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Health inequalities according to educational level in different welfare regimes: a comparison of 23 European countries

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Abstract The object of this study was to determine whether the magnitude of educational health inequalities varies between European countries with different welfare regimes. The data source is based on the first and second wave of the European Social Survey. The first health indicator describes people's mental and physical health in general, while the second reports cases of any limiting longstanding illness. Educational inequalities in health were measured as the difference in health between people with an average number of years of education and people whose educational years lay one standard deviation below the national average. Moreover, South European welfare regimes had the largest health inequalities, while countries with Bismarckian welfare regimes tended to demonstrate the smallest. Although the other welfare regimes ranked relatively close to each other, the Scandinavian welfare regimes were placed less favourably than the Anglo-Saxon and East European. Thus, this study shows an evident patterning of magnitudes of health inequalities according to features of European welfare regimes. Although the greater distribution of welfare benefits within the Scandinavian countries are likely to have a protective effect for disadvantaged cities in these countries, other factors such as relative deprivation and class-patterned health behaviours might be acting to widen health inequalities.

Keywords: health inequalities, morbidity, education, welfare regimes, Europe

Introduction

Recent studies using data collected in national health surveys or national longitudinal mortality studies have indicated that considerable socioeconomic inequalities in morbidity and mortality are present across Europe (Cavelaars *et al.* 1998, Fox 1994, Huisman *et al.* 2003, Kunst *et al.*, 2005, Lahelma *et al.* 1994, Mackenbach 2005, Mackenbach *et al.* 1997a, 1997b, 1999, 2000, Silventoinen and Lahelma 2002, Knesebeck *et al.* 2006). Rather surprisingly,

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given that the overall health of their population is amongst the best in the world, countries that emphasise egalitarian principles, such as Sweden and Norway, do not seem to offer any exceptions in this respect. This has generated public debate and political mobilisation within the Social Democratic welfare states, as well as extensive discussions as to how social inequalities in health should be tackled and measured (Judge *et al.* 2005). This also leaves open to question to what extent socioeconomic inequalities in health in European countries are related to the type of welfare state. Previous studies have shown that, overall, population health differs substantially by welfare regime (Navarro *et al.* 2003, 2006, Coburn 2004, Bambra 2006a). Therefore, in this study we examine whether the magnitude of socioeconomic inequalities (assessed using the proxy measure of educational level) in self-assessed health varies by welfare regime. Specifically, we examine the following two hypotheses:

1. Different types of welfare regimes are associated with differences in overall levels of health, and relative and absolute health inequalities.
2. The cross-national variation in health and inequalities in health is smaller *within* specific welfare regimes than *between* different welfare regimes.

Educational inequalities in health in Europe

People with lower educational attainment have poorer self-reported health, higher rates of infectious disease and shorter life expectancy than the better educated (Feldman *et al.* 1989, Guralnik *et al.* 1993, Kitagawa and Hauser 1973). Although people's socioeconomic position may be more accurately expressed by occupation or income, we might argue that education lies at the heart of people's position in society because it is a fundamental determinant of both occupation and income (Lahelma 2001, Ross and Wu 1995). Education is a widely applied measure of socioeconomic position and reflects people's material and non-material resources and shapes the likelihood of being unemployed (Knesebeck 2006). Within Europe, the size of educational inequalities in health varies, and it has been shown that health inequalities by educational level are relatively large in the welfare states of Sweden, Norway and Denmark, while inequalities in Spain, Switzerland and West Germany are smaller. Intermediate positions have been observed for Finland, the UK, France, and Italy (Cavelaars *et al.* 1998). A Finnish study comparing the Nordic welfare states, found that educational health inequalities in 1994 were largest in Norway (Silventoinen and Lahelma 2002). More recent international studies have also documented that the size of educational health inequalities varies between countries (Huisman *et al.* 2003, Knesebeck *et al.* 2006). However, no study has yet specifically tested differences in inequalities in health between countries according to welfare regime theory.

Welfare regimes

In the *Three Worlds of Welfare Capitalism* (1990), Esping-Andersen presents the first serious attempt to classify welfare states. His typology is based upon the operationalisation of three principles: decommodification (the extent to which an individual's welfare is reliant upon the market), social stratification (the role of welfare states in maintaining or breaking down social stratification), and the private-public mix (the relative roles of the state, the family and the market in welfare provision). The application of these principles leads to the division of welfare states into three ideal regime types (Figure 1): Liberal, Conservative, and Social Democratic. The modal examples of the three regimes are USA (Liberal), Germany (Conservative), and Sweden (Social Democratic). In the Liberal regime countries, state provision of welfare is minimal, benefits are modest and often attract strict entitlement criteria, and recipients are usually means-tested and stigmatised (Esping-Andersen

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Author	*Welfare Regimes*			
Esping-Andersen (1990)	*Liberal*	*Conservative*	*Social Democratic*	
	Australia	Finland	Austria	
	Canada	France	Belgium	
	Ireland	Germany	Netherlands	
	New Zealand	Japan	Denmark	
	UK	Italy	Norway	
	USA	Switzerland	Sweden	
Ferrera (1996)	*Anglo-Saxon*	*Bismarckian*	*Scandinavian*	*Southern*
	Ireland	Austria	Denmark	Greece
	UK	Belgium	Finland	Italy
		France	Norway	Portugal
		Germany	Sweden	Spain
		Luxembourg		
		Netherlands		
		Switzerland		

Figure 1 *Welfare state typologies*

1990: 26). The Conservative welfare state regime is distinguished by its 'status differentiating' welfare programmes in which benefits are often earnings related, administered through the employer, and geared towards maintaining existing social patterns. The role of the family is also emphasised and the redistributive impact is minimal (1990: 27). The Social Democratic regime is the smallest regime cluster. Welfare provision is characterised by universal and comparatively generous benefits, a commitment to full employment and income protection, and a strongly interventionist state used to promote equality through a redistributive social security system.

