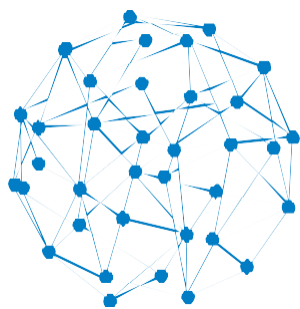




TID

Tobacco Induced Diseases

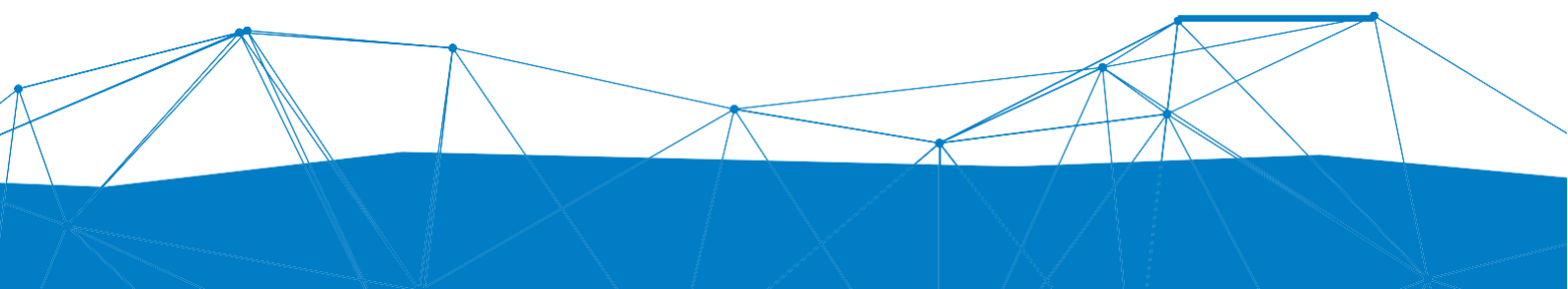
Supplementary file

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Supplementary Table 1. Smoking and alcohol use classifications

Characteristic*	N/3376 (%)
Smoker, chronic smoker, former smoker and never smoker	
Never smoker	1807/3376 (53.5%)
Former smoker	955/3376 (28.3%)
Chronic smoker	934/3376 (27.7%)
Active smoker, chronic active smoker and nonactive smoker	
Nonactive smoker	2617/3376 (77.5%)
Active smoker	759/3376 (22.5%)
Chronic active smoker	480/3376 (14.2%)
High dependent smoker and high dependent active smoker	
High dependent smoker	309/3376 (9.2%)
High dependent active smoker	309/3376 (9.2%)
Alcohol use classification	

Characteristic*	N/3376 (%)
Non-heavy drinker	2880/3376 (85.3%)
Heavy drinker	496/3376 (14.7%)
Combined smoking and alcohol use classifications	
Never/former smoker and non-heavy drinker	2427/3376 (71.9%)
Never/former-nonactive smoker and non-heavy drinker	2326/3376 (68.9%)
Chronic smoker-heavy drinker	271/3376 (8.0%)
Active smoker-heavy drinker	205/3376 (6.1%)
High dependent smoker-heavy drinker	99/3376 (2.6%)

*: The characteristics listed are juxtaposed with each other.

Supplementary Table 2. Distribution and univariate analysis results of subjective OD by different characteristics, NHANES 2013-2014 (n=3376)

Characteristics	Subjective OD		Statistics*	p value	OR (95%CI)	p value**
	No (n=2692)	Yes (n=684)				
Age (years, means±SD)	57.8±11.6	58.2±11.6	0.720	0.483	1.00(1.00-1.01)	0.506
Age strata (n%)			1.545	0.216		
40-49 years	729 (29.3%)	189 (26.9%)			Ref.	Ref.
50-59 years	765 (28.6%)	176 (32.3%)			1.01(0.80-1.27)	0.961
60-69 years	692 (23.6%)	150 (20.4%)			0.84(0.66-1.06)	0.141
70-79 years	386 (12.4%)	95 (12.7%)			0.95(0.72-1.25)	0.711
≥80 years	210 (6.1%)	74 (7.7%)			1.36(0.99-1.85)	0.052
Gender (n%)			0.232	0.637		
Female	1400 (52.4%)	372 (51.4%)			Ref.	Ref.
Male	1292 (47.6%)	312 (48.6%)			0.91(0.77-1.08)	0.266
Race (n%)			3.468	0.014		
Other race/multi-racial	46 (1.9%)	23 (2.8%)			Ref.	Ref.
Other Hispanic	352 (6.9%)	93 (7.0%)			0.48(0.27-0.86)	0.013

