher impact in the rest of the world (+742 k DALYs) than in the OECD countries (-490 k DALYs). In economic terms, the results are the opposite: Here the sensitivity analysis results in 39.0% lower costs (-67.0 billion USD) than in the standard scenario, whereas the strong decline in OECD countries (-72.2 billion USD) was just slightly compensated for by a rise of 5.2 billion USD in the rest of the world. A full list with the percentage and absolute variance obtained in the sensitivity analysis, on both country and aggregated level, is provided in Appendix Tab. 7 – Tab. 12.



Appendix Fig. 1: Disability-adjusted life years (in DALYs per 100000 inhabitants) caused by caries, periodontal diseases, edentulism, and STL correlated with sugar supply (in kcal per person per day) in OECD and non-OECD countries in 2010 (based on IHME 2016⁽²⁾ and FAO Stat 2016⁽³⁾, see Appendix Tab. 3)

Appendix Tab. 1: OECD country list abbreviations

OECD country	Abbreviation
Australia	AUS
Austria	AUT
Belgium	BEL
Canada	CAN
Chile	CHL
Czech Republic	CZE
Denmark	DNK
Estonia	EST
Finland	FIN
France	FRA
Germany	DEU
Greece	GRC
Hungary	HUN
Iceland	ISL
Ireland	IRL
Israel	ISR
Italy	ITA
Japan	JPN
Luxembourg	LUX
Mexico	MX
Netherlands	NLD
New Zealand	NZL
Norway	NOR
Poland	POL
Portugal	PRT
Slovakia	SVK
Slovenia	SVN
South Korea	KOR
Spain	ESP
Sweden	SWE
Switzerland	CHE
Turkey	TUR
United Kingdom	GBR
United States	USA

Appendix Tab. 2: Global MDS-related dental disease burden in 2010 (in relative and total numbers, age-standardized)

Country abbreviation	DALYs caused by caries, periodontal diseases, edentulism, STL			Total DALYs caused by caries, peri- odontal diseas- es, eden- tulism, STL			MDS- related DALYs caused by caries, periodontal diseases, edentulism, STL			MDS-related DALYs caused by caries, peri- odontal diseas- es, edentulism, STL		
	UI95%	DALYs per 100000	Lower Upper limit limit	UI95%	Total DALYs	Lower limit Upper limit	UI95%	DALYs per 100000	Lower Upper limit limit	UI95%	Total DALYs	Lower limit Upper limit
Afghanistan AFG		115	(64-191)		32 706	(18 173-54 269)		21	(11-37)		5 984	(3 137-10 475)
Albania ALB		204	(112-340)		6 433	(3 526-10 762)		49	(24-88)		1 536	(765-2 782)
Algeria DZA		179	(103-292)		66 396	(38 194-108 276)		75	(37-134)		27 643	(13 794-49 755)
Angola AGO		98	(50-171)		19 309	(9 903-33 785)		29	(15-51)		5 784	(2 947-10 156)
Antigua and Barbuda ATG		305	(175-496)		267	(153-433)		115	(58-207)		100	(50-180)
Argentina ARG		373	(209-624)		150 770	(84 343-251 876)		235	(117-425)		94 837	(47 236-171 582)
Armenia ARM		237	(132-397)		7 005	(3 890-11 740)		170	(88-301)		5 025	(2 591-8 910)
Australia AUS		330	(201-507)		73 677	(44 849-113 383)		71	(33-133)		15 829	(7 479-29 800)
Austria AUT		306	(179-489)		25 686	(15 025-40 953)		107	(51-202)		8 984	(4 267-16 909)
Azerbaijan AZE		189	(102-326)		17 293	(9 320-29 851)		66	(34-119)		6 072	(3 106-10 909)
Bangladesh BGD		173	(97-285)		260 898	(146 593-430 644)		20	(10-34)		29 835	(15 822-51 717)
Barbados BRB		395	(233-632)		1 106	(652-1 770)		215	(103-399)		603	(288-1 117)
Belarus BLR		207	(120-337)		19 643	(11 340-31 898)		77	(39-139)		7 288	(3 662-13 193)
Belgium BEL		293	(173-462)		31 799	(18 833-50 193)		110	(52-204)		11 961	(5 624-22 162)
Belize BLZ		214	(119-359)		659	(366-1 103)		166	(85-293)		512	(263-902)
Benin BEN		74	(33-142)		7 049	(3 129-13 573)		13	(7-24)		1 281	(660-2 254)
Bolivia BOL		230	(128-381)		23 358	(13 051-38 779)		97	(50-173)		9 909	(5 093-17 600)
Bosnia and Herzegovina BIH		262	(146-435)		10 050	(5 598-16 691)		51	(25-94)		1 949	(944-3 598)
Botswana BWA		101	(55-173)		1 999	(1 087-3 402)		78	(40-139)		1 536	(788-2 745)

Brazil	BRA	318	(184-513)	621 774	(360 329-1004 004)	123	(60-226)	240 268	(116 895-442 280)
Brunei	BRN	90	(47-160)	361	(190-639)	65	(32-123)	260	(126-494)
Bulgaria	BGR	239	(140-382)	17 672	(10 331-28 230)	61	(31-110)	4 496	(2 262-8 150)
Burkina Faso	BFA	76	(34-148)	11 801	(5 255-23 071)	14	(7-24)	2 166	(1 158-3 727)
Cambodia	KHM	63	(32-110)	9 110	(4 640-16 013)	40	(21-69)	5 835	(3 091-10 061)
Cameroon	CMR	72	(32-141)	14 945	(6 705-29 096)	22	(11-39)	4 482	(2 288-8 031)
Canada	CAN	378	(232-571)	128 913	(79 182-194 619)	74	(35-138)	25 080	(12 031-47 001)
Cape Verde	CPV	88	(40-171)	431	(195-839)	57	(29-102)	278	(143-500)
Central African Republic	CAF	119	(63-206)	5 194	(2 754-8 986)	14	(7-24)	613	(324-1 066)
Chad	TCD	67	(30-129)	7 833	(3 510-15 168)	24	(13-41)	2 829	(1 519-4 825)
Chile	CHL	372	(204-633)	63 715	(34 905-108 625)	249	(125-454)	42 734	(21 465-77 811)
China	CHN	126	(67-218)	1716 821	(918 424-2977 131)	19	(10-34)	262 818	(137 456-463 271)
Colombia	COL	252	(137-425)	116 911	(63 677-197 365)	118	(59-212)	54 753	(27 600-98 316)
Congo	COG	115	(61-200)	4 757	(2 514-8 289)	35	(18-62)	1 446	(746-2 561)
Costa Rica	CRI	262	(142-443)	12 228	(6 643-20 719)	216	(108-388)	10 074	(5 052-18 132)
Cote d'Ivoire	CIV	77	(34-151)	14 650	(6 577-28 875)	26	(14-46)	5 000	(2 636-8 828)
Croatia	HRV	269	(146-455)	11 619	(6 323-19 695)	145	(68-274)	6 278	(2 948-11 864)
Cuba	CUB	418	(248-661)	47 203	(28 010-74 714)	252	(127-453)	28 460	(14 379-51 198)
Cyprus	CYP	259	(150-422)	2 171	(1 254-3 535)	65	(31-123)	542	(261-1 032)
Czech Republic	CZE	226	(122-386)	23 570	(12 699-40 260)	88	(39-172)	9 220	(4 096-17 935)
Denmark	DNK	259	(142-439)	14 332	(7 859-24 313)	123	(57-235)	6 803	(3 172-13 041)
Djibouti	DJI	155	(78-280)	1 303	(655-2 347)	102	(52-181)	853	(433-1 522)
Dominica	DMA	322	(186-519)	224	(129-361)	167	(84-300)	116	(59-209)
Dominican Republic	COM	268	(153-440)	26 844	(15 280-44 029)	119	(61-213)	11 960	(6 075-21 326)
Ecuador	ECU	269	(152-446)	40 345	(22 725-66 896)	63	(31-116)	9 417	(4 600-17 420)
Egypt	EGY	198	(113-323)	154 414	(88 340-251 895)	89	(45-159)	69 560	(35 474-124 132)
El Salvador	SLV	245	(136-408)	15 218	(8 466-25 391)	152	(78-270)	9 469	(4 845-16 827)

Estonia	EST	225	(133-361)	3 010	(1 770-4 824)	91	(44-168)	1 210	(591-2 238)
Ethiopia	ETH	134	(67-240)	116 438	(58 431-209 416)	19	(10-32)	16 477	(8 905-28 026)
Fiji	FJI	73	(39-125)	630	(336-1 079)	69	(36-121)	593	(307-1 046)
Finland	FIN	273	(171-413)	14 648	(9 155-22 126)	40	(19-76)	2 140	(1 006-4 052)
France	FRA	233	(127-393)	146 679	(80 064-247 823)	94	(45-177)	59 485	(28 472-111 248)
Gabon	GAB	135	(73-233)	2 107	(1 134-3 630)	40	(20-72)	625	(314-1 126)
Georgia	GEO	277	(157-456)	12 166	(6 902-20 016)	116	(60-205)	5 108	(2 654-9 006)
Germany	DEU	362	(203-598)	296 361	(166 176-489 464)	112	(47-225)	91 489	(38 374-184 052)
Ghana	GHA	73	(32-142)	17 764	(7 879-34 445)	31	(16-55)	7 600	(3 984-13 282)
Greece	GRC	337	(191-554)	37 430	(21 193-61 534)	74	(35-139)	8 190	(3 830-15 403)
Grenada	GRD	283	(162-459)	297	(170-481)	141	(71-250)	147	(75-262)
Guatemala	GTM	192	(105-324)	27 536	(15 049-46 601)	172	(87-304)	24 659	(12 554-43 658)
Guinea	GIN	77	(35-148)	8 357	(3 854-16 092)	34	(18-60)	3 734	(1 943-6 583)
Guinea-Bissau	GNB	78	(35-150)	1 240	(561-2 384)	32	(17-56)	505	(263-885)
Guyana	GUY	216	(119-365)	1 663	(914-2 815)	145	(74-258)	1 118	(572-1 989)
Haiti	HTI	219	(123-364)	21 673	(12 153-35 986)	65	(34-114)	6 403	(3 357-11 235)
Honduras	HND	204	(110-348)	15 550	(8 436-26 564)	168	(86-300)	12 817	(6 584-22 902)
Hungary	HUN	235	(129-393)	23 493	(12 892-39 291)	77	(36-145)	7 724	(3 583-14 480)
Iceland	ISL	247	(142-400)	785	(451-1 271)	107	(50-197)	338	(160-625)
India	IND	193	(109-320)	2327 048	(1317 914-3863 877)	62	(33-110)	750 528	(392 436-1327 635)
Indonesia	IDN	83	(41-154)	197 362	(97 715-367 614)	34	(18-62)	81 872	(42 158-147 580)
Iran	IRN	174	(99-283)	129 419	(73 645-210 935)	72	(36-126)	53 348	(27 115-93 919)
Iraq	IRQ	144	(81-242)	44 626	(25 019-74 916)	45	(23-80)	13 829	(7 011-24 907)
Ireland	IRL	228	(136-361)	10 235	(6 103-16 180)	57	(26-111)	2 572	(1 171-4 993)
Israel	ISR	221	(126-360)	16 373	(9 325-26 709)	59	(28-109)	4 344	(2 090-8 101)
Italy	ITA	221	(120-372)	133 502	(72 549-225 161)	72	(34-134)	43 394	(20 856-81 020)
Jamaica	JAM	303	(175-491)	8 337	(4 824-13 511)	194	(99-343)	5 326	(2 733-9 430)
Japan	JPN	218	(130-346)	274 375	(164 235-436 604)	44	(22-83)	55 790	(27 103-105 167)

Jordan	JOR	145	(82-241)	9 365	(5 319-15 521)	119	(61-211)	7 657	(3 923-13 588)
Kazakhstan	KAZ	198	(108-337)	31 442	(17 141-53 623)	106	(55-192)	16 913	(8 680-30 508)
Kenya	KEN	126	(63-227)	51 756	(25 946-93 194)	51	(26-88)	20 710	(10 849-35 910)
Kiribati	KIR	66	(35-115)	65	(34-113)	59	(31-104)	58	(30-102)
Kuwait	KWT	135	(72-230)	4 021	(2 139-6 861)	89	(43-159)	2 645	(1 281-4 747)
Kyrgyzstan	KGZ	162	(86-281)	8 647	(4 591-15 008)	98	(52-171)	5 257	(2 773-9 145)
Laos	LAO	62	(31-111)	3 938	(1 977-7 092)	13	(7-23)	836	(450-1 433)
Latvia	LVA	233	(137-371)	4 879	(2 864-7 784)	112	(55-206)	2 349	(1 147-4 327)
Lebanon	LBN	227	(133-365)	9 831	(5 761-15 822)	122	(61-223)	5 279	(2 629-9 671)
Lesotho	LSO	129	(74-208)	2 593	(1 489-4 179)	44	(23-76)	876	(460-1 521)
Liberia	LBR	76	(35-143)	2 998	(1 364-5 631)	18	(9-31)	712	(372-1 234)
Lithuania	LTU	231	(135-372)	7 201	(4 189-11 587)	111	(56-201)	3 466	(1 756-6 250)
Luxembourg	LUX	266	(154-430)	1 344	(777-2 178)	59	(26-116)	299	(133-587)
Macedonia	MKD	226	(125-382)	4 755	(2 623-8 040)	115	(58-206)	2 416	(1 214-4 338)
Madagascar	MDG	146	(73-264)	30 799	(15 374-55 727)	30	(16-52)	6 275	(3 290-10 945)
Malawi	MWI	128	(64-228)	19 105	(9 611-34 170)	38	(19-66)	5 663	(2 913-9 927)
Malaysia	MYS	68	(34-125)	19 353	(9 515-35 415)	76	(38-137)	21 337	(10 675-38 601)
Maldives	MDV	69	(34-127)	224	(110-415)	80	(41-144)	262	(133-470)
Mali	MLI	71	(32-136)	9 960	(4 484-19 119)	25	(13-45)	3 569	(1 849-6 300)
Malta	MLT	284	(164-460)	1 202	(696-1 948)	134	(64-254)	567	(270-1 077)
Mauritania	MRT	78	(35-148)	2 817	(1 263-5 346)	85	(43-149)	3 069	(1 560-5 406)
Mauritius	MUS	91	(46-163)	1 117	(565-2 005)	72	(36-129)	882	(445-1 595)
Mexico	MX	233	(125-399)	274 259	(147 832-470 330)	195	(100-347)	230 189	(118 329-408 576)
Moldova	MDA	183	(104-303)	6 534	(3 716-10 838)	68	(35-120)	2 419	(1 254-4 303)
Mongolia	MNG	159	(83-279)	4 305	(2 240-7 562)	58	(30-101)	1 562	(822-2 722)
Montenegro	MNE	233	(129-389)	1 437	(798-2 402)	87	(44-156)	538	(272-967)
Morocco	MAR	194	(114-316)	61 715	(36 328-100 420)	115	(61-199)	36 459	(19 333-63 155)
Mozambique	MOZ	131	(66-232)	31 445	(15 785-55 890)	34	(18-60)	8 284	(4 322-14 398)

