The Effects of Compulsory Schooling on Health and Hospitalization over the Life Cycle

Online Appendix

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Abstract

This online appendix provides supplementary results and documentation supporting our main findings on the causal effects of the 1972 U.K. ROSLA reform on health and health care utilization in adulthood. Appendix A contains several supplementary figures and tables based on the 1972 reform at the heart of our analyses. Appendix B shows complementary findings for cohorts affected by the 1947 U.K. ROSLA reform. As noted throughout the paper, we report remarkably similar first-stage estimates describing the effect of the 1947 reform on educational attainment. However, we find weaker evidence of the reform's effects on health and health care utilization–consistent with both theory and more recent findings on the unique circumstances surrounding this reform. Finally, Appendix C provides additional documentation for the ICD-10 codes and classifications used for all of our hospitalization analyses.

Appendix A: Supplemental Tables and Figures

Table A1: SLS Sample Means

	Men		Women	
	Sep. 1950 - August 1957	Sep. 1957 - August 1964	Sep. 1950 - August 1957	Sep. 1957 - August 1964
Pre-Defined Characteristics				
% White	0.998	0.997	0.998	0.998
% Non-White	0.002	0.003	0.002	0.002
% Catholic (Raised)	0.139	0.149	0.16	0.173
% Church of Scotland (Raised)	0.447	0.386	0.475	0.427
Education Outcomes				
% No Qualification	0.371	0.296	0.377	0.269
% At Least O-Grades	0.629	0.704	0.623	0.731
% Degree	0.245	0.239	0.256	0.255
Post-Defined Characteristics				
% Unskilled	0.193	0.240	0.259	0.242
% Skilled	0.447	0.474	0.418	0.457
% Professional	0.36	0.287	0.324	0.301
% Ever Married	0.843	0.665	0.894	0.759
Deprivation Index	−0.486	−0.155	−0.332	0.024
N	14,641	17,135	14,774	16,946

Notes: Table A1 is based on data from the Scottish Longitudinal Study (SLS) and provides means for all observable demographic characteristics among SLS participants born within seven years of the 1972 U.K. ROSLA reform.

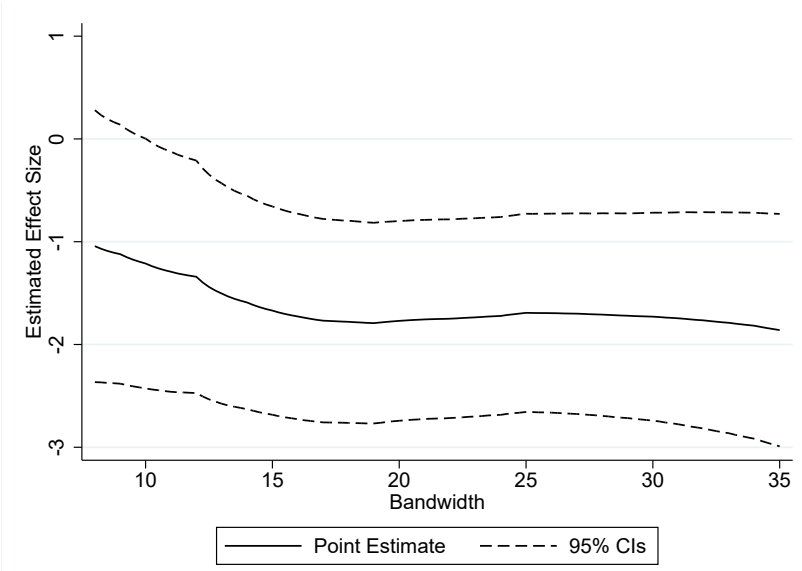
Table A2: Balance Check: Effects of the 1972 ROSLA Reform on Observables

	Female	Protestant	Catholic	Urban
Coef	−0.022	0.005	0.011	0.001
(SE)	(0.016)	(0.021)	(0.013)	(0.001)
N	64,267	64,267	64,267	64,267
Bandwidth	36.17	27.67	19.81	27.96

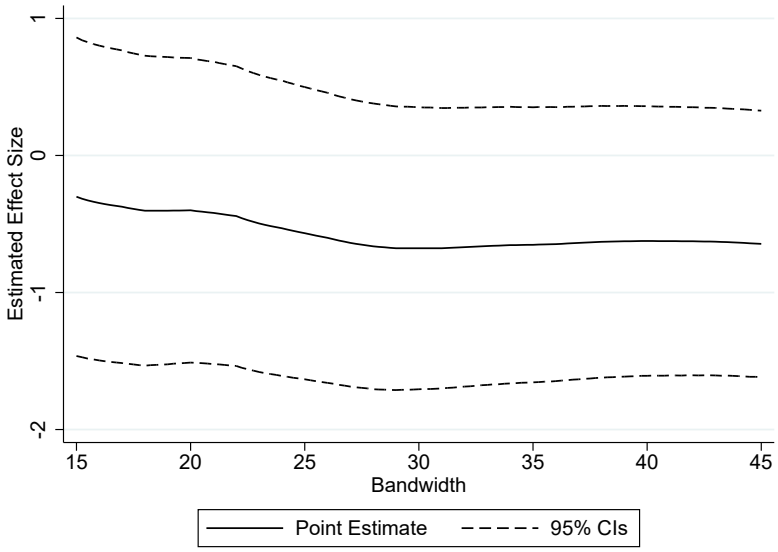
Table A2 reports reduced-form estimates using local polynomial regression discontinuity estimation. To test balance, we include four observable, individual characteristics on the left-hand side. We flexibly control for birth month-year, centered around the reform cut-off date. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

Figure A1: Main Effects Estimation by Bandwidth

(a) Men: Inpatient Episodes



(b) Women: Inpatient Episodes



Notes: Figure A1 shows the coefficients and 95% confidence intervals for our main analysis of inpatient hospitalization episodes. In Table 2 of the main paper, we reported reduced-form estimates using local polynomial regression discontinuity estimation with the optimal, MSE-minimizing bandwidth. In this Figure, we show the same reduced-form estimates (y-axis) alongside confidence intervals for a variety of bandwidths (x-axis)

Table A3: Effects of the 1972 ROSLA Reform on Emigration

	Men	Women
Mean	0.048	0.039
[SD]	[0.213]	[0.193]
Coef	0.009	−0.008
(SE)	(0.008)	(0.009)
N	35,228	34,831
Bandwidth	22.63	14.36

Table A3 reports reduced-form estimates using local polynomial regression discontinuity estimation. Our main outcome is observed emigration. All regressions include two dummy control variables for ethnicity (i.e., Black and Asian/Other) and two controls for childhood religion (i.e., protestant and catholic). We flexibly control for birth month-year, centered around the reform cut-off date. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

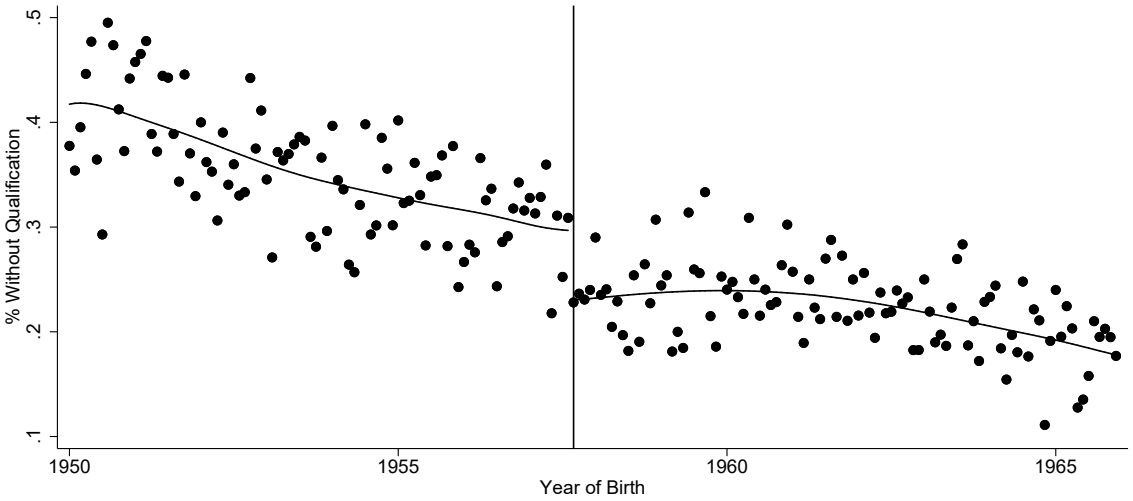
Table A4: Placebo Regressions: 1958 to 1972 Birth Cohorts

	No Qual.	Inpatient Epis. (all)	Inpatient Epis. (Digest. Syst.)	Alcohol-related Epis.
Panel A: Men				
Mean	0.287	3.876	0.750	0.244
[SD]	[0.452]	[7.438]	[2.440]	[1.756]
Coef	−0.019	−0.022	−0.066	0.038
(SE)	(0.016)	(0.284)	(0.082)	(0.068)
N	33,451	33,794	33,794	33,794
Bandwidth	26.66	25.60	26.88	26.34
Panel B: Women				
Mean	0.244	5.080	0.841	0.112
[SD]	[0.430]	[8.716]	[2.541]	[1.000]
Coef	−0.008	−0.527	0.003	−0.007
(SE)	(0.028)	(0.363)	(0.085)	(0.044)
N	33,564	33,802	33,802	33,802
Bandwidth	15.58	18.98	27.50	20.15

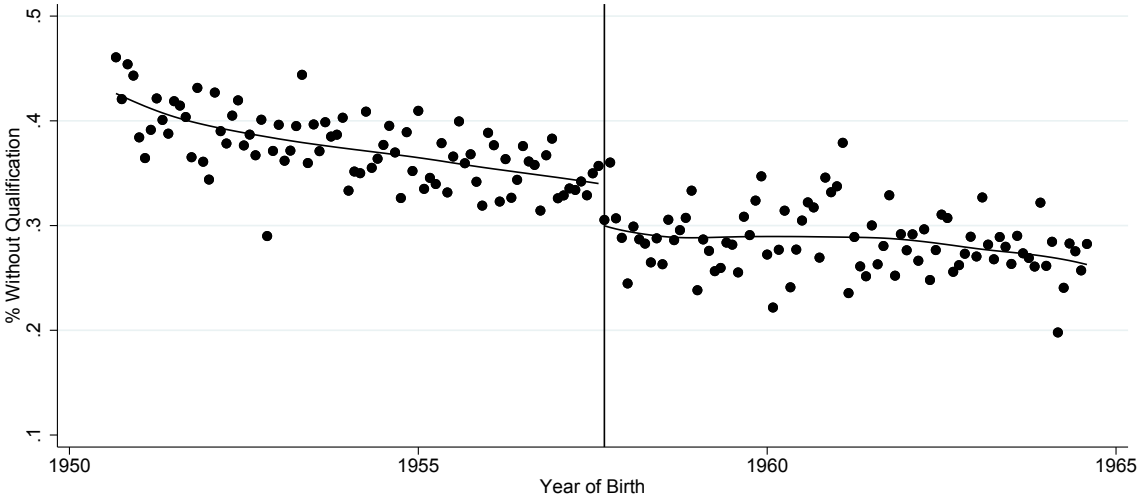
Table A4 reports placebo estimates using local polynomial regression discontinuity estimation for our main outcomes of interest. More specifically, this table calculates reduced-form effects for a hypothetical ROSLA reform affecting everyone born after September 1965. Panels (A) and (B) contain separate estimates for men and women (respectively) for respondents born between August 1958 and September 1972. All regressions include two dummy control variables for ethnicity (i.e, Black and Asian/Other) and two controls for childhood religion (i.e., protestant and catholic). We flexibly control for birth month-year, centered around the reform cut-off date. All data come from the Scottish Longitudinal Study (SLS). Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

Figure A2: Comparison of Educational Measures in the SHeS and SLS Data

(a) SHeS: % No Qualification



(b) SLS: % No Qualification



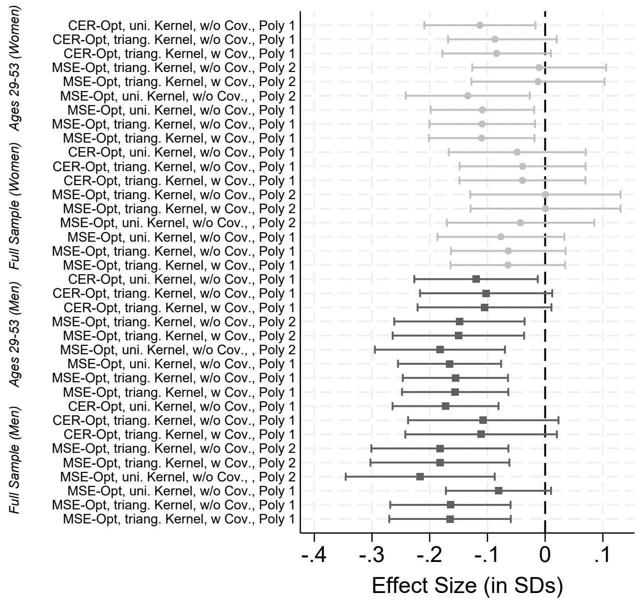
Notes: Figure A2 compares educational measures across the two main data sources used within this paper. Each dot describes the proportion without formal qualification ($\approx$ high school dropouts) for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1972 ROSLA reform. Panel (a) shows results using information from pooled waves of the Scottish Health Survey (SHeS) over the 1995-2016 period. Panel (b) shows similar results using the most recent information for each respondent within the Scottish Longitudinal Study (SLS).

