Supplementary Material for the paper: "Educational class inequalities in the incidence of coronary heart disease in Europe: the MORGAM Project Cohort Component".

Technical details: assessment of the contribution of 28-day case fatality and CHD incidence to inequalities in incident mortality

For this analysis we are referring to the three educational classes, namely high, intermediate and low, derived from population-, sex- and birth cohort-specific tertiles of the distribution of years of schooling. For any given education e, the rate of death from incident CHD event M, the total incidence rate C and the 28-day case-fatality proportion F are related as: $M(e) = C(e)xF(e)$, or equivalently on the log scale, $\log(M(e)) = \log(C(e)) + \log(F(e))$. We assumed log-linear relationships between education (e=1,2 and 3) and each of M, C, and F, and indicated with μ, γ and φ the coefficients for education, respectively. μ is the difference in the log(mortality rate) when education increases one level, and similarly for = γ and φ. From these assumptions it follows that $\mu = \gamma + \varphi$, so the difference in log(mortality rate) between two adjacent educational classes can be disentangled as the sum of the differences in log(total incidence rate) and log(28-day case-fatality proportion).

We estimated μ and γ using log-linear models assuming a Poisson distribution for the number of events and adjusting for attained age during follow-up. Similarly, we estimated φ from a log-linear model assuming a binomial distribution for the number of incident cases which were fatal. All the models were population- and sex-specific; in women, due to the low number of first fatal events in some populations, we considered intermediate and high education together. To test the null hypothesis of $\gamma = \varphi$ (i.e. equal contribution of incidence and 28-day case-fatality to the educational class inequalities in the rate of death from incident CHD), we derived 95% confidence intervals for $\gamma - \varphi$ from bootstrapping (percentile method, n=2000 samples). Findings are presented in Table S1; in some cases, when the numbers of events were small and/or there were possible departures from the log-linearity assumption, the difference between column 1 ("death from incident CHD event") and the sum of columns 2 and 3 ("CHD incidence" and "Case-fatality") was relatively large.

Supplementary Tables

Table S1: Breakdown of educational class inequalities in rate of death from incident CHD as the sum of inequalities in rate of incident CHD and in incident 28-day case-fatality, by population. Men (above) and women (below), 35-64 years old, free of CHD at baseline.

	Men		
Population	**Death from incident CHD event**	**CHD Incidence**	**Case-Fatality**
Northern Sweden	-0.02	0.09	-0.13
Germany (Augsburg)	0.12	0.07	0.04
Southern Italy (Latina/Moli-sani)	0.10	0.04	0.07
Denmark (Glostrup)	0.11	0.12	-0.01
Lithuania (Kaunas)	0.11	0.12	-0.004
France	0.21	0.14	0.08
Northern Italy (Brianza)	0.20	0.12	0.12
Finland (East/West)	0.23	0.21	0.04
Scotland	0.29	0.25	0.05
Northern Ireland (Belfast)	0.45	0.22	0.27

Table S1 (cont.)

Population	Women		
	Death from incident CHD event	**CHD Incidence**	**Case-Fatality**
Southern Italy (Latina/Moli-sani)	-0.08	0.09	-0.05
Finland (East/West)	0.13	0.13	0.03
Lithuania (Kaunas)	0.23	0.18	0.02
Germany (Augsburg)	0.20	0.14	0.06
Denmark (Glostrup)	0.18	0.24	-0.03
Scotland	0.21	0.28	-0.06
Northern Sweden	0.29	0.15	0.14
Northern Italy (Brianza)	0.57	0.30	0.28

In the table: difference in log(event rate) between two adjacent educational classes, for incident mortality, CHD incidence and 28-day case-fatality.
The coefficients are described in the supplementary appendix for technical details; when the numbers of events were small and/or there were possible departures from the log-linearity assumption, the difference between column 1 ("death from incident CHD event") and the sum of columns 2 and 3 ("CHD incidence" and "Case-fatality") was relatively large. Populations are sorted according to the sum of columns 2 and 3 (as in Figure 1 in the main text).