Mexican American	238 (4.3%)	57 (4.0%)			0.53(0.31-0.93)	0.023
Non-Hispanic white	1,167 (70.8%)	359 (75.5%)			0.62(0.37-1.05)	0.064
Non-Hispanic black	566 (10.8%)	109 (7.9%)			0.39(0.23-0.67)	<0.001
Non-Hispanic Asian	323 (5.3%)	43 (2.7%)			0.27(0.15-0.49)	<0.001
Educational level (n%)			0.989	0.336		
Under high school education	625 (15.7%)	149 (13.7%)			Ref.	Ref.
Over or equal to high school education	2,067 (84.3%)	535 (86.3%)			1.09(0.89-1.33)	0.426
Marital status (n%)			5.009	0.041		
Currently unmarried	1,074 (34.8%)	308 (38.6%)			Ref.	Ref.
Currently married	1,618 (65.2%)	376 (61.4%)			0.81(0.68-0.96)	0.015
History of drug use (n%)			5.357	0.035		
No	1,984 (66.3%)	445 (59.2%)			Ref.	Ref.
Yes	708 (33.7%)	239 (40.8%)			1.51(1.26-1.80)	<0.001
Persistent cold/flu last one year (n%)			42.391	<0.001		
No	2,524 (94.4%)	599 (86.5%)			Ref.	Ref.
Yes	168 (5.6%)	85 (13.5%)			2.13(1.61-2.80)	<0.001
Persistent dry mouth (n%)			64.390	<0.001		

No	2,359 (89.1%)	490 (75.2%)			Ref.	Ref.
Yes	333 (10.9%)	194 (24.8%)			2.80(2.29-3.43)	<0.001
Tonsils removed (n%)			3.530	0.080		
No	2,023 (69.8%)	481 (65.3%)			Ref.	Ref.
Yes	669 (30.2%)	203 (34.7%)			1.28(1.06-1.54)	0.01
Head/face/skull trauma (n%)			27.648	<0.001		
No	2,184 (77.1%)	476 (67.9%)			Ref.	Ref.
Yes	508 (22.9%)	208 (32.1%)			1.88(1.55-2.27)	<0.001
Nasal congestion in past 1 year since allergy or sinusitis (n%)			13.205	0.002		
No	1,560 (50.5%)	293 (38.0%)			Ref.	Ref.
Yes	1,132 (49.5%)	391 (62.0%)			1.84(1.55-2.18)	<0.001
History of ear infection (n%)			5.132	0.014		
No	2,157 (76.5%)	483 (67.1%)			Ref.	Ref.
Yes	494 (21.7%)	185 (31.2%)			1.67(1.37-2.03)	<0.001
Don't know	41 (1.8%)	16 (1.7%)			1.74(0.94-3.07)	0.063
Heavy drinker (n%)			4.146	0.060		

No	2,327 (86.0%)	553 (79.7%)			Ref.	Ref.
Yes	365 (14.0%)	131 (20.3%)			1.51(1.21-1.88)	<0.001
Serum Cotinine [ng/ml, median (IQR)]	0.02 (0.01, 0.34)	0.03 (0.01, 87.40)	3.723	0.002	1.001(1.001-1.002)	<0.001
Smoking and drinking status^{***} (n%)						
Never smoker	1,505 (68.6%)	302 (53.9%)	22.606	<0.001	Ref.	Ref.
Chronic smoker	692 (31.4%)	242 (46.1%)			1.74(1.44-2.11)	<0.001
Never/former-nonactive smoker	2,114 (85.2%)	503 (78.8%)	28.927	<0.0014	Ref.	Ref.
Chronic active smokers	360 (14.8%)	120 (21.2%)			1.40(1.11-1.76)	0.004
Never/former-nonactive smoker	2,114 (90.6%)	503 (85.1%)	8.609	0.010	Ref.	Ref.
High dependent active smokers	229 (9.4%)	80 (14.9%)			1.47(1.11-1.92)	0.006
Never/former smoker and non-heavy drinker	1,981 (96.6%)	446 (92.6%)	6.539	0.022	Ref.	Ref.
High dependent smoker-heavy drinker	72 (3.4%)	27 (7.4%)			1.67(1.04-2.59)	0.028
Never/former-nonactive smoker and non-heavy drinker	1,899 (92.4%)	427 (86.6%)	8.559	0.010	Ref.	Ref.
Active smoker-heavy drinker	150 (7.6%)	55 (13.4%)			1.63(1.17-2.25)	0.003
Never/former smoker and non-heavy drinker	1,981 (91.0%)	446 (82.2%)	8.920	0.009	Ref.	Ref.

