

Supplementary materials

Table S1. Data sources

Country	Design	Inclusion	Age-range	Periods covered								Person-years	Deaths	
England&Wales	Longitudinal census-linked	1% sample	35-79	1971-76	1976-81	1981-86	1986-91	1991-96	1996-01	2001-06	2006-09		9263404	121256
Finland	Longitudinal census-linked	All	35-79	1970-75	1975-80	1980-85	1985-90	1990-95	1995-00	2000-05	2005-10		94128652	1126865
France	Longitudinal census-linked	1% sample	35-79	1970-75	1975-80	1980-82	1982-87	1987-90	1990-95	1995-99	1999-04	2004-07	7423169	72826
Italy (Turin)	Longitudinal census-linked	All (city)	35-79	1971-76	1976-81	1981-86	1986-91	1991-96	1996-01	2001-02	2006-10		18732474	195711
Norway	Longitudinal census-linked	All	40-79	1970-75	1975-80	1980-85	1985-90	1990-95	1995-01	2001-06	2006-09		57717104	821768

Table S2. Results of mortality analysis

a. All-cause mortality and mortality from large cause-of-death groups

Country	Sex	Cause of death	Mortality trend			RR start	RR average	Trend RD	Trend RR	Classification
			Low DI	High Dh	Ratio Dh/DI					
England/W	males	All causes	-0,010	-0,011	1,135	1,32	1,55	-7,42	0,00	la
England/W	females	All causes	-0,007	-0,009	1,211	1,32	1,45	-2,02	0,00	la
Finland	males	All causes	-0,007	-0,012	1,675	1,38	1,66	0,72	0,02	la
Finland	females	All causes	-0,007	-0,010	1,551	1,36	1,50	0,18	0,01	la
France	males	All causes	-0,005	-0,009	1,619	1,82	1,92	-2,54	0,01	la
France	females	All causes	-0,005	-0,010	1,822	1,40	1,39	1,89	0,01	la
Italy (Turin)	males	All causes	-0,010	-0,013	1,330	1,31	1,47	-2,21	0,01	la
Italy (Turin)	females	All causes	-0,010	-0,009	0,882	1,43	1,29	-4,91	0,00	lc
Norway	males	All causes	-0,004	-0,010	2,324	1,37	1,74	5,94	0,02	la
Norway	females	All causes	-0,003	-0,008	2,757	1,45	1,67	3,65	0,02	la
England/W	males	CVD	-0,016	-0,019	1,221	1,15	1,49	-2,78	0,01	la
England/W	females	CVD	-0,015	-0,016	1,071	1,76	1,65	-3,82	0,00	la
Finland	males	CVD	-0,013	-0,019	1,488	1,29	1,65	-1,43	0,02	la
Finland	females	CVD	-0,016	-0,021	1,309	1,57	1,69	-3,38	0,00	la
France	males	CVD	-0,012	-0,019	1,573	1,56	1,80	-0,72	0,03	la
France	females	CVD	-0,014	-0,023	1,566	2,06	2,09	-1,07	0,04	la
Italy (Turin)	males	CVD	-0,016	-0,019	1,175	1,28	1,33	-1,72	0,01	la
Italy (Turin)	females	CVD	-0,018	-0,015	0,798	1,81	1,54	-4,12	-0,01	lc