There has been extensive scholarly debate about the theoretical and empirical value of the Three Worlds (for a detailed summary see Arts and Gelissen 2002). Numerous critiques exist about the range of countries and regimes most notably the misclassification of the Southern European welfare states as immature Conservative ones or placing the Antipodean welfare states in the Liberal category (see, for example, Leibfreid 1992, Castles and Mitchell 1993, Ferrera 1996, Bonoli 1997, Navarro *et al.* 2003); the absence of gender in the typology (see for example, Sainsbury 1994, 1999, Bambra 2004, 2007a); the methodology (Castles and Mitchell 1993, Kangas 1994, Ragin 1994, Fawcett and Papadopoulos 1997, Pitruzello 1999, Bambra 2006b); the analytical focus on cash benefits (Alber and Standing 2000, Abrahamson 1999, Kautto 2002, Bambra 2005a, 2005b), and the creation of regimes that generalise about all forms of social policy provision from this base (Kasza 2002, Bambra 2005a, 2005b).

As a result of this criticism, modified or alternative typologies have been proposed by others (Leibfried 1992, Castles and Mitchell 1993, Siaroff 1994, Ferrera 1996, Bonoli 1997, Korpi and Palme 1998, Navarro *et al.* 2003, Bambra 2004, 2005b, in press), most of which place emphasis on those characteristics of welfare states not extensively examined by Esping-Andersen. The welfare ideal-types of Esping-Andersen have also been tested empirically (Kangas 1994, Ragin 1994, Wildeboer Schut *et al.* 2001, Bambra 2006b, 2007b). Although the findings were not totally consistent, the major concern was that Esping-Andersen's typology does not fully capture country range and variation and that therefore,

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the insertion of a fourth 'southern European' regime is required (Leibfreid 1992, Ferrera 1996, Bonoli 1997, Bambra 2007b). However, we have yet to see a new categorisation, which has been generally accepted as the new standard typology of welfare regimes, although Ferrera's four-fold typology has been highlighted as one of the most accurate (Bambra 2007b). Ferrera focuses on different dimensions of how social benefits are granted and organised, and makes a distinction between the Scandinavian (Social Democratic), Anglo-Saxon (Liberal), Bismarckian (Conservative) and southern countries (Figure 1). Although there are clear similarities between Ferrera's and Esping-Andersen's typologies, Ferrera's classification is intended to account for differences in the way welfare is delivered whilst Esping-Andersen's still tends to emphasise the quantity of welfare provided (Bonoli 1997, Bambra 2007b). In this way, the additional Southern regime is characterised by a fragmented system of welfare provision which consists of diverse income maintenance schemes that range from the meagre to the generous and a healthcare system that provides only limited and partial coverage. There is also a strong reliance on the family and charitable sector (Ferrera 1996).

One new challenge to conventional welfare regime typologies concerns the Eastern European countries (Czech Republic, Estonia, Hungary, Poland, Slovakia, and Slovenia). According to Esping-Andersen (1999), these countries comprise clearly the most under-defined and understudied regions. These countries have experienced extensive economic upheaval and have undertaken comprehensive social reforms throughout the 1990s (Kovacs 2002). They have emphasised the Liberal regime approaches of marketisation, decentralisation and the reform of health insurance schemes (EC and WHO 2002). In comparison with the other member states of the European Union, they have limited health service provision and overall population health is relatively poor. It will therefore be interesting to see how these countries rank in comparison to more established Western European welfare states.

Our study utilises survey data from 23 European countries, which we categorise into five regimes based upon Ferrera's (1996) classification, plus an additional category for Eastern Europe (Table 1).

Data and methods

This study was conducted as part of the European-Union-funded 'Tackling Health Inequalities in Europe (Eurothine)' project (http://mgzlx4.erasmusmc.nl/eurothine/). It is based on data from the first and second wave of the European Social Survey (ESS), fielded in 2002 and 2004, comprising more than 80,000 respondents in 23 countries. The main objective of the ESS is to provide high-quality data over time about changing social attitudes and values in Europe. The data and extensive documentation are freely available for downloading at the Norwegian Social Science Data Services (NSD) web site (http://www.nsd.uib.no). A total number of 77805 respondents were available in the sample after deleting cases listwise by each variable in our analysis. It should be noted that we have data for only one year with respect to Italy, Slovakia, and Estonia, which makes the sample size smaller in these countries compared to the others, as shown in Table 1. Response percentages are also given in Table 1. Most countries have a sufficient response, but we are left with some uncertainty regarding the low response percentage of Switzerland in the first ESS-round (33.5%). Another methodological issue is that our sample comes from two sweeps of the ESS. We therefore tested the effect of combining these data by means of a sensitivity analysis. This analysis (not shown in tables) showed that our main results could be replicated on the basis of each survey separately.