Chronic smoker-heavy drinker	194 (9.0%)	77 (17.8%)	1.76(1.32-2.33)	<0.001
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CI: Confidence interval, **IQR:** Interquartile range, **OD:** Olfactory dysfunction, **OR:** Odd ratio, **Ref:** Reference, **SD:** standard deviation

*: t test and survey Wilcoxon rank-sum test for continuous variables, the chi-squared test for weighted percentages of categorical variables.

** : Univariate analysis results by logistic regression,

***: Different smoking and drinking statuses are compared in pairs

Supplementary Table 3. Distribution and univariate analysis results of objective OD by different characteristics, NHANES 2013-2014 (n=3376)

Characteristics	Objective OD		Statistics [*]	p value	OR (95%CI)	p value ^{**}
	No (n=2758)	Yes (n=618)				
Age (years, means±SD)	56.8 ± 11.1	64.2 ± 12.4	14.318	<0.001	1.06(1.05-1.06)	<0.001
Age strata (n%)						
40-49 years			48.907	<0.001	Ref.	Ref.
50-59 years	834 (31.0%)	84 (15.1%)			1.55(1.15-2.10)	0.04
60-69 years	736 (30.5%)	115 (22.6%)			2.35(1.77-3.12)	<0.001
70-79 years	681 (22.8%)	161 (23.3%)			3.37(2.49-4.59)	<0.001
≥80 years	359 (11.5%)	122 (18.6%)			9.12(6.62-12.65)	<0.001
Gender (n%)			13.979	0.002		
Female	1,520 (53.9%)	252 (41.8%)			Ref.	Ref.
Male	1,238 (46.1%)	366 (58.2%)			1.78(1.49-2.13)	<0.001
Race (n%)			2.404	0.074		
Other race/multi-racial	60 (2.3%)	9 (1.3%)			Ref.	Ref.
Other Hispanic	236 (4.1%)	59 (4.9%)			1.67(0.82-3.77)	0.186
Mexican American	369 (6.9%)	76 (7.1%)			1.37(0.68-3.07)	0.403

Non-Hispanic white	1,267 (72.6%)	259 (66.9%)			1.36(0.70-2.98)	0.395
Non-Hispanic black	531 (9.7%)	144 (13.2%)			1.81 (0.92-3.98)	0.109
Non-Hispanic Asian	295 (4.4%)	71 (6.5%)			1.60(0.80-3.60)	0.215
Educational level (n%)			33.713	<0.001		
Under high school education	569 (13.6%)	205 (25.3%)			Ref.	Ref.
Over or equal to high school education	2,189 (86.4%)	413 (74.7%)			0.52(0.43-0.63)	<0.001
Marital status (n%)			2.389	0.143		
Currently unmarried	1,109 (35.0%)	273 (39.1%)			Ref.	Ref.
Currently married	1,649 (65.0%)	345 (60.9%)			0.85(0.71-1.01)	0.070
History of drug use (n%)			38.506	<0.001		
No	1,916 (62.7%)	513 (77.5%)			Ref.	Ref.
Yes	842 (37.3%)	105 (22.5%)			0.47(0.37-0.58)	<0.001
Persistent cold/flu last one year (n%)			1.671	0.216		
No	2,564 (92.9%)	559 (91.3%)			Ref.	Ref.
Yes	194 (7.1%)	59 (8.7%)			1.39(1.02-1.88)	0.033
Persistent dry mouth (n%)			6.998	0.018		
No	2,345 (87.0%)	504 (80.8%)			Ref.	Ref.