Table S2: Inequality in the distribution of CHD risk factors, by population. Men (above) and women (below), 35-64 years old, free of CHD at baseline

	Men					
Population	**Non HDL-C° (mmol/L)**	**HDL-C°° (mmol/L)**	**Systolic BP° (mmHg)**	**Smoke^**	**DM^**	**BMI° (Kg/m^2)**
Northern Sweden	**0.19**	0.04	**2.2**	**1.9**	1.2	**0.90**
Finland (East/West)	**0.25**	0.01	**3.9**	**2.3**	1.1	**1.04**
Denmark (Glostrup)	**0.27**	**-0.11**	1.1	**3.1**	1.9	**2.26**
Northern Ireland (Belfast)	-0.04	-0.04	**5.7**	**3.3**	2.1	**0.94**
Scotland	-0.05	-0.01	**2.8**	**3.7**	0.8	**0.66**
France	-0.08	-0.02	**3.1**	**1.8**	1.4	**1.40**
Germany (Augsburg)	0.04	0.02	**3.1**	**1.7**	**2.4**	**1.43**
Northern Italy (Brianza)	-0.04	**0.06**	1.5	**1.9**	2.3	**0.95**
Southern Italy (Latina/Moli-sani)	0.05	**0.08**	**2.0**	1.7	**1.6**	**1.58**
Lithuania (Kaunas)	**-0.20**	**0.09**	**3.9**	**3.7**	1.7	0.18
Poland (Tarnobrzeg\Voivodship)	**-0.63**	**0.12**	**-4.2**	**1.5**	**0.3**	**-1.94**
Poland (Warsaw)	**-0.29**	**0.17**	**7.5**	**3.4**	1.5	0.03
Russia (Novosibirsk)	**-0.28**	**0.07**	2.2	**3.5**	1.1	-0.57

Table S2 (cont.)

Population	Women					
	Non HDL-C° (mmol/L)	**HDL-C°° (mmol/L)**	**Systolic BP° (mmHg)**	**Smoke^**	**DM^**	**BMI° (Kg/m^2)**
Northern Sweden	**0.46**	-0.06	**6.0**	**2.8**	**3.7**	**1.47**
Finland (East/West)	**0.30**	**-0.06**	**6.1**	**2.3**	**1.4**	**2.58**
Denmark (Glostrup)	**0.50**	**-0.24**	**-2.4**	**3.5**	1.4	**1.66**
Scotland	**0.31**	**-0.18**	**4.9**	**4.6**	1.0	**1.84**
Germany (Augsburg)	0.09	**-0.12**	**2.9**	**1.3**	1.7	**2.76**
Northern Italy (Brianza)	0.14	**-0.10**	**5.1**	**0.6**	1.5	**2.77**
Southern Italy (Latina/Moli-sani)	0.03	**-0.07**	**5.7**	**0.8**	**2.8**	**3.63**
Lithuania (Kaunas)	-0.17	**-0.09**	**5.9**	1.2	**5.1**	**2.98**
Poland (Tarnobrzeg\Voivodship)	**-0.43**	0.04	-1.4	**0.1**	0.2	0.91
Poland (Warsaw)	0.01	**-0.06**	**4.9**	1.1	**4.1**	**3.57**
Russia (Novosibirsk)	0.08	-0.05	**7.4**	**3.6**	1.0	**2.51**

°: Slope Index of Inequality, as the mean difference between the least and the most educated subjects. If SII > 0, the mean value is higher (= less favorable risk factor distribution) among the least educated than in the most educated subjects.
°°: Slope Index of Inequality, as the mean difference between the least and the most educated subjects. If SII > 0, the mean value is higher (= more favorable risk factor distribution) among the least educated than in the most educated subjects
^: Relative Index of Inequality, as the risk factor prevalence ratio between the most and the least educated subjects. If RII > 1, the risk factor prevalence is higher among the least educated subjects
In bold: rejection of the null hypothesis of no difference among educational classes at 5% significance level.
The SII (RII) were estimated from linear (logistic) regression models adjusting for baseline age and cohort.