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Table 1 *Country statistics (N = 77805)*

		Sample size (N)					*Response rate*		*Years of education*	
		2002		*2004*					*Men*	*Women*
Welfare regime	*Country*	*Achieved interviews*	*Missing data*	*Achieved interviews*	*Missing data*	*Included in the analysis*	*2002*	*2004*	*Average (s.deviation)*	*Average (s.deviation)*
Scandinavian	Denmark	1506	4.12%	1487	5.18%	**2854**	67.7	64.3	13.43 (3.64)	13.18 (3.58)
	Finland	2000	5.70%	2022	5.09%	**3805**	73.2	70.7	12.05 (3.91)	12.49 (4.11)
	Norway	2036	1.62%	1760	3.92%	**3694**	65.0	66.2	13.33 (3.54)	13.25 (3.64)
	Sweden	1999	4.95%	1948	4.77%	**3755**	69.5	65.9	12.13 (3.46)	12.23 (3.51)
Anglo-Saxon	Ireland	2046	9.24%	2286	8.09%	**3958**	64.5	59.7	12.82 (3.61)	12.98 (3.32)
	UK	2052	3.36%	1897	4.27%	**3799**	55.5	54.6	12.66 (3.38)	12.50 (3.09)
Bismarckian	Austria	2257	5.49%	2256	9.44%	**4176**	60.4	62.4	12.51 (3.04)	12.09 (2.94)
	Belgium	1899	10.48%	1778	5.01%	**3389**	59.2	61.2	12.52 (3.79)	12.14 (3.79)
	France	1503	5.32%	1806	4.21%	**3153**	43.1	43.6	11.88 (4.05)	11.82 (4.08)
	Germany	2919	6.41%	2870	8.82%	**5349**	55.7	51.0	13.48 (3.39)	12.62 (3.29)
	Luxembourg	1552	15.53%	1635	8.13%	**2813**	43.9	50.1	12.33 (4.24)	11.80 (4.20)
	Netherlands	2364	3.17%	1881	2.60%	**4121**	67.9	65.1	13.20 (3.93)	12.28 (3.61)
	Switzerland	2040	3.87%	2141	3.08%	**4036**	33.5	48.6	10.89 (3.37)	10.62 (3.15)
Southern	Greece	2566	3.43%	2406	2.83%	**4816**	80.0	78.8	10.57 (4.60)	9.33 (4.53)
	Italy	1207	6.05%	n.a.	n.a.	**1134**	43.7	n.a.	11.04 (4.64)	10.27 (4.92)
	Portugal	1511	4.77%	2052	3.95%	**3410**	68.8	71.2	7.73 (4.55)	6.93 (4.74)
	Spain	1729	13.01%	1663	6.55%	**3058**	53.2	59.7	11.14 (5.45)	10.53 (5.65)
Eastern	Czech Rep.	1360	6.03%	3026	10.44%	**3988**	43.3	55.3	12.68 (2.51)	12.24 (2.52)
	Estonia	n.a.	n.a.	1989	6.18%	**1866**	n.a.	79.1	11.96 (3.11)	12.19 (3.71)
	Hungary	1685	5.16%	1498	5.27%	**3017**	69.9	65.4	12.09 (3.38)	11.64 (3.52)
	Poland	2110	7.73%	1716	6.99%	**3543**	73.2	73.7	11.63 (3.23)	11.42 (3.49)
	Slovakia	n.a.	n.a.	1512	12.04%	**1330**	n.a.	64.2	12.36 (3.06)	11.84 (2.93)
	Slovenia	1519	5.46%	1442	9.50%	**2741**	70.5	69.7	11.81 (3.34)	11.10 (3.50)

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We used both indicators of morbidity available in the ESS: self-reported general health and limiting longstanding illness. Self-reported general health was constructed from a variable asking; 'How is your (physical and mental) health in general?'. Eligible responses were 'very good', 'good', 'fair', 'bad', and 'very bad'. We dichotomised the variable into 'very good or good' health versus 'less than good' health ('fair', 'bad', and 'very bad'). As for limiting longstanding illness, people were asked if they were hampered in daily activities in any way by any longstanding illness or disability, infirmity or mental health problem. Eligible responses were 'yes a lot', 'yes to some extent' and 'no'. We dichotomised this variable into 'yes' (regardless of whether to some extent or a lot) and 'no'.

Computation and interpretation of the measure of educational inequalities in health

The ESS-data file provides two variables of educational attainment – the first is a recoded variable that focuses on levels of education achieved, while the second gives years of full-time education. Analysing education as highest attained level complicates comparisons between countries as the population distribution across the levels of education strongly differs between countries (Knesebeck *et al.* 2006). One solution would be to adjust for the size of each educational group by calculating the RII (Mackenbach and Kunst 1997b). However, we prefer to use the second available variable on education in our sample – full-time education in years – because there is a higher degree of international comparability and flexibility in its use. We also have to take into account the extent of variations of reported years of education in different countries, because the variation is larger in, for example, Southern countries compared to the Northern. We did this by applying a *total impact* measure of education. First, for each country separately, we standardised the continuous variables of educational attainment, such that the national average was equal to 0 and the standard deviation equal to 1 year of education. Secondly, we reverted this variable by multiplying it with a factor of –1, such that higher values corresponded with lower educational levels. Next, the standardised variable was introduced as an independent variable in a logistic regression analysis, controlled for age, with health variables as the dependent variable. Finally, we transformed the odds ratios of each regression coefficient by calculating their exponential functions. The odds ratios should be interpreted as the health difference between people with average years of education and those whose number of years of education is one standard deviation below the national average.