Myanmar	MMR	68	(35-123)	35 568	(18 094-63 892)	3	(1-5)	1 434	(753-2 498)
Namibia	NAM	113	(63-190)	2 464	(1 375-4 155)	43	(22-77)	938	(481-1 683)
Nepal	NPL	169	(97-277)	45 305	(26 001-74 321)	13	(7-23)	3 616	(1 957-6 182)
Netherlands	NLD	323	(192-514)	53 818	(31 875-85 484)	119	(57-225)	19 855	(9 482-37 481)
New Zealand	NZL	289	(180-436)	12 569	(7 830-18 942)	77	(37-143)	3 354	(1 613-6 220)
Nicaragua	NIC	204	(110-347)	11 861	(6 415-20 179)	154	(80-270)	8 952	(4 680-15 723)
Niger	NER	63	(29-116)	9 961	(4 604-18 509)	11	(5-18)	1 674	(866-2 897)
Nigeria	NGA	78	(35-154)	125 090	(56 649-246 656)	29	(15-50)	45 617	(24 024-80 456)
North Korea	PRK	121	(64-210)	29 708	(15 669-51 470)	15	(8-26)	3 623	(1 890-6 333)
Norway	NOR	310	(183-491)	15 138	(8 954-23 964)	78	(37-147)	3 825	(1 805-7 189)
Oman	OMN	126	(68-214)	3 525	(1 907-6 000)	81	(41-144)	2 262	(1 141-4 021)
Pakistan	PAK	165	(92-273)	284 867	(159 840-472 784)	76	(39-135)	132 304	(67 461-234 350)
Panama	PAN	253	(138-432)	9 315	(5 075-15 909)	114	(58-206)	4 206	(2 123-7 587)
Paraguay	PRY	273	(158-441)	17 647	(10 204-28 560)	79	(39-142)	5 085	(2 538-9 172)
Peru	PER	263	(150-435)	77 183	(43 988-127 507)	84	(44-150)	24 668	(12 750-43 902)
Philippines	PHL	75	(37-135)	69 890	(34 646-126 025)	69	(37-119)	64 671	(34 238-111 756)
Poland	POL	226	(124-390)	86 424	(47 368-148 795)	114	(54-216)	43 339	(20 562-82 588)
Portugal	PRT	309	(181-496)	32 920	(19 278-52 740)	61	(28-115)	6 446	(3 027-12 282)
Romania	ROU	257	(141-434)	56 296	(30 894-94 938)	117	(65-198)	25 601	(14 220-43 226)
Russia	RUS	200	(115-326)	283 105	(162 385-462 339)	101	(48-188)	143 200	(68 442-266 685)
Rwanda	RWA	124	(61-227)	13 410	(6 651-24 625)	17	(9-31)	1 881	(984-3 363)
Saint Lucia	LCA	324	(187-525)	575	(331-932)	194	(97-348)	343	(172-617)
Saint Vincent and the Grenadines	VCT	295	(169-480)	322	(185-526)	170	(86-304)	186	(94-333)
Samoa	WSM	69	(37-119)	129	(68-221)	48	(25-84)	89	(46-156)
Sao Tome and Principe	STP	74	(33-144)	133	(59-257)	51	(27-90)	92	(48-161)
Saudi Arabia	SAU	139	(78-238)	37 645	(20 966-64 460)	79	(40-144)	21 434	(10 780-38 983)
Senegal	SEN	72	(32-141)	9 351	(4 199-18 303)	38	(20-66)	4 869	(2 533-8 589)

Serbia	SRB	246	(138-408)	23 714	(13 281-39 437)	73	(37-130)	7 029	(3 535-12 586)
Sierra Leone	SLE	72	(33-137)	4 178	(1 938-7 921)	11	(5-18)	612	(318-1 064)
Slovakia	SVK	211	(113-365)	11 465	(6 156-19 816)	103	(45-203)	5 571	(2 435-11 001)
Slovenia	SVN	250	(131-435)	5 121	(2 692-8 923)	67	(31-126)	1 371	(645-2 580)
Solomon Islands	SLB	60	(31-105)	316	(162-558)	29	(15-50)	151	(79-263)
South Africa	ZAF	128	(73-210)	66 280	(37 799-108 355)	76	(39-133)	39 199	(20 144-68 926)
South Korea	KOR	161	(91-267)	77 918	(44 252-129 601)	74	(36-138)	35 882	(17 423-66 813)
Spain	ESP	212	(133-325)	97 745	(61 285-150 193)	34	(16-63)	15 520	(7 395-29 264)
Sri Lanka	LKA	94	(48-164)	19 513	(10 067-33 981)	56	(27-102)	11 599	(5 551-21 189)
Sudan	SDN	127	(73-204)	45 422	(26 252-73 331)	43	(22-75)	15 456	(7 954-26 893)
Suriname	SUR	287	(163-469)	1 506	(854-2 463)	189	(97-336)	994	(508-1 764)
Swaziland	SWZ	118	(65-199)	1 405	(779-2 370)	91	(47-163)	1 089	(557-1 945)
Sweden	SWE	313	(186-494)	29 306	(17 383-46 250)	81	(38-156)	7 618	(3 519-14 623)
Switzerland	CHE	307	(184-483)	24 037	(14 353-37 751)	131	(63-243)	10 282	(4 936-19 021)
Taiwan	TWN	129	(70-221)	29 755	(16 172-51 115)	72	(35-132)	16 590	(8 130-30 496)
Tajikistan	TJK	140	(72-248)	10 764	(5 575-19 095)	73	(38-127)	5 594	(2 943-9 799)
Tanzania	TZA	129	(65-232)	57 991	(29 043-104 413)	30	(15-52)	13 389	(6 942-23 482)
Thailand	THA	104	(52-186)	69 066	(34 715-123 486)	100	(51-177)	66 273	(34 050-117 467)
The Bahamas	BHS	320	(184-524)	1 151	(663-1 886)	132	(64-245)	476	(229-882)
The Gambia	GMB	78	(34-151)	1 314	(576-2 550)	65	(33-114)	1 091	(559-1 926)
Timor-Leste	TLS	57	(28-103)	611	(299-1 113)	19	(10-33)	203	(105-356)
Togo	TGO	76	(35-147)	4 779	(2 182-9 310)	25	(13-45)	1 603	(831-2 852)
Trinidad and Tobago	TTO	345	(199-560)	4 591	(2 646-7 443)	232	(116-418)	3 083	(1 539-5 556)
Tunisia	TUN	224	(130-360)	23 797	(13 848-38 303)	90	(45-162)	9 533	(4 757-17 276)
Turkey	TUR	220	(129-354)	159 025	(92 950-255 303)	102	(53-179)	73 414	(37 922-129 184)
Turkmenistan	TKM	162	(85-282)	8 193	(4 287-14 263)	36	(18-63)	1 812	(930-3 206)
Uganda	UGA	114	(57-207)	38 891	(19 308-70 565)	31	(16-54)	10 477	(5 454-18 360)

Ukraine	UKR	215	(124-347)	98 526	(56 557-158 734)	99	(47-181)	45 139	(21 684-82 934)
United Arab Emirates	ARE	98	(48-182)	8 246	(4 008-15 319)	88	(41-166)	7 387	(3 460-13 954)
United Kingdom	GBR	289	(172-454)	180 786	(107 754-283 988)	80	(39-150)	50 324	(24 225-93 726)
United States	USA	251	(153-388)	776 583	(475 288-1203 621)	83	(40-156)	256 887	(123 533-482 312)
Uruguay	URY	430	(244-704)	14 532	(8 224-23 755)	147	(68-278)	4 969	(2 295-9 389)
Uzbekistan	UZB	162	(85-282)	45 042	(23 647-78 355)	44	(23-77)	12 289	(6 435-21 368)
Vanuatu	VUT	64	(34-112)	149	(78-261)	43	(23-76)	101	(53-177)
Venezuela	VEN	239	(128-409)	69 458	(37 263-118 749)	149	(75-268)	43 417	(21 707-77 897)
Vietnam	VNM	84	(41-154)	75 146	(36 435-137 340)	28	(15-48)	24 847	(12 963-43 165)
Yemen	YEM	128	(72-210)	29 320	(16 526-48 024)	70	(36-122)	16 045	(8 318-27 796)
Zambia	ZMB	115	(58-207)	15 218	(7 650-27 424)	31	(16-53)	4 080	(2 149-7 016)
Zimbabwe	ZWE	110	(62-179)	14 377	(8 170-23 473)	55	(29-94)	7 191	(3 825-12 339)
OECD*		255	(149-410)	2901 381	(1696 159-4664 545)	91	(44-171)	1038 872	(499 938-1940 208)
Rest of the world**		145	(80-245)	8904 747	(4899 445-15074 842)	53	(27-95)	3060 948	(1565 225-5460 766)
WORLD		174	(97-289)	11806 128	(6595 604-19739 387)	61	(31-110)	4099 820	(2065 163-7400 974)

* Excluded countries: Chile, Portugal, Turkey (included in rest of the world)

**Excluded countries: Andorra, Bahrain, Bhutan, Burundi, Comoros, Congo, Equatorial Guinea, Eritrea, Micronesia, Libya, Marshall Islands, Palestine, Papua New Guinea, Qatar, Seychelles, Singapore, Somalia, South Sudan, Syria, Tonga

MDS ... mono- and disaccharides

STL ... severe tooth loss

Appendix Tab. 3: Oral disease burden, sugar supply and oral healthcare coverage in 168 countries

	DALYs caused by caries, periodontal diseases, edentulism, STL	DALYs due to caries (deciduous and permanent)	DALYs due to periodontal diseases	DALYs due to edentulism, severe tooth loss (STL)	Sugar supply in 2010 according to FAO Stat 2016 (5)	Oral Healthcare Coverage based on (6)	Income group according to World Bank 2005 (7)
	DALYs per 100000	DALYs per 100000	DALYs per 100000	DALYs per 100000	in kcal / p*d	in %	
Afghanistan	115	33	22	61	86	44.7	LIC
Albania	204	26	71	107	178	59.9	UMC
Algeria	179	34	36	109	290	59.9	UMC
Angola	98	32	30	36	120	52.5	LMC
Antigua and Barbuda	305	46	76	183	289	59.9	UMC
Argentina	373	52	120	202	462	59.9	UMC
Armenia	237	58	56	123	378	52.5	LMC
Australia	330	14	70	246	387	74.5	HIC
Austria	306	23	76	208	447	74.5	HIC
Azerbaijan	189	59	49	81	159	59.9	UMC
Bangladesh	173	38	38	96	58	32.1	LIC
Barbados	395	46	91	258	568	74.5	HIC
Belarus	207	29	51	127	302	59.9	UMC
Belgium	293	17	74	202	537	74.5	HIC
Belize	214	48	57	110	428	52.5	LMC
Benin	74	29	36	9	53	44.7	LIC
Bolivia	230	43	64	123	261	52.5	LMC
Bosnia and Herzegovina	262	36	84	142	160	73.6	LMC
Botswana	101	38	17	47	322	59.9	UMC
Brazil	318	33	88	197	390	71.4	LMC
Brunei	90	25	28	38	386	74.5	HIC
Bulgaria	239	25	57	156	247	59.9	UMC
Burkina Faso	76	28	40	8	48	21.2	LIC
Cambodia	63	32	11	20	184	44.7	LIC
Cameroon	72	29	35	8	91	52.5	LMC
Canada	378	21	57	300	367	74.5	HIC
Cape Verde	88	31	47	11	211	52.5	LMC
Central African Republic	119	34	36	49	50	44.7	LIC

Chad	67	29	31	7	89	24.0	LIC
Chile	372	53	129	189	470	59.9	UMC
China	126	44	28	53	59	46.5	LMC
Colombia	252	44	82	125	298	59.9	UMC
Congo	115	33	36	46	133	52.5	LMC
Costa Rica	262	45	89	128	521	59.9	UMC
Cote d'Ivoire	77	29	39	9	98	39.9	LIC
Croatia	269	31	103	135	474	80.4	UMC
Cuba	418	47	93	278	588	59.9	UMC
Cyprus	259	24	69	166	277	74.5	HIC
Czech Republic	226	25	92	108	370	91.8	UMC
Denmark	259	21	97	140	465	74.5	HIC
Djibouti	155	37	67	51	296	52.5	LMC
Dominica	322	47	75	199	415	59.9	UMC
Dominican Republic	268	47	66	155	308	57.7	LMC
Ecuador	269	42	73	154	183	69.5	LMC
Egypt	198	40	35	123	297	52.5	LMC
El Salvador	245	45	71	129	383	52.5	LMC
Estonia	225	29	52	144	391	73.8	UMC
Ethiopia	134	35	55	44	51	24.2	LIC
Fiji	73	37	7	29	314	59.9	UMC
Finland	273	16	41	216	288	81.8	HIC
France	233	26	84	123	353	74.5	HIC
Gabon	135	34	40	61	154	59.9	UMC
Georgia	277	56	63	158	253	49.8	LMC
Germany	362	15	136	211	475	99.8	HIC
Ghana	73	23	41	9	129	32.2	LIC
Greece	337	24	107	206	251	74.5	HIC
Grenada	283	48	67	168	361	59.9	UMC
Guatemala	192	42	57	92	481	52.5	LMC
Guinea	77	29	38	10	135	44.7	LIC
Guinea-Bissau	78	29	39	10	123	44.7	LIC
Guyana	216	48	59	109	368	52.5	LMC
Haiti	219	45	57	118	166	44.7	LIC
Honduras	204	43	63	97	446	52.5	LMC
Hungary	235	19	91	125	323	76.9	UMC
Iceland	247	28	64	156	439	74.5	HIC

India	193	42	43	108	185	48.0	LIC
Indonesia	83	34	26	23	138	52.5	LMC
Iran	174	33	37	104	272	52.5	LMC
Iraq	144	32	32	80	179	52.5	LMC
Ireland	228	22	43	163	355	88.6	HIC
Israel	221	28	56	136	253	74.5	HIC
Italy	221	27	76	117	275	74.5	HIC
Jamaica	303	47	71	186	472	52.5	LMC
Japan	218	22	47	149	238	74.5	HIC
Jordan	145	35	26	84	466	52.5	LMC
Kazakhstan	198	57	50	91	259	59.9	LMC
Kenya	126	32	55	39	158	39.1	LIC
Kiribati	66	37	6	24	454	52.5	LMC
Kuwait	135	39	38	58	347	74.5	HIC
Kyrgyzstan	162	57	40	65	226	44.7	LIC
Laos	62	32	13	17	53	28.4	LIC
Latvia	233	29	53	150	471	71.4	UMC
Lebanon	227	36	42	149	441	59.9	UMC
Lesotho	129	37	15	77	168	44.7	LIC
Liberia	76	29	36	11	72	44.7	LIC
Lithuania	231	35	52	145	386	59.9	UMC
Luxembourg	266	24	73	169	292	92.8	HIC
Macedonia	226	26	82	118	371	52.5	LMC
Madagascar	146	49	56	41	72	44.7	LIC
Malawi	128	34	52	41	121	46.9	LIC
Malaysia	68	29	21	19	401	66.7	UMC
Maldives	69	33	18	18	355	52.5	LMC
Mali	71	29	34	9	104	44.7	LIC
Malta	284	24	73	187	564	74.5	HIC
Mauritania	78	30	40	8	348	56.4	LIC
Mauritius	91	33	28	30	314	64.3	UMC
Mexico	233	45	80	108	464	50.6	UMC
Moldova	183	29	48	106	248	44.7	LIC
Mongolia	159	58	42	59	130	44.7	LIC
Montenegro	233	26	82	124	282	52.5	LMC
Morocco	194	36	37	121	366	37.4	LMC
Mozambique	131	34	54	43	108	44.7	LIC
Myanmar	68	23	21	24	14	36.1	LIC
Namibia	113	40	16	58	168	56.3	LMC