Table A5: Years of Education and Self-Reported Health

	Poor Health	Illness	Current Drinker	Current Smoker	Ever Smoked
	All (N=66,655)				
Mean	0.271	0.457	0.894	0.297	0.601
[SD]	[0.444]	[0.498]	[0.308]	[0.457]	[0.489]
IV (2nd Stage)	−0.018	0.047	0.057	−0.044	0.065
	(0.056)	(0.083)	(0.051)	(0.072)	(0.072)
Bandwidth:	68.1	103.4	101.0	105.1	85.6

This table reports the 2nd stage estimates of an instrumental variable ("fuzzy RDD") estimation. Main outcomes are dichotomous indicators for self-reported poor health, longstanding illness, current alcohol consumption, current smoking behavior, and whether the respondent ever smoked. The endogenous (instrumented) variable is a continuous measure for years of education. All coefficients are obtained using a non-parametric regression discontinuity estimation with automated bandwidth selection. The running variable is birth month-year centered around the September 1972 cutoff. All data come from pooled waves of the Scottish Health Survey (SHeS) over the 1995-2016 period. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

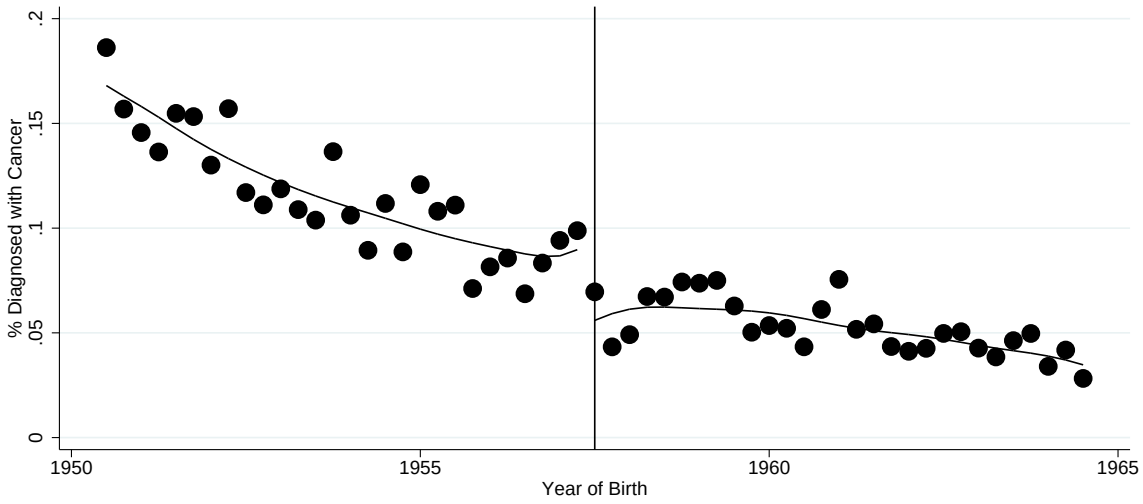
Figure A3: Robustness: Effects on Inpatient Episodes by Specification



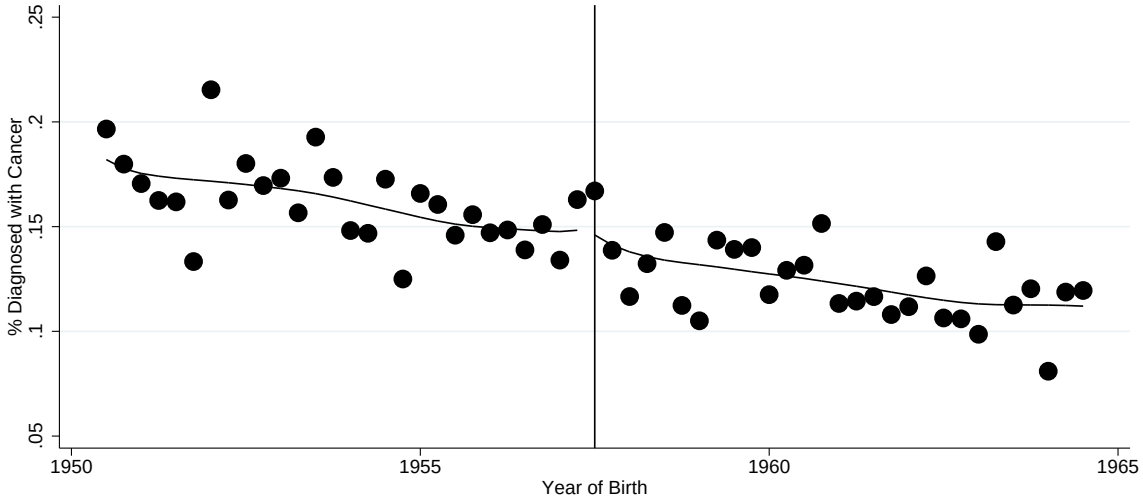
Notes: This Figure repeats the estimation of the effect of the 1972 ROSLA reform on the number of inpatient hospital episodes using a local polynomial approach. We show a set of results that differ in terms of the bandwidth selection process (mean-squared error (MSE) optimal or coverage error (CER) optimal), the kernel (triangular or uniform), the inclusion of covaraites (with or without covariates), and the polynomial order (first or second order). Blue squares and whiskers represent point estimates and 95% confidence intervals for men, red circles and whiskers represent those for women. We also do our estimations for the full sample and a sample that focuses on inpatient episodes between ages 29 and 53. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date.

Figure A4: Effects of the 1972 ROSLA Reform on Cancer Prevalence

(a) Men: Any Cancer Diagnosis



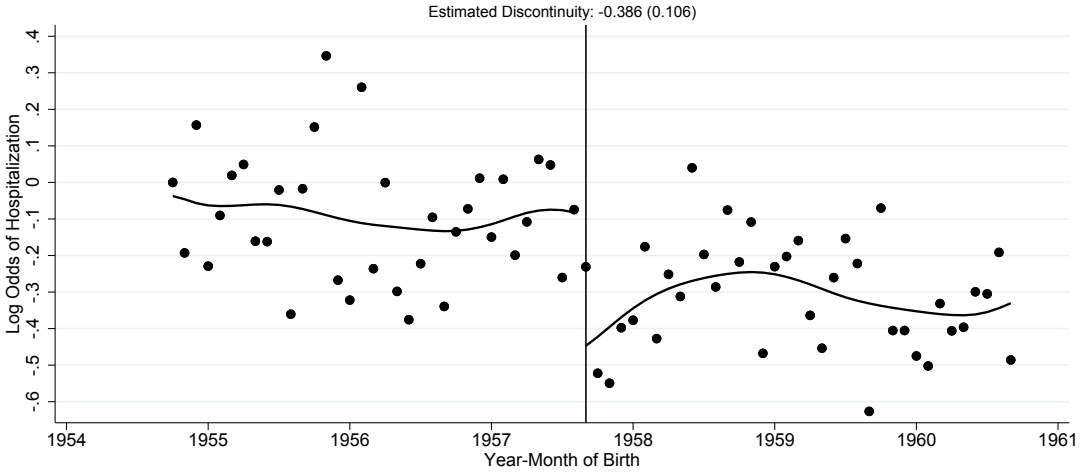
(b) Women: Any Cancer Diagnosis



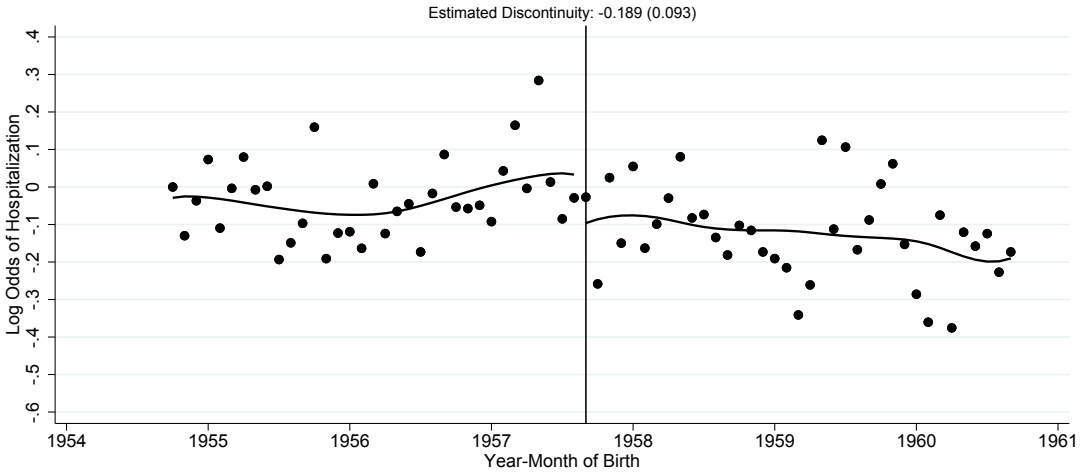
Notes: Figure A4 describes the reduced-form effects of the 1972 ROSLA reform on cancer diagnoses. Each dot describes the proportion diagnosed with any cancer in adulthood for each month-year birth cohort. Since cancer diagnoses are rare within these groups, we instead show quarterly aggregates for later cohorts for confidentiality reasons. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1972 ROSLA reform. Panels (a) and (b) describe the effects of the 1972 reform on alcohol-related inpatient episodes for men and women, respectively. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period.