The first hypothesis that is tested in our study states that welfare regimes are associated with both absolute and relative measures of health inequalities. First, we calculated the (age-adjusted) percentages of the total sample reporting fair/poor general health and limiting longstanding illness in each country. Secondly, we calculated the rate differences (RD) between the higher and lower education group using the median of the total impact measure within each country as cut-off point. Both measures were age-standardised using the weighted European population average as a basis.

To assess the extent to which cross-national differences in the magnitude of health inequalities could be explained by grouping countries according to welfare type we performed one-way ANOVA tests. We specifically tested whether the between-group variance of the three statistical measures (overall prevalence, absolute difference, and relative inequalities) differed significantly from the within-group variance. In addition, we calculated R squares by dividing the between-group sums of squares (SSb) with the total sums of squares (SSt), in order to determine the percentages of between-country variance that is explained by the welfare regime clusters.

The analysis is based on responses from people aged 18 or over. A weight has been applied (dweight) to correct for design effects due to sampling designs in countries where not all individuals in the population have an identical selection probability.

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Results

Table 2 shows that East European welfare regimes have the highest prevalence of ill-health for men and women with respect to both health indicators. South European welfare regimes have the second highest prevalence of self-assessed fair/poor general health, while they have the lowest prevalence of limiting longstanding illness. The dissimilar reporting of ill-health between limiting longstanding illness and self-assessed fair/poor health in the South is relatively large. Although the prevalence of fair/poor self-assessed health is larger than those of limiting longstanding illness within all other welfare regimes, the difference is largest in the South. This might suggest that self-assessed health is understood differently in the South from elsewhere. The Anglo-Saxon welfare regimes demonstrate the smallest prevalence rates for fair/poor general health and the second smallest for limiting longstanding illness.

Furthermore, Table 2 shows that health inequalities are significant for both men and women, according to both health indicators, and within all welfare regimes. South European welfare regimes have the largest health inequalities, both regarding rate differences and odds ratios, with the exception of the rate difference for limiting longstanding illness. Clearly, Bismarckian welfare regimes were observed to have the smallest health inequalities, even though the prevalence rates were only average. Although the other welfare regimes rank relatively close to each other, those of Scandinavia are placed less favourably than in the Anglo-Saxon and Eastern European countries. Our results refer to the point estimates however, and it should be noted that the confidence intervals of the welfare types overlap, meaning that the cross-regime variations in health inequalities might be attributable to chance fluctuations. Country-specific results are shown in Table 3. Prevalence rates and odds ratios also converged into scatter plots (Figures 2 and 3), showing graphically whether the countries cluster within each welfare regime.

Figures 2 and 3 give the results for men and women's reporting of limiting longstanding illness and fair/poor general health respectively. The Scandinavian countries are pretty tightly clustered. The only divergence from this pattern was found with respect to the reporting of fair/poor general health among Finnish (high OR compared to other Scandinavian countries) and Swedish (low OR compared to other Scandinavian countries) men. The South European countries, which do not appear to cluster markedly with respect to the results of self-assessed fair/poor health, reported fewest cases of longstanding illness, but had relatively large relative health inequalities. However, it should be remarked that Italian men and women, together with Spanish men, demonstrate smaller odds ratios than the other South European countries.

Bismarckian countries are fairly clustered below the x-axis, which indicates average odds ratios. The only exception concerns the high odds ratios reported among Luxembourg men concerning the reporting of fair/poor general health. Regarding the Anglo-Saxon welfare regime, Ireland seems to have lower prevalence rates than those of the UK, but both countries are advantageously placed with regard to both sexes and both health indicators. Although men and women living in East European countries reported poorer general health and more cases of limiting longstanding illness than people in other European countries, they demonstrated average magnitudes of odds ratios. However, a few exceptions should be mentioned. First, Polish men have higher odds ratios regarding the results of limiting longstanding illness. Secondly, Hungarian women have highest odds ratios for self-assessed health, while the odds ratios are among the smallest for Slovak men and women regarding self-assessed health. Generally, for limiting longstanding illness among both men and women, the countries cluster according to welfare typologies. For fair/poor general health, however, the clustering is not as strong.