Nepal	169	35	35	99	41	22.5	LIC
Netherlands	323	30	73	221	447	74.5	HIC
New Zealand	289	16	39	234	533	74.5	HIC
Nicaragua	204	44	65	95	383	44.7	LIC
Niger	63	27	26	10	48	44.7	LIC
Nigeria	78	34	37	7	100	44.7	LIC
North Korea	121	43	26	52	46	44.7	LIC
Norway	310	21	81	208	331	74.5	HIC
Oman	126	35	32	59	318	59.9	UMC
Pakistan	165	41	35	88	255	56.8	LIC
Panama	253	44	84	125	287	59.9	UMC
Paraguay	273	33	70	170	250	58.8	LMC
Peru	263	43	72	148	216	52.5	LMC
Philippines	75	48	9	18	215	41.6	LMC
Poland	226	25	88	113	421	74.5	HIC
Portugal	309	23	76	211	255	75.1	HIC
Romania	257	37	87	134	225	52.5	LMC
Russia	200	29	50	120	452	77.0	LMC
Rwanda	124	35	52	37	54	44.7	LIC
Saint Lucia	324	47	76	201	484	59.9	UMC
Saint Vincent and the Gren- adines	295	48	73	173	422	59.9	UMC
Samoa	69	36	6	27	215	52.5	LMC
Sao Tome and Principe	74	29	37	9	203	44.7	LIC
Saudi Arabia	139	33	35	71	318	59.9	UMC
Senegal	72	29	35	8	151	44.7	LIC
Serbia	246	26	85	135	232	52.5	LMC
Sierra Leone	72	42	21	9	35	44.7	LIC
Slovakia	211	26	86	99	448	94.3	UMC
Slovenia	250	23	116	110	218	74.5	HIC
Solomon Is- lands	60	36	5	19	124	44.7	LIC
South Africa	128	35	20	73	318	56.8	LMC
South Korea	161	32	38	91	337	74.5	HIC
Spain	212	22	25	164	232	80.2	HIC
Sri Lanka	94	32	26	36	291	80.3	LMC
Sudan	127	22	26	79	233	44.7	LIC
Suriname	287	47	72	168	456	52.5	LMC
Swaziland	118	47	15	56	319	61.9	LMC

Sweden	313	22	75	215	372	83.2	HIC
Switzerland	307	24	72	211	553	74.5	HIC
Taiwan	129	45	26	58	271	74.5	HIC
Tajikistan	140	57	34	49	173	44.7	LIC
Tanzania	129	32	54	42	96	44.7	LIC
Thailand	104	32	38	34	383	52.5	LMC
The Bahamas	320	48	81	191	356	74.5	HIC
The Gambia	78	29	42	7	247	44.7	LIC
Timor-Leste	57	30	13	14	89	44.7	LIC
Togo	76	29	37	10	100	44.7	LIC
Trinidad and Tobago	345	47	85	214	556	59.9	UMC
Tunisia	224	35	42	147	334	62.2	LMC
Turkey	220	44	35	141	311	52.5	LMC
Turkmenistan	162	58	41	62	85	52.5	LMC
Uganda	114	34	47	34	101	44.7	LIC
Ukraine	215	28	52	135	425	71.7	LMC
United Arab Emirates	98	38	34	26	375	80.2	HIC
United Kingdom	289	23	71	195	347	74.5	HIC
United States	251	14	48	189	552	74.0	HIC
Uruguay	430	51	130	249	343	85.1	UMC
Uzbekistan	162	58	40	63	100	44.7	LIC
Vanuatu	64	36	6	22	194	52.5	LMC
Venezuela	239	44	82	113	377	59.9	UMC
Vietnam	84	39	24	21	96	44.1	LIC
Yemen	128	33	24	71	276	44.7	LIC
Zambia	115	30	49	36	99	30.5	LIC
Zimbabwe	110	34	13	63	223	37.7	LIC

Appendix Tab. 4: MDS-related dental disease burden on disease level in 168 countries, in DALYs per 100000 (age-standardized, standard scenario)

	MDS-related caries	UI95 %	MDS-related periodontal diseases			MDS-related edentulism, SFT (due to caries)			MDS-related edentulism, STL (due to periodontal diseases)			
	DALYs per 100000	Lower limit	Upper limit	DALYs per 100000	Lower limit	Upper limit	DALYs per 100000	Lower limit	Upper limit	DALYs per 100000	Lower limit	Upper limit
Afghanistan	11	(5-22)		2	(1-5)		6	(4-9)		1	(1-2)	
Albania	18	(8-35)		16	(6-33)		7	(5-10)		7	(4-9)	
Algeria	40	(18-77)		14	(5-28)		16	(10-22)		5	(4-8)	
Angola	15	(7-29)		5	(2-9)		7	(5-10)		2	(1-3)	
Antigua and Barbuda	53	(24-103)		29	(12-58)		21	(14-30)		11	(8-16)	
Argentina	96	(43-185)		72	(29-146)		38	(26-54)		29	(19-40)	
Armenia	88	(40-170)		27	(11-57)		42	(28-57)		13	(9-18)	
Australia	21	(10-41)		35	(14-72)		5	(4-7)		9	(6-12)	
Austria	42	(19-82)		44	(18-90)		11	(7-15)		11	(7-15)	
Azerbaijan	37	(17-72)		10	(4-21)		15	(10-21)		4	(3-6)	
Bangladesh	9	(4-17)		3	(1-6)		6	(4-8)		2	(1-3)	
Barbados	105	(47-201)		67	(27-137)		27	(18-37)		17	(11-24)	
Belarus	35	(16-68)		20	(8-41)		14	(9-19)		8	(5-11)	
Belgium	36	(16-69)		52	(20-104)		9	(6-13)		13	(9-18)	
Belize	81	(37-154)		32	(13-64)		39	(26-54)		15	(10-21)	
Benin	6	(3-12)		2	(1-5)		3	(2-5)		1	(1-2)	
Bolivia	44	(20-86)		22	(9-44)		21	(14-29)		10	(7-14)	
Bosnia and Herzegovina	23	(10-44)		17	(7-35)		6	(4-8)		5	(3-6)	
Botswana	49	(22-94)		7	(3-14)		19	(13-27)		3	(2-4)	
Brazil	51	(23-97)		44	(18-91)		15	(10-20)		13	(9-17)	
Brunei	38	(17-76)		14	(6-29)		10	(7-14)		4	(2-5)	
Bulgaria	25	(11-48)		18	(7-38)		10	(7-14)		7	(5-10)	
Burkina Faso	5	(2-10)		2	(1-5)		4	(3-6)		2	(1-3)	
Cambodia	23	(11-44)		3	(1-5)		13	(9-18)		1	(1-2)	
Cameroon	11	(5-21)		4	(2-9)		5	(3-7)		2	(1-3)	
Canada	31	(14-62)		27	(11-56)		8	(5-11)		7	(5-10)	
Cape Verde	26	(12-50)		13	(5-27)		12	(8-17)		6	(4-9)	
Central African Republic	7	(3-13)		2	(1-5)		4	(3-5)		1	(1-2)	

Chad	10	(5-19)	4	(1-8)	8	(5-11)	3	(2-4)
Chile	99	(45-191)	79	(32-163)	40	(27-55)	32	(21-44)
China	10	(5-20)	2	(1-4)	6	(4-8)	1	(1-2)
Colombia	52	(24-100)	32	(13-65)	21	(14-29)	13	(9-18)
Congo	18	(8-34)	6	(3-13)	8	(6-11)	3	(2-4)
Costa Rica	94	(42-180)	60	(24-122)	38	(25-52)	24	(16-33)
Cote d'Ivoire	11	(5-22)	5	(2-10)	7	(5-10)	3	(2-4)
Croatia	58	(26-112)	63	(25-129)	11	(8-16)	12	(8-17)
Cuba	109	(50-212)	71	(29-142)	44	(30-60)	28	(19-39)
Cyprus	27	(12-53)	25	(10-52)	7	(5-10)	6	(4-9)
Czech Republic	37	(17-73)	44	(18-90)	3	(2-4)	4	(2-5)
Denmark	39	(18-78)	59	(23-122)	10	(7-14)	15	(10-21)
Djibouti	43	(19-83)	26	(10-53)	20	(14-28)	12	(8-17)
Dominica	78	(36-151)	41	(16-83)	31	(21-43)	16	(11-22)
Dominican Republic	57	(26-110)	26	(11-54)	24	(16-34)	11	(8-16)
Ecuador	31	(14-60)	17	(7-36)	9	(6-13)	5	(4-7)
Egypt	47	(21-91)	14	(5-28)	22	(15-31)	6	(4-9)
El Salvador	68	(31-130)	35	(14-72)	32	(22-45)	17	(11-23)
Estonia	45	(21-88)	26	(11-54)	12	(8-16)	7	(5-9)
Ethiopia	7	(3-13)	4	(1-8)	5	(4-7)	3	(2-4)
Fiji	46	(21-88)	3	(1-6)	18	(13-26)	1	(1-2)
Finland	18	(8-36)	15	(6-31)	3	(2-5)	3	(2-4)
France	37	(17-71)	38	(15-78)	9	(6-13)	10	(7-14)
Gabon	21	(9-40)	8	(3-17)	8	(6-11)	3	(2-4)
Georgia	57	(26-109)	21	(8-43)	29	(19-40)	10	(7-14)
Germany	27	(13-53)	84	(34-172)	0	(0-0)	0	(0-0)
Ghana	12	(5-23)	7	(3-14)	8	(5-11)	5	(3-7)
Greece	24	(11-46)	35	(14-71)	6	(4-8)	9	(6-12)
Grenada	69	(32-131)	31	(12-64)	28	(19-38)	13	(9-17)
Guatemala	81	(36-154)	36	(14-73)	38	(26-53)	17	(11-23)
Guinea	15	(7-30)	7	(3-14)	9	(6-12)	4	(2-5)
Guinea-Bissau	14	(6-27)	6	(2-13)	8	(5-11)	3	(2-5)
Guyana	70	(31-135)	28	(11-58)	33	(22-46)	13	(9-19)
Haiti	30	(13-57)	12	(5-25)	16	(11-23)	7	(5-9)
Honduras	77	(35-151)	37	(15-75)	37	(25-50)	17	(12-24)
Hungary	25	(11-47)	38	(15-77)	6	(4-8)	9	(6-12)
Iceland	49	(22-94)	36	(14-73)	12	(8-17)	9	(6-13)

India	31	(14-60)	10	(4-21)	16	(11-22)	5	(4-7)
Indonesia	19	(9-36)	5	(2-10)	9	(6-12)	2	(1-3)
Iran	35	(16-67)	13	(5-27)	17	(11-23)	6	(4-9)
Iraq	23	(10-45)	7	(3-15)	11	(7-15)	4	(2-5)
Ireland	32	(14-62)	20	(8-42)	4	(2-5)	2	(2-3)
Israel	28	(13-54)	18	(7-39)	7	(5-10)	5	(3-7)
Italy	30	(14-58)	27	(11-56)	8	(5-11)	7	(5-10)
Jamaica	88	(40-170)	43	(17-88)	42	(28-57)	21	(14-28)
Japan	21	(10-41)	15	(6-30)	5	(4-7)	4	(3-5)
Jordan	65	(29-125)	16	(6-33)	31	(21-42)	8	(5-10)
Kazakhstan	59	(27-116)	17	(7-34)	24	(16-33)	7	(5-9)
Kenya	20	(9-38)	11	(5-23)	12	(8-17)	7	(5-10)
Kiribati	37	(17-70)	3	(1-7)	17	(12-24)	2	(1-2)
Kuwait	53	(24-98)	17	(7-35)	14	(9-19)	4	(3-6)
Kyrgyzstan	52	(23-99)	12	(5-24)	29	(19-39)	6	(4-9)
Laos	7	(3-13)	1	(0-2)	5	(3-7)	1	(0-1)
Latvia	54	(25-106)	33	(13-66)	16	(11-21)	9	(6-13)
Lebanon	63	(28-125)	24	(9-49)	25	(17-35)	10	(6-13)
Lesotho	25	(11-48)	3	(1-6)	14	(9-19)	2	(1-2)
Liberia	8	(4-15)	3	(1-7)	5	(3-6)	2	(1-3)
Lithuania	53	(24-103)	26	(11-54)	21	(14-29)	11	(7-14)
Luxembourg	28	(13-54)	28	(11-57)	2	(1-3)	2	(1-3)
Macedonia	38	(17-74)	39	(16-81)	18	(12-25)	19	(13-26)
Madagascar	14	(6-26)	5	(2-11)	8	(5-11)	3	(2-4)
Malawi	16	(7-31)	8	(3-17)	9	(6-12)	4	(3-6)
Malaysia	46	(21-87)	11	(4-23)	15	(10-22)	4	(2-5)
Maldives	46	(21-91)	8	(3-17)	22	(14-31)	4	(3-6)
Mali	12	(5-23)	5	(2-9)	7	(4-9)	3	(2-4)
Malta	53	(24-105)	53	(21-111)	14	(9-19)	14	(9-19)
Mauritania	41	(18-77)	18	(7-36)	18	(12-25)	8	(5-11)
Mauritius	41	(19-79)	11	(5-23)	15	(10-21)	4	(3-6)
Mexico	82	(37-159)	48	(19-99)	41	(28-56)	24	(16-33)
Moldova	28	(13-55)	15	(6-32)	16	(10-21)	9	(6-12)
Mongolia	30	(14-58)	7	(3-14)	17	(11-23)	4	(3-5)
Montenegro	29	(13-57)	30	(12-61)	14	(9-19)	14	(10-20)
Morocco	53	(24-101)	17	(7-35)	33	(23-47)	11	(7-15)
Mozambique	15	(7-28)	8	(3-15)	8	(5-11)	4	(3-6)
Myanmar	1	(1-2)	0	(0-1)	1	(1-1)	0	(0-0)
Namibia	26	(12-52)	3	(1-7)	12	(8-16)	2	(1-2)