Figure A5: Main Effects Estimation Using Two-Step Approach

(a) Hospitalization Episodes - Men

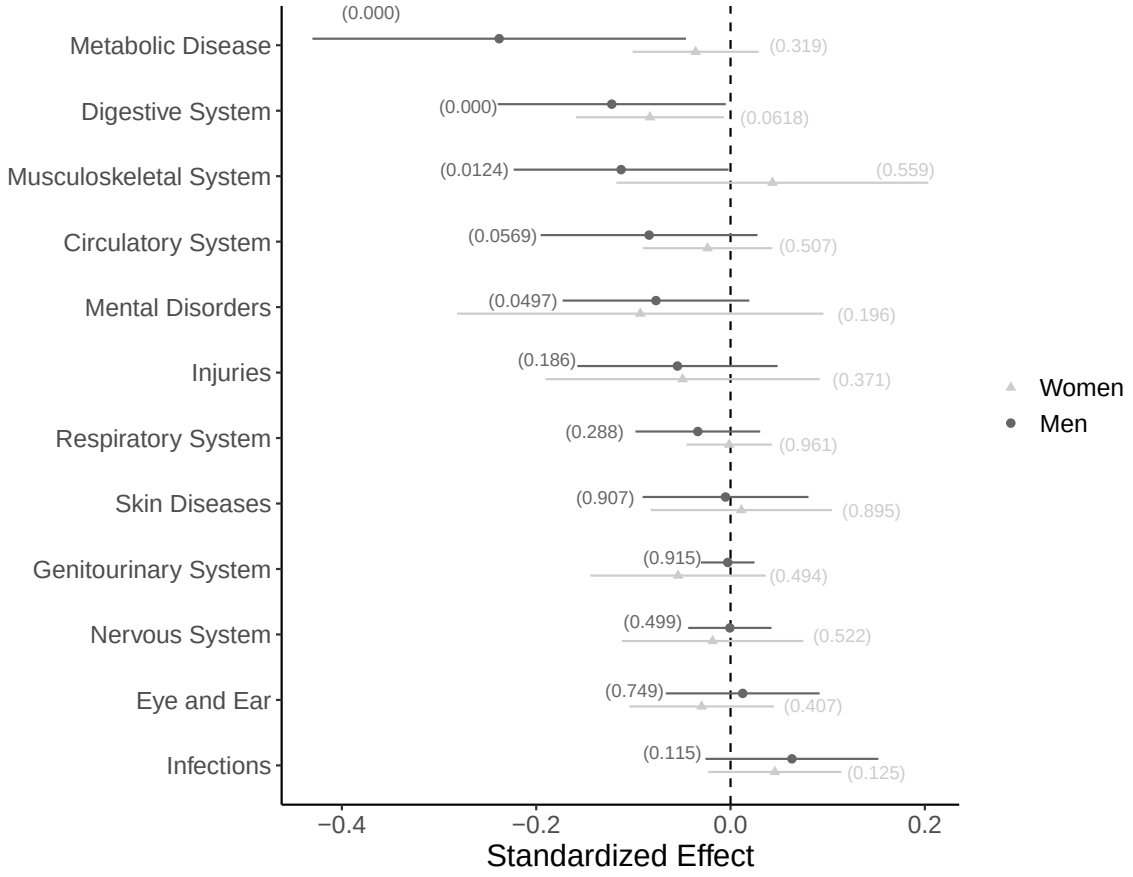


(b) Hospitalization Episodes - Women



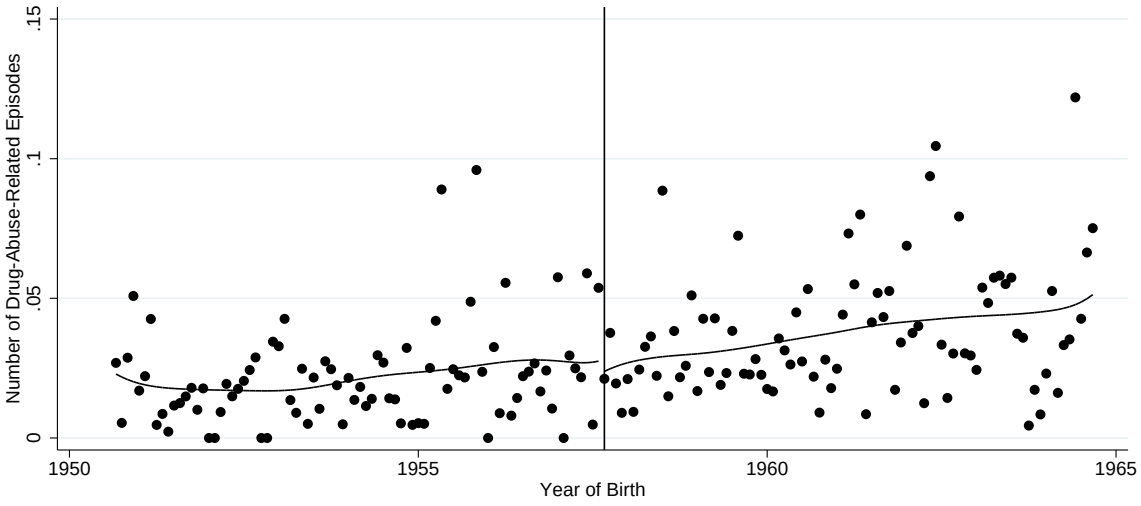
Notes: These figures describe the relationship between the 1972 ROSLA reform and inpatient hospitalization episodes. Estimation is given by the two-step procedure outlined in equations (2)–(3) in Section 5.3 of the main paper, except that here we use a Poisson link function. The first step involves a panel poisson regression of mortality on birth month-year fixed effects. Fitted values for these fixed effects then serve as the outcome variable in a local linear regression that we use to estimate the discontinuity at the reform cutoff. Panels (a) and (b) show results based on this procedure for hospitalization of men and women, respectively. All estimates should be interpreted relative to the September 1950 birth cohort. The vertical line denotes the 1972 ROSLA reform. This figure is based on data from the Scottish Longitudinal Study (SLS).

Figure A6: Effects of the 1972 ROSLA Reform on Hospitalization (Days) by Diagnosis



Notes: Figure A6 shows a series of reduced-form estimates using local polynomial regression discontinuity estimation, separately for men (blue circles) and women (red triangles). Our main outcome is the aggregate number of observed inpatient days by primary diagnosis from 1981 to 2016. Effects are re-scaled to reflect changes in standard deviations. Horizontal lines are the associated 95% confidence intervals. All regressions control for ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Multiple hypotheses adjusting q-values are reported in parentheses.

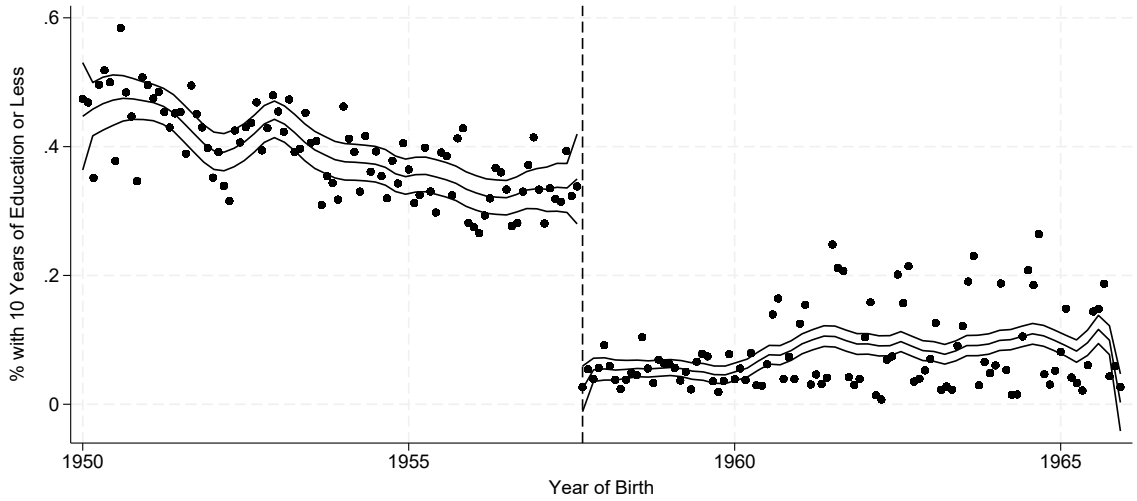
Figure A7: Effects of the 1972 ROSLA Reform on Drug Abuse-Related Hospitalization



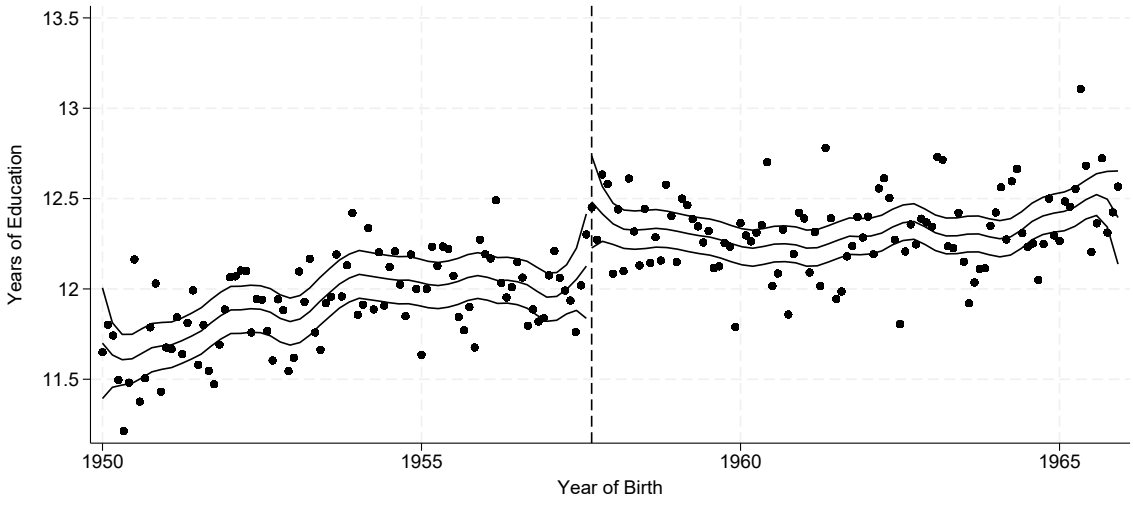
Notes: Figure A7 describes the reduced-form effects of the 1972 ROSLA reform on drug abuse-related hospitalization. Each dot describes average drug-related inpatient episodes in adulthood for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1972 ROSLA reform. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date.

Figure A8: Effects of the 1972 ROSLA Reform on Educational Attainment

(a) ≤10 Years of Education



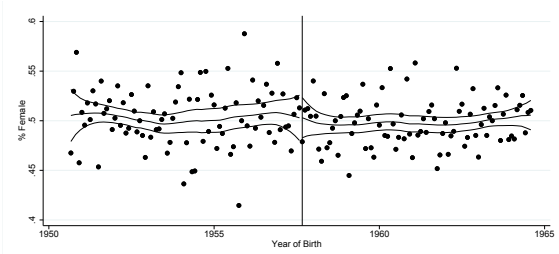
(b) Years of Education



Notes: Figure A8 describes the effects of the 1972 ROSLA reform on educational attainment. Each dot is the average outcome for each month-year birth cohort. Horizontal local polynomial smooth lines (alongside 90% confidence intervals) provide a flexible fit. The vertical line denotes the 1972 ROSLA reform. Panel A describes the effect of the 1972 reform on the proportion of students with no more 10 years of education. Panel B describes the effect of the same reform on years of education. The figure is based on pooled data from the 1995-2016 waves of the Scottish Health Survey (SHeS).

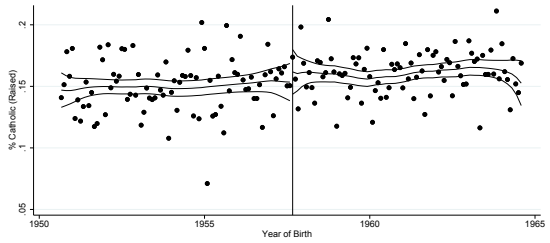
Figure A9: Covariate Balance

(a) Fraction Female

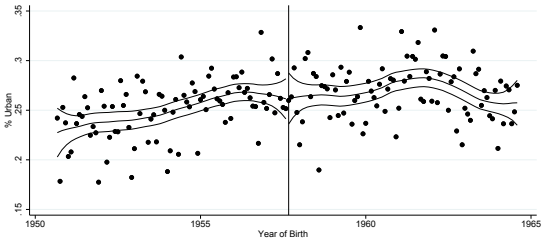


(b) Fraction Raised Church of Scotland

(c) Fraction Catholic



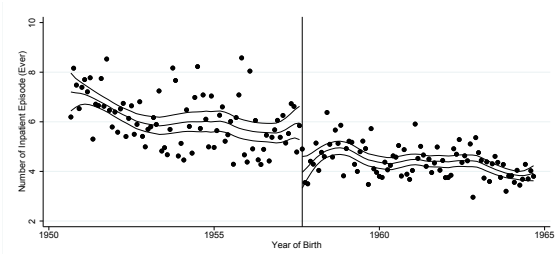
(d) Fraction Urban



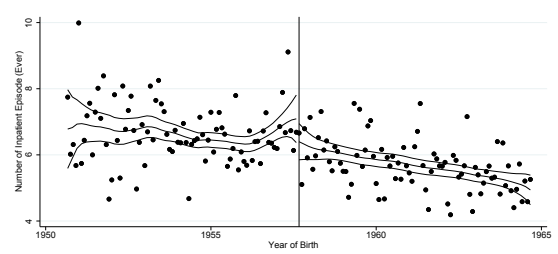
Notes: This Figure provides evidence of covariate balance for tbe 1972 ROSLA reform. Each dot describes the proportion that is female, was raised Protestant in childhood and lives in an urban area, respectively, for each month-year birth cohort. Horizontal local polynomial smooth lines (alongside 90% confidence intervals) provide a flexible fit. The vertical line denotes the 1972 ROSLA reform. The figure is based on data from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date.