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Table 2 *Odds ratios (95% CI), prevalence rates and absolute differences for each welfare system separately (N = 77805)*

	Limiting longstanding illness						*Fair/poor general health*					
	Men			*Women*			*Men*			*Women*		
Welfare regime	*Prev*	*RD*	*OR (95% CI)*	*Prev*	*RD*	*OR (95% CI)*	*Prev*	*RD*	*OR (95% CI)*	*Prev*	*RD*	*OR (95% CI)*
Scandinavian	24.7	9.5	**1.37 (1.29–1.45)**	28.5	8.1	**1.34 (1.26–1.43)**	26.0	10.5	**1.44 (1.35–1.53)**	28.5	12.1	**1.54 (1.44–1.64)**
Anglo-Saxon	20.4	5.9	**1.31 (1.19–1.43)**	19.9	6.4	**1.23 (1.12–1.34)**	20.8	9.6	**1.35 (1.23–1.48)**	21.5	8.2	**1.29 (1.18–1.41)**
Bismarckian	21.6	4.2	**1.16 (1.10–1.21)**	23.5	4.0	**1.17 (1.12–1.23)**	26.8	6.4	**1.19 (1.14–1.24)**	30.9	5.7	**1.25 (1.20–1.30)**
Southern	13.7	5.7	**1.38 (1.26–1.51)**	19.2	9.5	**1.63 (1.49–1.78)**	30.5	14.8	**1.57 (1.47–1.69)**	40.2	17.3	**1.69 (1.58–1.81)**
Eastern	29.7	5.4	**1.26 (1.19–1.33)**	30.7	10.5	**1.42 (1.34–1.50)**	44.4	11.0	**1.39 (1.32–1.47)**	50.4	12.8	**1.54 (1.46–1.63)**

Prev = age-adjusted prevalence of ill-health. **RD** = age-adjusted rate difference (percentage) between high and low socioeconomic group.

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Table 3 *Prevalences and absolute differences for each country separately, adjusted for age. Odds ratios (95% CI). N = 77805*

		Limiting longstanding illness						*Fair/poor general health*					
		Men			*Women*			*Men*			*Women*		
Welfare regime	*Country*	*Prev*	*RD*	*OR (95% CI)*	*Prev*	*RD*	*OR (95% CI)*	*Prev*	*RD*	*OR (95% CI)*	*Prev*	*RD*	*OR (95% CI)*
Scandinavian	Denmark	20.6	10.9	**1.37 (1.20–1.57)**	25.1	6.4	**1.39 (1.21–1.59)**	21.0	11.0	**1.41 (1.23–1.61)**	23.4	10.7	**1.47 (1.27–1.69)**
	Finland	29.5	7.1	**1.36 (1.21–1.54)**	29.7	6.8	**1.33 (1.18–1.51)**	34.9	15.2	**1.62 (1.43–1.84)**	32.7	9.4	**1.45 (1.28–1.66)**
	Norway	22.8	10.1	**1.35 (1.20–1.51)**	27.4	8.2	**1.31 (1.16–1.48)**	23.6	10.8	**1.45 (1.29–1.63)**	27.1	12.1	**1.55 (1.36–1.76)**
	Sweden	24.9	4.7	**1.20 (1.07–1.35)**	30.3	5.9	**1.25 (1.11–1.40)**	23.5	–2.1	1.09 (0.97–1.22)	28.5	12.1	**1.47 (1.30–1.67)**
Anglo-Saxon	Ireland	16.3	6.7	**1.33 (1.16–1.54)**	15.7	6.2	**1.32 (1.15–1.50)**	15.1	7.6	**1.40 (1.21–1.63)**	16.5	6.6	**1.31 (1.15–1.49)**
	UK	24.2	5.1	**1.30 (1.15–1.48)**	24.0	5.5	**1.14 (1.01–1.29)**	26.4	10.2	**1.32 (1.18–1.49)**	26.9	6.8	**1.25 (1.11–1.41)**
Bismarckian	Austria	21.9	2.8	1.10 (0.98–1.24)	24.4	7.1	**1.28 (1.14–1.45)**	21.5	4.2	1.11 (0.98–1.25)	26.7	5.1	**1.38 (1.22–1.55)**
	Belgium	19.9	6.6	**1.18 (1.04–1.34)**	20.9	4.3	**1.25 (1.09–1.44)**	21.0	10.0	**1.28 (1.13–1.45)**	25.2	10.0	**1.50 (1.32–1.71)**
	France	20.2	3.7	**1.31 (1.13–1.51)**	22.6	3.0	**1.22 (1.06–1.40)**	35.4	11.4	**1.32 (1.16–1.49)**	39.4	12.4	**1.41 (1.25–1.59)**
	Germany	26.1	3.6	**1.20 (1.09–1.32)**	27.0	6.8	**1.38 (1.25–1.53)**	38.6	5.7	**1.24 (1.14–1.35)**	39.9	7.7	**1.40 (1.28–1.53)**
	Luxembourg	19.7	7.9	**1.26 (1.08–1.45)**	16.3	6.3	**1.22 (1.03–1.46)**	32.2	15.9	**1.59 (1.40–1.81)**	39.8	11.7	**1.32 (1.17–1.49)**
	Netherlands	21.5	7.6	**1.27 (1.13–1.44)**	28.5	2.1	**1.16 (1.04–1.29)**	22.9	8.5	**1.36 (1.21–1.54)**	29.1	2.8	**1.15 (1.03–1.28)**
	Switzerland	18.6	5.1	**1.18 (1.04–1.34)**	19.6	0.4	1.12 (0.99–1.27)	14.5	5.5	**1.22 (1.06–1.41)**	17.3	5.5	**1.33 (1.16–1.53)**
Southern	Greece	14.3	6.2	**1.45 (1.26–1.68)**	21.6	10.8	**1.50 (1.31–1.71)**	19.3	9.7	**1.60 (1.40–1.83)**	28.9	14.4	**1.60 (1.42–1.81)**
	Italy	14.2	5.4	1.30 (0.96–1.75)	11.0	7.1	**1.51 (1.06–2.15)**	32.1	13.2	**1.40 (1.12–1.76)**	41.8	7.8	**1.22 (1.00–1.49)**
	Portugal	12.4	4.5	**1.54 (1.23–1.93)**	19.0	10.8	**1.96 (1.61–2.38)**	43.1	14.6	**1.58 (1.38–1.82)**	54.1	18.3	**1.55 (1.37–1.76)**
	Spain	13.8	7.7	**1.48 (1.22–1.79)**	18.4	8.8	**1.80 (1.49–2.18)**	33.3	5.6	**1.19 (1.04–1.35)**	40.6	11.1	**1.52 (1.33–1.75)**
Eastern	Czech Rep.	29.8	5.6	**1.13 (1.02–1.26)**	32.3	10.2	**1.37 (1.23–1.54)**	39.1	8.1	**1.23 (1.11–1.37)**	41.9	11.2	**1.43 (1.29–1.60)**
	Estonia	26.8	3.5	1.17 (0.99–1.40)	25.5	10.4	**1.57 (1.23–1.54)**	55.3	16.1	**1.53 (1.27–1.85)**	53.7	14.0	**1.56 (1.32–1.84)**
	Hungary	29.4	6.2	**1.27 (1.11–1.44)**	29.2	8.2	**1.37 (1.21–1.55)**	50.4	10.6	**1.46 (1.29–1.67)**	55.4	15.8	**1.71 (1.51–1.93)**
	Poland	29.5	10.6	**1.49 (1.31–1.71)**	31.5	10.9	**1.42 (1.24–1.63)**	44.7	13.9	**1.54 (1.36–1.73)**	53.6	16.6	**1.63 (1.43–1.86)**
	Slovakia	25.1	3.7	**1.26 (1.04–1.52)**	27.2	13.3	**1.45 (1.19–1.77)**	41.5	3.0	1.07 (0.90–1.27)	48.2	6.6	**1.26 (1.05–1.50)**
	Slovenia	34.8	7.1	**1.24 (1.08–1.41)**	34.6	13.9	**1.41 (1.23–1.62)**	40.6	15.6	**1.53 (1.34–1.75)**	51.3	17.0	**1.60 (1.41–1.83)**