Nepal	6	(3-11)	2	(1-4)	4	(3-6)	1	(1-2)
Netherlands	53	(24-103)	42	(17-89)	13	(9-19)	11	(7-15)
New Zealand	34	(16-66)	27	(11-55)	9	(6-12)	7	(5-9)
Nicaragua	67	(30-130)	32	(13-65)	37	(25-51)	18	(12-24)
Niger	5	(2-10)	2	(1-3)	3	(2-4)	1	(1-1)
Nigeria	14	(6-26)	5	(2-10)	8	(5-10)	3	(2-4)
North Korea	8	(4-15)	2	(1-3)	4	(3-6)	1	(1-1)
Norway	28	(12-55)	35	(14-70)	7	(5-10)	9	(6-12)
Oman	44	(20-85)	13	(5-27)	18	(12-24)	5	(4-7)
Pakistan	42	(19-80)	12	(5-24)	18	(12-25)	5	(3-7)
Panama	50	(23-96)	31	(13-65)	20	(14-28)	13	(8-17)
Paraguay	33	(15-63)	23	(9-47)	14	(9-19)	9	(6-13)
Peru	37	(17-71)	20	(8-42)	17	(12-24)	10	(7-13)
Philippines	41	(19-78)	3	(1-5)	24	(16-34)	1	(1-2)
Poland	43	(19-85)	48	(19-100)	11	(7-15)	12	(8-17)
Portugal	23	(11-46)	25	(10-53)	6	(4-8)	6	(4-9)
Romania	33	(15-65)	25	(10-52)	16	(11-22)	12	(8-17)
Russia	53	(23-101)	30	(12-61)	12	(8-17)	7	(5-9)
Rwanda	8	(3-15)	4	(1-8)	4	(3-6)	2	(1-3)
Saint Lucia	90	(41-172)	48	(19-99)	36	(24-51)	19	(13-27)
Saint Vincent and the Grenadines	81	(37-155)	40	(16-82)	32	(22-45)	16	(11-22)
Samoa	31	(14-59)	2	(1-3)	15	(10-20)	1	(1-1)
Sao Tome and Principe	23	(11-44)	10	(4-20)	13	(9-18)	5	(4-7)
Saudi Arabia	42	(19-83)	14	(6-30)	17	(11-24)	6	(4-8)
Senegal	17	(8-33)	7	(3-15)	10	(6-13)	4	(3-5)
Serbia	24	(11-46)	26	(10-52)	11	(8-15)	12	(8-17)
Sierra Leone	6	(3-11)	1	(0-2)	3	(2-4)	1	(0-1)
Slovakia	47	(21-93)	50	(20-102)	3	(2-4)	3	(2-4)
Slovenia	20	(9-40)	33	(13-68)	5	(4-7)	8	(6-11)
Solomon Islands	18	(8-34)	1	(0-2)	10	(7-13)	0	(0-1)
South Africa	45	(20-85)	8	(3-17)	19	(13-27)	4	(2-5)
South Korea	42	(19-83)	17	(7-34)	11	(7-15)	4	(3-6)
Spain	20	(9-40)	8	(3-16)	4	(3-6)	2	(1-2)
Sri Lanka	37	(17-69)	10	(4-20)	7	(5-10)	2	(1-3)
Sudan	20	(9-37)	8	(3-16)	11	(7-15)	4	(3-6)
Suriname	86	(39-165)	43	(17-88)	41	(27-56)	20	(14-28)
Swaziland	60	(27-116)	6	(2-12)	23	(16-32)	2	(2-3)

Sweden	33	(15-65)	36	(14-75)	6	(4-8)	6	(4-8)
Switzerland	53	(25-101)	52	(20-105)	13	(9-19)	13	(9-18)
Taiwan	48	(22-92)	9	(4-19)	12	(8-17)	2	(2-3)
Tajikistan	39	(18-75)	8	(3-16)	22	(15-30)	4	(3-6)
Tanzania	12	(6-24)	7	(3-14)	7	(5-9)	4	(3-5)
Thailand	49	(22-93)	19	(8-39)	23	(15-33)	9	(6-13)
The Bahamas	68	(30-131)	37	(15-77)	17	(12-24)	10	(6-13)
The Gambia	28	(13-54)	13	(5-28)	16	(10-22)	7	(5-10)
Timor-Leste	11	(5-20)	1	(1-3)	6	(4-8)	1	(1-1)
Togo	12	(5-22)	5	(2-10)	6	(4-9)	3	(2-4)
Trinidad and Tobago	104	(47-200)	61	(24-126)	42	(28-58)	24	(17-34)
Tunisia	47	(21-91)	18	(7-37)	18	(12-24)	7	(5-9)
Turkey	55	(25-104)	14	(6-29)	26	(17-36)	7	(5-10)
Turkmenistan	20	(9-38)	5	(2-9)	9	(6-13)	2	(1-3)
Uganda	14	(6-26)	6	(2-12)	8	(5-10)	3	(2-5)
Ukraine	48	(21-93)	29	(11-59)	14	(9-19)	8	(6-11)
United Arab Emirates	57	(25-110)	17	(6-35)	11	(7-16)	3	(2-5)
United Kingdom	32	(15-63)	32	(13-65)	8	(6-11)	8	(6-11)
United States	32	(15-61)	34	(14-71)	8	(6-11)	9	(6-12)
Uruguay	70	(32-134)	58	(23-117)	10	(7-15)	9	(6-12)
Uzbekistan	23	(10-44)	5	(2-11)	13	(9-18)	3	(2-4)
Vanuatu	28	(13-54)	1	(1-3)	13	(9-19)	1	(0-1)
Venezuela	66	(30-126)	40	(16-83)	27	(18-37)	16	(11-22)
Vietnam	15	(7-29)	3	(1-6)	8	(6-11)	2	(1-2)
Yemen	37	(16-69)	9	(3-18)	20	(14-29)	5	(3-7)
Zambia	12	(5-22)	6	(3-13)	8	(5-11)	4	(3-6)
Zimbabwe	30	(13-57)	4	(2-8)	19	(13-26)	2	(2-3)

Appendix Tab. 5: MDS-related dental disease burden on disease level in 168 countries, in total DALYs in the year 2010

	MDS-related caries		MDS-related periodontal diseases		MDS-related edentulism, SFT (mediated via caries)		MDS-related edentulism, STL (mediated via periodontal diseases)	
	Total DALYs	UI95% Lower limit Upper limit	Total DALYs	UI95% Lower limit Upper limit	Total DALYs	UI95% Lower limit Upper limit	Total DALYs	UI95% Lower limit Upper limit
Afghanistan	3 170	(1 415-6 118)	684	(269- 1 399)	1 752	(1 195-2 433)	378	(258-525)
Albania	580	(262-1 113)	516	(205- 1 059)	233	(157-323)	207	(140-288)
Algeria	14 689	(6 573-28 401)	5 044	(2 012- 10 382)	5 889	(3 877-8 168)	2 022	(1 331-2 805)
Angola	2 990	(1 336-5 703)	932	(367- 1 873)	1 419	(948- 1 966)	443	(296-613)
Antigua and Barbuda	46	(21-90)	25	(10-51)	19	(13-26)	10	(7-14)
Argentina	38 674	(17 455-74 715)	29 022	(11 635-59 021)	15 505	(10 367-21 621)	11 636	(7 780-16 225)
Armenia	2 596	(1 171-5 017)	811	(323- 1 675)	1 232	(836- 1 690)	385	(261-528)
Australia	4 730	(2 172-9 261)	7 886	(3 150- 16 113)	1 205	(809- 1 659)	2 008	(1 349-2 766)
Austria	3 484	(1 556-6 880)	3 677	(1 496- 7 507)	887	(591- 1 227)	936	(624- 1 295)
Azerbaijan	3 412	(1 574-6 608)	922	(368- 1 889)	1 368	(917- 1 900)	370	(248-513)
Bangladesh	13 385	(5 935-26 300)	4 385	(1 766- 8 868)	9 088	(6 117-12 466)	2 977	(2 004-4 084)
Barbados	294	(132-564)	187	(75-383)	75	(50-104)	48	(32-66)
Belarus	3 300	(1 470-6 400)	1 903	(780- 3 908)	1 323	(896- 1 830)	763	(516- 1 055)
Belgium	3 912	(1 752-7 546)	5 621	(2 228- 11 294)	996	(675- 1 363)	1 431	(969- 1 959)
Belize	250	(113-475)	97	(39-198)	119	(80-165)	46	(31-64)
Benin	587	(262- 1 132)	238	(92-487)	324	(217-453)	131	(88-183)
Bolivia	4 525	(2 069-8 706)	2 194	(877-4 493)	2 148	(1 446-2 963)	1 042	(701- 1 437)
Bosnia and Herzegovina	873	(400- 1 686)	669	(268- 1 349)	231	(156-319)	177	(119-244)
Botswana	958	(433- 1 853)	138	(55-284)	384	(263-531)	55	(38-76)
Brazil	99 940	(45 497-190 176)	86 894	(35 082- 178 573)	28 583	(19 426-39 332)	24 852	(16 890- 34 198)

Brunei	151	(68-303)	56	(22-116)	38	(26-55)	14	(10-20)
Bulgaria	1 846	(833-3 552)	1 363	(550-2 829)	740	(506-1 017)	547	(373-751)
Burkina Faso	822	(366-1 590)	389	(156-808)	648	(432-902)	307	(204-427)
Cambodia	3 376	(1 531-6 358)	381	(152-769)	1 866	(1 265-2 636)	211	(143-298)
Cameroon	2 175	(966-4 258)	864	(347-1 783)	1 032	(698-1 424)	410	(277-566)
Canada	10 687	(4 851-20 955)	9 303	(3 698-18 936)	2 722	(1 861-3 801)	2 369	(1 620-3 309)
Cape Verde	126	(57-245)	63	(25-130)	60	(40-83)	30	(20-42)
Central African Republic	292	(133-554)	103	(42-209)	161	(110-224)	57	(39-79)
Chad	1 186	(539-2 242)	421	(166-885)	902	(601-1 253)	320	(214-445)
Chile	16 959	(7 720-32 721)	13 545	(5 458-27 997)	6 799	(4 607-9 503)	5 431	(3 679-7 590)
China	141 710	(63 871-275 188)	29 507	(11 818-61 145)	75 815	(51 122-105 062)	15 786	(10 645-21 876)
Colombia	24 282	(11 152-46 559)	14 802	(5 900-30 165)	9 735	(6 554-13 415)	5 934	(3 995-8 178)
Congo	725	(332-1 406)	255	(104-517)	344	(230-472)	121	(81-166)
Costa Rica	4 378	(1 970-8 411)	2 813	(1 138-5 719)	1 755	(1 184-2 436)	1 128	(761-1 565)
Cote d'Ivoire	2 183	(997-4 237)	940	(367-1 996)	1 312	(890-1 814)	565	(383-781)
Croatia	2 512	(1 145-4 847)	2 738	(1 102-5 598)	492	(336-679)	537	(366-740)
Cuba	12 313	(5 599-23 939)	8 002	(3 245-16 015)	4 936	(3 355-6 815)	3 208	(2 181-4 429)
Cyprus	225	(103-442)	207	(84-436)	57	(39-80)	53	(36-74)
Czech Republic	3 907	(1 775-7 573)	4 614	(1 844-9 397)	320	(218-442)	378	(258-522)
Denmark	2 171	(986-4 317)	3 251	(1 258-6 776)	553	(372-780)	828	(557-1 167)
Djibouti	361	(161-697)	217	(87-446)	171	(115-237)	103	(69-143)
Dominica	55	(25-105)	28	(11-58)	22	(15-30)	11	(8-16)
Dominican Republic	5 753	(2 613-10 981)	2 652	(1 063-5 362)	2 433	(1 642-3 411)	1 122	(757-1 573)
Ecuador	4 618	(2 081-8 970)	2 597	(1 032-5 402)	1 409	(952-1 951)	792	(535-1 097)
Egypt	36 493	(16 181-71 223)	10 676	(4 196-21 999)	17 323	(11 680-23 914)	5 068	(3 417-6 996)
El Salvador	4 234	(1 910-8 111)	2 187	(861-4 503)	2 010	(1 368-2 778)	1 038	(707-1 435)
Estonia	607	(276-1 179)	353	(144-716)	159	(108-217)	92	(63-126)
Ethiopia	6 189	(2 823-11 598)	3 184	(1 280-6 628)	4 691	(3 171-6 471)	2 413	(1 631-3 329)

Fiji	398	(182-759)	25	(10-51)	160	(108-222)	10	(7-14)
Finland	990	(452-1 923)	821	(330-1 671)	180	(122-250)	149	(101-207)
France	23 183	(10 778-44 693)	24 227	(9 668-49 269)	5 904	(3 924-8 453)	6 170	(4 101-8 833)
Gabon	321	(143-620)	126	(51-261)	129	(87-176)	50	(34-69)
Georgia	2 494	(1 126-4 765)	906	(366-1 873)	1 252	(852-1 737)	455	(310-631)
Germany	22 443	(10 378-43 363)	68 828	(27 851-140 387)	53	(36-74)	164	(109-227)
Ghana	2 864	(1 282-5 549)	1 665	(656-3 435)	1 942	(1 294-2 719)	1 129	(752-1 580)
Greece	2 645	(1 192-5 159)	3 882	(1 528-7 922)	674	(450-941)	989	(660-1 381)
Grenada	72	(33-137)	33	(13-67)	29	(20-40)	13	(9-18)
Guatemala	11 604	(5 136-22 136)	5 118	(2 029-10 528)	5 508	(3 740-7 629)	2 429	(1 649-3 365)
Guinea	1 681	(775-3 227)	724	(292-1 502)	929	(613-1 296)	400	(264-558)
Guinea-Bissau	226	(101-429)	99	(40-206)	125	(85-174)	55	(37-76)
Guyana	540	(241-1 042)	218	(88-451)	256	(173-353)	104	(70-143)
Haiti	2 919	(1 322-5 651)	1 205	(482-2 440)	1 614	(1 100-2 226)	666	(454-919)
Honduras	5 898	(2 689-11 501)	2 793	(1 115-5 725)	2 800	(1 887-3 852)	1 326	(894-1 824)
Hungary	2 453	(1 102-4 751)	3 821	(1 492-7 738)	567	(387-778)	883	(603-1 212)
Iceland	154	(70-298)	115	(45-232)	39	(26-55)	29	(19-41)
India	368 966	(166 813-721 219)	124 802	(50 112-255 362)	191 863	(131 150-262 324)	64 897	(44 361-88 731)
Indonesia	44 283	(20 422-86 238)	11 234	(4 416-23 901)	21 021	(13 816-29 865)	5 333	(3 505-7 577)
Iran	26 387	(11 698-49 819)	9 788	(3 944-20 312)	12 526	(8 369-17 352)	4 647	(3 104-6 437)
Iraq	7 059	(3 108-13 893)	2 318	(929-4 796)	3 351	(2 239-4 680)	1 101	(735-1 537)
Ireland	1 413	(645-2 762)	895	(351-1 864)	161	(107-224)	102	(68-142)
Israel	2 092	(964-4 017)	1 371	(531-2 863)	533	(360-738)	349	(236-484)
Italy	18 181	(8 367-34 817)	16 405	(6 588-34 054)	4 630	(3 102-6 386)	4 178	(2 799-5 762)
Jamaica	2 421	(1 096-4 669)	1 191	(480-2 416)	1 149	(776-1 572)	565	(382-773)
Japan	25 990	(12 004-51 695)	18 475	(7 422-37 793)	6 619	(4 487-9 165)	4 705	(3 190-6 515)
Jordan	4 166	(1 848-8 058)	1 026	(409-2 130)	1 977	(1 337-2 728)	487	(329-672)
Kazakhstan	9 418	(4 308-18 404)	2 654	(1 069-5 378)	3 777	(2 577-5 247)	1 064	(726-1 479)
Kenya	8 253	(3 735-15 552)	4 618	(1 889-9 488)	5 026	(3 350-6 970)	2 812	(1 875-3 900)

