

Smoking uptake in UK children: analysis of the UK Millennium Cohort Study - Appendix

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APPENDIX CONTENTS

1. Additional information on the Millennium Cohort Study
2. Assessment of outcomes
3. Covariate data
4. Population data
5. Analyses
6. Appendix Table 1: Description of sample
7. Appendix Table 2: Associations of early life exposure smoking with early-teen smoking
8. Appendix Table 3: Associations of smoking as pre-teen, and age of starting smoking on smoking use as an early-teen
9. Appendix Table 4: Dose-response in associations of peer smoking and early-teen smoking

1) Sampling for the MCS was in a cluster-stratified framework and smaller population groups were over sampled, including those in the smaller nations of the UK, as well as those in disadvantaged areas and from ethnic minority backgrounds. Caregivers were interviewed when children were aged approximately nine months, 3 years, 5 years, 7, 11 and 14 years, with interviews with children when they were aged 11 and 14. The survey covers a wide range of topics, and full details are given elsewhere ¹.

We also use data from previous waves of the MCS to assess two markers of early-life exposure to smoking; exposure to smoking in the same room of the home in the first four waves of MCS (when children were aged 9 months to 7 years old) and maternal smoking during pregnancy. Due to missing data these two analyses were based on different sample numbers: 11,557 children were included in analyses of exposure to smoking in the same room in early life and 9,949 children in analyses of maternal smoking during pregnancy.

2) Assessment of outcomes

The outcome in this study was early-teen smoking, classified as ever smoking, current smoking, and continuing current smoking among ever users. This was ascertained by children reading a set of statements relating to tobacco smoking and describe which best described them. We categorised responses “I usually smoke between one and six cigarettes a week” and “I usually smoke more than six cigarettes a week” as current smokers. We categorised those responding “I have only ever tried smoking cigarettes once” and “I used to smoke sometimes but I never smoke a cigarette now” and “I sometimes smoke cigarettes now but I don’t smoke as many as one a week” plus current smoking as ever smokers. To investigate differing aspects of smoking we report on ever smoking, current smoking, and current smoking among the subset of the population who had ever smoked (referred to here as being a continuing current smoker).

3) Covariate data

Family income was ascertained based on the Organisation for Economic Co-operation and Development and categorised in five groups ³.

Children were asked to assess if their friends smoked using the question “How many of your friends smoke cigarettes? Do not include electronic cigarettes “(e-cigarettes).” We classed this into two groups of “None of them” versus “some of them”; “most of them” and “all of them.”

Exposure to smoking in the same room was assessed in the first four waves of the MCS using the question “Does anyone smoke in the same room as [name] nowadays?” We have categorised this into the number of survey waves where there was smoking in the same room as the child ⁴. We created a variable on maternal smoking during pregnancy based on questions in the first wave of the MCS covering how many cigarettes mothers smoked before their pregnancy, whether they changed the amount they smoked during pregnancy and number of cigarettes smoked after any changes ⁵. We categorised smoking during pregnancy into three groups of never, quit smoking while pregnant, and smoking during pregnancy.

4) Population data

We use data on population size from the Population Estimates by single year of age and sex for local authorities in the UK, mid-2014. This was matched to MCS data on the basis of Government Office Region for England and country for the smaller nations of the UK. Due to small numbers of 15 year olds in the MCS sample and resultant instability in estimates, we have excluded 15 year olds from these estimates.

We used percentages corrected for survey weighting (explained further below) to produce estimates of the number of children who have ever smoked and were current smokers for each region by combining these percentages with age-specific population data from the ONS for 2014.

5) Analyses

We present descriptive percentages unweighted and regression analyses used survey weights provided by the data collection team which are designed to correct for sampling differences between groups as well as attrition over time, to ensure representativeness for the whole of the UK². We conducted secondary analyses of data which does not contain identifiable data and for which participants have given consent for use for research. Data collection for the MCS was approved by the Yorkshire and Humber ethics committee; further details are available from <http://www.cls.ioe.ac.uk/>.

We also present a number of additional analyses in the Appendix. We assessed whether having tried tobacco as a pre-teen (aged approximately 11 years) was associated with being a current smoker as an early teen. Pre-teen tobacco use was assessed in the relevant wave using the question “Have you ever tried a cigarette, even if it was only a single puff?” with options yes and no. Children were further asked the age at which they first tried smoking if they reported use, and we investigated whether age of first trying tobacco was related to being a current smoker. We assessed the potential for dose response by the number of friends reported to be smokers, using all available categories of responses.

