

ONLINE SUPPLEMENTARY MATERIALS**Hardening or softening? An observational study of changes to the prevalence of hardening indicators in Victoria, Australia, 2001–2016**

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APPENDIX A

Table A1. Prevalence of hardening indicators among current smokers aged 26+ in the state of Victoria, Australia, 2001 – 2016

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Linear trend | |
|---|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------------|--------|
| | Adjusted percentage | | | | | | | | | | | | | | | | OR (95% CI) | P |
| | | | | | | | | | | | | | | | | | AOR (95% CI) | values |
| <i>Hardening Indicators</i> | | | | | | | | | | | | | | | | | | |
| Daily smoking | 84.2 | 87.3 | 88.1 | 85.2 | 87.4 | 85.3 | 84.1 | 84.5 | 83.7 | 83.4 | 81.9 | 82.9 | 86.0 | 81.7 | 76.8 | 79.7 | 0.96 (0.94, 0.97) | <.001 |
| | | | | | | | | | | | | | | | | | 0.96 (0.95, 0.98) | <.001 |
| Heavy consumption | 42.3 | 41.0 | 44.0 | 34.3 | 37.9 | 35.3 | 36.0 | 35.6 | 34.9 | 28.0 | 27.0 | 28.0 | 22.3 | 25.4 | 24.1 | 21.3 | 0.93 (0.92, 0.95) | <.001 |
| | | | | | | | | | | | | | | | | | 0.93 (0.92, 0.94) | <.001 |
| Never attempted to quit | 19.6 | 22.5 | 18.8 | 18.5 | 17.5 | 15.4 | 17.0 | 16.9 | 17.1 | 18.0 | 12.5 | 17.8 | 15.3 | 17.2 | 18.9 | 15.0 | 0.99 (0.97, 1.00) | .065 |
| | | | | | | | | | | | | | | | | | 0.98 (0.97, 1.00) | .050 |
| No quit attempt in the past 5 years | 36.2 | 35.9 | 33.4 | 31.7 | 34.3 | 29.4 | 31.9 | 32.6 | 30.4 | 32.1 | 25.1 | 30.9 | 24.3 | 28.8 | 29.7 | 25.8 | 0.98 (0.96, 0.99) | <.001 |
| | | | | | | | | | | | | | | | | | 0.97 (0.96, 0.99) | <.001 |
| No quit attempt in the past 12 months | 62.3 | 61.2 | 64.3 | 63.8 | 69.5 | 67.0 | 65.1 | 61.7 | 64.5 | 63.6 | 59.7 | 64.7 | 59.8 | 57.6 | 62.1 | 54.4 | 0.98 (0.97, 0.99) | .004 |
| | | | | | | | | | | | | | | | | | 0.98 (0.97, 0.99) | .001 |
| No intention to quit in the next 6 months | 45.6 | 49.9 | 45.1 | 47.6 | 46.9 | 46.5 | 39.9 | 38.1 | 40.6 | 39.6 | 36.0 | 36.6 | 36.5 | 40.5 | 36.4 | 38.9 | 0.97 (0.96, 0.98) | <.001 |
| | | | | | | | | | | | | | | | | | 0.97 (0.96, 0.98) | <.001 |
| No intention to | 83.9 | 86.3 | 84.5 | 86.3 | 84.0 | 83.7 | 80.7 | 79.3 | 84.0 | 83.4 | 78.0 | 77.4 | 75.8 | 77.7 | 73.4 | 72.1 | 0.94 (0.93, 0.96) | <.001 |

| | | | | | | | | | | | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|------|------|-----|-----|------|------|------|-------------------|-------------------|-------|
| quit in the next 30 days | | | | | | | | | | | | | | | | | | 0.95 (0.93, 0.96) | <.001 |
| Happy to smoke | 18.9 | 20.1 | 16.9 | 14.0 | 10.3 | 11.7 | -- | -- | -- | 11.8 | 11.2 | -- | 9.2 | 12.3 | 13.5 | 12.0 | 0.98 (0.96, 1.00) | .024 | |
| | | | | | | | | | | | | | | | | | 0.97 (0.95, 0.99) | .001 | |
| Hardcore smoker | 17.2 | 15.3 | 16.6 | 13.0 | 17.0 | 13.3 | 13.3 | 10.9 | 14.4 | 11.3 | 9.0 | 9.8 | 5.8 | 10.1 | 8.3 | 9.1 | 0.94 (0.93, 0.96) | <.001 | |
| | | | | | | | | | | | | | | | | | 0.94 (0.92, 0.96) | <.001 | |
| Given up giving up ^a | 1.1 | 0.5 | 1.4 | 0.6 | 1.1 | 0.4 | 0.6 | 0.9 | 0.5 | 0.6 | 0.8 | 1.1 | 0.4 | 0.7 | 0.5 | 0.6 | N/A | N/A | |
| N current smokers per year ^{b c} | 334 | 329 | 400 | 490 | 465 | 451 | 477 | 656 | 689 | 605 | 577 | 462 | 498 | 532 | 524 | 434 | | | |

Note. OR = odds ratio; AOR = odds ratio, adjusted for sex, age, education and socioeconomic status; 95% CI = 95% confidence intervals; -- question not asked in these years; N/A significant testing not conducted due to low probability outcome.

^a For the model predicting *given up giving up*, the age variable was collapsed into two categories, 26 – 49 year olds vs. 50+ year olds.

^b “N current smokers per year” is the weighted N, limited to those who had complete data for the four covariates.

^c The total weighted N varied across models predicting each outcome, due to missing data on the outcome; however, where data was missing (including due to “don’t know / can’t say” responses), it applied to a maximum of 4.9% of cases (per outcome variable): *daily smoking* (n=7924; 0% missing); *heavy consumption* (n=7706; 2.8% missing); *never attempted to quit* (n=7827; 1.2% missing); *no quit attempt in the past 5 years* and *no quit attempt in the past 12 months* (n=7769; 2.0% missing); *no intention to quit in the next six months* and *no intention to quit in the next 30 days* (n=7894; 0.4% missing); *hardcore smokers* (n=7538; 4.9% missing); and *given up giving up* (n=7704; 2.8% missing). Even fewer cases (n=5477) were available for the *happy to smoke* variable, given that this question was not asked every year.

APPENDIX B: Results of interaction tests and stratified analyses by sex**Table B1. Sex*year interactions for each hardening indicator, 2001 – 2016**

| | Interaction test |
|---|-------------------------|
| Daily smoking | F = 0.50, p = .478 |
| Heavy consumption | F = 0.13, p = .722 |
| Never attempted to quit | F = 0.01, p = .930 |
| No quit attempt in the past 5 years | F = 0.34, p = .559 |
| No quit attempt in the past 12 months | F = 0.26, p = .608 |
| No intention to quit in the next 6 months | F = 0.31, p = .579 |
| No intention to quit in the next 30 days | F = 0.56, p = .455 |
| Happy to smoke | F = 1.75, p = .185 |
| Hardcore smoker | F = 0.24, p = .625 |

Figure B1. Change in prevalence of selected hardening indicators between 2001 and 2016, by sex