Yes	413 (13.0%)	114 (19.2%)			1.28(1.02-1.61)	0.032
Tonsils removed (n%)			1.555	0.231		
No	2,063 (69.4%)	441 (65.4%)			Ref.	Ref.
Yes	695 (30.6%)	177 (34.6%)			1.19 (0.98-1.44)	0.078
Head/face/skull trauma (n%)			2.838	0.113		
No	2,189 (75.4%)	471 (72.9%)			Ref.	Ref.
Yes	569 (24.6%)	147 (27.1%)			1.20(0.97-1.47)	0.083
Nasal congestion in past 1 year since allergy or sinusitis (n%)			41.586	<0.001		
No	1,425 (44.9%)	428 (65.4%)			Ref.	Ref.
Yes	1,333 (55.1%)	190 (34.6%)			0.47(0.39-0.57)	<0.001
History of ear infection (n%)			8.033	0.002		
No	2,136 (73.6%)	504 (79.4%)			Ref.	Ref.
Yes	579 (24.8%)	100 (17.5%)			0.73(0.58-0.92)	0.009
Don't know	43 (1.5%)	14 (3.1%)			1.38(0.72-2.48)	0.302
Heavy drinker (n%)			6.468	0.022		
No	2,367 (85.5%)	513 (79.7%)			Ref.	Ref.

Yes	391 (14.5%)	105 (20.3%)			1.24(0.98-1.56)	0.075
Serum Cotinine [ng/ml, median (IQR)]	0.02 (0.01, 0.61)	0.03 (0.01, 6.51)	1.808	0.092	1.00(1.000-1.001)	0.040
Smoking and drinking status*** (n%)						
Never smoker	1,506 (67.1%)	301 (55.5%)	8.817	0.010	Ref.	Ref.
Chronic smoker	722 (32.9%)	212 (44.5%)			1.47(1.21-1.79)	<0.001
Never/former-nonactive smoker	2,156 (84.4%)	461 (80.5%)	2.643	0.125	Ref.	Ref.
Chronic active smokers	369 (15.6%)	111 (19.5%)	2.579	0.129	1.41(1.11-1.77)	0.004
Never/former-nonactive smoker	2,156 (89.9%)	461 (86.8%)			Ref.	Ref.
High dependent active smokers	243 (10.1%)	66 (13.2%)			1.27(0.94-1.69)	0.106
Never/former smoker and non-heavy drinker	1,999 (96.3%)	428 (92.8%)	6.783	0.020	Ref.	Ref.
High dependent smoker-heavy drinker	71 (3.7%)	28 (7.2%)			1.84(1.16-2.86)	0.008
Never/former-nonactive smoker and non-heavy drinker	1,923 (91.8%)	403 (87.5%)	2.851	0.112	Ref.	Ref.
Active smoker-heavy drinker	158 (8.2%)	47 (12.5%)			1.42(1.00-1.98)	0.045
Never/former smoker and non-heavy drinker	1,999 (90.0%)	428 (84.3%)	8.338	0.011	Ref.	Ref.
Chronic smoker-heavy drinker	210 (10.0%)	61 (15.7%)			1.36(1.00-1.84)	0.049

CI: Confidence interval, **IQR:** Interquartile range, **OD:** Olfactory dysfunction, **OR:** Odd ratio, **Ref:** Reference, **SD:** standard deviation

*: t test and survey Wilcoxon rank-sum test for continuous variables, the chi-squared test for weighted percentages of categorical variables.