For cross sectional analyses of risks of smoking the distribution of outcomes by groups was first examined descriptively. We used three separate logistic regression models to assess associations of socio-demographic factors and exposure to caregiver and friend smoking with the three outcomes of being an ever smoker, current smoker or continuing current smoker. Our models of ever and current smoking used data from the whole sample, while the model of continuing current smoking was restricted to children reporting being an ever smoker. We also investigated the potential impacts of early-life exposure to smoking using further separate logistic regressions to assess associations of exposure to smoking in the same room of the home and maternal smoking during pregnancy. These models were adjusted for our socio-demographic factors of interest: age, sex, country of UK, equivalised family income (in five groups), ethnicity, child-reported caregiver current smoking, and child-reported peer smoking

Appendix Table 1: Description of sample

		Sample number	% of sample
Age (years)	13	2,837	24.5
	14/15*	8,720	75.5
Gender	Female	5,845	50.6
	Male	5,712	49.4
Country	England	7,543	65.3
	Wales	1,559	13.5
	Scotland	1,292	11.2
	N. Ireland	1,163	10.1
Family income group	1 (highest)	2,747	23.8
	2	2,774	24.0
	3	2,389	20.7
	4	1,861	16.1
	5 (lowest)	1,786	15.5
Ethnic group	White	9,741	84.3
	Mixed	99	0.9
	Indian	303	2.6
	Pakistani and Bangladeshi	814	7.0
	Black	392	3.4
	Other Ethnic group	208	1.8
Caregiver current smoking	No	9,309	80.5
	Yes	2,248	19.5
Friend smoking	No	7,079	61.3
	Some/most/all	3,492	30.2
	No answer	986	8.5
Child exposed to smoking in the home	Never	8669	75.0
	At least one survey wave	1368	11.8
	In two survey waves	766	6.7
	In three survey waves	461	4.0
	In all survey waves aged 0 - 7 years	293	2.5
Maternal smoking during pregnancy [‡]	Never	7046	61.0
	Quit during pregnancy	1076	9.3
	Smoked during pregnancy	1827	15.8
Ever smoked at age 11 [‡]	No	11,004	95.2
	Yes	273	2.4
Smoking at age 14	Never	9,959	86.2
	Ever but not currently	1,378	11.9
	Current	220	1.9
Overall		11,557	100.0

*note that due to a low number of 15 year olds, these groups have been collapsed

[‡] Due to some missing data, tobacco use at age 11 and maternal smoking do not total to 100%

Appendix Table 2: Associations of early life exposure smoking with early-teen smoking

		Ever smoked tobacco			Current smoking tobacco		Continuing current smoking tobacco	
		N	%	AOR (95% CI)	%	AOR (95% CI)	%	AOR (95% CI)
Child exposed to smoking in the same room of the home	Never	8669	10.3	ref	1.0	ref	10.5	ref
	At least one survey wave	1368	20.3	1.55 (1.21 ; 1.98)	3.6	1.88 (0.87 ;4.08)	15.2	0.61 (0.30 ; 1.24)
	In two survey waves	766	25.6	1.53 (1.12 ; 2.09)	5.5	1.45 (0.77 ; 2.70)	21.4	0.76 (0.32 ; 1.79)
	In three survey waves	461	28.2	1.76 (1.29 ; 2.41)	3.9	0.99 (0.43 ; 2.27)	12.3	0.41 (0.15; 1.09)
	In all survey waves aged 0 - 7 years	293	35.8	2.67 (1.51 ; 4.70)	8.9	1.94 (1.01 ; 3.73)	29.2	0.89 (0.39 ; 2.07)
Maternal smoking during pregnancy	Never	7046	10.2	ref	0.9	Ref	9.0	ref
	Quit during pregnancy	1076	19.5	1.52 (1.20 ; 1.93)	2.5	1.83 (1.02 ; 3.26)	12.9	1.50 (0.83 ; 2.71)
	Smoked during pregnancy	1827	27.0	1.74 (1.43 ; 2.11)	5.2	2.16 (1.42 ; 3.26)	19.0	1.49 (0.94 ; 2.36)

These results from separate logistic regression models

AOR = Adjusted Odds Ratio, adjusted for age, sex, country of UK, family income group, ethnicity, and child-reported peer smoking, CI = Confidence Intervals. Continuing current smoker refers to those reporting having ever smoked at age 11 who were current smokers.

Bold represents $p \leq 0.05$

Appendix Table 3: Associations of smoking as pre-teen, and age of starting smoking on smoking use as an early-teen

		% current smoking at early-teen	Adjusted odds ratio (CI)	Adjusted odds ratio (CI)
Ever smoked as pre-teen	No	1.6	ref	-
	Yes	15.8	3.95 (2.08 ; 7.48)	-
Age started smoking (years)	10/11	23.9	-	4.03 (1.62 ; 10.05)
	12	36.0	-	6.83 (3.26 ; 14.30)
	13	10.8	-	1.51 (0.83 ; 2.73)
	14/15	8.2	ref	ref

CI = Confidence Intervals

These adjusted odds ratios adjusted for age, sex, country of UK, family income group, ethnicity, caregiver current smoking, and child-reported peer smoking

Bold represents $p \leq 0.05$

Appendix Table 4: Dose-response in associations of peer smoking and early-teen smoking