Kiribati	36	(16-69)	3	(1-7)	17	(12-24)	2	(1-2)
Kuwait	1 592	(720-2 934)	516	(206-1 042)	405	(269-583)	131	(87-189)
Kyrgyzstan	2 760	(1 251-5 287)	626	(252-1 270)	1 526	(1 035-2 109)	346	(235-478)
Laos	430	(197-823)	58	(23-116)	308	(202-436)	41	(27-58)
Latvia	1 140	(517-2 216)	686	(274-1 391)	326	(222-449)	196	(134-270)
Lebanon	2 730	(1 218-5 444)	1 038	(412-2 123)	1 094	(724-1 524)	416	(275-580)
Lesotho	499	(225-962)	65	(26-130)	276	(185-380)	36	(24-50)
Liberia	325	(148-605)	133	(52-272)	180	(122-254)	74	(50-104)
Lithuania	1 659	(756-3 211)	815	(327-1 672)	665	(451-917)	327	(222-451)
Luxembourg	140	(64-271)	140	(56-287)	10	(7-14)	10	(7-14)
Macedonia	809	(362-1 551)	829	(332-1 709)	384	(257-532)	394	(263-545)
Madagascar	2 932	(1 338-5 585)	1 109	(447-2 269)	1 621	(1 092-2 243)	613	(413-848)
Malawi	2 468	(1 111-4 690)	1 231	(496-2 504)	1 311	(871-1 824)	654	(435-910)
Malaysia	12 960	(5 875-24 569)	3 047	(1 220-6 463)	4 316	(2 899-6 128)	1 014	(681-1 441)
Maldives	150	(67-296)	27	(11-56)	71	(47-100)	13	(9-18)
Mali	1 658	(752-3 234)	640	(251-1 295)	916	(610-1 277)	354	(236-493)
Malta	226	(102-444)	226	(90-472)	58	(39-81)	58	(39-81)
Mauritania	1 484	(667-2 797)	654	(262-1 313)	647	(438-899)	285	(193-396)
Mauritius	510	(233-976)	140	(56-289)	182	(122-259)	50	(33-71)
Mexico	97 011	(43 800-186 950)	57 065	(22 969-116 918)	47 924	(32 464-65 927)	28 190	(19 096-38 780)
Moldova	1 007	(453-1 967)	551	(222-1 147)	557	(374-769)	304	(205-420)
Mongolia	815	(372-1 563)	192	(75-392)	450	(303-621)	106	(71-146)
Montenegro	179	(80-350)	186	(74-379)	85	(58-116)	88	(60-121)
Morocco	16 876	(7 594-32 179)	5 546	(2 219-11 269)	10 564	(7 164-14 832)	3 472	(2 355-4 875)
Mozambique	3 523	(1 597-6 699)	1 812	(727-3 646)	1 948	(1 319-2 676)	1 001	(678-1 376)
Myanmar	672	(301-1 284)	203	(81-423)	430	(285-608)	130	(86-183)
Namibia	578	(261-1 131)	75	(30-155)	253	(168-351)	33	(22-46)
Nepal	1 532	(695-2 958)	505	(202-1 041)	1 188	(798-1 642)	391	(263-541)
Netherlands	8 766	(4 031-17 134)	7 059	(2 754-14 768)	2 233	(1 494-3 091)	1 798	(1 203-2 489)

New Zealand	1 497	(683-2 883)	1 177	(472-2 404)	381	(256-523)	300	(201-411)
Nicaragua	3 888	(1 734-7 574)	1 877	(760-3 792)	2 149	(1 474-2 939)	1 038	(711-1 419)
Niger	821	(370-1 561)	257	(102-512)	454	(300-629)	142	(94-196)
Nigeria	21 790	(10 044-41 959)	7 588	(3 039-16 201)	12 045	(8 115-16 537)	4 194	(2 826-5 759)
North Korea	1 950	(880-3 720)	383	(155-803)	1 078	(715-1 513)	212	(140-297)
Norway	1 348	(609-2 702)	1 700	(675-3 412)	343	(230-476)	433	(290-600)
Oman	1 240	(556-2 368)	374	(149-761)	497	(335-685)	150	(101-207)
Pakistan	72 294	(32 227-137 951)	20 097	(8 095-41 529)	31 231	(21 236-42 935)	8 682	(5 903-11 935)
Panama	1 849	(848-3 529)	1 153	(461-2 398)	741	(501-1 022)	462	(313-637)
Paraguay	2 129	(949-4 104)	1 472	(587-3 012)	877	(592-1 215)	607	(409-840)
Peru	10 779	(4 955-20 809)	5 948	(2 388-12 211)	5 117	(3 484-7 012)	2 824	(1 923-3 870)
Philippines	38 472	(17 471-73 090)	2 356	(942-4 874)	22 468	(14 911-31 842)	1 376	(913-1 950)
Poland	16 253	(7 384-32 331)	18 289	(7 267-38 098)	4 139	(2 781-5 721)	4 658	(3 129-6 438)
Portugal	2 494	(1 120-4 853)	2 666	(1 053-5 646)	621	(413-862)	664	(441-921)
Romania	7 249	(3 283-14 164)	5 552	(2 188-11 413)	3 441	(2 352-4 745)	2 635	(1 801-3 634)
Russia	74 435	(33 228-143 580)	41 988	(17 207-86 379)	17 120	(11 513-23 481)	9 657	(6 494-13 245)
Rwanda	816	(366-1 608)	395	(159-819)	451	(310-631)	218	(150-305)
Saint Lucia	160	(72-304)	85	(34-175)	64	(43-90)	34	(23-47)
Saint Vincent and the Grenadines	89	(40-170)	44	(17-90)	36	(24-49)	18	(12-24)
Samoa	58	(25-110)	3	(1-6)	27	(18-38)	1	(1-2)
Sao Tome and Principe	42	(19-79)	17	(7-36)	23	(16-32)	10	(6-13)
Saudi Arabia	11 420	(5 164-22 312)	3 880	(1 545-8 157)	4 579	(3 039-6 356)	1 555	(1 032-2 159)
Senegal	2 237	(1 022-4 299)	899	(354-1 900)	1 237	(825-1 705)	497	(332-685)
Serbia	2 287	(1 018-4 481)	2 479	(985-4 989)	1 086	(735-1 496)	1 177	(796-1 621)
Sierra Leone	339	(152-649)	55	(22-114)	187	(124-259)	30	(20-42)
Slovakia	2 560	(1 150-5 032)	2 710	(1 081-5 554)	146	(99-202)	154	(105-214)
Slovenia	417	(188-815)	675	(266-1 387)	106	(73-144)	172	(118-234)
Solomon Islands	93	(42-180)	4	(2-9)	52	(34-71)	2	(2-3)

South Africa	23 055	(10 441-43 786)	4 318	(1 721-8 816)	9 960	(6 723-13 749)	1 866	(1 259-2 575)
South Korea	20 577	(9 292-40 171)	8 022	(3 270-16 536)	5 240	(3 497-7 271)	2 043	(1 363-2 835)
Spain	9 423	(4 297-18 439)	3 533	(1 383-7 264)	1 866	(1 248-2 590)	699	(468-971)
Sri Lanka	7 661	(3 449-14 323)	2 029	(806-4 161)	1 509	(1 024-2 138)	400	(271-566)
Sudan	7 162	(3 166-13 445)	2 792	(1 118-5 797)	3 959	(2 641-5 505)	1 543	(1 029-2 146)
Suriname	450	(204-863)	224	(89-460)	214	(144-294)	106	(71-146)
Swaziland	717	(325-1 382)	72	(29-148)	273	(185-376)	27	(19-38)
Sweden	3 119	(1 421-6 066)	3 403	(1 351-7 065)	524	(357-714)	572	(390-779)
Switzerland	4 141	(1 918-7 925)	4 054	(1 601-8 208)	1 055	(716-1 460)	1 032	(701-1 429)
Taiwan	11 134	(5 051-21 389)	2 089	(834-4 347)	2 836	(1 891-4 008)	532	(355-752)
Tajikistan	3 015	(1 359-5 803)	588	(237-1 230)	1 666	(1 127-2 315)	325	(220-452)
Tanzania	5 577	(2 532-10 701)	3 046	(1 221-6 217)	3 083	(2 062-4 245)	1 684	(1 126-2 318)
Thailand	32 464	(14 869-61 426)	12 476	(5 021-25 632)	15 411	(10 229-21 967)	5 922	(3 931-8 442)
The Bahamas	245	(110-473)	134	(54-277)	62	(43-85)	34	(23-47)
The Gambia	475	(213-917)	228	(89-465)	262	(173-367)	126	(83-176)
Timor-Leste	115	(51-220)	16	(6-33)	64	(41-91)	9	(6-13)
Togo	727	(328-1 417)	305	(124-638)	402	(267-561)	169	(112-235)
Trinidad and Tobago	1 389	(621-2 664)	812	(321-1 677)	557	(377-766)	325	(220-448)
Tunisia	4 987	(2 227-9 720)	1 931	(789-3 951)	1 885	(1 254-2 599)	730	(486-1 006)
Turkey	39 461	(17 973-75 099)	10 321	(4 156-20 939)	18 732	(12 519-26 274)	4 900	(3 274-6 872)
Turkmenistan	999	(449-1 935)	229	(92-460)	474	(316-659)	109	(72-151)
Uganda	4 668	(2 083-9 005)	2 080	(845-4 233)	2 580	(1 748-3 543)	1 150	(779-1 579)
Ukraine	22 022	(9 685-42 357)	13 161	(5 235-26 869)	6 232	(4 234-8 580)	3 725	(2 530-5 128)
United Arab Emirates	4 777	(2 122-9 261)	1 389	(545-2 945)	946	(615-1 354)	275	(179-394)
United Kingdom	20 113	(9 275-39 309)	19 996	(7 982-40 391)	5 122	(3 494-7 033)	5 092	(3 474-6 992)
United States	98 208	(45 033-190 014)	105 670	(42 596-219 196)	25 534	(17 295-35 213)	27 474	(18 609-37 889)
Uruguay	2 364	(1 074-4 522)	1 961	(788-3 963)	352	(237-494)	292	(196-410)
Uzbekistan	6 462	(2 890-12 361)	1 452	(581-2 969)	3 572	(2 420-4 930)	803	(544-1 108)
Vanuatu	65	(30-125)	3	(1-7)	31	(21-43)	2	(1-2)

Venezuela	19 315	(8 652-36 714)	11 677	(4 651-24 036)	7 744	(5 237-10 686)	4 681	(3 166-6 460)
Vietnam	13 286	(5 874-25 510)	2 651	(1 037-5 451)	7 427	(5 045-10 174)	1 482	(1 007-2 030)
Yemen	8 368	(3 699-15 682)	1 965	(784-4 000)	4 625	(3 106-6 571)	1 086	(730-1 543)
Zambia	1 574	(704-2 978)	833	(333-1 707)	1 094	(727-1 525)	579	(385-807)
Zimbabwe	3 921	(1 766-7 505)	510	(205-1 050)	2 442	(1 641-3 348)	318	(213-436)
OECD*	412 619	(188 466-801 232)	407 036	(163 347-836 020)	120 827	(81 646-166 933)	98 390	(66 479-136 022)
Rest of the world**	1506 140	(679 788-2906 129)	602 973	(242 147-1238 876)	693 632	(468 693-959 139)	258 202	(174 597-356 622)
WORLD	1918 760	(868 254-3707 361)	1010 009	(405 494-2074 896)	814 459	(550 339-1126 072)	356 593	(241 076-492 644)

MDS-related caries and PD

OECD*	819 655	(351 813-1637 253)
Rest of the world**	2109 113	(921 935-4145 005)
WORLD	2928 769	(1273 748-5782 257)

MDS-related edentulism and STL

OECD*	219 217	(148 125-302 955)
Rest of the world**	951 835	(643 290-1315 761)
WORLD	1171 051	(791 416-1618 716)

Sum of MDS-related caries, PD and mediated edentulism and STL

OECD*	1038 872	(499 938-1940 208)
Rest of the world**	3060 948	(1565 225-5460 766)
WORLD	4099 820	(2065 163-7400 974)

* Excluded countries: Chile, Portugal, Turkey (included in rest of the world)

**Excluded countries: Andorra, Bahrain, Bhutan, Burundi, Comoros, Congo, Equatorial Guinea, Eritrea, Micronesia, Libya, Marshall Islands, Palestine, Papua New Guinea, Qatar, Seychelles, Singapore, Somalia, South Sudan, Syria, Tonga

MDS ... mono- and disaccharides

PD ... periodontal diseases

STL ... severe tooth loss

Appendix Tab. 6: MDS-related dental diseases in 168 countries (aggregated disease level), in DALYs per 100000 (age-standardized, standard scenario)

	MDS-related caries and caries-mediated edentulism, STL	UI95%		MDS-related periodontal diseases and periodontal disease-mediated edentulism, STL	UI95%	
		Lower limit	Upper limit		Lower limit	Upper limit
Afghanistan	17	(9-30)		4	(2-7)	
Albania	26	(13-45)		23	(11-43)	
Algeria	55	(28-99)		19	(9-36)	
Angola	22	(12-39)		7	(3-13)	
Antigua and Barbuda	75	(38-133)		40	(19-74)	
Argentina	134	(69-239)		101	(48-186)	
Armenia	130	(68-227)		40	(20-75)	
Australia	27	(13-49)		44	(20-84)	
Austria	52	(26-97)		55	(25-105)	
Azerbaijan	52	(27-93)		14	(7-26)	
Bangladesh	15	(8-26)		5	(2-9)	
Barbados	131	(65-238)		84	(38-160)	
Belarus	49	(25-87)		28	(14-52)	
Belgium	45	(22-82)		65	(29-122)	
Belize	120	(63-208)		47	(23-85)	
Benin	10	(5-17)		4	(2-7)	
Bolivia	66	(35-115)		32	(16-58)	
Bosnia and Herzegovina	29	(14-52)		22	(10-41)	
Botswana	68	(35-121)		10	(5-18)	
Brazil	66	(33-117)		57	(27-109)	
Brunei	47	(24-89)		17	(8-34)	
Bulgaria	35	(18-62)		26	(12-48)	
Burkina Faso	9	(5-16)		4	(2-8)	
Cambodia	36	(19-62)		4	(2-7)	
Cameroon	16	(8-27)		6	(3-11)	
Canada	39	(20-73)		34	(16-65)	
Cape Verde	38	(20-67)		19	(9-35)	
Central African Republic	10	(6-18)		4	(2-7)	
Chad	18	(10-30)		6	(3-11)	
Chile	139	(72-246)		111	(53-208)	
China	16	(8-28)		3	(2-6)	
Colombia	73	(38-129)		45	(21-83)	
Congo	26	(14-45)		9	(4-17)	