Figure A10: Effects of the 1972 ROSLA Reform on Hospitalization

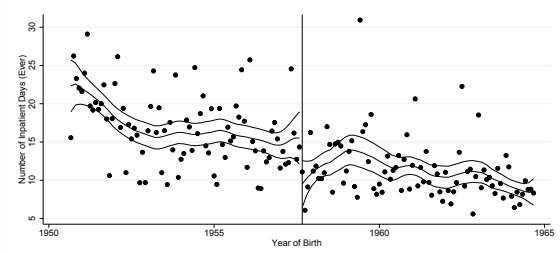
(a) Men: Inpatient Episodes



(b) Women: Inpatient Episodes



(c) Men: Inpatient Days

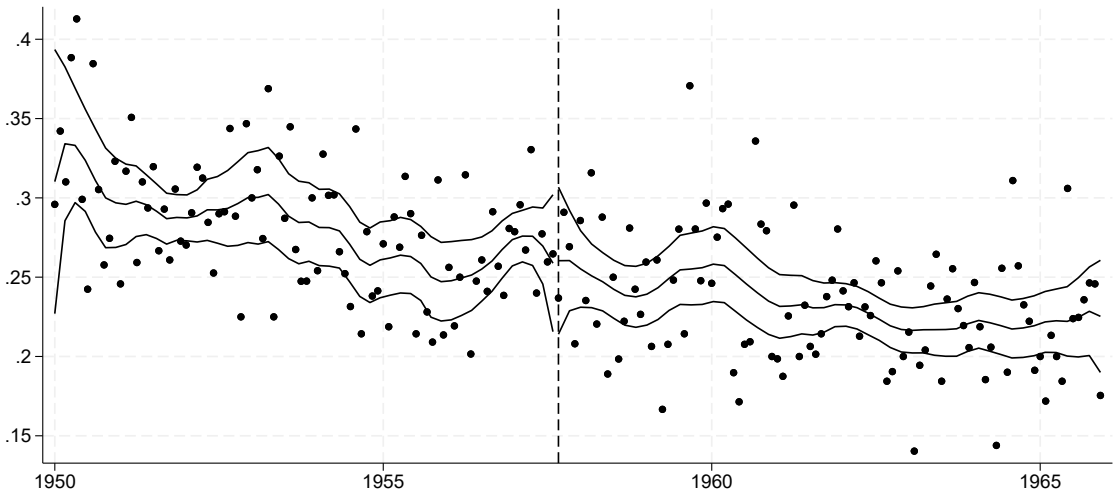


(d) Women: Inpatient Days

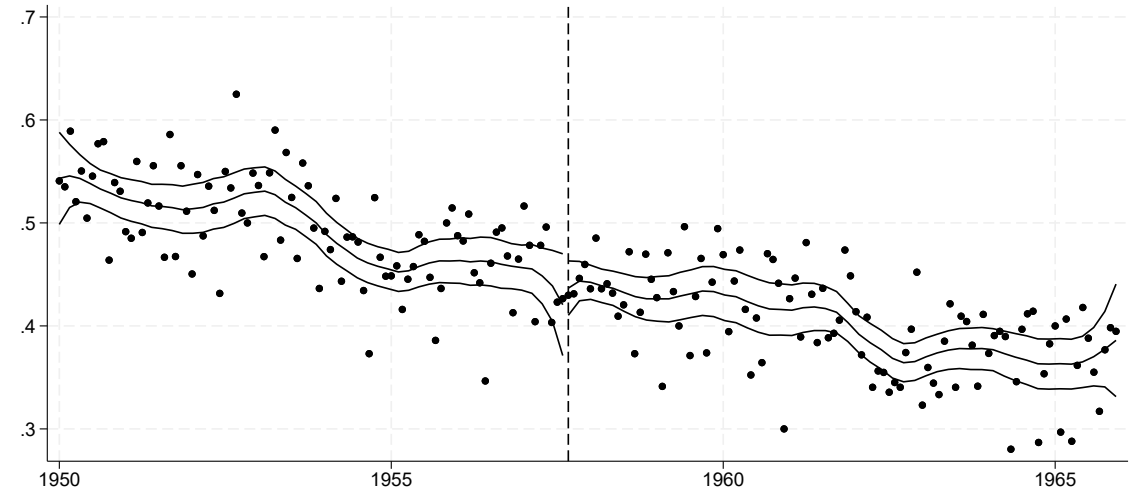
Notes: Figure A10 describes the reduced-form effects of the 1972 ROSLA reform on hospitalization. Each dot describes the average number of hospitalization events in adulthood for each month-year birth cohort. Horizontal local polynomial smooth lines (alongside 90% confidence intervals) provide a flexible fit. The vertical line denotes the 1972 ROSLA reform. Panels (a) and (c) describe the effects of the 1972 reform on inpatient episodes and days for men, respectively. Panels (b) and (d) provide the corresponding figures for women. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period.

Figure A11: Effects of the 1972 ROSLA Reform on Self-Reported Health

(a) 1972 Reform: Poor Health



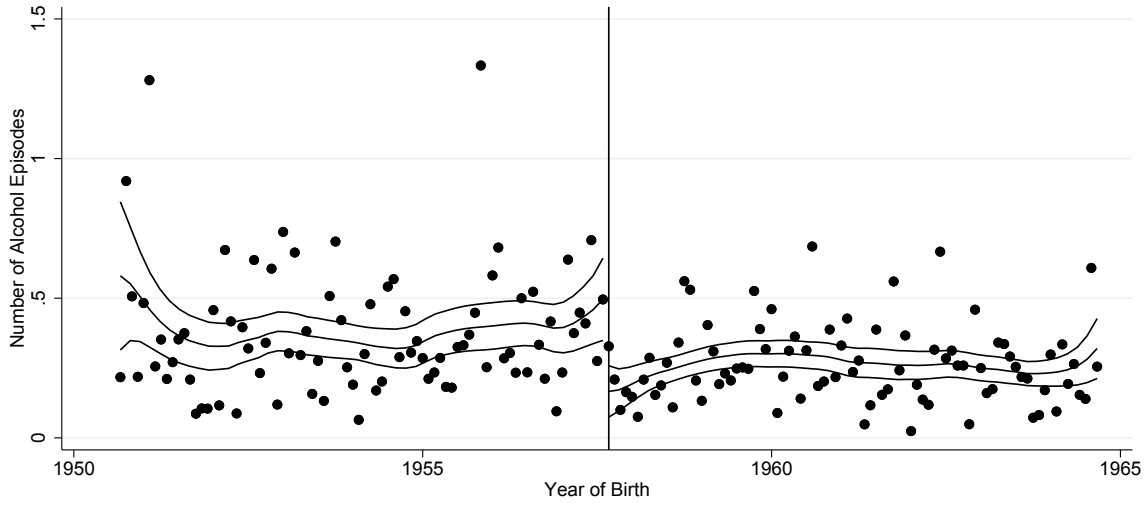
(b) 1972 Reform: Long-Standing Illness



Notes: Figure A11 describes the reduced-form effects of the 1972 ROSLA reform on self-reported health. Each dot is the average outcome for each month-year birth cohort. Horizontal local polynomial smooth lines (alongside 90% confidence intervals) provide a flexible fit. The vertical line denotes the 1972 ROSLA reform. Panel A describes the effect of the 1972 reform on the proportion of survey respondents reporting being in "fair," "bad," or "very bad" health. Panel B describes the effect of the same reform on the proportion of survey respondents who reported having a long-standing illness. The figure is based on pooled data from the 1995-2016 waves of the Scottish Health Survey (SHeS).

Figure A12: Effects of the 1972 ROSLA Reform on Alcohol-Related Hospitalization

(a) Men



(b) Women

Notes: Figure A12 describes the reduced-form effects of the 1972 ROSLA reform on alcohol-related hospitalization. Each dot describes the average number of alcohol-related inpatient episodes in adulthood for each month-year birth cohort. Alcohol-related admissions include episodes characterized as alcohol poisoning, intoxication, harmful use, or dependency/withdrawal. Horizontal local polynomial smooth lines (alongside 90% confidence intervals) provide a flexible fit. The vertical line denotes the 1972 ROSLA reform. Panels (a) and (b) describe the effects of the 1972 reform on alcohol-related inpatient episodes for men and women, respectively. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period.

Appendix B: 1947 ROSLA Reform Results

Table B1: SLS Sample Means: 1947 ROSLA Reform

Panel A: Sample for 1947 ROSLA	Men		Women	
	April 1926 - March 1933	April 1933 - March 1940	April 1926 - March 1933	April 1933 - March 1940
Pre-Defined Characteristics				
% White	0.998	0.997	0.996	0.997
% Non-White	0.002	0.003	0.004	0.003
% Catholic (Raised)	0.089	0.115	0.104	0.131
% Church of Scotland (Raised)	0.450	0.496	0.469	0.502
Education Outcomes				
% No Qualification	0.746	0.663	0.764	0.677
%At Least O-Grades	0.254	0.337	0.236	0.323
% Degree	0.115	0.140	0.104	0.128
Post-Defined Characteristics				
% Unskilled	0.273	0.243	0.350	0.338
% Skilled	0.439	0.443	0.398	0.395
% Professional	0.288	0.315	0.252	0.267
% Ever Married	0.914	0.912	0.912	0.937
Deprivation Index	−0.056	−0.146	−0.027	−0.150
N	9,910	11,240	11,408	11,801

Notes: Table B1 is based on data from the Scottish Longitudinal Study (SLS) and provides means for all observable demographic characteristics among SLS participants born within seven years of the 1947 U.K. ROSLA reform.

Table B2: Effects of the 1947 ROSLA Reform on Education

	Years of Education	≤9 years	≤10 years	≤11 years	≤12 years	≤13 years
	All (N=37,078; bandwidth = 57 months)					
Estimate	0.530	−0.413	−0.073	−0.017	0.013	−0.007
	(0.104)	(0.024)	(0.025)	(0.019)	(0.017)	(0.015)
Outcome Mean	10.17	0.571	0.749	0.838	0.891	0.925
	Men (N=16,500; bandwidth = 49 months)					
Estimate	0.369	−0.407	−0.011	0.031	0.020	0.004
	(0.164)	(0.038)	(0.034)	(0.034)	(0.026)	(0.024)
Outcome Mean	10.34	0.555	0.712	0.806	0.866	0.908
	Women (N=20,578; bandwidth = 57 months)					
Estimate	0.653	−0.412	−0.112	−0.042	−0.036	−0.015
	(0.133)	(0.030)	(0.034)	(0.027)	(0.022)	(0.018)
Outcome Mean	10.05	0.584	0.777	0.863	0.910	0.938

Table B2 reports estimates based on the first-stage equation using local polynomial regression discontinuity estimation. Estimates are provided both using years of education and for five distinct levels of educational attainment. All regressions control for sex (overall estimates), ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from pooled waves of the Scottish Health Survey (SHeS) over the 1995-2016 period. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

Table B3: Effects of the 1947 ROSLA Reform on Inpatient Hospitalization

Panel A: Full Sample

	Men		Women	
	Episodes	Days	Episodes	Days
Mean	11.260	57.324	10.540	58.717
[SD]	[13.110]	[111.737]	[11.998]	[111.845]
Coef	−1.700	−7.020	0.234	4.205
(SE)	(0.908)	(7.349)	(0.702)	(5.346)
N	21,311	21,311	23,407	23,407
Bandwidth	21.29	23.94	29.66	24.50

Panel B: Restricted Sample (Ages 53-77)

	Men		Women	
	Episodes	Days	Episodes	Days
Mean	6.305	21.426	5.305	20.601
[SD]	[8.885]	[56.78]	[7.521]	[53.214]
Coef	−1.104	−3.096	0.040	−1.853
(SE)	(0.768)	(3.899)	(0.513)	(3.771)
N	12,813	12,813	16,796	16,796
Bandwidth	20.30	26.98	30.83	23.15

Table B3 reports reduced-form estimates using local polynomial regression discontinuity estimation, separately for men and women. Our main outcome is the aggregate number of observed hospitalization events from 1981 to 2016–expressed in terms of hospitalization episodes and days. Panel A contains estimates for the full sample while Panel B reports theses estimates for hospitalization experiences between the ages of 53 and 77. All regressions control for ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

Table B4: Effects of the 1947 ROSLA Reform on Cancer Prevalence

Panel A: Full Sample

	Men				Women			
	Any Cancer	Lung Cancer	Skin Cancer	Urin. Cancer	Any Cancer	Lung Cancer	Skin Cancer	Breast Cancer
Mean	0.395	0.067	0.123	0.107	0.333	0.049	0.097	0.069
[SD]	[0.489]	[0.250]	[0.328]	[0.310]	[0.253]	[0.216]	[0.296]	[0.176]
Coef	−0.000	0.019	0.009	−0.047	0.010	0.013	0.007	−0.006
(SE)	(0.029)	(0.019)	(0.019)	(0.022)	(0.027)	(0.013)	(0.018)	(0.014)
N	19,404	19,404	19,404	19,404	21,999	21,999	21,999	21,999
Bandwidth	36.37	23.80	35.83	24.92	36.43	26.80	29.91	24.85

Panel B: Restricted Sample (Ages 53-77)

	Men				Women			
	Any Cancer	Lung Cancer	Skin Cancer	Urin. Cancer	Any Cancer	Lung Cancer	Skin Cancer	Breast Cancer
Mean	0.265	0.005	0.146	0.0862	0.221	0.005	0.106	0.0580
[SD]	[0.441]	[0.067]	[0.354]	[0.281]	[0.415]	[0.074]	[0.308]	[0.234]
Coef	−0.041	−0.007	−0.003	−0.068	0.016	0.005	0.014	0.007
(SE)	(0.049)	(0.009)	(0.034)	(0.033)	(0.034)	(0.003)	(0.029)	(0.022)
N	8,501	8,501	8,501	8,501	11,936	11,936	11,936	11,936
Bandwidth	27.46	31.84	36.00	28.11	33.79	19.63	23.31	23.87