**: Univariate analysis results by logistic regression,

***: Different smoking and drinking statuses are compared in pairs

Supplementary Table 4. Detailed multivariate analysis results of subjective olfactory dysfunction by different characteristics, NHANES 2013-2014 (n=3376)

Characteristics	Model 1*		Model 2.1*		Model 2.2*		Model 3.1*		Model 3.2*		Model 3.3*	
	AOR	p	AOR (95%	p	AOR (95%	p	AOR	p	AOR (95%	p	AOR (95%	p
	(95% CI)	value**	CI)	value**	CI)	value**	(95% CI)	value**	CI)	value**	CI)	value**
Exposure Group	1.47(1.12-1.93)	0.005	1.55(1.16-2.08)	0.003	1.69(1.19-2.40)	0.004	1.72(1.14-2.60)	0.010	1.90(1.25-2.88)	0.003	1.23(0.97-1.55)	0.088
Covariates												
Age	1.00(0.99-1.02)	0.486	1.01(0.99-1.02)	0.125	1.01(0.99-1.02)	0.127	1.01(1.00-1.02)	0.204	1.01(0.99-1.02)	0.181	1.01(0.99-1.02)	0.234
Gender												
Female							Ref.					
Male	1.23(0.94-1.62)	0.133	1.15(0.89-1.48)	0.277	1.15(0.89-1.50)	0.287	1.24(0.95-1.63)	0.118	1.31(0.98-1.73)	0.064	1.27(0.95-1.69)	0.100
Race												
Other race/multi-racial							Ref.					

	Table 1. Mean (SD) of the 12-item GDS-15 score by demographic and clinical characteristics											
	Ref.				Ref.				Ref.			
Currently unmarried												
Currently married	0.89(0.68-1.17)	0.410	0.98(0.76-1.25)	0.848	0.93(0.72-1.20)	0.583	0.95(0.72-1.25)	0.703	0.84(0.63-1.11)	0.218	0.84(0.63-1.12)	0.229
History of drug use												
No												
Yes	1.13(0.82-1.56)	0.470	1.26(0.94-1.70)	0.125	1.22(0.90-1.67)	0.199	1.23(0.88-1.72)	0.224	1.31(0.92-1.85)	0.131	1.37(0.97-1.94)	0.072
Heavy drinker												
No												
Yes	1.25(0.88-1.78)	0.220	1.22(0.87-1.72)	0.251	1.29(0.90-1.85)	0.158	-	-	-	-	-	-
Persistent cold/flu last one year												
No												

Yes	2.00(1.34-3.00)	<0.001	1.95(1.33-2.85)	<0.001	2.21(1.50-3.26)	<0.001	1.84(1.21-2.81)	0.005	2.14(1.38-3.33)	<0.001	1.92(1.23-2.99)	0.004
Persistent dry mouth												
No	Ref.											
Yes	2.05(1.49-2.82)	<0.001	1.22(1.68-3.03)	<0.001	2.35(1.74-3.17)	<0.001	2.13(1.54-2.94)	<0.001	2.30(1.65-3.20)	<0.001	2.04(1.45-2.86)	<0.001
Tonsils removed												
No	Ref.											
Yes	1.18(0.89-1.58)	0.251	1.11(0.84-1.45)	0.460	1.13(0.85-1.49)	0.408	1.11(0.83-1.48)	0.500	1.07(0.78-1.45)	0.679	1.09(0.80-1.49)	0.574
Head/face/skull trauma												
No	Ref.											
Yes	1.32(0.98-1.76)	0.063	1.27(0.96-1.67)	0.091	1.32(0.99-1.95)	0.059	1.23(0.91-1.67)	0.177	1.22(0.89-1.66)	0.223	1.30(0.95-1.78)	0.103
Nasal congestion												

**in past 1 year
since allergy or
sinusitis**

No	Ref.											
Yes	1.44(1.11- 1.86)	0.006	1.33(1.05- 1.70)	0.020	1.30(1.01- 1.67)	0.041	1.28(0.96- 1.70)	0.090	1.43(1.09- 1.88)	0.010	1.53(1.16- 2.02)	0.003

**History of ear
infection**

No	Ref.											
Yes	1.21(0.91- 1.63)	0.194	1.30(0.99- 1.71)	0.063	1.28(0.95- 1.71)	0.091	1.23(0.91- 1.67)	0.179	1.27(0.93- 1.73)	0.132	1.25(0.91- 1.72)	0.165
Don't know	0.63(0.29- 1.41)	0.263	1.06(0.49- 2.28)	0.886	1.11(0.50- 2.48)	0.802	1.34(0.61- 2.98)	0.465	1.40(0.62- 3.15)	0.418	1.44(0.64- 3.26)	0.381

AOR: Adjusted odd ratio, **CI:** Confidence interval, **Ref:** Reference

*: Columns represent individual multivariable logistic regression models based on different exposure groups, respectively: Model 1, chronic smoker; Model 2.1, chronic active smoker; Model 2.2, high dependent active smoker; Model 3.1, chronic smoker-heavy drinker; Model 3.2, active smoker-heavy drinker; and Model 3.3, high dependent smoker-heavy drinker. Each exposure group was examined in a separate multivariable

logistic regression model, with the respective reference group as defined in the main text (Table 2 footnotes).