Table S3: Number of CHD events, event rates and hazard ratios (95% confidence intervals) for low, intermediate and high education, by population. Men (left) and women (right), 35-64 years old, free of CHD at baseline

		Men							Women						
Population	**Educ**	**N**	**# Ev**	**Event Rates^**	**HR°**	**95%CI**		**p-val°°**	**N**	**# Ev**	**Event Rates^**	**HR°**	**95%CI**		**p-val°°**
Northern Sweden	Low	1094	156	851.0	1.2	0.9	1.5		1003	88	344.2	1.6	1.1	2.3	
	Interm	717	96	867.5	1.2	0.9	1.6	0.3	912	53	304.1	1.4	1.0	2.1	0.04
	High	1020	109	702.9	ref	-	-		1061	46	213.3	ref	-		
Finland (East/West)	Low	3959	705	1052.4	1.4	1.3	1.6		4170	346	321.0	1.4	1.2	1.7	
	Interm	3644	542	883.6	1.2	1.1	1.4	<.0001	4059	293	284.5	1.3	1.1	1.5	0.0001
	High	4237	471	682.0	ref	-	-		4944	267	217.6	ref	-		
Denmark (Glostrup)	Low	721	149	944.8	1.3	1.0	1.6		823	111	414.4	1.8	1.4	2.4	
	Interm	795	175	916.8	1.2	1.0	1.5	0.06	731	69	311.3	1.4	1.0	1.9	0.0002
	High	1058	193	747.6	ref	-	-		1001	79	225.5	ref	-		
Northern Ireland (Belfast)	Low	729	102	959.1	1.5	1.1	2.0								
	Interm	856	107	835.9	1.4	1.1	1.9	0.01			-				
	High	975	95	618.7	ref	-	-								
Scotland	Low	3105	274	1228.2	1.6	1.3	2.0		3538	121	479.2	1.8	1.2	2.6	
	Interm	1586	106	869.9	1.1	0.9	1.5	<.0001	1269	30	306.3	1.2	0.7	1.9	0.005
	High	1895	104	759.5	ref	-	-		1874	35	253.7	ref	-		
France	Low	2078	95	498.4	1.3	1.0	1.7								
	Interm	2531	120	504.5	1.3	1.0	1.7	0.07			-				
	High	2998	105	377.9	ref	-	-								

Table S3 (cont).

Population	Educ	Men							Women						
		N	# Ev	Event Rates^	HR°	95%CI		p-val°°	N	# Ev	Event Rates^	HR°	95%CI		p-val°°
Germany (Augsburg)	Low	1574	161	598.3	1.1	0.9	1.4		1508	71	195.3	1.4	1.0	2.0	
	Interm	1179	152	634.3	1.2	0.9	1.5	0.3	1146	44	168.3	1.2	0.8	1.8	0.2
	High	1475	151	523.1	ref	-	-		1659	61	137.3	ref	-		
Northern Italy (Brianza)	Low	1057	96	552.1	1.2	0.8	1.7		1096	35	178.6	2.4	1.2	4.8	
	Interm	443	30	486.7	1.1	0.7	1.8	0.7	497	16	128.9	1.5	0.7	3.3	0.03
	High	826	48	436.7	ref	-	-		846	11	74.1	ref	-		
Southern Italy (Latina/Moli-sani)	Low	2848	47	307.9	1.1	0.7	1.6		3418	18	69.1	1.4	0.7	2.7	
	Interm	2128	47	250.9	0.9	0.6	1.3	0.63	2792	20	69.3	1.4	0.7	2.7	0.5
	High	4036	49	284.9	ref	-	-		4567	17	48.1	ref	-		
Lithuania (Kaunas)	Low	660	35	738.4	1.4	0.8	2.2		726	25	293.9	2.1	1.0	4.8	
	Interm	757	86	1101.2	2.0	1.3	3.1	0.01	777	24	245.2	1.8	0.8	4.2	0.2
	High	655	28	547.9	ref	-	-		649	8	139.6	ref	-		

^: CHD incidence rate at the attained age of 60 years during the follow-up, per 100,000 person-years.
°: Hazard Ratio of first CHD event during follow-up for low and intermediate educations, as compared to subjects in the high educational class group (reference).
°°: 2 df test p-value for the null hypothesis of no association between education and CHD incidence. Belfast, France, Italy-Moli-Sani: men only.