Table B4 reports regression discontinuity estimates using local polynomial regression discontinuity estimation, separately for men and women. Our main outcomes are dichotomous indicators for ever receiving a cancer diagnosis and for specific cancer types. Panel A contains estimates for the full sample while Panel B reports estimates for cancer prevalence between the ages of 53 and 77. All regressions control for ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

Table B5: Education and Self-Reported Health

	Poor Health	Illness	Current Drinker	Current Smoker	Ever Smoked
	All (N=37,071; bandwidth = 51 months)				
Mean	0.422	0.660	0.766	0.179	0.633
[SD]	[0.494]	[0.474]	[0.424]	[0.383]	[0.482]
Reduced Form	0.031	0.010	0.006	-0.005	-0.005
	(0.029)	(0.026)	(0.020)	(0.021)	(0.027)
OLS (years of schooling)	-0.042	-0.018	0.017	-0.032	-0.021
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
OLS (>11 years)	-0.179	-0.087	0.078	-0.130	-0.096
	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)
	Men (N=16,498; bandwidth = 56 months)				
Mean	0.427	0.660	0.840	0.165	0.741
[SD]	[0.495]	[0.474]	[0.367]	[0.372]	[0.439]
Reduced Form	0.042	-0.011	-0.014	-0.001	-0.019
	(0.043)	(0.040)	(0.028)	(0.028)	(0.035)
OLS (years of schooling)	-0.040	-0.018	0.012	-0.030	-0.021
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
OLS (>11 years)	-0.178	-0.090	0.056	-0.125	-0.091
	(0.008)	(0.008)	(0.004)	(0.007)	(0.008)
	Women (N=20,573; bandwidth = 62 months)				
Mean	0.419	0.659	0.709	0.189	0.552
[SD]	[0.494]	[0.474]	[0.455]	[0.392]	[0.498]
Reduced Form	0.021	0.031	0.019	-0.005	0.002
	(0.036)	(0.034)	(0.030)	(0.028)	(0.037)
OLS (years of schooling)	-0.043	-0.018	0.022	-0.034	-0.021
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
OLS (>11 years)	-0.180	-0.085	0.096	-0.134	-0.100
	(0.007)	(0.007)	(0.006)	(0.007)	(0.008)

Table B5 reports OLS and local polynomial regression discontinuity estimates, separately for men and women. OLS describe either the effect of obtaining an additional year of schooling or having more than 11 years of education. Reduced-form estimates reflect the effect of being exposed to the 1972 ROSLA. Our main outcomes are dichotomous indicators for self-reported poor health, longstanding illness, current alcohol consumption, current smoking behavior, and whether the respondent ever smoked. All regressions control for sex (overall estimates), ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from pooled waves of the Scottish Health Survey (SHeS) over the 1995-2016 period. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

Table B6: Effects of the 1947 ROSLA Reform on Hospitalization for Substance Abuse

Panel A: Full Sample

	Alcohol-Related Inpatient Admissions				Drug-Related Inpatient Admissions			
	Men		Women		Men		Women	
	Episodes	Days	Episodes	Days	Episodes	Days	Episodes	Days
Mean	0.283	2.183	0.127	0.968	0.007	0.033	0.008	0.049
(SD)	(1.324)	(15.78)	(0.842)	(8.788)	(0.113)	(0.980)	(0.134)	(1.224)
Coef	0.028	−0.742	0.109	0.829	0.005	0.044	0.014	0.041
(SE)	(0.084)	(0.934)	(0.046)	(0.366)	(0.005)	(0.038)	(0.010)	(0.028)
N	21,311	21,311	23,407	23,407	21,311	21,311	23,407	23,407
Bandwidth	25.07	37.73	14.25	17.67	16.77	17.94	20.55	16.29

Panel B: Restricted Sample (Ages 53-77)

	Alcohol-Related Inpatient Admissions				Drug-Related Inpatient Admissions			
	Men		Women		Men		Women	
	Episodes	Days	Episodes	Days	Episodes	Days	Episodes	Days
Mean	0.113	0.713	0.051	0.427	0.005	0.022	0.004	0.023
(SD)	(0.786)	(9.258)	(0.616)	(7.102)	(0.088)	0.(780)	(0.091)	(0.750)
Coef	−0.008	−0.030	0.017	−0.147	0.007	0.092	0.001	−0.011
(SE)	(0.046)	(0.447)	(0.030)	(0.228)	(0.004)	(0.060)	(0.005)	(0.022)
N	12,717	12,717	16,651	16,651	12,717	12,717	16,651	16,651
Bandwidth	27.30	18.18	18.18	30.77	21.90	31.38	42.59	30.05

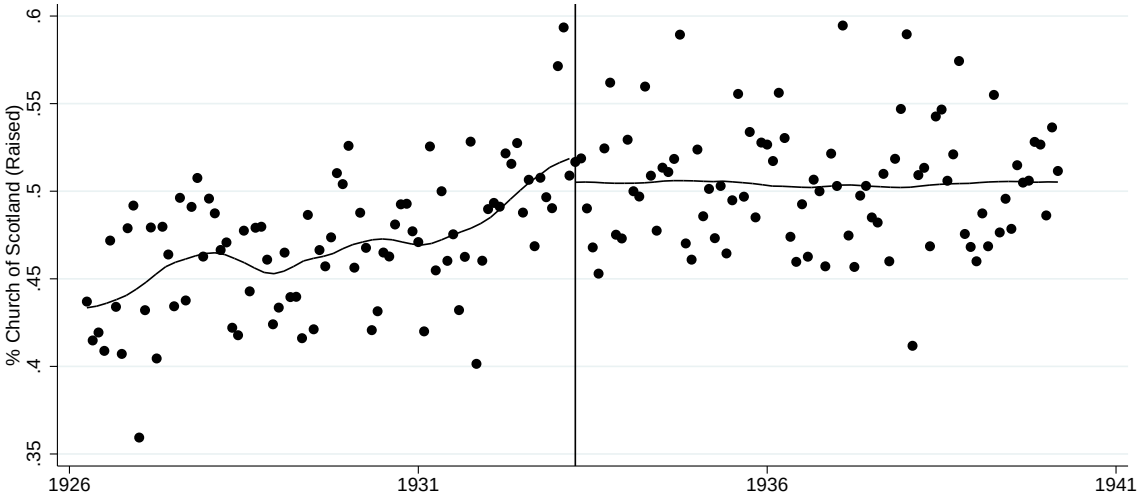
Table B6 reports reduced-form estimates using local polynomial regression discontinuity estimation, separately for men and women. Our main outcome is the aggregate number of observed alcohol- and drug-related hospitalization events from 1981 to 2016–expressed in terms of hospitalization episodes and days. Panel A contains estimates for the full sample while Panel B reports theses estimates for hospitalization experiences between the ages of 53 and 77. All regressions control for ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

Table B7: Effects of the 1947 ROSLA Reform on Emigration

	Men	Women
Mean	0.022	0.019
[SD]	[0.146]	[0.138]
Coef	0.009	0.007
(SE)	(0.005)	(0.005)
N	21,484	23,492
Bandwidth	11.18	21.38

Table B7 reports reduced-form estimates using local polynomial regression discontinuity estimation, separately for men and women. Our main outcome is observed emigration. All regressions control for ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses.

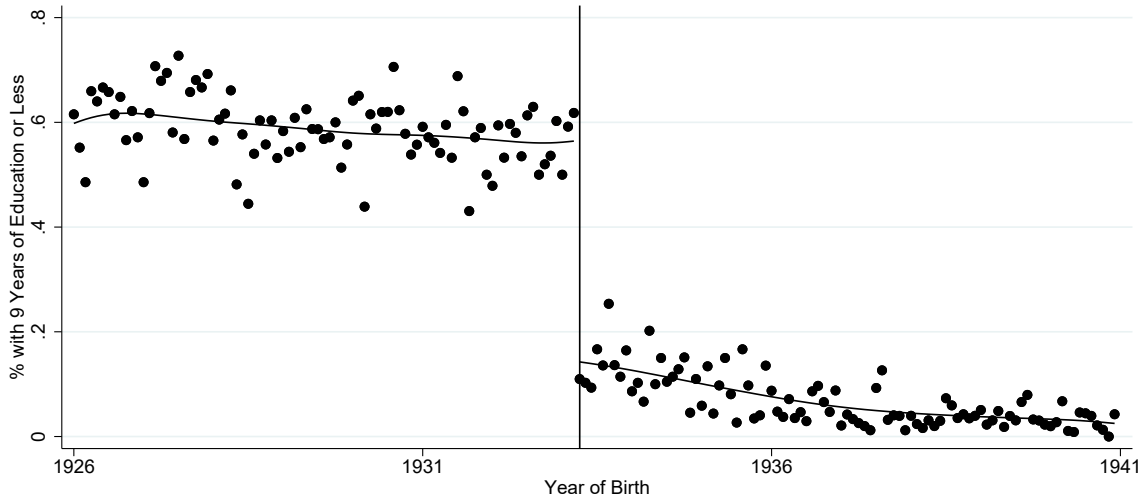
Figure B1: Balanced Covariates: Fraction Church of Scotland



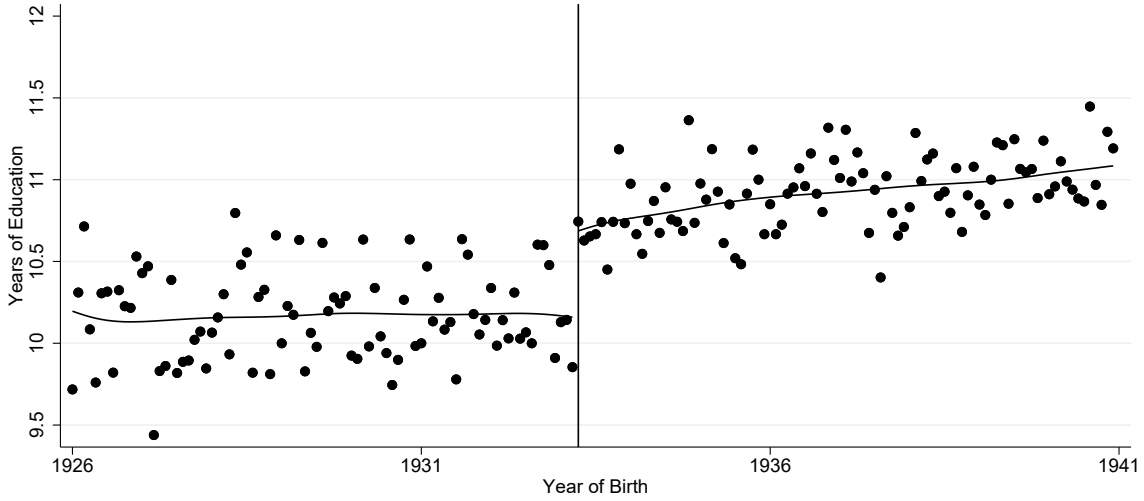
Notes: Figure B1 provides evidence of covariate balance for tbe 1947 ROSLA reform. Each dot describes the proportion raised Protestant in childhood for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. The figure is based on data from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date.

Figure B2: Effects of the 1947 ROSLA Reform on Educational Attainment

(a) ≤9 Years of Education



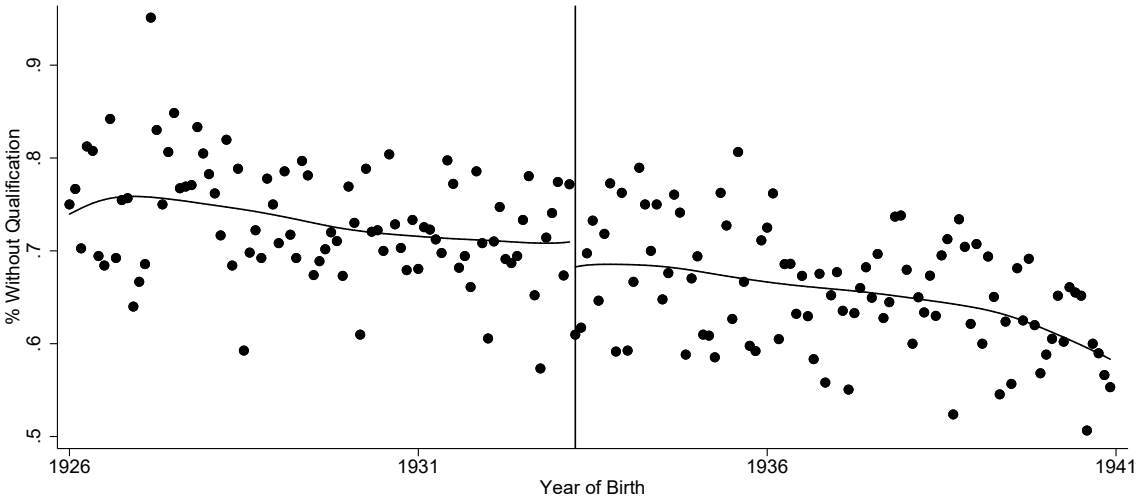
(b) Years of Education



Notes: Figure B2 describes the effects of the 1947 ROSLA reform on educational attainment. Each dot is the average outcome for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. Panel A describes the effect of the 1947 reform on the proportion of students with no more 9 years of education. Panel B describes the effect of the same reform on years of education. The figure is based on pooled data from the 1995-2016 waves of the Scottish Health Survey (SHeS).