Norway	males	CVD	-0,012	-0,020	1,691	1,33	1,87	-0,39	0,03	la
Norway	females	CVD	-0,013	-0,019	1,466	1,75	2,15	-2,55	0,03	la
England/W	males	Cancer	-0,006	-0,005	0,929	1,28	1,49	-1,75	0,00	lc
England/W	females	Cancer	-0,002	-0,006	2,521	0,89	1,27	1,85	0,01	lb
Finland	males	Cancer	-0,006	-0,008	1,376	1,30	1,42	-0,18	0,01	la
Finland	females	Cancer	-0,002	-0,005	2,358	1,02	1,19	1,09	0,01	la
France	males	Cancer	-0,001	-0,004	4,517	1,54	1,83	1,49	0,01	la
France	females	Cancer	0,001	-0,003	-3,467	1,17	1,06	1,79	0,01	(la)
Italy (Turin)	males	Cancer	-0,004	-0,007	1,768	1,29	1,54	0,61	0,01	la
Italy (Turin)	females	Cancer	-0,004	-0,006	1,314	1,14	1,10	0,37	0,00	la
Norway	males	Cancer	0,001	-0,003	-4,188	1,23	1,43	3,02	0,01	(la)
Norway	females	Cancer	0,002	-0,003	-1,747	1,13	1,31	2,96	0,01	(la)
England/W	males	Other diseases	-0,006	-0,005	0,760	2,09	1,96	-2,70	-0,01	lc
England/W	females	Other diseases	-0,002	-0,001	0,836	1,50	1,68	-0,27	0,00	lc
Finland	males	Other diseases	0,000	-0,005	15,042	1,64	1,87	1,66	0,02	la
Finland	females	Other diseases	0,001	-0,005	-6,457	1,47	1,65	1,40	0,01	(la)
France	males	Other diseases	-0,006	-0,006	1,092	2,32	2,17	-2,62	0,00	la
France	females	Other diseases	-0,006	-0,015	2,667	1,18	1,81	1,28	0,04	la
Italy (Turin)	males	Other diseases	-0,011	-0,013	1,203	1,47	1,67	-1,78	0,01	la
Italy (Turin)	females	Other diseases	-0,008	-0,005	0,597	1,79	1,59	-1,62	-0,01	lc
Norway	males	Other diseases	0,001	-0,004	-3,387	1,65	2,06	2,82	0,03	(la)
Norway	females	Other diseases	0,004	-0,004	-1,006	1,68	2,04	2,65	0,04	(la)
England/W	males	External causes	-0,006	-0,006	0,962	1,47	1,42	-0,19	0,00	lc
England/W	females	External causes	-0,009	-0,014	1,524	1,04	1,03	0,22	0,01	la
Finland	males	External causes	0,000	-0,004	12,498	1,95	2,09	0,67	0,02	la
Finland	females	External causes	0,004	-0,006	-1,459	1,04	1,51	1,07	0,04	(la)
France	males	External causes	-0,004	-0,002	0,505	3,68	2,69	-0,70	-0,02	lc
France	females	External causes	-0,006	-0,007	1,283	1,54	1,21	-0,10	0,01	la
Italy (Turin)	males	External causes	-0,009	-0,016	1,822	1,01	1,34	0,68	0,02	la
Italy (Turin)	females	External causes	-0,017	-0,022	1,264	0,75	0,88	0,46	0,01	lb
Norway	males	External causes	-0,002	-0,009	3,876	1,67	1,98	0,48	0,03	la
Norway	females	External causes	0,001	-0,008	-6,683	0,78	1,19	0,60	0,03	(lb)