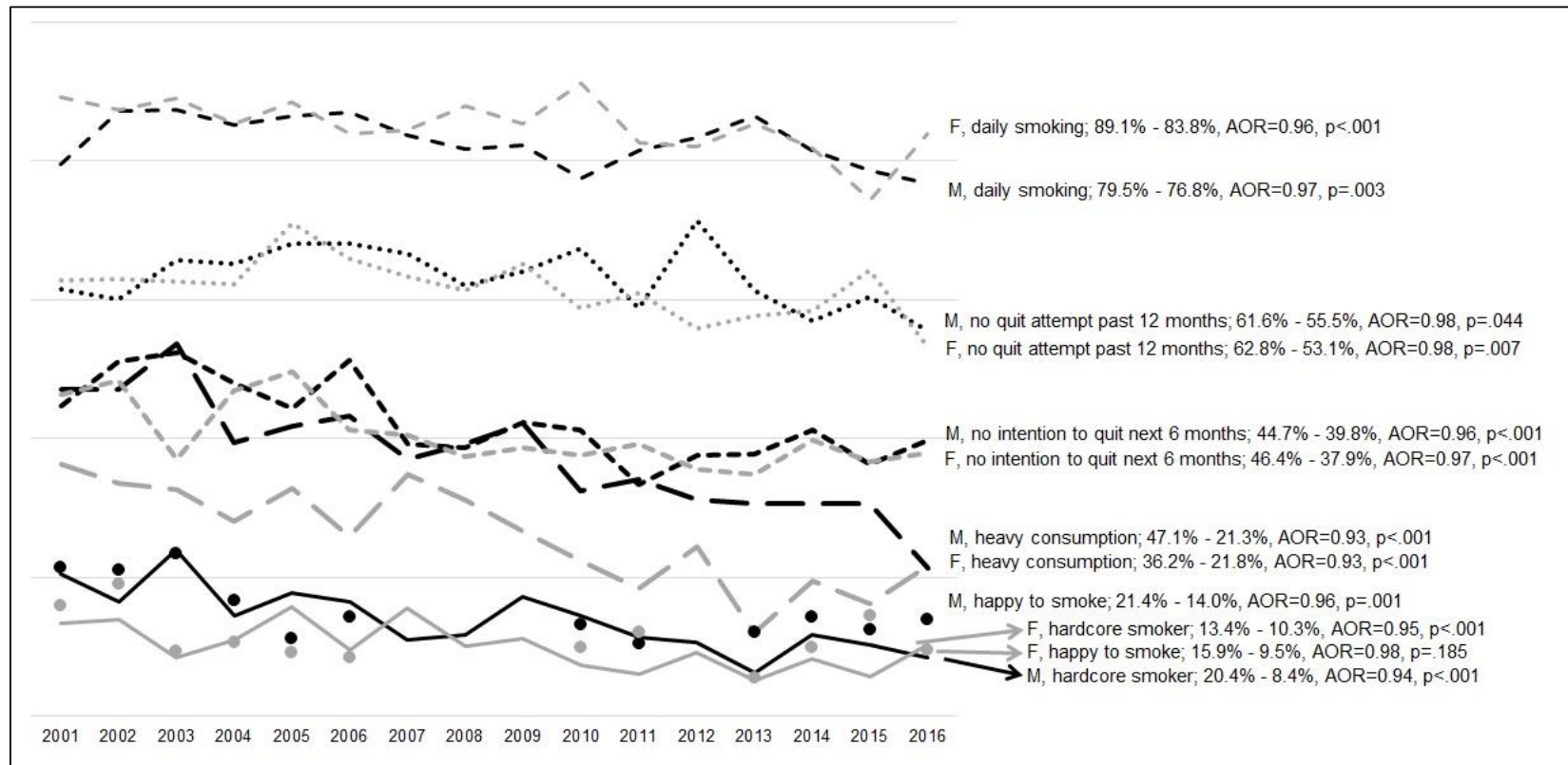


Figure B1. F = females; M = males; AOR = odds ratio, adjusted for age, education and socioeconomic status. For clarity, three hardening indicators are not included in the figure. Results of the stratified models for these outcomes are (% for 2001 and 2016, respectively): *never attempted to quit*, males 20.0% – 19.8%, AOR=0.98, p=.148, females 19.2% – 8.7%, AOR=0.98, p=.166; *no quit attempt in the past 5 years*, males 36.3% – 28.3%, AOR=0.97, p=.001, females 36.1% – 22.6%, AOR=0.98, p=.013; *no intention to quit in the next 30 days*, males 82.3% – 69.9%, AOR=0.94, p<.001, females 85.9% – 75.2%, AOR=0.95, p<.001.