Prev = age-adjusted prevalence of ill-health. **RD** = age-adjusted rate difference (percentage) between high and low socioeconomic group.

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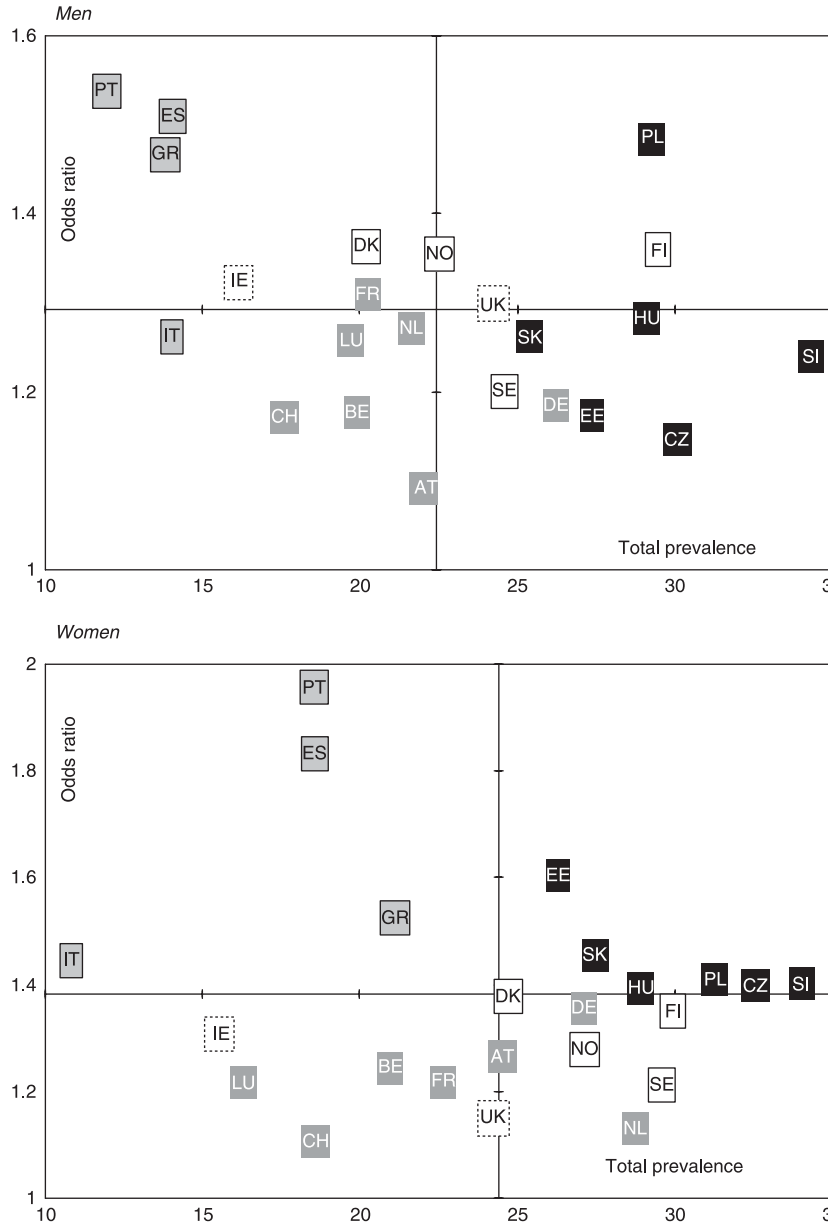