b. Specific causes of death

			Mortality trend									
			Low	High	Ratio							
			DI	Dh	Dh/DI	RR start	RR averag	Trend RD	Trend RR			Classificat
England/W	males	Ischemic heart dis	-0.016	-0.021	1.286	1.04	1.49	-0.79	0.01			la
England/W	females	Ischemic heart dis	-0.015	-0.021	1.360	1.59	1.84	-1.03	0.02			la
Finland	males	Ischemic heart dis	-0.014	-0.021	1.517	1.26	1.69	-0.78	0.03			la
Finland	females	Ischemic heart dis	-0.015	-0.022	1.440	1.60	1.76	-1.40	0.00			la
Italy (Turin)	males	Ischemic heart dis	-0.016	-0.021	1.286	1.16	1.27	0.36	0.01			la
Italy (Turin)	females	Ischemic heart dis	-0.021	-0.016	0.775	1.82	1.66	-1.47	-0.02			lc
Norway	males	Ischemic heart dis	-0.015	-0.024	1.658	1.30	1.97	-0.90	0.04			la
Norway	females	Ischemic heart dis	-0.015	-0.024	1.615	1.87	2.50	-1.44	0.05			la
England/W	males	Cerebrovascular c	-0.017	-0.019	1.131	1.27	1.58	-0.95	0.01			la
England/W	females	Cerebrovascular c	-0.016	-0.011	0.691	2.35	1.50	-1.77	-0.02			lc
Finland	males	Cerebrovascular c	-0.013	-0.019	1.431	1.16	1.51	-0.02	0.02			la
Finland	females	Cerebrovascular c	-0.016	-0.020	1.241	1.42	1.53	-0.77	0.00			la
Italy (Turin)	males	Cerebrovascular c	-0.020	-0.020	1.012	1.45	1.42	-1.36	0.00			la
Italy (Turin)	females	Cerebrovascular c	-0.018	-0.013	0.692	2.04	1.53	-1.50	-0.02			lc
Norway	males	Cerebrovascular c	-0.012	-0.018	1.492	1.43	1.69	-0.32	0.02			la
Norway	females	Cerebrovascular c	-0.016	-0.019	1.202	1.69	1.85	-1.02	0.01			la
England/W	males	Lung cancer	-0.012	-0.018	1.486	1.86	2.69	-1.65	0.04			la
England/W	females	Lung cancer	0.003	-0.003	-0.769	0.98	1.85	0.63	0.02			(Ib)
Finland	males	Lung cancer	-0.010	-0.013	1.286	2.08	2.36	-1.48	0.02			la
Finland	females	Lung cancer	0.012	0.002	0.144	0.88	1.65	0.51	0.05			IIb
Italy (Turin)	males	Lung cancer	-0.001	-0.006	5.135	1.65	2.14	0.48	0.02			la
Italy (Turin)	females	Lung cancer	0.005	0.001	0.271	0.83	0.91	0.17	0.01			IIb
Norway	males	Lung cancer	0.008	-0.002	-0.203	1.40	2.37	2.03	0.05			(Ia)
Norway	females	Lung cancer	0.026	0.012	0.451	1.61	2.23	2.02	0.07			IIa
England/W	females	Breast cancer	-0.006	-0.010	1.683	0.63	0.96	0.73	0.01			Ib
Finland	females	Breast cancer	0.000	-0.005	-17.726	0.59	0.79	0.61	0.01			Ib
Italy (Turin)	females	Breast cancer	-0.005	-0.010	2.136	0.70	0.90	0.82	0.01			Ib
Norway	females	Breast cancer	-0.003	-0.004	1.227	0.88	0.90	0.12	0.00			Ib
England/W	males	Colorectal cancer	-0.007	-0.001	0.148	1.45	1.25	-0.61	-0.02			Ic
England/W	females	Colorectal cancer	-0.009	-0.006	0.715	0.66	1.96	0.20	-0.05			Id
Finland	males	Colorectal cancer	0.001	-0.005	-6.428	0.75	0.95	0.35	0.01			(Ib)
Finland	females	Colorectal cancer	-0.004	-0.006	1.513	0.94	0.98	0.08	0.00			Ib
Italy (Turin)	males	Colorectal cancer	-0.004	-0.007	1.493	1.16	1.11	0.16	0.01			la
Italy (Turin)	females	Colorectal cancer	-0.007	-0.009	1.323	1.04	1.25	0.03	0.01			la
Norway	males	Colorectal cancer	0.002	-0.002	-1.272	0.89	1.06	0.46	0.01			(Ib)
Norway	females	Colorectal cancer	0.001	-0.002	-1.557	1.09	1.24	0.22	0.01			(Ia)