Table S4: Slope Index of Inequality and 95% confidence intervals for CHD incidence (right), by population and region.
Men, 35-64 years old, free of CHD at baseline

Population	First CHD event			
	Fatal		Fatal or non-fatal	
	SII	(95%CI)	SII	(95%CI)
Nordic Countries	**129.6**	**(72.9; 185.6)**	**462.0**	**(355.8; 568.9)**
Northern Sweden	-9.9	(-126; 110.8)	228.7	(-89.1; 500.5)
Finland (East/West)	**178.1**	**(99.1; 246.9)**	**551.4**	**(407; 690.3)**
Denmark (Glostrup)	87.1	(-51.6; 214.6)	**316.3**	**(60.5; 578.3)**
The UK	**254.5**	**(154.3; 343.6)**	**594.4**	**(392.7; 774.5)**
Northern Ireland (Belfast)	**161.3**	**(62.6; 237.8)**	**498.9**	**(172.2; 777.1)**
Scotland	**326.9**	**(120.4; 496.7)**	**771.3**	**(473.1; 1055.6)**
Central and South Europe	37.5	(-11.7; 82.4)	95.5	(-14.5; 194.8)
France	44.6	(-26.9; 102.4)	**194.0**	**(19.7; 364.6)**
Germany (Augsburg)	93.1	(-23.5; 204.8)	119.2	(-69.6; 297.9)
Northern Italy (Brianza)	55.5	(-38.6; 146.3)	194.2	(-99.9; 452.8)
Southern Italy (Latina/Moli-sani)	36.0	(-59.6; 117.6)	30.0	(-152.6; 220.1)
East Europe and Russia				
Lithuania (Kaunas)	122.1	(-204.6; 399.3)	286.6	(-185.8; 711.4)
All populations	**111.9**	**(75.3; 147.1)**	**342.9**	**(268.4; 413.5)**

SII: Slope Index of Inequality, as the difference in event rate (per 100,000 person-years) between the least and the most educated men, estimated from Poisson regression models as described in the methods. A SII >0 indicates higher event rates among the least educated subjects. 95% confidence interval for SII from n=1000 bootstrapped samples; in bold SII significantly different from 0.

Table S5: Slope Index of Inequality and 95% confidence intervals for CHD incidence (right), by population and region. Women, 35-64 years old, free of CHD at baseline

Population	First CHD event			
	Fatal		Fatal or non-fatal	
	SII	(95%CI)	SII	(95%CI)
Nordic Countries	**37.6**	**(17.8; 57.6)**	**182.5**	**(130.6; 230)**
Northern Sweden	**74.4**	**(15.7; 131)**	**193.4**	**(65.1; 321.3)**
Finland (East/West)	**25.1**	**(2.4; 46)**	**155.5**	**(91.2; 213.5)**
Denmark (Glostrup)	**66.7**	**(4.8; 128.3)**	**271.9**	**(144; 389.1)**
The UK				
Scotland	70.6	(-38.3; 158)	**383.8**	**(201.9; 547.8)**
Central and South Europe	**34.3**	**(8.4; 58.2)**	**81.5**	**(34.7; 126.3)**
Germany (Augsburg)	46.9	(-0.4; 94)	**89.7**	**(5.3; 168.1)**
Northern Italy (Brianza)	**71.6**	**(10.9; 112.9)**	**158.9**	**(53.1; 248.5)**
Southern Italy (Latina/Moli-sani)	3.2	(-15.4; 21.3)	34.4	(-23.1; 88.6)
East Europe and Russia				
Lithuania (Kaunas)	76.6	(-55.8; 181.8)	158.9	(-95.7; 331.4)
All populations	**42.9**	**(26.4; 58)**	**169.7**	**(133.9; 204.8)**

SII: Slope Index of Inequality, as the difference in event rate (per 100,000 person-years) between the least and the most educated men, estimated from Poisson regression models as described in the methods. A SII >0 indicates higher event rates among the least educated subjects. 95% confidence interval for SII from n=1000 bootstrapped samples; in bold SII significantly different from 0.