Costa Rica	131	(67-232)	84	(41-156)
Cote d'Ivoire	18	(10-32)	8	(4-15)
Croatia	69	(34-128)	76	(34-147)
Cuba	153	(79-272)	99	(48-181)
Cyprus	34	(17-62)	31	(14-61)
Czech Republic	41	(19-77)	48	(20-95)
Denmark	49	(24-92)	74	(33-143)
Djibouti	63	(33-111)	38	(19-70)
Dominica	110	(57-194)	57	(27-105)
Dominican Republic	82	(42-144)	38	(18-69)
Ecuador	40	(20-73)	23	(10-43)
Egypt	69	(36-122)	20	(10-37)
El Salvador	100	(53-175)	52	(25-95)
Estonia	57	(29-105)	33	(15-63)
Ethiopia	12	(7-21)	6	(3-11)
Fiji	65	(34-114)	4	(2-7)
Finland	22	(11-41)	18	(8-35)
France	46	(23-84)	48	(22-92)
Gabon	29	(15-51)	11	(5-21)
Georgia	85	(45-148)	31	(15-57)
Germany	27	(13-53)	84	(34-172)
Ghana	20	(11-34)	12	(6-21)
Greece	30	(15-55)	44	(20-84)
Grenada	97	(50-169)	44	(21-81)
Guatemala	119	(62-207)	53	(26-97)
Guinea	24	(13-42)	10	(5-19)
Guinea-Bissau	22	(12-38)	10	(5-18)
Guyana	103	(54-181)	42	(20-77)
Haiti	46	(25-80)	19	(9-34)
Honduras	114	(60-201)	54	(26-99)
Hungary	30	(15-55)	47	(21-89)
Iceland	61	(30-111)	46	(20-86)
India	46	(25-82)	16	(8-29)
Indonesia	27	(14-49)	7	(3-13)
Iran	52	(27-90)	19	(9-36)
Iraq	34	(17-60)	11	(5-20)
Ireland	35	(17-67)	22	(9-45)
Israel	35	(18-64)	23	(10-45)
Italy	38	(19-68)	34	(16-66)
Jamaica	130	(68-227)	64	(31-116)

Japan	26	(13-48)	18	(8-35)
Jordan	95	(49-167)	23	(11-43)
Kazakhstan	83	(43-149)	23	(11-43)
Kenya	32	(17-55)	18	(9-33)
Kiribati	54	(28-95)	5	(2-9)
Kuwait	67	(33-118)	22	(10-41)
Kyrgyzstan	80	(43-138)	18	(9-33)
Laos	12	(6-20)	2	(1-3)
Latvia	70	(35-127)	42	(19-79)
Lebanon	88	(45-161)	34	(16-62)
Lesotho	39	(20-67)	5	(3-9)
Liberia	13	(7-22)	5	(3-10)
Lithuania	75	(39-133)	37	(18-68)
Luxembourg	30	(14-56)	30	(12-60)
Macedonia	57	(29-99)	58	(28-107)
Madagascar	22	(12-37)	8	(4-15)
Malawi	25	(13-43)	13	(6-23)
Malaysia	61	(31-109)	14	(7-28)
Maldives	68	(35-121)	12	(6-23)
Mali	18	(10-32)	7	(3-13)
Malta	67	(33-124)	67	(30-130)
Mauritania	59	(30-102)	26	(13-47)
Mauritius	56	(29-100)	15	(7-29)
Mexico	123	(65-215)	72	(36-132)
Moldova	44	(23-76)	24	(12-44)
Mongolia	47	(25-81)	11	(5-20)
Montenegro	43	(22-76)	44	(22-81)
Morocco	86	(46-148)	28	(14-51)
Mozambique	23	(12-39)	12	(6-21)
Myanmar	2	(1-4)	1	(0-1)
Namibia	38	(20-68)	5	(2-9)
Nepal	10	(6-17)	3	(2-6)
Netherlands	66	(33-122)	53	(24-104)
New Zealand	43	(22-78)	34	(15-65)
Nicaragua	104	(55-181)	50	(25-90)
Niger	8	(4-14)	3	(1-4)
Nigeria	21	(11-37)	7	(4-14)
North Korea	12	(7-21)	2	(1-4)
Norway	35	(17-65)	44	(20-82)
Oman	62	(32-109)	19	(9-35)

Pakistan	60	(31-105)	17	(8-31)
Panama	70	(37-124)	44	(21-83)
Paraguay	46	(24-82)	32	(15-60)
Peru	54	(29-95)	30	(15-55)
Philippines	65	(35-112)	4	(2-7)
Poland	53	(27-100)	60	(27-117)
Portugal	29	(14-54)	31	(14-62)
Romania	49	(26-86)	37	(18-69)
Russia	65	(32-118)	36	(17-70)
Rwanda	12	(6-21)	6	(3-10)
Saint Lucia	127	(65-222)	67	(32-126)
Saint Vincent and the Grenadines	114	(59-200)	56	(27-104)
Samoa	46	(23-79)	2	(1-4)
Sao Tome and Principe	36	(19-62)	15	(7-28)
Saudi Arabia	59	(30-106)	20	(10-38)
Senegal	27	(14-46)	11	(5-20)
Serbia	35	(18-62)	38	(18-68)
Sierra Leone	9	(5-16)	1	(1-3)
Slovakia	50	(23-96)	53	(22-106)
Slovenia	26	(13-47)	41	(19-79)
Solomon Islands	27	(14-47)	1	(1-2)
South Africa	64	(33-111)	12	(6-22)
South Korea	53	(26-98)	21	(10-40)
Spain	24	(12-46)	9	(4-18)
Sri Lanka	44	(22-79)	12	(5-23)
Sudan	31	(16-53)	12	(6-22)
Suriname	127	(66-221)	63	(31-116)
Swaziland	83	(43-147)	8	(4-16)
Sweden	39	(19-72)	42	(19-84)
Switzerland	66	(34-120)	65	(29-123)
Taiwan	60	(30-110)	11	(5-22)
Tajikistan	61	(32-106)	12	(6-22)
Tanzania	19	(10-33)	11	(5-19)
Thailand	72	(38-126)	28	(13-51)
The Bahamas	85	(42-155)	47	(21-90)
The Gambia	44	(23-76)	21	(10-38)
Timor-Leste	17	(9-29)	2	(1-4)
Togo	18	(9-31)	8	(4-14)
Trinidad and To- bago	146	(75-258)	86	(41-160)

Tunisia	65	(33-116)	25	(12-47)
Turkey	81	(42-141)	21	(10-39)
Turkmenistan	29	(15-51)	7	(3-12)
Uganda	21	(11-37)	9	(5-17)
Ukraine	62	(30-111)	37	(17-70)
United Arab Emirates	68	(33-126)	20	(9-40)
United Kingdom	40	(20-74)	40	(18-76)
United States	40	(20-73)	43	(20-83)
Uruguay	80	(39-149)	67	(29-130)
Uzbekistan	36	(19-62)	8	(4-15)
Vanuatu	41	(22-72)	2	(1-4)
Venezuela	93	(48-163)	56	(27-105)
Vietnam	23	(12-40)	5	(2-8)
Yemen	57	(30-97)	13	(7-24)
Zambia	20	(11-34)	11	(5-19)
Zimbabwe	49	(26-83)	6	(3-11)

Appendix Tab. 7: Sensitivity analysis - Absolute and relative deviations of MDS-related dental diseases from standard scenario in 168 countries (negative values indicate higher burdens in the standard scenario)

	MDS-related caries and caries-mediated edentulism, STL			Deviation from standard scenario in %	MDS-related periodontal diseases and periodontal disease-mediated edentulism, STL			Deviation from standard scenario in %
	DALYs per 100000	UI95%			DALYs per 100000	UI95%		
		Lower limit	Upper limit			Lower limit	Upper limit	
Afghanistan	+26	+14	+46	+151.2	+6	+3	+10	+151.2
Albania	+5	+3	+10	+21.3	+5	+2	+9	+21.3
Algeria	-14	-7	-25	-25.5	-5	-2	-9	-25.5
Angola	+18	+9	+31	+80.0	+6	+3	+10	+80.0
Antigua and Barbuda	-19	-10	-34	-25.3	-10	-5	-19	-25.3
Argentina	-71	-37	-127	-53.2	-54	-26	-99	-53.2
Armenia	-56	-29	-97	-42.9	-17	-8	-32	-42.9
Australia	-12	-6	-22	-44.2	-20	-9	-37	-44.2
Austria	-27	-13	-50	-51.7	-28	-13	-54	-51.7
Azerbaijan	+19	+10	+33	+35.8	+5	+2	+9	+35.8
Bangladesh	+40	+22	+70	+272.4	+13	+7	+23	+272.4
Barbados	-81	-40	-148	-62.0	-52	-24	-99	-62.0
Belarus	-14	-7	-25	-28.5	-8	-4	-15	-28.5
Belgium	-27	-13	-49	-59.8	-39	-18	-73	-59.8
Belize	-59	-31	-103	-49.5	-23	-11	-42	-49.5
Benin	+29	+15	+51	+307.5	+12	+6	+22	+307.5
Bolivia	-11	-6	-20	-17.2	-5	-3	-10	-17.2
Bosnia and Herzegovina	+10	+5	+18	+35.0	+8	+4	+15	+35.0
Botswana	-22	-12	-40	-32.9	-3	-2	-6	-32.9
Brazil	-29	-15	-52	-44.6	-25	-12	-49	-44.6
Brunei	-21	-10	-39	-44.0	-8	-4	-15	-44.0
Bulgaria	-4	-2	-8	-12.6	-3	-2	-6	-12.6
Burkina Faso	+33	+18	+56	+350.0	+16	+8	+28	+350.0
Cambodia	+6	+3	+11	+17.4	+1	+	+1	+17.4
Cameroon	+21	+11	+38	+137.4	+8	+4	+16	+137.4
Canada	-16	-8	-30	-41.1	-14	-6	-27	-41.1
Cape Verde	+1	+	+2	+2.4	+	+	+1	+2.4
Central African Republic	+34	+18	+59	+332.0	+12	+6	+22	+332.0
Chad	+25	+14	+42	+142.7	+9	+5	+16	+142.7
Chile	-75	-39	-133	-54.0	-60	-29	-112	-54.0
China	+42	+22	+74	+266.1	+9	+4	+16	+266.1
Colombia	-20	-10	-36	-27.5	-12	-6	-23	-27.5
Congo	+16	+8	+28	+62.4	+6	+3	+10	+62.4
Costa Rica	-77	-40	-136	-58.5	-49	-24	-91	-58.5
Cote d'Ivoire	+22	+12	+38	+120.4	+10	+5	+18	+120.4
Croatia	-38	-19	-70	-54.4	-41	-18	-80	-54.4

Cuba	-97	-50	-172	-63.3	-63	-30	-114	-63.3
Cyprus	-7	-4	-14	-22.0	-7	-3	-13	-22.0
Czech Republic	-17	-8	-32	-41.6	-20	-8	-40	-41.6
Denmark	-26	-13	-49	-53.5	-39	-18	-77	-53.5
Djibouti	-17	-9	-30	-27.0	-10	-5	-19	-27.0
Dominica	-53	-27	-93	-48.0	-27	-13	-50	-48.0
Dominican Republic	-24	-13	-43	-29.9	-11	-5	-21	-29.9
Ecuador	+7	+4	+13	+18.0	+4	+2	+8	+18.0
Egypt	-19	-10	-33	-27.3	-6	-3	-10	-27.3
El Salvador	-44	-23	-76	-43.6	-23	-11	-42	-43.6
Estonia	-26	-13	-47	-44.8	-15	-7	-28	-44.8
Ethiopia	+40	+22	+67	+323.5	+21	+11	+37	+323.5
Fiji	-20	-11	-35	-31.2	-1	-1	-2	-31.2
Finland	-5	-3	-10	-25.0	-5	-2	-9	-25.0
France	-18	-9	-33	-38.8	-19	-8	-36	-38.8
Gabon	+12	+6	+21	+40.3	+5	+2	+9	+40.3
Georgia	-12	-7	-22	-14.6	-5	-2	-8	-14.6
Germany	-15	-7	-29	-54.5	-46	-19	-94	-54.5
Ghana	+13	+7	+23	+67.4	+8	+4	+14	+67.4
Greece	-4	-2	-8	-13.9	-6	-3	-12	-13.9
Grenada	-39	-20	-68	-40.2	-18	-8	-33	-40.2
Guatemala	-66	-34	-114	-55.1	-29	-14	-53	-55.1
Guinea	+14	+8	+25	+60.0	+6	+3	+11	+60.0
Guinea-Bissau	+17	+9	+29	+75.6	+7	+4	+13	+75.6
Guyana	-43	-22	-75	-41.3	-17	-8	-32	-41.3
Haiti	+14	+7	+24	+30.1	+6	+3	+10	+30.1
Honduras	-59	-31	-104	-51.6	-28	-14	-51	-51.6
Hungary	-10	-5	-18	-33.1	-16	-7	-30	-33.1
Iceland	-31	-15	-56	-50.8	-23	-10	-44	-50.8
India	+8	+4	+14	+16.8	+3	+1	+5	+16.8
Indonesia	+15	+8	+27	+56.5	+4	+2	+7	+56.5
Iran	-11	-6	-19	-20.6	-4	-2	-7	-20.6
Iraq	+7	+4	+12	+20.7	+2	+1	+4	+20.7
Ireland	-14	-7	-26	-39.2	-9	-4	-18	-39.2
Israel	-5	-3	-9	-14.6	-3	-2	-7	-14.6
Italy	-8	-4	-15	-21.5	-7	-3	-14	-21.5
Jamaica	-70	-37	-123	-54.2	-35	-17	-63	-54.2
Japan	-2	-1	-4	-9.2	-2	-1	-3	-9.2
Jordan	-51	-26	-90	-53.6	-13	-6	-23	-53.6
Kazakhstan	-14	-7	-25	-16.6	-4	-2	-7	-16.6
Kenya	+12	+6	+20	+36.7	+7	+3	+12	+36.7
Kiribati	-28	-15	-50	-52.4	-3	-1	-5	-52.4
Kuwait	-25	-12	-44	-37.8	-8	-4	-16	-37.8
Kyrgyzstan	-4	-2	-6	-4.4	-1	-	-1	-4.4
Laos	+36	+19	+61	+307.5	+5	+2	+8	+307.5
Latvia	-38	-19	-69	-54.1	-23	-11	-43	-54.1