Figure B3: Comparison of Educational Measures in the SHeS and SLS Data

(a) SHeS: % No Qualification

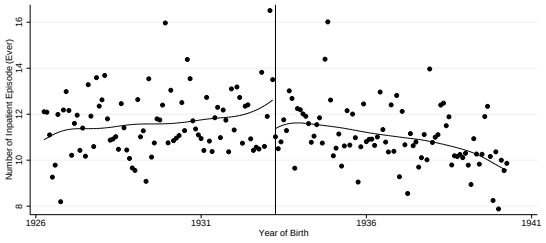


(b) SLS: % No Qualification

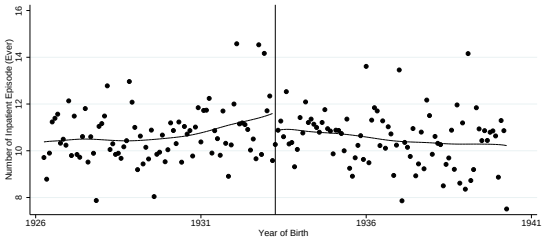
Notes: Figure B3 compares educational measures across the two main data sources used within this paper. Each dot describes the proportion without formal qualification ($\approx$ high school dropouts) for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. Panel (a) shows results using information from pooled waves of the Scottish Health Survey (SHeS) over the 1995-2016 period. Panel (b) shows similar results using the most recent information for each respondent within the Scottish Longitudinal Study (SLS).

Figure B4: Effects of the 1947 ROSLA Reform on Hospitalization

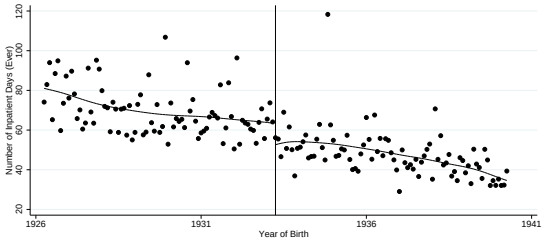
(a) Men: Inpatient Episodes



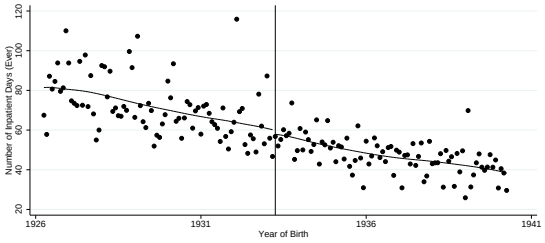
(b) Women: Inpatient Episodes



(c) Men: Inpatient Days



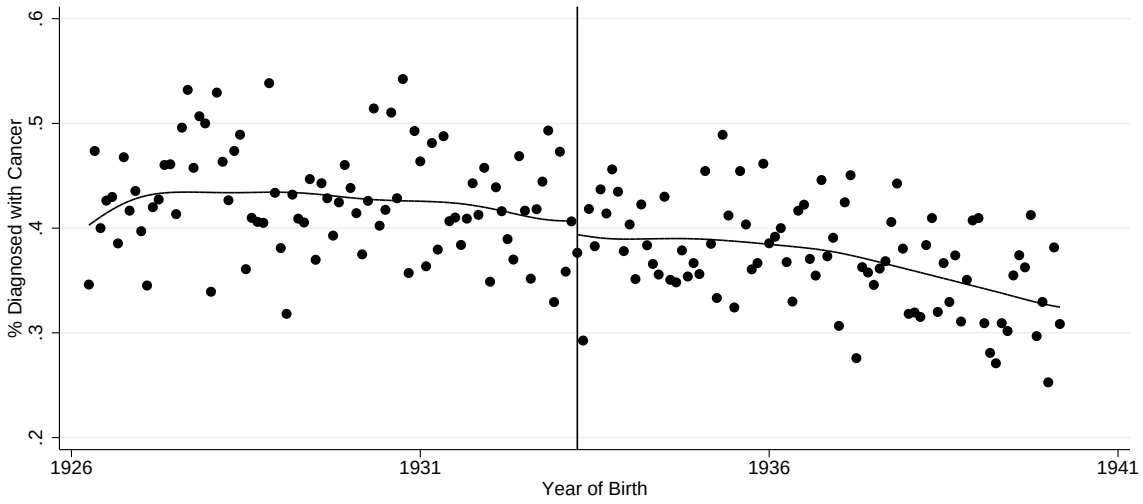
(d) Women: Inpatient Days



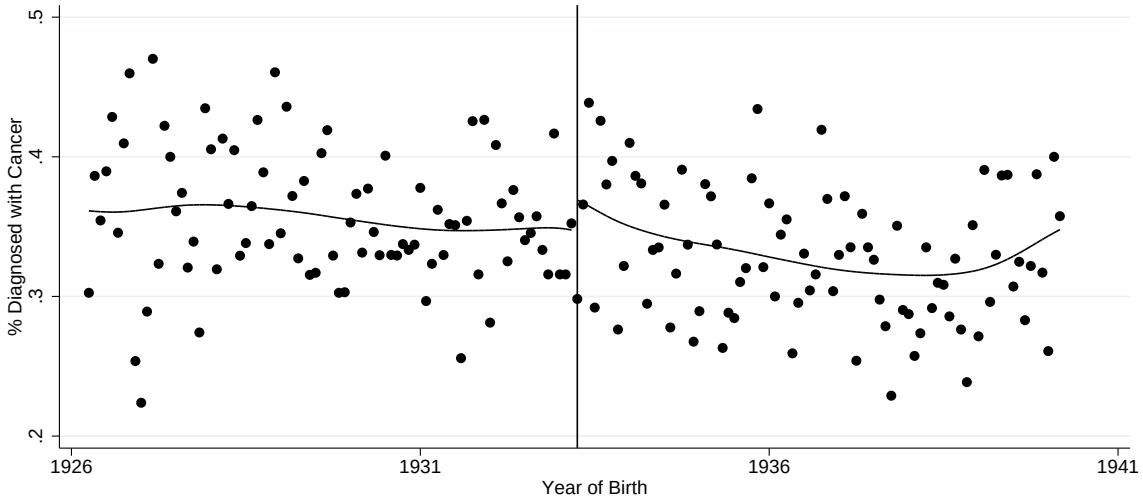
Notes: Figure B4 describes the reduced-form effects of the 1947 ROSLA reform on hospitalization. Each dot describes average hospitalization events in adulthood for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. Panels (a) and (c) describe the effects of the 1947 reform on inpatient episodes and days for men, respectively. Panels (b) and (d) provide the corresponding figures for women. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period.

Figure B5: Effects of the 1947 ROSLA Reform on Cancer Prevalence

(a) Men: Any Cancer Diagnosis



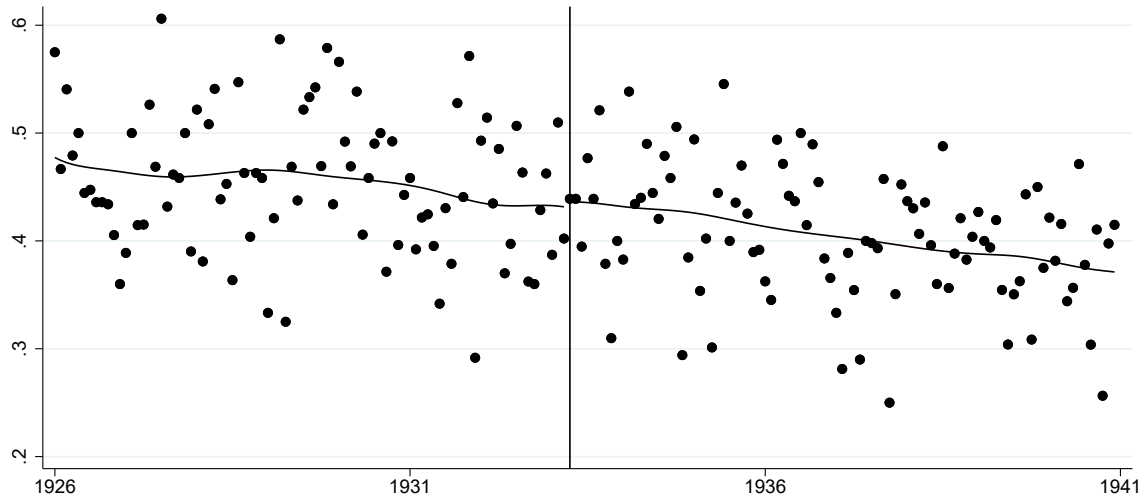
(b) Women: Any Cancer Diagnosis



Notes: Figure B5 describes the reduced-form effects of the 1947 ROSLA reform on cancer diagnoses. Each dot describes the proportion diagnosed with any cancer in adulthood for each month-year birth cohort. Since cancer diagnoses are rare within these groups, we instead show quarterly aggregates for later cohorts for confidentiality reasons. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. Panels (a) and (b) describe the effects of the 1947 reform on alcohol-related inpatient episodes for men and women, respectively. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period.