Figure 2 *Odds ratios (Y-axis) and national prevalence rates (X-axis) for having limiting longstanding illness (self-reported) among European men and women. Axes lines represent unweighted average values. Ferrera*: Scandinavian (NO, SE, DK, FI), Bismarckian (AT, BE, CH, DE, FR, LU, NL), Anglo-Saxon (IE, UK), Southern (ES, GR, IT, PT), Eastern (CZ, EE, HU, PL, SI, SK).

The one-way ANOVA-test showed that within welfare group variance is significantly smaller than the between welfare group variance for measures of limiting longstanding illness (except from the RD-measure of men), but not with regard to fair/poor general health (except from the prevalence) (see Table 4). This implies that the Ferrera welfare typology explains at least 50 per cent of the cross-national variations regarding longstanding illness, but not with regard to general health.

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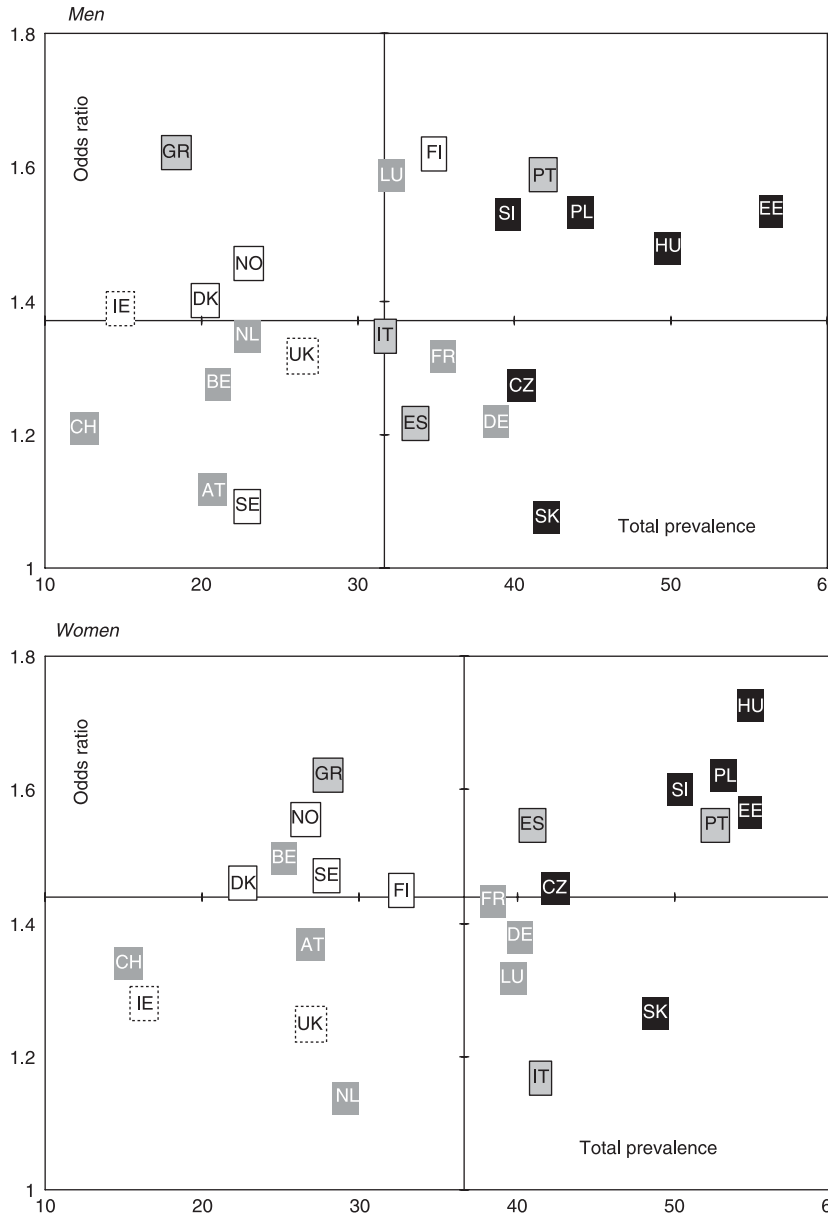

Figure 3 *Odds ratios (Y-axis) and national prevalence rates (X-axis) for having fair/poor general health (self-reported) among European men and women. Axes lines represent unweighted average values. Ferrera*: Scandinavian (NO, SE, DK, FI), Bismarckian (AT, BE, CH, DE, FR, LU, NL), Anglo-Saxon (IE, UK), Southern (ES, GR, IT, PT), Eastern (CZ, EE, HU, PL, SI, SK).