Lebanon	-45	-23	-82	-51.0	-17	-8	-32	-51.0
Lesotho	+11	+6	+19	+28.6	+1	+1	+3	+28.6
Liberia	+26	+14	+43	+200.0	+10	+5	+19	+200.0
Lithuania	-33	-17	-58	-44.0	-16	-8	-30	-44.0
Luxembourg	-8	-4	-15	-26.0	-8	-3	-16	-26.0
Macedonia	-24	-12	-41	-41.8	-24	-12	-45	-41.8
Madagascar	+43	+23	+74	+200.0	+16	+8	+30	+200.0
Malawi	+20	+10	+34	+78.5	+10	+5	+18	+78.5
Malaysia	-28	-14	-50	-46.1	-7	-3	-13	-46.1
Maldives	-27	-14	-48	-39.2	-5	-2	-9	-39.2
Mali	+20	+10	+35	+107.7	+8	+4	+14	+107.7
Malta	-41	-21	-76	-61.7	-41	-19	-80	-61.7
Mauritania	-22	-12	-39	-37.9	-10	-5	-18	-37.9
Mauritius	-18	-9	-31	-31.2	-5	-2	-9	-31.2
Mexico	-66	-35	-115	-53.4	-39	-19	-71	-53.4
Moldova	-6	-3	-10	-12.9	-3	-2	-6	-12.9
Mongolia	+31	+16	+53	+66.2	+7	+4	+13	+66.2
Montenegro	-10	-5	-18	-23.4	-10	-5	-19	-23.4
Morocco	-35	-19	-61	-41.0	-12	-6	-21	-41.0
Mozambique	+23	+12	+39	+100.0	+12	+6	+21	+100.0
Myanmar	+31	+16	+52	+1442.9	+9	+5	+17	+1442.9
Namibia	+11	+6	+19	+28.6	+1	+1	+3	+28.6
Nepal	+43	+24	+73	+426.8	+14	+7	+25	+426.8
Netherlands	-34	-17	-63	-51.7	-28	-12	-54	-51.7
New Zealand	-26	-13	-47	-59.5	-20	-9	-39	-59.5
Nicaragua	-45	-24	-79	-43.6	-22	-11	-39	-43.6
Niger	+28	+15	+48	+350.0	+9	+4	+16	+350.0
Nigeria	+25	+13	+42	+116.0	+9	+4	+16	+116.0
North Korea	+46	+24	+79	+369.6	+9	+4	+17	+369.6
Norway	-12	-6	-23	-34.7	-15	-7	-29	-34.7
Oman	-20	-10	-35	-32.1	-6	-3	-11	-32.1
Pakistan	-9	-5	-16	-15.3	-3	-1	-5	-15.3
Panama	-17	-9	-31	-24.7	-11	-5	-20	-24.7
Paraguay	-6	-3	-11	-13.6	-4	-2	-8	-13.6
Peru	-	-	+	-.0	+	-	+	+.0
Philippines	+	+	+1	+.5	+	+	+	+.5
Poland	-26	-13	-49	-48.7	-29	-13	-57	-48.7
Portugal	-4	-2	-8	-15.3	-5	-2	-9	-15.3
Romania	+15	+10	+20	+30.2	+11	+8	+15	+30.2
Russia	-34	-16	-62	-52.2	-19	-9	-37	-52.2
Rwanda	+35	+19	+62	+300.0	+17	+9	+31	+300.0
Saint Lucia	-70	-36	-123	-55.4	-37	-18	-70	-55.4
Saint Vincent and the Grena- dines	-55	-29	-98	-48.8	-27	-13	-51	-48.8
Samoa	+	+	+	+.5	+	+	+	+.5
Sao Tome and Principe	+2	+1	+4	+6.4	+1	+	+2	+6.4

Saudi Arabia	-19	-10	-34	-32.1	-6	-3	-12	-32.1
Senegal	+12	+6	+20	+43.0	+5	+2	+9	+43.0
Serbia	-2	-1	-4	-6.9	-3	-1	-5	-6.9
Sierra Leone	+47	+25	+81	+517.1	+8	+4	+14	+517.1
Slovakia	-26	-12	-50	-51.8	-27	-11	-55	-51.8
Slovenia	-	-	-	-.9	-	-	-1	-.9
Solomon Islands	+20	+11	+35	+74.2	+1	+	+2	+74.2
South Africa	-21	-11	-36	-32.1	-4	-2	-7	-32.1
South Korea	-19	-9	-35	-35.9	-7	-3	-14	-35.9
Spain	-2	-1	-3	-6.9	-1	-	-1	-6.9
Sri Lanka	-11	-6	-20	-25.8	-3	-1	-6	-25.8
Sudan	-2	-1	-4	-7.3	-1	-	-2	-7.3
Suriname	-67	-35	-116	-52.6	-33	-16	-61	-52.6
Swaziland	-27	-14	-48	-32.3	-3	-1	-5	-32.3
Sweden	-16	-8	-30	-41.9	-18	-8	-35	-41.9
Switzerland	-40	-21	-73	-60.9	-40	-18	-75	-60.9
Taiwan	-12	-6	-22	-20.3	-2	-1	-4	-20.3
Tajikistan	+15	+8	+26	+24.9	+3	+1	+5	+24.9
Tanzania	+24	+13	+42	+125.0	+13	+7	+24	+125.0
Thailand	-31	-17	-55	-43.6	-12	-6	-22	-43.6
The Bahamas	-34	-17	-61	-39.3	-18	-8	-35	-39.3
The Gambia	-5	-3	-10	-12.6	-3	-1	-5	-12.6
Timor-Leste	+24	+12	+41	+142.7	+3	+2	+6	+142.7
Togo	+21	+11	+36	+116.0	+9	+4	+16	+116.0
Trinidad and Tobago	-90	-46	-158	-61.2	-52	-25	-98	-61.2
Tunisia	-23	-12	-41	-35.3	-9	-4	-16	-35.3
Turkey	-25	-13	-43	-30.5	-6	-3	-12	-30.5
Turkmenistan	+45	+23	+79	+154.1	+10	+5	+19	+154.1
Uganda	+24	+13	+42	+113.9	+11	+5	+19	+113.9
Ukraine	-30	-15	-55	-49.2	-18	-8	-34	-49.2
United Arab Emirates	-29	-14	-53	-42.4	-8	-4	-17	-42.4
United Kingdom	-15	-8	-28	-37.8	-15	-7	-29	-37.8
United States	-24	-12	-44	-60.9	-26	-12	-50	-60.9
Uruguay	-30	-14	-55	-37.0	-25	-11	-48	-37.0
Uzbekistan	+42	+22	+72	+116.0	+9	+5	+17	+116.0
Vanuatu	+5	+2	+8	+11.3	+	+	+	+11.3
Venezuela	-40	-20	-70	-42.7	-24	-11	-45	-42.7
Vietnam	+29	+15	+50	+125.0	+6	+3	+11	+125.0
Yemen	-12	-6	-21	-21.7	-3	-1	-5	-21.7
Zambia	+24	+13	+40	+118.2	+13	+6	+22	+118.2
Zimbabwe	-2	-1	-3	-3.1	-	-	-	-3.1

Appendix Tab. 8: Population and MDS-related costs per capita in 31 OECD countries and the rest of the world (standard scenario)

	Population in 2010 in millions	Direct costs of MDS-related dental diseases			Indirect costs of MDS-related dental diseases			Total costs of MDS-related dental diseases (direct + indirect)		
		USD per capita	UI95%		USD per capita	UI95%		USD per capita	UI95%	
			Lower limit	Upper limit		Lower limit	Upper limit		Lower limit	Upper limit
Australia	22.032	93.3	(49.5-162.2)		46.5	(24.7-80.8)		139.8	(74.2-243.0)	
Austria	8.363	88.1	(46.6-153.7)		73.7	(39.0-128.6)		161.9	(85.5-282.4)	
Belgium	10.896	61.1	(32.3-105.4)		72.8	(38.5-125.7)		133.9	(70.7-231.2)	
Canada	34.005	69.8	(37.0-120.9)		45.6	(24.2-79.0)		115.4	(61.2-199.9)	
Czech Republic	10.474	57.7	(31.5-98.0)		30.0	(16.3-50.9)		87.7	(47.8-148.8)	
Denmark	5.653	136.8	(71.8-241.3)		101.8	(53.5-179.5)		238.6	(125.3-420.8)	
Estonia	1.331	38.8	(21.0-66.8)		18.3	(9.9-31.4)		57.0	(30.8-98.2)	
Finland	5.363	19.4	(10.6-33.3)		30.3	(16.5-51.8)		49.7	(27.0-85.1)	
France	65.028	79.2	(42.0-137.4)		55.7	(29.6-96.7)		134.9	(71.6-234.1)	
Germany	81.777	182.2	(99.0-309.3)		99.9	(54.3-169.6)		282.0	(153.2-478.9)	
Greece	11.121	55.7	(29.2-97.4)		28.3	(14.8-49.4)		84.0	(44.1-146.8)	
Hungary	10.000	19.5	(10.3-33.5)		14.5	(7.7-25.0)		34.0	(18.0-58.6)	
Iceland	0.318	16.4	(8.7-28.3)		54.2	(28.8-93.5)		70.6	(37.5-121.9)	
Ireland	4.560	58.8	(31.9-101.0)		42.7	(23.2-73.4)		101.5	(55.2-174.4)	
Israel	7.624	50.6	(26.9-87.5)		23.4	(12.4-40.4)		73.9	(39.3-127.8)	
Italy	59.277	105.2	(55.5-182.1)		38.4	(20.2-66.4)		143.6	(75.7-248.6)	
Japan	128.070	41.5	(22.5-72.5)		25.4	(13.8-44.4)		67.0	(36.2-116.9)	
Luxembourg	0.507	96.4	(52.6-164.3)		84.5	(46.1-144.0)		180.9	(98.6-308.4)	
Mexico	118.618	19.5	(10.1-34.6)		16.9	(8.7-30.0)		36.5	(18.8-64.6)	
Netherlands	16.615	90.1	(48.2-156.9)		89.0	(47.6-154.9)		179.1	(95.8-311.9)	
New Zealand	4.351	25.5	(13.6-43.9)		31.5	(16.8-54.4)		57.0	(30.4-98.3)	
Norway	4.889	82.0	(43.7-142.5)		96.2	(51.2-167.1)		178.3	(94.9-309.6)	
Poland	38.043	33.3	(17.9-58.6)		20.1	(10.8-35.4)		53.5	(28.7-94.0)	
Slovakia	5.391	58.9	(32.3-100.6)		32.6	(17.9-55.7)		91.5	(50.2-156.3)	
Slovenia	2.049	26.0	(13.8-45.3)		22.9	(12.1-39.8)		48.9	(25.9-85.0)	
South Korea	24.501	135.1	(72.9-234.1)		43.4	(23.4-75.3)		178.5	(96.4-309.4)	
Spain	46.577	42.3	(23.2-73.0)		16.1	(8.8-27.8)		58.4	(32.1-100.7)	
Sweden	9.378	95.6	(51.5-164.4)		68.7	(37.0-118.1)		164.3	(88.6-282.5)	
Switzerland	7.825	260.1	(139.7-446.3)		141.4	(75.9-242.6)		401.5	(215.6-688.9)	
United Kingdom	62.851	64.1	(34.5-110.3)		45.1	(24.3-77.5)		109.2	(58.8-187.8)	
USA	309.347	129.0	(69.0-225.0)		56.1	(30.0-97.9)		185.2	(99.0-322.9)	
OECD	1116.834	88.3	(47.3-153.0)		46.7	(25.0-80.9)		135.0	(72.3-233.9)	
Rest of the world	5806.865	1.5	(0.6-2.0)		2.1	(1.1-3.8)		3.6	(1.7-5.8)	
Sum / Global average	6923.699	15.5	(8.1-26.3)		9.3	(4.9-16.2)		24.8	(13.1-42.6)	

Appendix Tab. 9: Sensitivity analysis – Absolute deviations from MDS-related costs per capita in 31 OECD countries and the rest of the world (negative values indicate higher burdens in the standard scenario)

	Direct costs of MDS-related dental diseases	UI95%		Indirect costs of MDS-related dental diseases	UI95%		Total costs of MDS-related dental diseases (direct + indirect)	UI95%	
	USD per capita	Lower limit	Upper limit	USD per capita	Lower limit	Upper limit	USD per capita	Lower limit	Upper limit
Australia	-41.2	-21.9	-71.7	-20.5	-10.9	-35.7	-61.8	-32.8	-107.4
Austria	-45.5	-24.1	-79.4	-38.1	-20.1	-66.5	-83.7	-44.2	-145.9
Belgium	-36.5	-19.3	-63.0	-43.5	-23.0	-75.2	-80.1	-42.3	-138.2
Canada	-28.7	-15.2	-49.7	-18.8	-9.9	-32.5	-47.5	-25.2	-82.2
Czech Republic	-24.0	-13.1	-40.8	-12.5	-6.8	-21.2	-36.5	-19.9	-62.0
Denmark	-73.3	-38.5	-129.2	-54.5	-28.6	-96.1	-127.8	-67.1	-225.3
Estonia	-17.4	-9.4	-29.9	-8.2	-4.4	-14.1	-25.5	-13.8	-44.0
Finland	-4.9	-2.6	-8.3	-7.6	-4.1	-13.0	-12.4	-6.8	-21.3
France	-30.7	-16.3	-53.3	-21.6	-11.5	-37.5	-52.4	-27.8	-90.8
Germany	-99.3	-54.0	-168.7	-54.5	-29.6	-92.5	-153.8	-83.6	-261.1
Greece	-7.8	-4.1	-13.6	-3.9	-2.1	-6.9	-11.7	-6.1	-20.5
Hungary	-6.4	-3.4	-11.1	-4.8	-2.5	-8.3	-11.3	-6.0	-19.4
Iceland	-8.3	-4.4	-14.4	-27.5	-14.6	-47.5	-35.9	-19.0	-61.9
Ireland	-23.0	-12.5	-39.5	-16.7	-9.1	-28.7	-39.7	-21.6	-68.3
Israel	-7.4	-3.9	-12.8	-3.4	-1.8	-5.9	-10.8	-5.8	-18.7
Italy	-22.6	-11.9	-39.1	-8.2	-4.3	-14.3	-30.8	-16.2	-53.3
Japan	-3.8	-2.1	-6.7	-2.4	-1.3	-4.1	-6.2	-3.4	-10.8
Luxembourg	-25.1	-13.7	-42.8	-22.0	-12.0	-37.5	-47.1	-25.7	-80.3
Mexico	-10.4	-5.4	-18.5	-9.0	-4.7	-16.0	-19.5	-10.0	-34.5
Netherlands	-46.6	-24.9	-81.1	-46.0	-24.6	-80.1	-92.6	-49.5	-161.2
New Zealand	-15.1	-8.1	-26.1	-18.7	-10.0	-32.4	-33.9	-18.1	-58.5
Norway	-28.5	-15.2	-49.5	-33.4	-17.8	-58.1	-61.9	-33.0	-107.6
Poland	-16.2	-8.7	-28.5	-9.8	-5.3	-17.2	-26.0	-14.0	-45.8
Slovakia	-30.5	-16.7	-52.1	-16.9	-9.3	-28.8	-47.4	-26.0	-80.9
Slovenia	-0.2	-0.1	-0.4	-0.2	-0.1	-0.4	-0.4	-0.2	-0.8
South Korea	-48.5	-26.2	-84.1	-15.6	-8.4	-27.0	-64.1	-34.6	-111.1
Spain	-2.9	-1.6	-5.0	-1.1	-0.6	-1.9	-4.0	-2.2	-6.9
Sweden	-40.1	-21.6	-68.9	-28.8	-15.5	-49.5	-68.9	-37.1	-118.5
Switzerland	-158.5	-85.1	-272.0	-86.2	-46.3	-147.8	-244.7	-131.4	-419.8
United Kingdom	-24.2	-13.0	-41.6	-17.0	-9.2	-29.3	-41.2	-22.2	-70.9

United States	-78.6	-42.0	-137.0	-34.2	-18.3	-59.6	-112.7	-60.3	-196.6
OECD	-42.5	-22.7	-73.6	-22.2	-11.9	-38.5	-64.7	-34.6	-112.1
Rest of the world	0.4	0.2	0.5	0.5	0.3	0.9	0.9	0.4	1.4
Global average	-6.5	-3.5	-11.4	-3.1	-1.7	-5.5	-9.7	-5.2	-16.9

Appendix Tab. 10: Sensitivity analysis - Absolute deviations from standard scenario (Global direct and indirect healthcare costs of MDS-related dental disorders in 2010) in 31 OECD countries and the rest of the world (negative values indicate higher costs in the standard scenario)

	Total direct oral healthcare expenditures billion USD	MDS-related costs due to caries and caries-mediated edentulism, STL UI95%			MDS-related costs due to periodontal diseases and periodontal disease-mediated edentulism, STL UI95%			GNI per capita current USD	Total indirect oral healthcare costs billion USD	MDS-related costs due to caries and caries-mediated edentulism, STL UI95%			MDS-related costs due to periodontal diseases and periodontal disease-mediated edentulism, STL UI95%		
		billion USD	Lower limit	Upper limit	billion USD	Lower limit	Upper limit			billion USD	Lower limit	Upper limit	billion USD	Lower limit	Upper limit
Australia	0.00	-0.34	-0.19	-0.58	-0.57	-0.29	-1.00	0.00	0.00	-0.17	-0.09	-0.29	-0.28	-0.15	-0.50
Austria	0.00	-0.19	-0.10	-0.32	-0.20	-0.10	-0.34	0.00	0.00	-0.16	-0.08	-0.27	-0.16	-0.08	-0.29
Belgium	0.00	-0.16	-0.09	-0.28	-0.23	-0.12	-0.41	0.00	0.00	-0.19	-0.11	-0.33	-0.28	-0.14	-0.49
Canada	0.00	-0.52	-0.28	-0.89	-0.45	-0.23	-0.80	0.00	0.00	-0.34	-0.19	-0.58	-0.30	-0.15	-0.52
Czech Republic	0.00	-0.12	-0.06	-0.19	-0.14	-0.07	-0.23	0.00	0.00	-0.06	-0.03	-0.10	-0.07	-0.04	-0.12
Denmark	0.00	-0.17	-0.09	-0.29	-0.25	-0.13	-0.44	0.00	0.00	-0.12	-0.07	-0.21	-0.18	-0.09	-0.33
Estonia	0.00	-0.01	-0.01	-0.02	-0.01	0.00	-0.01	0.00	0.00	-0.01	0.00	-0.01	0.00	0.00	-0.01
Finland	0.00	-0.01	-0.01	-0.02	-0.01	-0.01	-0.02	0.00	0.00	-0.02	-0.01	-0.04	-0.02	-0.01	-0.03
France	0.00	-0.98	-0.54	-1.67	-1.02	-0.52	-1.80	0.00	0.00	-0.69	-0.38	-1.17	-0.72	-0.37	-1.27
Germany	0.00	-2.00	-1.13	-3.31	-6.13	-3.28	10.48	0.00	0.00	-1.09	-0.62	-1.81	-3.36	-1.80	-5.75
Greece	0.00	-0.04	-0.02	-0.06	-0.05	-0.03	-0.09	0.00	0.00	-0.02	-0.01	-0.03	-0.03	-0.01	-0.05
Hungary	0.00	-0.03	-0.01	-0.04	-0.04	-0.02	-0.07	0.00	0.00	-0.02	-0.01	-0.03	-0.03	-0.02	-0.05
Iceland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	0.00	-0.01
Ireland	0.00	-0.06	-0.04	-0.11	-0.04	-0.02	-0.07	0.00	0.00	-0.05	-0.03	-0.08	-0.03	-0.02	-0.05
Israel	0.00	-0.03	-0.02	-0.06	-0.02	-0.01	-0.04	0.00	0.00	-0.02	-0.01	-0.03	-0.01	-0.01	-0.02
Italy	0.00	-0.70	-0.38	-1.19	-0.63	-0.32	-1.13	0.00	0.00	-0.26	-0.14	-0.43	-0.23	-0.12	-0.41
Japan	0.00	-0.29	-0.16	-0.50	-0.20	-0.11	-0.36	0.00	0.00	-0.18	-0.10	-0.30	-0.13	-0.07	-0.22

Luxembourg	0.00	-0.01	0.00	-0.01	-0.01	0.00	-0.01	0.00	0.00	-0.01	0.00	-0.01	-0.01	0.00	-0.01
Mexico	0.00	-0.78	-0.41	-1.36	-0.46	-0.23	-0.84	0.00	0.00	-0.68	-0.36	-1.18	-0.40	-0.20	-0.72
Netherlands	0.00	-0.43	-0.24	-0.73	-0.35	-0.18	-0.62	0.00	0.00	-0.42	-0.23	-0.72	-0.34	-0.17	-0.61
New Zealand	0.00	-0.04	-0.02	-0.06	-0.03	-0.01	-0.05	0.00	0.00	-0.05	-0.03	-0.08	-0.04	-0.02	-0.06
Norway	0.00	-0.06	-0.03	-0.11	-0.08	-0.04	-0.14	0.00	0.00	-0.07	-0.04	-0.13	-0.09	-0.05	-0.16
Poland	0.00	-0.29	-0.16	-0.50	-0.33	-0.17	-0.58	0.00	0.00	-0.18	-0.10	-0.30	-0.20	-0.10	-0.35
Slovakia	0.00	-0.08	-0.04	-0.13	-0.08	-0.05	-0.15	0.00	0.00	-0.04	-0.02	-0.07	-0.05	-0.03	-0.08
Slovenia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
South Korea	0.00	-0.86	-0.47	-1.47	-0.33	-0.17	-0.59	0.00	0.00	-0.27	-0.15	-0.47	-0.11	-0.06	-0.19
Spain	0.00	-0.10	-0.06	-0.17	-0.04	-0.02	-0.07	0.00	0.00	-0.04	-0.02	-0.06	-0.01	-0.01	-0.02
Sweden	0.00	-0.18	-0.10	-0.30	-0.20	-0.10	-0.34	0.00	0.00	-0.13	-0.07	-0.22	-0.14	-0.07	-0.25
Switzerland	0.00	-0.63	-0.35	-1.06	-0.61	-0.32	-1.07	0.00	0.00	-0.34	-0.19	-0.57	-0.33	-0.17	-0.58
United Kingdom	0.00	-0.76	-0.42	-1.30	-0.76	-0.39	-1.32	0.00	0.00	-0.54	-0.30	-0.91	-0.53	-0.28	-0.93
United States	0.00	-11.71	-6.45	-19.93	-12.59	-6.54	-22.45	0.00	0.00	-5.09	-2.81	-8.67	-5.48	-2.85	-9.77
OECD	0.00	-21.56	-11.9	-36.7	-25.86	-13.5	-45.5	0.00	0.00	-11.2	-6.2	-19.1	-13.56	-7.1	-23.8
Rest of the world	0.00	1.67	0.7	1.8	0.55	0.2	1.1	0.00	0.00	2.7	1.5	4.6	0.32	0.2	0.5
SUM	0.00	-19.89	-11.2	-34.9	-25.31	-13.3	-44.4	0.00	0.00	-8.6	-4.7	-14.5	-13.24	-6.9	-23.3

Appendix Tab. 11: Global disease and economic burden of MDS-related dental disorders in 2010 (summarised results)

		OECD			Rest of the world			Total		
		UI95% Lower limit	UI95% Upper limit		UI95% Lower limit	UI95% Upper limit		UI95% Lower limit	UI95% Upper limit	
Total oral disease burden	in 1000 DALYs	3 526	2 088	5 595	12 047	6 885	19 672	15 573	8 973	25 267
... associated with the consumption of MDS										
1) due to caries and caries-mediated edentulism, STL	in 1000 DALYs	533	270	968	2 200	1 148	3 865	2 733	1 419	4 833
2) due to PD and PD-mediated edentulism, STL	in 1000 DALYs	505	230	972	861	417	1 695	1 367	647	2 568
1) + 2)	in 1000 DALYs	1 039	500	1 940	3 061	1 565	5 461	4 100	2 065	7 401
Share 1)+2) / total	in %	29.5	14.2	55.0	25.4	13.0	45.3	26.3	13.3	47.5
Total DIRECT oral healthcare expenditure	in billion USD	263.7			34.0			297.7		
... associated with the consumption of MDS										
1) due to caries and caries-mediated edentulism, STL	in billion USD	46.5	25.6	79.1	6.5	2.7	7.0	53.0	28.3	86.1
2) due to PD and PD-mediated edentulism, STL	in billion USD	52.1	27.2	91.8	2.1	0.9	4.4	54.3	28.1	96.2
1) + 2)	in billion USD	98.6	52.8	170.9	8.7	3.6	11.4	107.3	56.4	182.3
Share 1)+2) / total	in %	37.4	20.0	64.8	25.5	10.5	33.6	36.0	18.9	61.2
Total INDIRECT oral healthcare costs	in billion USD	138.6			49.0			187.6		
... associated with the consumption of MDS										
1) due to caries and caries-mediated edentulism, STL	in billion USD	24.4	13.5	41.6	9.0	4.7	15.7	33.4	18.1	57.4
2) due to PD and PD-mediated edentulism, STL	in billion USD	27.7	14.4	48.7	3.5	1.7	6.5	31.2	16.1	55.2
1) + 2)	in billion USD	52.1	27.9	90.3	12.5	6.4	22.2	64.6	34.3	112.5
Share 1)+2) / total	in %	37.6	20.1	65.1	25.5	13.0	45.4	34.4	18.3	60.0
Total direct and indirect oral healthcare costs	in billion USD	402.4			82.9			485.3		
... associated with the consumption of MDS	in billion USD	150.7	80.7	261.2	21.1	10.0	33.6	171.9	90.7	294.9
Share	in %	37.5	20.1	64.9	25.5	12.0	40.6	35.4	18.7	60.8

Appendix Tab. 12: Sensitivity analysis - Absolute deviations from standard scenario (Global oral disease and economic burden of MDS-related oral disorders in 2010 - summarised results), negative values indicate higher burdens in the standard scenario

		OECD			Rest of the world			Total		
		UI95%			UI95%			UI95%		
		Lower limit	Upper limit		Lower limit	Upper limit		Lower limit	Upper limit	
Total oral disease burden	in %	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
... associated with the consumption of MDS										
1) due to caries and caries-mediated edentulism, STL	in 1000 DALYs	-247	-125	-447	+663	+360	+1,140	+416	+235	+693
2) due to PD and PD-mediated edentulism, STL	in 1000 DALYs	-243	-111	-468	+79	+45	+131	-164	-65	-337
1) + 2)	in 1000 DALYs	-490	-236	-915	+742	+405	+1,271	+252	+169	+356
Share 1)+2) / total	in %	-47.2	-47.2	-47.1	+24.2	+25.9	+23.3	+6.1	+8.2	+4.8
Total DIRECT oral healthcare expenditures	in billion USD	+0.0			+0.0			+0.0		
... associated with the consumption of MDS										
1) due to caries and caries-mediated edentulism, STL	in billion USD	-21.6	-11.9	-36.7	+1.7	+0.7	+1.8	-19.9	-11.2	-34.9
2) due to PD and PD-mediated edentulism, STL	in billion USD	-25.9	-13.5	-45.5	+0.6	+0.2	+1.1	-25.3	-13.3	-44.4
1) + 2)	in billion USD	-47.4	-25.4	-82.2	+2.2	+0.9	+2.9	-45.2	-24.5	-79.3
Share 1)+2) / total	in %	-48.1	-48.1	-48.1	+25.7	+25.7	+25.7	-42.1	-43.4	-43.5
Total INDIRECT oral healthcare costs	in billion USD	+0.0			+0.0			+0.0		
... associated with the consumption of MDS										
1) due to caries and caries-mediated edentulism, STL	in billion USD	-11.2	-6.2	-19.1	+2.7	+1.5	+4.6	-8.6	-4.7	-14.5
2) due to PD and PD-mediated edentulism, STL	in billion USD	-13.6	-7.1	-23.8	+0.3	+0.2	+0.5	-13.2	-6.9	-23.3
1) + 2)	in billion USD	-24.8	-13.3	-43.0	+3.0	+1.6	+5.2	-21.8	-11.6	-37.8
Share 1)+2) / total	in %	-47.6	-47.6	-47.6	+24.2	+25.9	+23.3	-33.7	-33.9	-33.6
Total direct and indirect oral healthcare costs	in billion USD	+0.0			+0.0			+0.0		
... associated with the consumption of MDS	in billion USD	-72.2	-38.7	-125.2	+5.2	+2.6	+8.1	-67.0	-36.1	-117.1
Share	in %	-47.9	-47.9	-47.9	+24.8	+25.8	+24.1	-39.0	-39.8	-39.7

Appendix Tab. 13: List of International Classification of Diseases (ICD) codes used in the Global Burden of Disease study due to oral diseases

GBD cause name	ICD code allotment in GBD 2013 ⁽⁸⁾
Deciduous and permanent caries	ICD 9: 521.0-522.9, V07.31, ICD 10: K02-K02.9
Periodontal diseases	ICD 9: 523-523.9, ICD 10: K05-K05.6
Edentulism and severe tooth loss	ICD 9: 525.0-525.19, 525.4-525.54
Other oral disorders	ICD 9: 520-521, 524-525, 525.2-525.3, 525.6-529.9, ICD 10: M26-M27.9

Abbreviations

AR	Attributable risk
BMI	Body mass index
CI	Confidence interval
DALYs	Disability-adjusted life years
DGE	Deutsche Gesellschaft für Ernährung
FAO	Food and Agriculture Organisation of the United Nations
GBD	Global Burden of Disease
GDP	Gross domestic product
ICD	International Classification of Diseases
IHME	Institute for Health Metrics and Evaluation
MDS	Mono- and disaccharides
NNS	National nutrition survey
OECD	Organisation for Economic Co-operation and Development
OR	Odds ratio
PAF	Population attributable fraction
PAR	Population attributable risk
PD	Periodontal diseases
PPP	Purchasing Power Parity
PUFA	Poly-unsaturated fatty acid
RR	Relative risk
SFA	Saturated Fatty Acids
STL	Severe tooth loss
UI	Uncertainty interval
USD	US dollar
WCRF	World Cancer Research Fund
WHO	World Health Organization

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