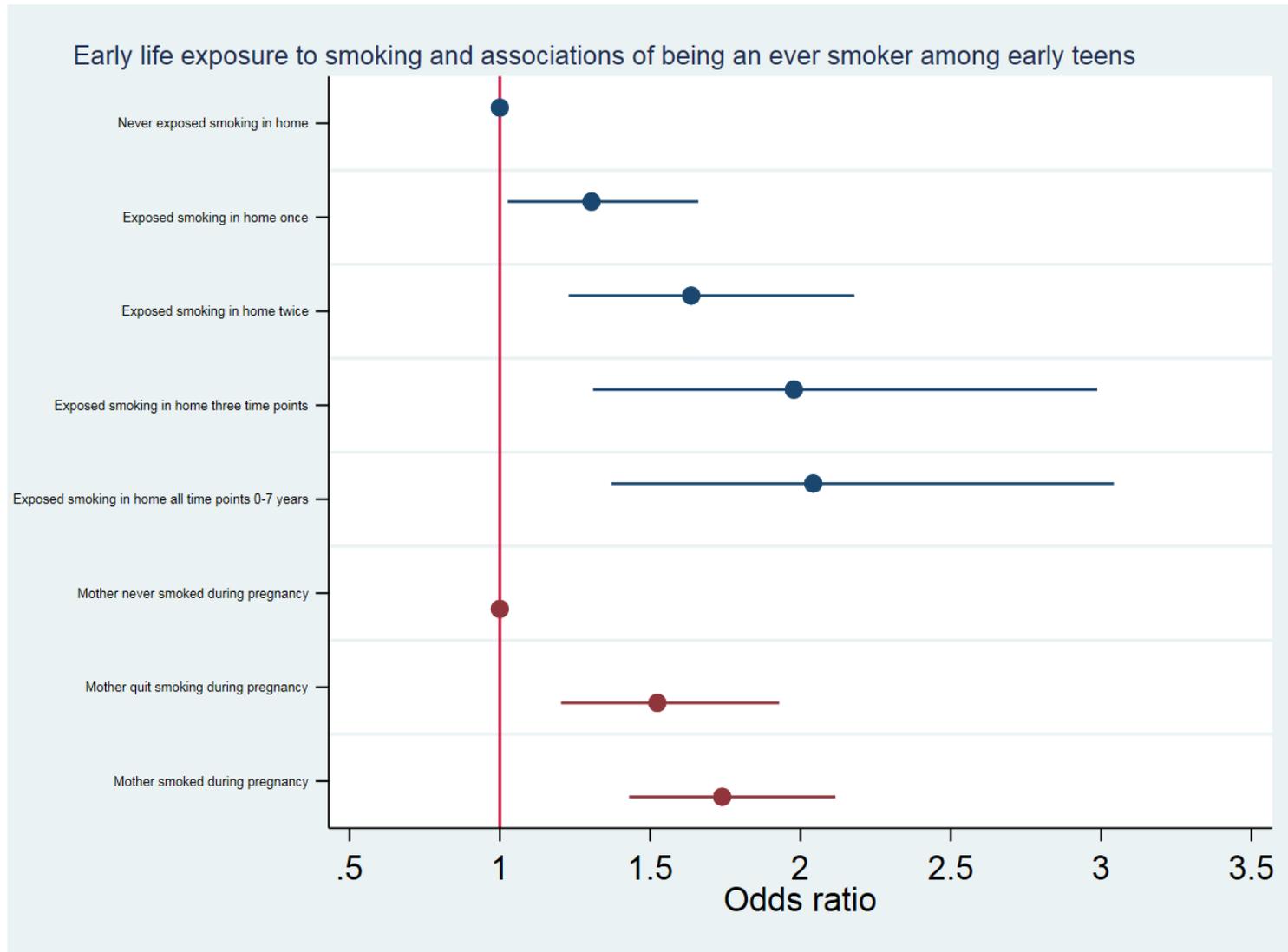
				Ever smoking		Current smoking		Continuing current smoking	
		N	%	AOR (CI)	%	AOR (CI)	%	AOR (CI)	
How	None of them	7,080	4.0	ref	<0.1	ref	1.1	ref	
many	Some of them	3,073	29.8	8.2 (6.58 ; 10.10)	2.5	44.12 (9.78 ; 199.11)	8.3	8.65 (1.88 ; 39.70)	
friends	Most of them	384	73.4	38.4 (26.14 ; 56.37)	30.5	643.53 (142.01 ; 2916.17)	41.5	74.20 (16.20 ; 339.20)	
smoke?	All of them	36	75.0	66.3 (27.94 ; 157.29)	50.0	2131.66 (384.87 ; 11806.54)	66.7	236.60 (40.40 ; 1385.90)	

AOR = Adjusted Odds Ratio, adjusted for age, sex, country of UK, family income group, ethnicity, caregiver current smoking, and child-reported friend smoking.

Continuing current smoker refers to those reporting having ever smoked at age 11 who were current smokers.

Bold represents $p \leq 0.05$

Appendix Figure 1: Dose-response in associations of peer smoking and early-teen smoking



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