Discussion

Our results have provided evidence for the hypothesis that welfare regimes are associated with cross-national differences in the overall level of self-reported health, and with absolute and relative educational health gaps. We observed that East European welfare regimes had

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Table 4 [a]*The proportion of between-country variance in health measures that can be explain by the countries' grouping according to the Ferrera*[b] *welfare regime typology*

	Limiting longstanding illness		*Fair/poor general health*	
	Men	*Women*	*Men*	*Women*
Statistical measure	R^2 *(sig)*	R^2 *(sig)*	R^2 *(sig)*	R^2 *(sig)*
Overall prevalence	**0.788 (0.000)**	**0.640 (0.001)**	**0.595 (0.002)**	**0.689 (0.000)**
Absolute difference (RD)	0.194 (0.395)	**0.698 (0.000)**	0.062 (0.874)	0.409 (0.041)
Relative inequalities (OR)	**0.473 (0.016)**	**0.707 (0.000)**	0.090 (0.775)	0.355 (0.081)

[a]R^2 and significance were calculated on basis of one-way ANOVA tests. R^2 gives the percent of between-country variance explained and is calculated by dividing the between group sums of squares (SSb) with the total sums of squares (SSt).
[b]*Ferrera*: Scandinavian (NO, SE, DK, FI), Bismarckian (AT, BE, CH, DE, FR, LU, NL), Anglo-Saxon (IE, UK), Southern (ES, GR, IT, PT), Eastern (CZ, EE, HU, PL, SI, SK).

the highest prevalence of both health indicators, while South European welfare regimes had the second highest prevalence of self-assessed poor general health, and the lowest prevalence of limiting longstanding illness. Apart from the low prevalence in the South for limiting longstanding illness, the Anglo-Saxon welfare regimes have the lowest prevalence for both health indicators and for both sexes. Furthermore, Southern European welfare regimes have the largest health inequalities (with the exception of the rate difference for limiting longstanding illness), while countries with Bismarckian welfare regimes tend to demonstrate the smallest. Although the East European, Anglo-Saxon and Scandinavian welfare regimes rank relatively close to each other, the Scandinavian welfare regimes are placed less favourably than the Anglo-Saxon and Eastern European. Furthermore, countries within each welfare regime seem to cluster strongly according to most measures of longstanding illness.

There are some important methodological issues that may have influenced our results. First, the ESS response rates vary strongly between countries, as shown in Table 2. This is especially the case for the first wave in Switzerland, which had a response rate of only 33.5 per cent. This number is critically small, and it could be the reason why Switzerland has lower prevalence rates, absolute differences and odds ratios than the average scores for both health indicators and for both sexes. If the non-response is related to health and socio-economic position, then this would produce biased inequality measures.

Secondly, we found that the country clustering in five welfare regimes is more evident for the results of longstanding illness compared to those of less than good general health. This seems reasonable, because people's views on general health are profoundly shaped by their national cultural background (Salomon *et al.* 2004, Appels *et al.* 1996, Jylhä *et al.* 1998). The differences in absolute levels of health between countries may suggest that the question on general health is perceived differently across countries, and is thus sensitive to cultural variations. We have already noted that self-assessed health might be comprehended differently in the South from elsewhere, and this would bias the odds ratios if the comprehension of health also varied across educational levels. A growing number of studies have however shown that measures of self-assessed health are strongly correlated with more objective measures such as mortality (Idler and Benyamini 1997, Heistaro *et al.* 2001). We also calculated Pearson's correlation between subjective health measures (age-adjusted percentage of people with fair/poor health and limiting longstanding illness) with adult mortality,

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using data collected from the WHO. The results demonstrated that high age-adjusted prevalence of fair/poor general health ($R_{men} = 0.82$, $R_{women} = 0.58$) and limiting longstanding illness ($R_{men} = 0.45$, $R_{women} = 0.48$) were associated with higher adult mortality for men and for women, but particularly regarding men's fair/poor general health. Previous studies have also shown that the apparent association of self-assessed health with mortality does not, or only slightly, differ between socioeconomic groups (Burstrom *et al.* 2001, Van Doorslaer and Gerdtham, 2003, Huisman *et al.* 2007).

Welfare state regimes, health and health inequalities

We observed that countries with the lowest average years of education, namely the Southern and Eastern European countries, have the largest overall prevalence rates of ill-health (except for the lower prevalence of limiting longstanding illness in the South), whilst the Anglo-Saxon countries have the lowest prevalence rates. This is in keeping with most previous research into variations in population health (such as infant mortality or total mortality) by welfare state regimes (see, for example, Navarro *et al.* 2003, 2006, Coburn 2004, Bambra 2006a).

We observed that grouping welfare regimes explained a meaningful part of the variation in the prevalence, and absolute and relative health gaps of limiting longstanding illness of the relevant European populations. This partly confirms our second hypothesis that grouping countries into welfare types decreases the variation of health inequality measures significantly. The country clustering in five welfare regimes was more evident for the results of limiting longstanding illness compared to those of less-than-good general health.

A recent review on studies of morbidity differences (Dahl *et al.* 2006) did not find a patterning of health inequalities according to features of welfare regimes. However, their study rested on Esping-Andersen's typology, it was based on measures of relative inequalities only, and in addition, national data sources were used, with a lower degree of international variation, which comprised fewer countries than the ESS.

It appeared that health inequalities in our study were smallest in Bismarckian countries and largest in Southern Europe. This finding is in keeping with other studies. