Supplementary Table S1: Baseline characteristics of participants by follow-up status

Characteristics[a]	Follow-up Status			
	Remained (N=24872)	Became ineligible (N=8099)	Died (N=4611)	Lost to follow-up (N=14471)
Number of teeth (2010)				
>= 20 teeth	9717 (57.4%)	1732 (10.2%)	927 (5.5%)	4558 (26.9%)
10-19 teeth	6616 (50.6%)	1748 (13.4%)	995 (7.6%)	3726 (28.5%)
1-9 teeth	5561 (42.3%)	2477 (18.8%)	1340 (10.2%)	3777 (28.7%)
Edentate	2309 (32.0%)	1781 (24.7%)	1184 (16.4%)	1943 (26.9%)
Age (Years)				
Mean (SD)	72.3 (5.0)	78.9 (6.2)	77.7 (6.7)	73.0 (5.4)
Sex				
Female	13717 (49.2%)	5013 (18.0%)	1578 (5.7%)	7574 (27.2%)
Male	11155 (46.2%)	3086 (12.8%)	3033 (12.5%)	6897 (28.5%)
Household income (2010)				
Mean (SD)	2.5 (1.6)	2.2 (1.5)	2.2 (1.6)	2.3 (1.7)
(Missing)	3377	2085	937	3031
Social participation 2010				
Everyday	1098 (56.5%)	199 (10.2%)	112 (5.8%)	533 (27.4%)
2-3 times a week	3912 (57.8%)	779 (11.5%)	382 (5.6%)	1691 (25.0%)
Once a week	3636 (55.7%)	869 (13.3%)	402 (6.2%)	1622 (24.8%)
1-2 times a month	4163 (51.7%)	1096 (13.6%)	656 (8.1%)	2141 (26.6%)
Few times a year	4426 (48.3%)	1251 (13.7%)	889 (9.7%)	2595 (28.3%)
Never	5182 (39.8%)	2529 (19.4%)	1462 (11.2%)	3838 (29.5%)
Denture status (2010)				
Do not wear dentures	10809 (50.9%)	2815 (13.3%)	1637 (7.7%)	5978 (28.1%)

Wear dentures	11883 (47.1%)	4090 (16.2%)	2437 (9.7%)	6833 (27.1%)
Marital status (2010)				
Widowed, divorced, or unmarried	5947 (41.0%)	3364 (23.2%)	1380 (9.5%)	3806 (26.3%)
Married	18673 (51.0%)	4505 (12.3%)	3102 (8.5%)	10335 (28.2%)
Self-rated health (2010)				
Very good	3364 (55.8%)	529 (8.8%)	349 (5.8%)	1790 (29.7%)
Good	18082 (50.7%)	4823 (13.5%)	2697 (7.6%)	10053 (28.2%)
Fair	2900 (34.1%)	2227 (26.2%)	1177 (13.8%)	2207 (25.9%)
Poor	296 (23.5%)	379 (30.1%)	328 (26.1%)	256 (20.3%)

[a]Mean (SD) for continuous variables; Frequency (%) for categorical variables

Supplementary Figure S1: Distribution of missingness among baseline variables in relation to the outcome
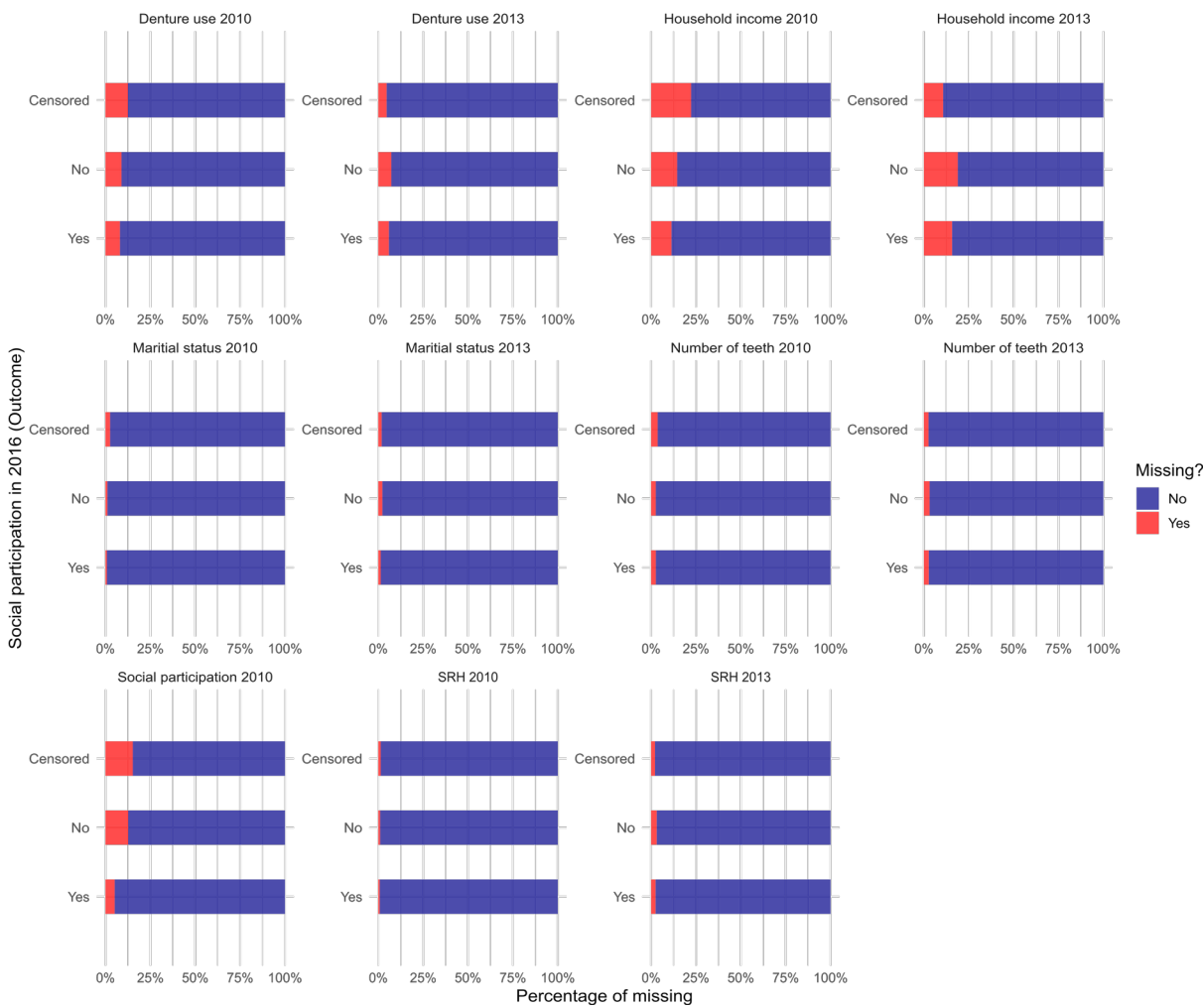
Supplementary Figure S2: Distribution of missingness among baseline variables in relation to the exposure
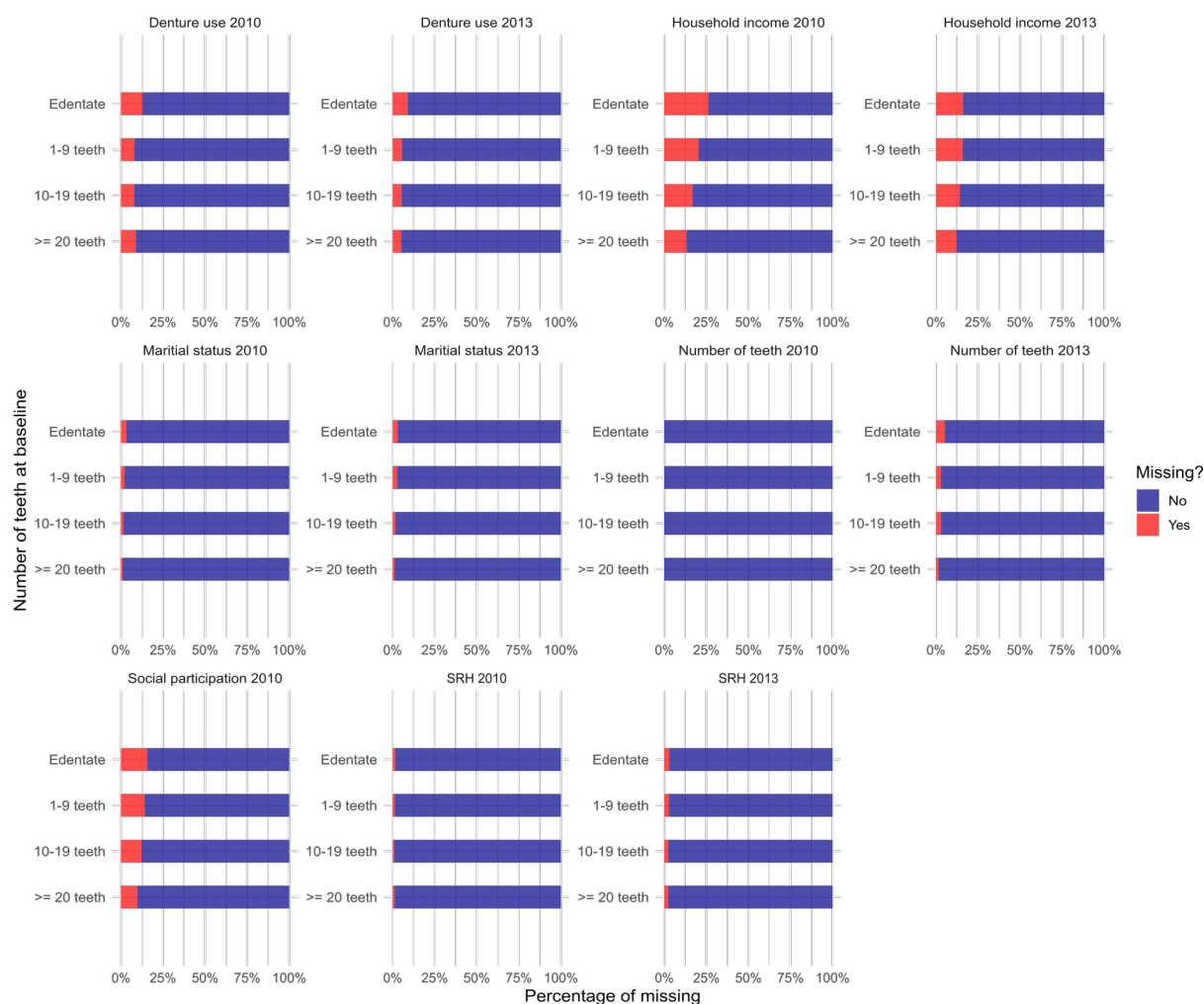
Supplementary Table S2: Results of TMLE analysis with complete cases

Contrast	OR [95% CI]	P value	E-value
Observed vs Edentate	0.80 [0.77-0.83]	< 0.000	1.81
Observed vs 1-9 teeth	0.97 [0.91-1.02]	0.242	1.22
Observed vs 10-19 teeth	1.00 [0.94-1.06]	0.998	1.00
Observed vs >=20 teeth	1.06 [1.03-1.09]	< 0.000	1.31
Edentate vs 1-9 teeth	1.21 [1.12-1.30]	< 0.000	1.71
Edentate vs 10-19 teeth	1.25 [1.16-1.35]	< 0.000	1.81
Edentate vs Observed	1.25 [1.20-1.30]	< 0.000	1.81
Edentate vs >=20 teeth	1.32 [1.25-1.40]	< 0.000	1.98

Supplementary Figure S3: Comparison of estimates with and without Super Learner (complete case analysis)