APPENDIX C: Results of interaction tests and stratified analyses by age**Table C1. Age*year interactions for each hardening indicator, 2001 – 2016**

| | Interaction test |
|---|---------------------------|
| Daily smoking | F = 0.07, p = .791 |
| Heavy consumption | F = 0.00, p = .956 |
| Never attempted to quit | F = 0.51, p = .476 |
| No quit attempt in the past 5 years | F = 0.68, p = .411 |
| No quit attempt in the past 12 months | F = 0.27, p = .603 |
| No intention to quit in the next 6 months | F = 0.01, p = .941 |
| No intention to quit in the next 30 days | F = 0.93, p = .334 |
| Happy to smoke | F = 5.10, p = .024 |
| Hardcore smoker | F = 0.07, p = .794 |

Figure C1. Change in prevalence of selected hardening indicators between 2001 and 2016, by age

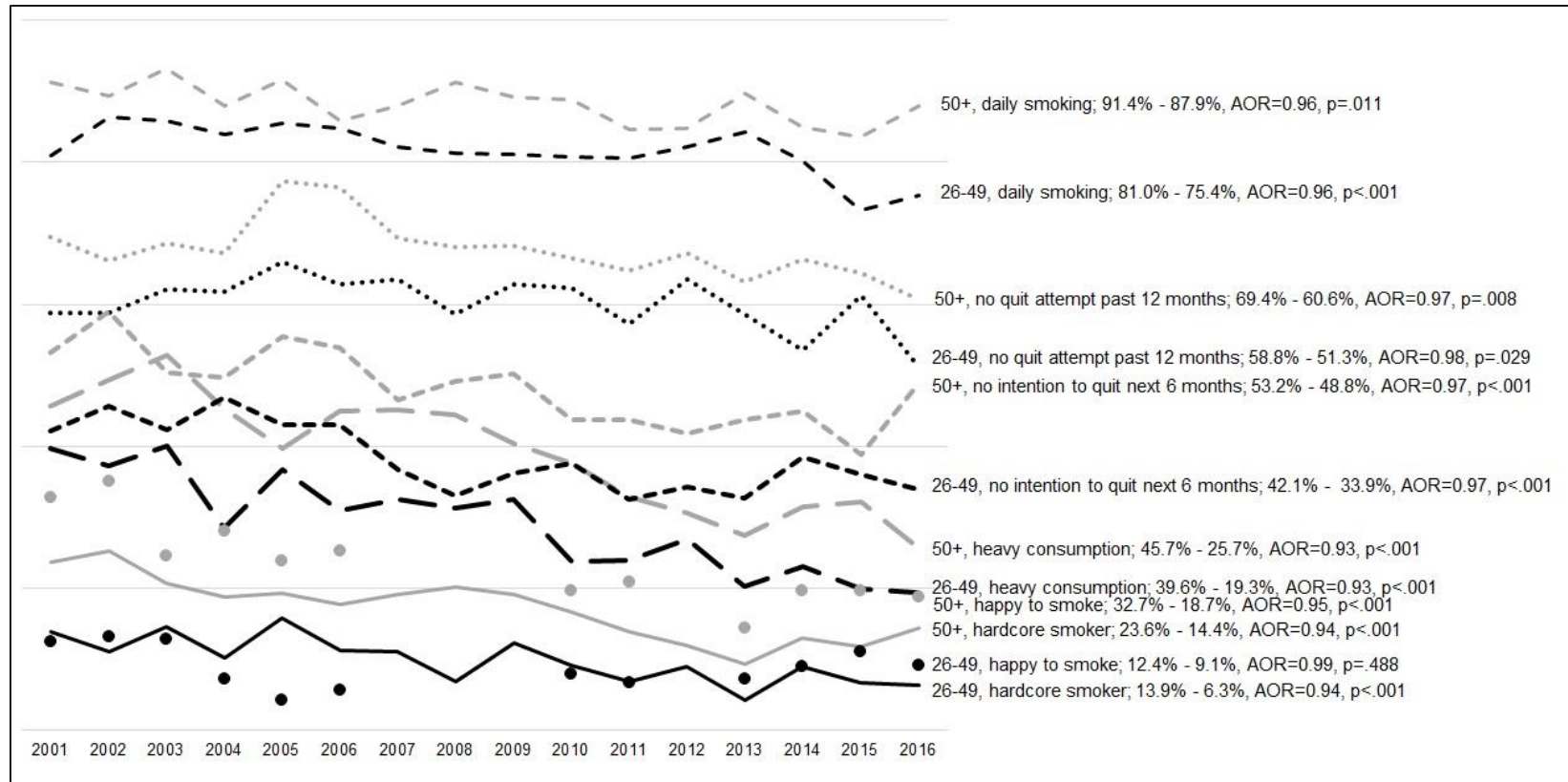


Figure C1. AOR = odds ratio, adjusted for sex, education and socioeconomic status. For clarity, three hardening indicators are not included in the figure. Results of the stratified models for these outcomes are (% for 2001 and 2016, respectively): *never attempted to quit*, 26-49 year olds 20.1% – 15.6%, AOR=0.99, p=.226, 50+ year olds 19.4% – 14.1%, AOR=0.97, p=.040; *no quit attempt in the past 5 years*, 26-49 year olds 30.6% – 21.7%, AOR=0.98, p=.008, 50+ year olds 49.1% – 34.0%, AOR=0.96, p<.001; *no intention to quit in the next 30 days*, 26-49 year olds 81.9% – 71.1%, AOR=0.95, p<.001, 50+ year olds 89.0% – 74.5%, AOR=0.94, p<.001.

APPENDIX D: Results of interaction tests and stratified analyses by education**Table D1. Education*year interactions for each hardening indicator, 2001 – 2016**

| | Interaction test |
|---|---------------------------|
| Daily smoking | F = 1.77, p = .183 |
| Heavy consumption | F = 1.21, p = .272 |
| Never attempted to quit | F = 0.00, p = .995 |
| No quit attempt in the past 5 years | F = 1.88, p = .170 |
| No quit attempt in the past 12 months | F = 2.90, p = .089 |
| No intention to quit in the next 6 months | F = 1.05, p = .306 |
| No intention to quit in the next 30 days | F = 3.69, p = .055 |
| Happy to smoke | F = 0.14, p = .712 |
| Hardcore smoker | F = 5.71, p = .017 |

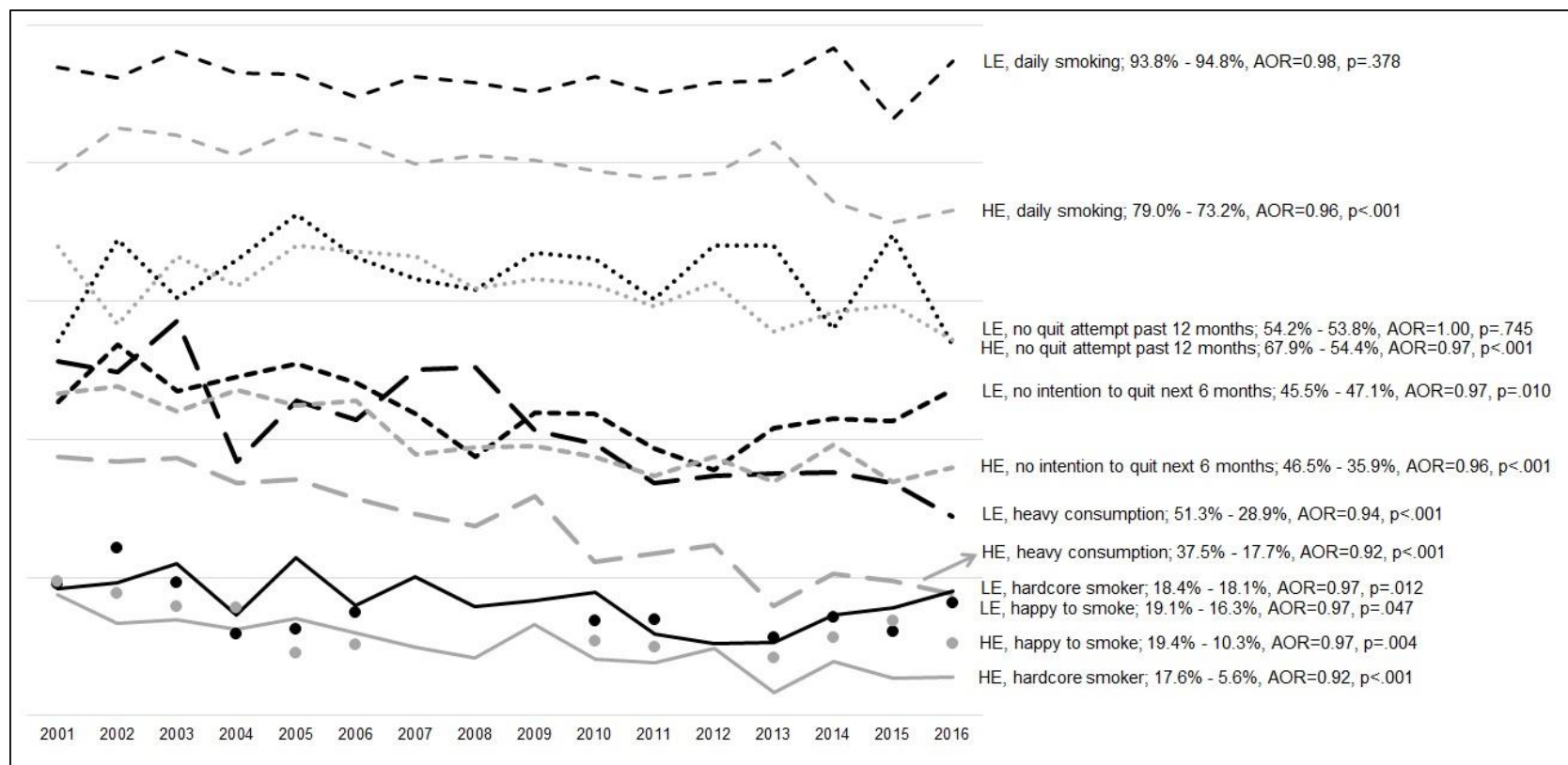
Figure D1. Change in prevalence of selected hardening indicators between 2001 and 2016, by education

Figure D1. LE = low education; HE = high education; AOR = odds ratio, adjusted for sex, age and socioeconomic status. For clarity, three hardening indicators are not included in the figure. Results of the stratified models for these outcomes are (% for 2001 and 2016, respectively): *never attempted to quit*, low education 18.1% – 9.2%, AOR=0.98, p=.265, high education 20.4% – 17.0%, AOR=0.98, p=.096; *no quit attempt in the past 5 years*, low education 35.3% – 23.5%, AOR=0.99, p=.200, high education 36.9% – 26.5%, AOR=0.97, p<.001; *no intention to quit in the next 30 days*, low education 82.1% – 77.3%, AOR=0.97, p=.006, high education 85.6% – 70.1%, AOR=0.94, p<.001.

APPENDIX E: Results of interaction tests and stratified analyses by socioeconomic status (SES)

Table E1. SES*year interactions for each hardening indicator, 2001 – 2016

| | Interaction test |
|---|---------------------------|
| Daily smoking | F = 0.01, p = .918 |
| Heavy consumption | F = 0.01, p = .934 |
| Never attempted to quit | F = 0.45, p = .500 |
| No quit attempt in the past 5 years | F = 0.02, p = .899 |
| No quit attempt in the past 12 months | F = 1.70, p = .192 |
| No intention to quit in the next 6 months | F = 4.12, p = .042 |
| No intention to quit in the next 30 days | F = 3.16, p = .075 |
| Happy to smoke | F = 1.20, p = .274 |
| Hardcore smoker | F = 0.61, p = .434 |

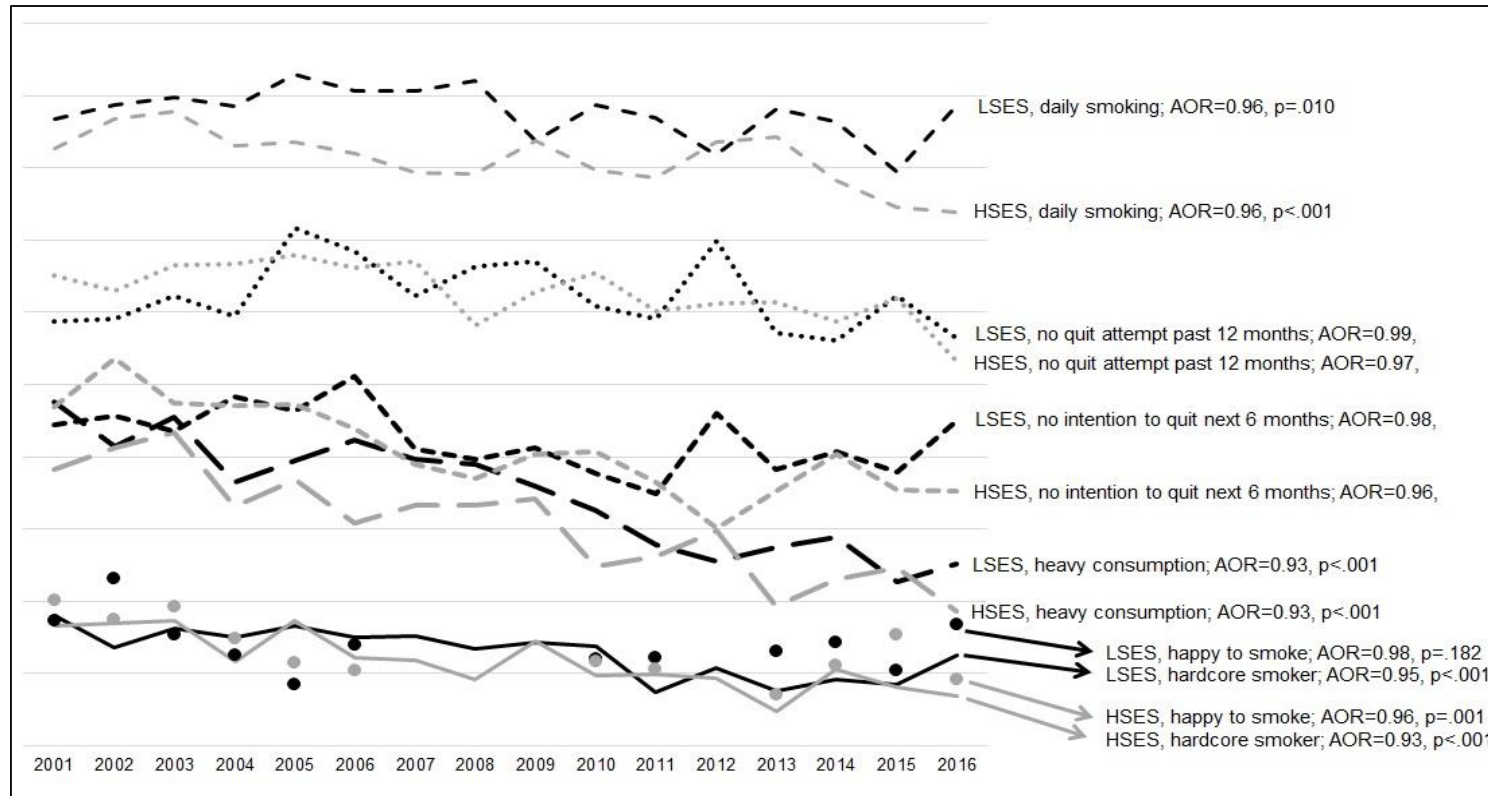
Figure E1. Change in prevalence of selected hardening indicators between 2001 and 2016, by SES

Figure E1. LSES = low socioeconomic status; HSES = high socioeconomic status; AOR = odds ratio, adjusted for sex, age and education. For clarity, three hardening indicators are not included in the figure. Results of the stratified models for these outcomes are (% for 2001 and 2016, respectively): *never attempted to quit*, low SES 18.3% – 11.5%, AOR=0.98, p=.124, high SES 20.4% – 17.3%, AOR=0.99, p=.260; *no quit attempt in the past 5 years*, low SES 32.9% – 22.6%, AOR=0.98, p=.012, high SES 38.7% – 28.0%, AOR=0.97, p=.001; *no intention to quit in the next 30 days*, low SES 80.3% – 74.4%, AOR=0.96, p=.001, high SES 87.2% – 70.7%, AOR=0.93, p<.001.

APPENDIX F

Table F1. Sensitivity analyses: comparing four different definitions of hardcore smokers

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Linear trend | |
|---|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------------|--------|
| | Adjusted percentage | | | | | | | | | | | | | | | | OR (95% CI) | P |
| | | | | | | | | | | | | | | | | | AOR (95% CI) | values |
| Hardcore smokers version 1 ^{a,b} | 17.2 | 15.3 | 16.6 | 13.0 | 17.0 | 13.3 | 13.3 | 10.9 | 14.4 | 11.3 | 9.0 | 9.8 | 5.8 | 10.1 | 8.3 | 9.1 | 0.94 (0.93, 0.96) | <.001 |
| Hardcore smokers version 2 ^c | 5.3 | 6.5 | 5.8 | 4.0 | 4.2 | 3.5 | 3.0 | 3.8 | 3.9 | 3.4 | 1.8 | 1.6 | 2.1 | 1.8 | 3.4 | 2.0 | 0.93 (0.90, 0.96) | <.001 |
| Hardcore smokers version 3 ^d | 31.1 | 32.4 | 31.3 | 32.4 | 35.1 | 32.1 | 28.9 | 24.5 | 29.0 | 26.1 | 23.5 | 26.7 | 24.1 | 28.0 | 22.6 | 26.7 | 0.97 (0.96, 0.98) | <.001 |
| Hardcore smokers version 4 ^e | 10.5 | 12.4 | 10.0 | 11.8 | 10.4 | 8.1 | 8.0 | 8.5 | 9.3 | 9.1 | 5.6 | 6.9 | 7.9 | 8.1 | 9.7 | 6.8 | 0.97 (0.95, 0.99) | .002 |
| | | | | | | | | | | | | | | | | | 0.97 (0.95, 0.99) | .003 |

Note. OR = odds ratio; AOR = odds ratio, adjusted for sex, age, education and socioeconomic status; 95% CI = 95% confidence intervals.

^a Definition used in primary analyses reported in manuscript.

^b Hardcore smokers version 1: smoked every day; smoked 16 or more cigarettes per day; had not made a quit attempt within the past 12 months; and did not intend to quit within the next six months.

^c Hardcore smokers version 2: smoked every day; smoked 16 or more cigarettes per day; had never attempted to quit; and did not intend to quit within the next six months.

^d Hardcore smokers version 3: smoked every day; had not made a quit attempt within the past 12 months; and did not intend to quit within the next six months.

^e Hardcore smokers version 4: smoked every day; had never attempted to quit; and did not intend to quit within the next six months.