Figure B6: Effects of the 1947 ROSLA Reform on Self-Reported Health

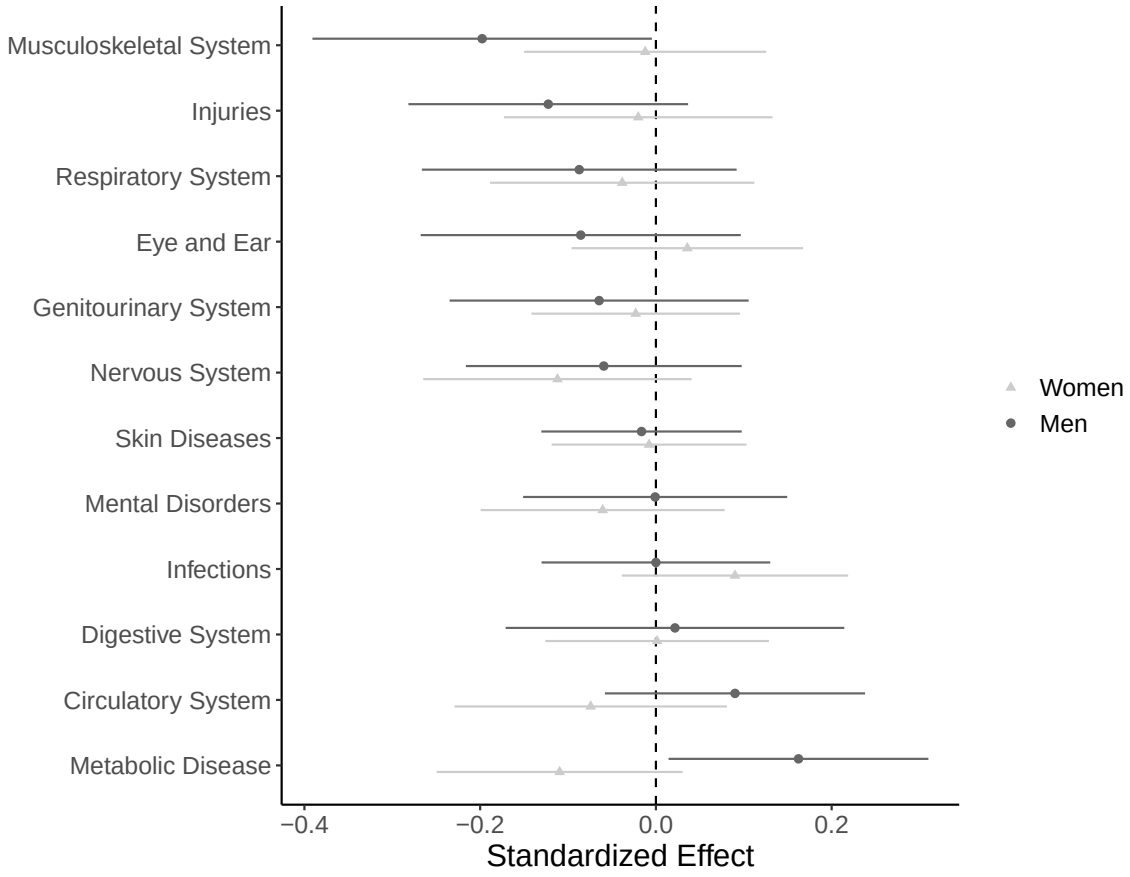
(a) 1947 Reform: Poor Health



(b) 1947 Reform: Long-Standing Illness

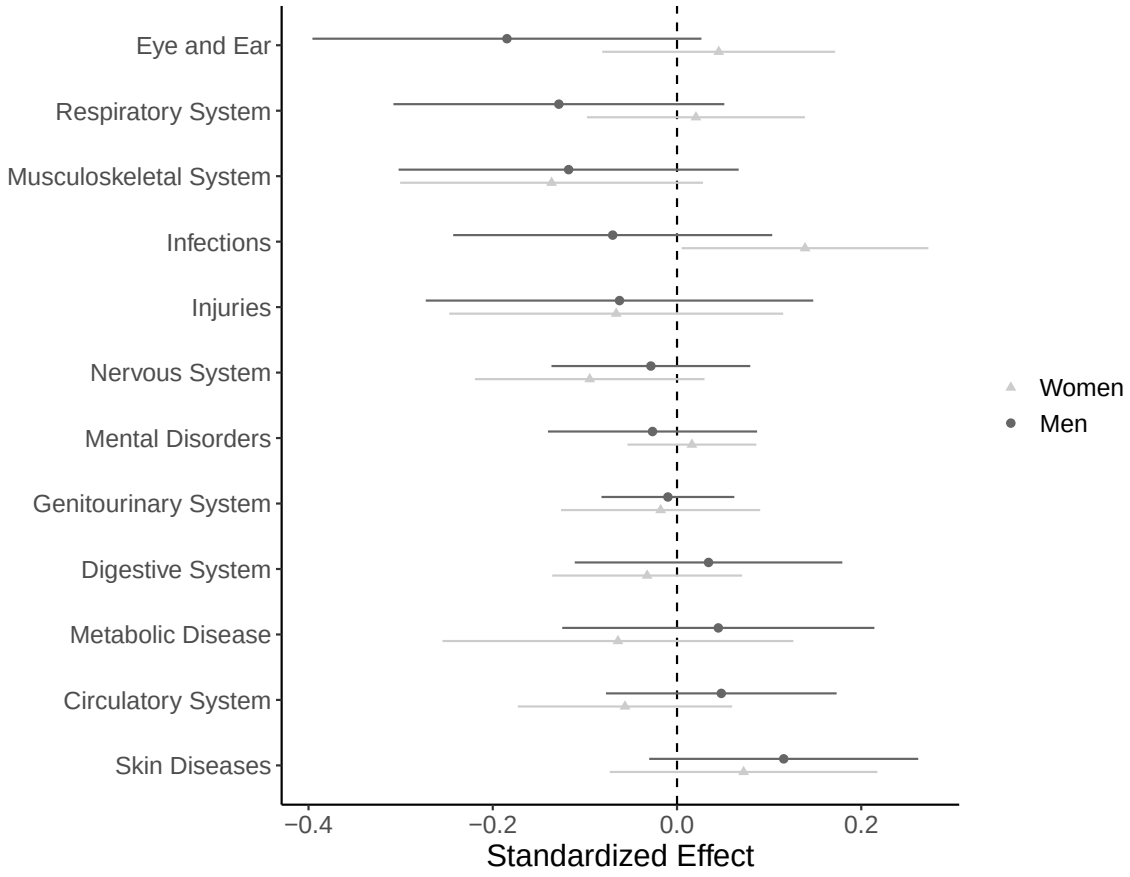
Notes: Figure B6 describes the reduced-form effects of the 1947 ROSLA reform on self-reported health. Each dot is the average outcome for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. Panel A describes the effect of the 1947 reform on the proportion of survey respondents reporting being in "fair," "bad," or "very bad" health. Panel B describes the effect of the same reform on the proportion of survey respondents who reported having a long-standing illness. The figure is based on pooled data from the 1995-2016 waves of the Scottish Health Survey (SHeS).

Figure B7: Effects of the 1947 ROSLA Reform on Hospitalization (Episodes) by Diagnosis



Notes: Figure B7 shows a series of reduced-form estimates using local polynomial regression discontinuity estimation, separately for men (blue circles) and women (red triangles). Our main outcome is the aggregate number of observed inpatient episodes by primary diagnosis from 1981 to 2016. Effects are re-scaled to reflect changes in standard deviations. Horizontal lines are the associated 95% confidence intervals. All regressions control for ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses and clustered by birth month-year.

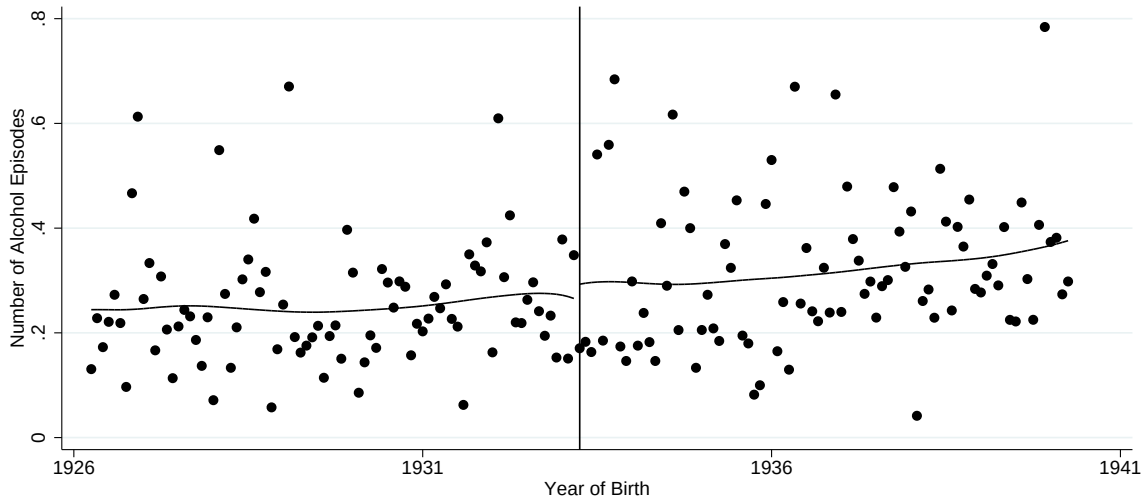
Figure B8: Effects of the 1947 ROSLA Reform on Hospitalization (Days) by Diagnosis



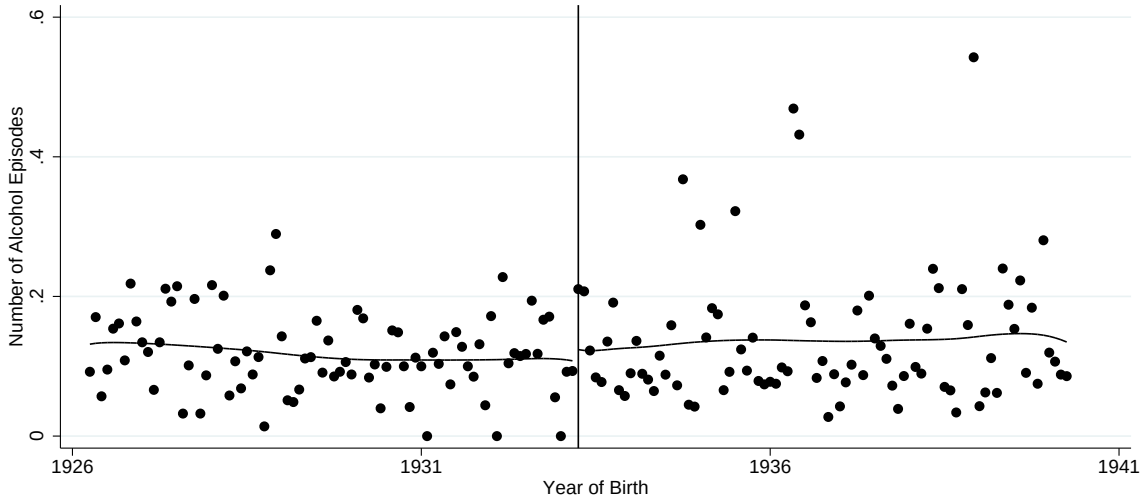
Notes: Figure B8 shows a series of reduced-form estimates using local polynomial regression discontinuity estimation, separately for men (blue circles) and women (red triangles). Our main outcome is the aggregate number of observed inpatient days by primary diagnosis from 1981 to 2016. Effects are re-scaled to reflect changes in standard deviations. Horizontal lines are the associated 95% confidence intervals. All regressions control for ethnicity, childhood religion, and are centered around the reform cutoff date. We also flexibly control for birth month-year. All data come from the Scottish Longitudinal Study (SLS) and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date. Heteroskedasticity-robust standard errors, obtained via nearest-neighbor variance estimation, are reported in parentheses and clustered by birth month-year.

Figure B9: Effects of the 1947 ROSLA Reform on Alcohol-Related Hospitalization

(a) Men

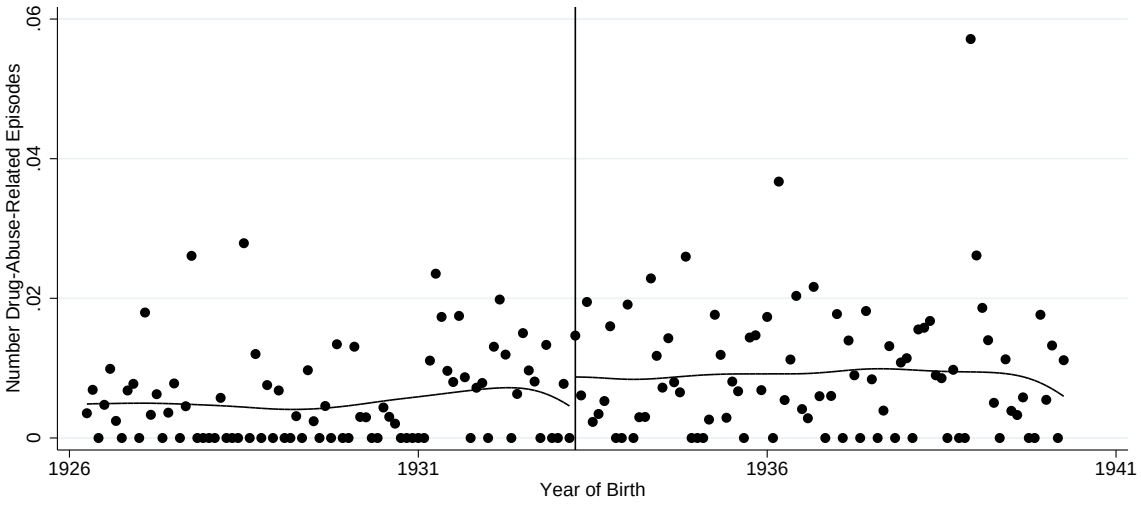


(b) Women



Notes: Figure B9 describes the reduced-form effects of the 1947 ROSLA reform on alcohol-related hospitalization. Each dot describes average alcohol-related inpatient episodes in adulthood for each month-year birth cohort. Alcohol-related admissions include episodes characterized as alcohol poisoning, intoxication, harmful use, or dependency/withdrawal. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. Panels (a) and (b) describe the effects of the 1947 reform on alcohol-related inpatient episodes for men and women, respectively. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period.

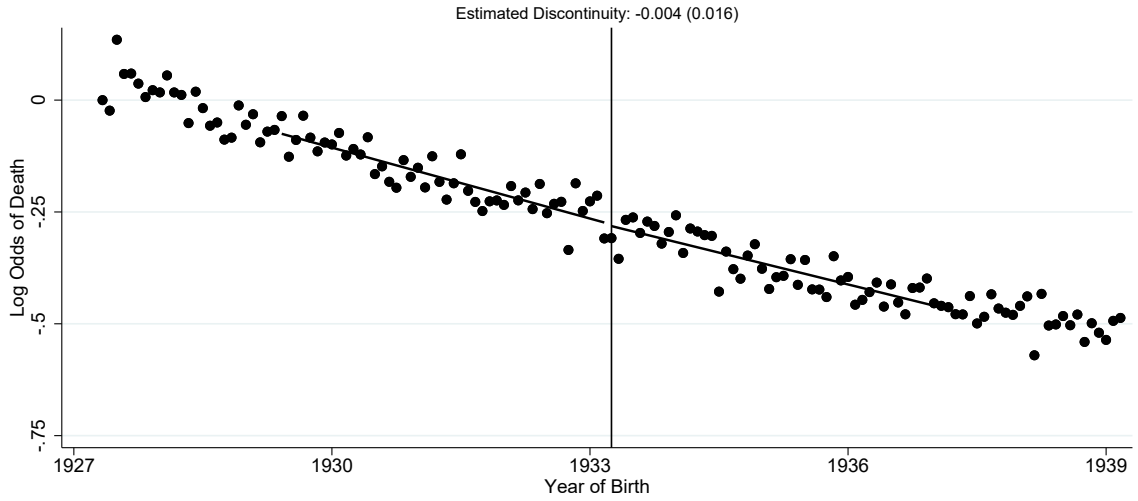
Figure B10: Effects of the 1947 ROSLA Reform on Drug Abuse-Related Hospitalization



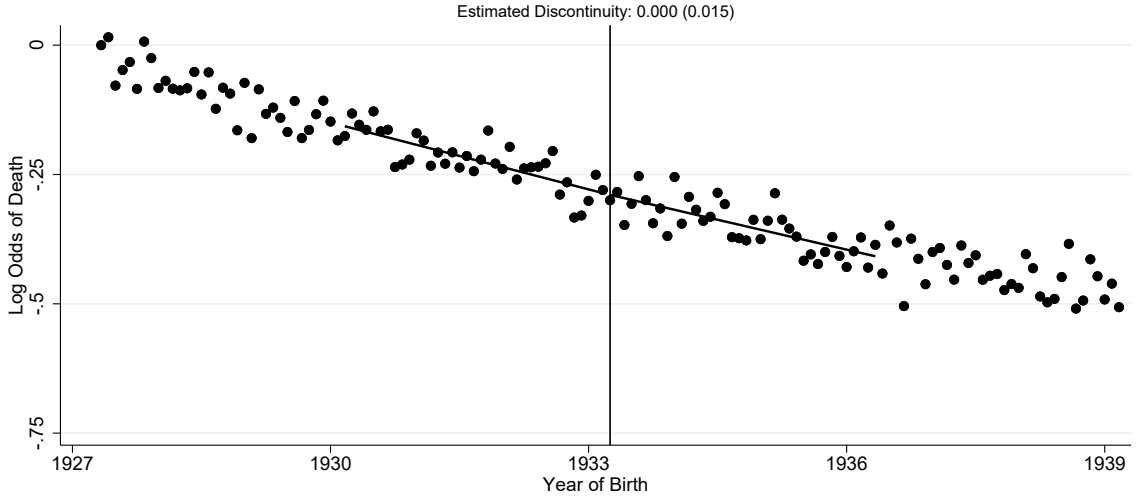
Notes: Figure B10 describes the reduced-form effects of the 1947 ROSLA reform on drug abuse-related hospitalization. Each dot describes average drug-related inpatient episodes in adulthood for each month-year birth cohort. Horizontal lowess lines provide a flexible fit with the vertical line denoting the 1947 ROSLA reform. The figure is based on data from the Scottish Longitudinal Study (SLS) over the 1981-2016 period and we further restrict this sample to individuals born within seven years of the ROSLA cutoff date..

Figure B11: Effects of the 1947 ROSLA Reform on Mortality

(a) Men



(b) Women



Notes: Figure B11 describes the relationship between the 1947 ROSLA reform and mortality. Each dot describes log odds death ratio for each month-year birth cohort. Estimation is given by the two-step procedure outlined in equations (2)–(3) in Section 5.3 of the main paper. The first step involves as panel logit regression of mortality on birth month-year fixed effects. Fitted values for these fixed effects then serve as the outcome variable in a local linear regression that we use to estimate the discontinuity at the reform cutoff. Panels (a) and (b) show results based on this procedure for men and women, respectively. All estimates should be interpreted relative to the September 1950 birth cohort. The vertical line denotes the 1947 ROSLA reform. This figure is based on data from the Scottish Census and Death Registry.

Appendix C: Hospitalization Diagnosis Categories

Appendix C provides detailed definitions for each major category and subcategory associated with hospital admissions in the Scottish Longitudinal Study (SLS). Each category is based on the 2016 *International Classification of Diseases and Related Health Problems: 10th Revision, 5th Edition.* These categories appear in the following Main Paper Figure 7, Figure A6, Figure B7, and Figure B8. Major categories are given with corresponding ICD-10 codes in parentheses:

Infectious and Parasitic Diseases (A00-B99)

"Infections" include: Intestinal infectious diseases (A00-A09); Tuberculosis (A15-A19); Certain zoonotic bacterial diseases (A20-A28); Other bacterial diseases (A30-A49); Infections with a predominantly sexual mode of transmission (A50-A64); Other spirochetal diseases (A65-A69) Other diseases caused by chlamydiae (A70-A74); Rickettsioses (A75-A79); Viral and prion infections of the central nervous system (A80-A89); Arthropod-borne viral fevers and viral hemorrhagic fevers (A90-A99);Viral infections characterized by skin and mucous membrane lesions (B00-B09); Other human herpesviruses (B10); Viral hepatitis (B15-B19); Human immunodeficiency virus [HIV] disease (B20-B20); Other viral diseases (B25-B34); Mycoses (B35-B49); Protozoal diseases (B50-B64); Helminthiases (B65-B83); Pediculosis, acariasis and other infestations (B85-B89); Sequelae of infectious and parasitic diseases (B90-B94); Bacterial and viral infectious agents (B95-B97); Other infectious diseases (B99).

Endocrine, Nutritional, and Metabolic Diseases (E00-E89)

"Metabolic Disease" include: Disorders of thyroid gland (E00-E07); Diabetes mellitus (E08-E13); Other disorders of glucose regulation and pancreatic internal secretions (E15-E16); Disorders of other endocrine gland (E20-E35); Intraoperative complications of endocrine system (E36); Malnutrition (E40-E46); Other nutritional deficiencies (E50-E64); Overweight, obesity and other hyperalimentation (E65-E68); Metabolic disorders (E70-E88); Other post-procedural endocrine and metabolic complications and disorders (E89).

Mental, Behavioral, and Neurodevelopmental Disorders (F01-F99)

"Mental Disorders" include: Mental disorders due to known physiological conditions (F01-F09); Mental and behavioral disorders due to psychoactive substance use (F10-F19); Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders (F20-F29); Mood [affective] disorders (F30-F39); Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders (F40-F48); Behavioral syndromes associated with physiological disturbances and physical factors (F50-F59); Disorders of adult personality and behavior (F60-F69); Intellectual Disabilities (F70-F79); Pervasive and specific developmental disorders (F80-F89); Behavioral and emotional disorders with onset usually occurring in childhood and adolescence (F90-F98); Unspecified mental disorder (F99-F99).

Diseases of the Nervous System (G00-G99)

"Nervous System" include: Inflammatory diseases of the central nervous system (G00-G09); Systemic atrophies primarily affecting the central nervous system (G10-G14); Extrapyramidal and movement disorders (G20-G26); Other degenerative diseases of the nervous system (G30-G32); Demyelinating diseases of the central nervous system (G35-G37); Episodic and paroxysmal disorders (G40-G47); Nerve, nerve root and plexus disorders (G50-G59); Polyneuropathies and other disorders of the peripheral nervous system (G60-G65); Diseases of myoneural junction and muscle (G70-G73); Cerebral palsy and other paralytic syndromes (G80-G83); Other disorders of the nervous system (G89-G99).

Diseases of the Eye, Adnexa, Ear, and Mastoid Process (H00-H95)

"Eye and Ear" include: Disorders of eyelid, lacrimal system and orbit (H00-H05); Disorders of conjunctiva (H10-H11); Disorders of sclera, cornea, iris and ciliary body (H15-H22); Disorders of lens (H25-H28); Disorders of choroid and retina (H30-H36); Glaucoma (H40-H42); Disorders of vitreous body and globe (H43-H44); Disorders of optic nerve and visual pathways (H46-H47); Disorders of ocular muscles, binocular movement, accommodation and refraction (H49-H52); Visual disturbances and blindness (H53-H54); Other disorders of eye and adnexa (H55-H57); Intraoperative and postprocedural complications and other disorders of eye and adnexa (H59); Diseases of external ear (H60-H62); Diseases of middle ear

and mastoid (H65-H75); Diseases of inner ear (H80-H83); Other disorders of ear (H90-H94); Other intraoperative and postprocedural complications and disorders of ear and mastoid process (H95).

Diseases of the Circulatory System (I00-I99)

"Circulatory System" include: Heart Disease: Acute rheumatic fever (I00-I02); Chronic rheumatic heart diseases (I05-I09); Hypertensive diseases (I10-I16);Ischemic heart diseases (I20-I25); Pulmonary heart disease and diseases of pulmonary circulation (I26-I28); Other forms of heart disease (I30-I52); Cerebrovascular diseases (I60-I69); Diseases of arteries, arterioles and capillaries (I70-I79); Diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified (I80-I89); Other and unspecified disorders of the circulatory system (I95-I99).[1]

Diseases of the Respiratory System (J00-J99)

"Respiratory System" include: Acute upper respiratory infections (J00-J06); Influenza and pneumonia (J09-J18); Other acute lower respiratory infections (J20-J22); Other diseases of upper respiratory tract (J30-J39); Chronic lower respiratory diseases (J40-J47); Lung diseases due to external agents (J60-J70); Other respiratory diseases principally affecting the interstitium (J80-J84); Suppurative and necrotic conditions of the lower respiratory tract (J85-J86); Other diseases of the pleura (J90-J94); Intraoperative and postprocedural complications and disorders of respiratory system, not elsewhere classified (J95); Other diseases of the respiratory system (J96-J99).

Diseases of the Digestive System (K00-K95)

"Digestive System" include: Diseases of oral cavity and salivary glands (K00-K14); Diseases of esophagus, stomach and duodenum (K20-K3); Diseases of appendix (K35-K38); Hernia (K40-K46); Noninfective enteritis and colitis (K50-K52); Other diseases of intestines (K55-K64); Diseases of peritoneum and retroperitoneum (K65-K68); Diseases of liver (K70-K77);

[1]We also focus on "Heart Disease" which includes (ICD-10 codes defined as before): acute rheumatic fever, chronic rheumatic heart diseases, hypertensive diseases, ischemic heart diseases, pulmonary heart disease and diseases of pulmonary circulation, and other forms of heart disease.

Disorders of gallbladder, biliary tract and pancreas (K80-K87); Other diseases of the digestive system (K90-K95).

Diseases of the Skin and Subcutaneous Tissue (L00-L99)

"Skin Diseases" include: Infections of the skin and subcutaneous tissue (L00-L08); Bullous disorders (L10-L14); Dermatitis and eczema (L20-L30); Papulosquamous disorders (L40-L45); Urticaria and erythema (L49-L54); Radiation-related disorders of the skin and subcutaneous tissue (L55-L59); Disorders of skin appendages (L60-L75); Intraoperative and postprocedural complications of skin and subcutaneous tissue (L76); Other disorders of the skin and subcutaneous tissue (L80-L99).

Diseases of the Musculoskeletal System and Connective Tissue (M00-M99)

"Musculoskeletal System" include: Arthropathies (M00-M25); Dentofacial anomalies [including malocclusion] and other disorders of jaw (M26-M27); Systemic connective tissue disorders (M30-M36); Dorsopathies (M40-M54); Soft tissue disorders (M60-M79); Osteopathies and chondropathie (M80-M94); ther disorders of the musculoskeletal system and connective tissue (M95); Other intraoperative and postprocedural complications and disorders of musculoskeletal system (M96); Periprosthetic fracture around internal prosthetic joint (M97); Biomechanical lesions, not elsewhere classified (M99).

Diseases of the Genitourinary System (N00-N99)

"Genitourinary System" include: Glomerular diseases (N00-N08); Renal tubulo-interstitial diseases (N10-N16); Acute kidney failure and chronic kidney disease (N17-N19); Other disorders of kidney and ureter (N20-N23); Urolithiasis (N25-N29); Other diseases of the urinary system (N30-N39); Diseases of male genital organs (N40-N53); Disorders of breast (N60-N65); Inflammatory diseases of female pelvic organs (N70-N77); Noninflammatory disorders of female genital tract (N80-N98); Other intraoperative and postprocedural complications and disorders of genitourinary system (N99)

Injury, Poisoning, and Other Consequences of External Causes (S00-T88)

"Injuries" include: Injuries to the head (S00-S09); Injuries to the neck (S10-S19); Injuries to the thorax (S20-S29); Injuries to the abdomen, lower back, lumbar spine, pelvis and external genitals (S30-S39); Injuries to the shoulder and upper arm (S40-S49); Injuries to the elbow and forearm (S50-S59); Injuries to the wrist, hand and fingers (S60-S69); Injuries to the hip and thigh (S70-S79); Injuries to the knee and lower leg (S80-S89); Injuries to the ankle and foot (S90-S99); Injury, poisoning and certain other consequences of external causes (T07-T88).