** : Multivariate analysis results by logistic regression

Supplementary Table 5. Detailed multivariate analysis results of objective olfactory dysfunction by different characteristics, NHANES 2013-2014 (n=3376)

Characteristics	Model 1*		Model 2*		Model 3.1*		Model 3.2*		Model 3.3*	
	AOR (95% CI)	p value**	AOR (95% CI)	p value**	AOR (95% CI)	p value**	AOR (95% CI)	p value**	AOR (95% CI)	p value**
Exposure Group	1.64(1.26- 2.12)	<0.001	1.59(1.10- 2.32)	0.014	2.69(1.36- 5.34)	0.005	1.67(1.12- 2.50)	0.013	1.49(0.99- 2.24)	0.054
Covariates										
Age	1.05(1.03- 1.06)	<0.001	1.05(1.04- 1.07)	<0.001	1.05(1.04- 1.07)	<0.001	1.05(1.04- 1.07)	<0.001	1.05(1.04- 1.07)	<0.001
Gender										
Female					Ref.					
Male	1.55(1.17- 2.05)	0.002	1.56(1.20- 2.04)	0.001	1.79(1.33- 2.42)	<0.001	1.66(1.25- 2.22)	<0.001	1.93(1.43- 2.60)	<0.001
Educational level										
Under high school education					Ref.					

Over or equal to high school education	0.56(0.42-0.76)	<0.001	0.61(0.46-0.81)	<0.001	0.54(0.39-0.75)	<0.001	0.52(0.38-0.71)	<0.001	0.48(0.35-0.96)	<0.001
History of drug use										
No	Ref.									
Yes	0.81(0.53-1.23)	0.315	0.79(0.53-1.18)	0.243	0.67(0.41-1.12)	0.126	0.72(0.45-1.14)	0.161	0.58(0.35-0.96)	0.033
Heavy drinker										
No	Ref.									
Yes	1.12(0.76-1.67)	0.563	1.18(0.82-1.69)	0.373	-	-	-	-	-	-
Persistent cold/flu last one year										
No	Ref.									
Yes	1.22(0.73-	0.444	1.18(0.72-	0.508	1.13(0.64-	0.670	1.11(0.64-	0.713	1.22(0.68-	0.514

[illegible]

**since allergy or
sinusitis**

No	Ref.									
Yes	1.63(1.29- 2.05)	<0.001	1.63(1.29- 2.05)	<0.001	1.58(1.17- 2.13)	0.003	1.63(1.29- 2.05)	<0.001	1.63(1.29- 2.05)	<0.001

**History of ear
infection**

No	Ref.									
Yes	0.93(0.65- 1.32)	0.674	0.86(0.61- 1.21)	0.387	0.71(0.47- 1.06)	0.092	0.76(0.52- 1.12)	0.162	0.75(0.50- 1.12)	0.160
Don't know	1.94(0.89- 4.24)	0.098	1.96(0.97- 3.99)	0.063	1.99(0.93- 4.26)	0.075	2.20(1.02- 4.71)	0.044	2.13(1.01- 4.50)	0.047

AOR: Adjusted odd ratio, **CI:** Confidence interval, **Ref:** Reference

*: Columns represent individual multivariable logistic regression models based on different exposure groups, respectively: Model 1, chronic smoker; Model 2, chronic active smoker; Model 3.1, high dependent smoker-heavy drinker; Model 3.2, chronic smoker-heavy drinker; and Model 3.3, active smoker-heavy drinker Each exposure group was examined in a separate multivariable logistic regression model, with the respective reference group as defined in the main text (Table 3 footnotes).

**: Multivariate analysis results by logistic regression