			Mortality trend								
			Low	High	Ratio						
			DI	Dh	Dh/DI		RR start	RR average	Trend RD	Trend RR	Classificat
England/W	males	Stomach cancer	-0.021	-0.019	0.919		1.89	1.93	-0.73	-0.01	Ic
England/W	females	Stomach cancer	-0.020	-0.014	0.663		1.89	1.93	-0.32	-0.03	Ic
Finland	males	Stomach cancer	-0.019	-0.021	1.116		1.57	1.65	-0.50	0.01	Ia
Finland	females	Stomach cancer	-0.019	-0.015	0.799		1.72	1.56	-0.33	0.00	Ic
Italy (Turin)	males	Stomach cancer	-0.015	-0.017	1.122		1.92	2.30	-0.61	0.01	Ia
Italy (Turin)	females	Stomach cancer	-0.013	N/A	N/A		Inf	2.29	-0.39	0.01	N/A
Norway	males	Stomach cancer	-0.016	-0.018	1.116		1.82	1.82	-0.51	0.01	Ia
Norway	females	Stomach cancer	-0.017	-0.017	0.983		1.38	1.34	-0.13	0.00	Ic
England/W	males	Prostate cancer	0.000	-0.004	-28.120		0.46	0.87	0.39	0.01	Ib
Finland	males	Prostate cancer	0.000	-0.005	-14.012		0.80	1.03	0.40	0.01	Ib
Italy (Turin)	males	Prostate cancer	-0.007	-0.011	1.649		0.70	1.07	0.23	0.01	Ib
Norway	males	Prostate cancer	0.000	-0.002	-4.517		1.03	1.02	0.25	0.01	Ia
England/W	males	Alcohol-related	0.023	0.008	0.322		0.38	1.15	0.40	0.04	IIb
England/W	females	Alcohol-related	0.022	N/A	N/A		Inf	1.03	-0.01	0.01	N/A
Finland	males	Alcohol-related	0.017	0.009	0.551		1.96	2.19	2.27	0.04	IIa
Finland	females	Alcohol-related	0.033	0.016	0.469		0.89	1.74	0.99	0.05	IIb
Italy (Turin)	males	Alcohol-related	0.002	N/A	N/A		3.11	2.77	0.01	-0.01	N/A
Italy (Turin)	females	Alcohol-related	0.012	N/A	N/A		Inf	1.33	0.03	0.06	N/A
Norway	males	Alcohol-related	0.009	0.002	0.212		2.34	3.17	0.71	0.05	IIa
Norway	females	Alcohol-related	0.017	0.004	0.238		1.17	2.57	0.29	0.07	IIa
England/W	males	Road traffic acc	-0.018	-0.024	1.303		1.01	2.40	0.01	0.02	Ia
England/W	females	Road traffic acc	-0.017	-0.015	0.908		0.81	0.87	0.08	0.01	Ic
Finland	males	Road traffic acc	-0.013	-0.016	1.180		1.90	1.85	-0.33	0.01	Ia
Finland	females	Road traffic acc	-0.015	-0.020	1.293		0.92	1.35	0.04	0.02	Ib
Italy (Turin)	males	Road traffic acc	-0.016	-0.027	1.720		0.87	1.34	0.36	0.03	Ib
Italy (Turin)	females	Road traffic acc	-0.025	-0.040	1.605		0.52	1.16	0.33	0.04	Ib
Norway	males	Road traffic acc	-0.010	-0.014	1.388		1.76	1.72	-0.09	0.02	Ia
Norway	females	Road traffic acc	-0.009	-0.014	1.600		0.79	0.93	0.06	0.02	Ib
England/W	males	Suicide	-0.005	-0.007	1.442		1.06	1.33	0.04	0.01	Ia
England/W	females	Suicide	-0.016	-0.014	0.919		1.40	0.72	0.07	0.00	Ic
Finland	males	Suicide	-0.003	-0.006	2.226		1.84	1.99	0.04	0.01	Ia
Finland	females	Suicide	0.003	-0.006	-2.416		0.82	1.39	0.30	0.04	(Ib)
Italy (Turin)	males	Suicide	-0.005	-0.011	2.247		0.75	1.23	0.22	0.02	Ib
Italy (Turin)	females	Suicide	-0.014	-0.018	1.217		0.48	0.60	0.23	0.00	Ib
Norway	males	Suicide	0.000	-0.008	23.362		1.21	1.61	0.30	0.03	Ia
Norway	females	Suicide	0.002	-0.008	-4.228		0.55	0.83	0.23	0.02	(Ib)

Notes:

- Mortality trend = slope parameter of linear regression of ASMR on calendar-year.
- $DI = \Delta_l$. $Dh = \Delta_h$.
- RR start = Rate Ratio of mortality at start of observation period (ca. 1970-1974).
- RR average = average Rate Ratio of mortality over the whole observation period (ca. 1970-2010).
- Trend RD = slope parameter of linear regression of RD on calendar-year.
- Trend RR = slope parameter of linear regression of RR on calendar-year.
- Classification is according to table 1. Between brackets: as in situation I.a or I.b, but mortality among the high educated declines, and that among the low educated increases. N/A = not available (mostly because of zero deaths in the highest education group at one or more points in time).

Table S3. Non-monotonic changes in the Rate Difference, as observed in five European countries 1970-2010

<i>Country, cause of death, and sex</i>	<i>Non-monotonic change in Rate Difference</i>	<i>Explanation in arithmetic terms</i>	<i>Comments</i>
Norway, cardiovascular disease, men	Increase until 1993, decrease after 1993	Situation I.a; Δ_h/Δ_l declines; RR increases; so that after 1993, $\Delta_h/\Delta_l < RR$	Mortality decline in low educated speeds up relative to that in high educated; combines with arithmetic turning-point to produce turning-point in RD
Finland, other diseases, men and women	Decline until 1988, increase after 1988	Switch from situation I.c to I.a; Δ_h/Δ_l increases strongly; RR increases; after 1988, $\Delta_h/\Delta_l > RR$	Mortality decline among low educated switches to mortality increase
Norway, other diseases, women	Decline until 1983, increase after 1983	Same as Finland, other diseases, men and women	Same as Finland, other diseases, men and women
Norway, alcohol-related causes, men	Increase until 1998, decrease after 1998	Switch from II.a to I.a; $RR > \Delta_h/\Delta_l$ during situation I.a	Mortality increase among both low and high educated switches to mortality decline
Finland, ischemic heart disease, men	Increase until 1988, decrease after 1988	Situation I.a; Δ_h/Δ_l declines; RR increases; so that after 1988, $\Delta_h/\Delta_l < RR$	Mortality decline in low educated speeds up relative to that in high educated; combines with arithmetic turning-point to produce turning-point in RD
Norway, ischemic heart disease, men	Increase until 1988, decrease after 1988	Same as Finland, ischemic heart disease, men	Same as Finland, ischemic heart disease, men
England/Wales, cerebrovascular disease, men	Increase until 1983, decrease after 1983	Situation I.a; Δ_h/Δ_l declines; RR remains stable; so that after 1983, $\Delta_h/\Delta_l < RR$	Mortality decline in low educated speeds up relative to that in high educated; combines with arithmetic turning-point to produce turning-point in RD
Finland, lung cancer,	Increase until 1983,	Situation I.a;	Mortality decline in low educated speeds up

men	decrease after 1983	Δ_h/Δ_l declines; RR increases; so that after 1983, $\Delta_h/\Delta_l < RR$	relative to that in high educated; combines with arithmetic turning-point to produce turning-point in RD
Norway, lung cancer, men	Decline until 1983, increase after 1983	Switch from situation II.c to II.a; Δ_h/Δ_l declines; RR increases; before 1983, $\Delta_h/\Delta_l > RR$; after 1983, $\Delta_h/\Delta_l < RR$	Mortality increase among high educated slows down much more than that among low educated; combines with arithmetic turning-point to produce turning-point in RD
Norway, road traffic accidents, women	Decline until 1993, increase after 1993	Switch from situation II.d to I.b; Δ_h/Δ_l fluctuates; RR increases; in situation I.b, $\Delta_h/\Delta_l > RR$	Mortality increase among high educated switches to mortality decline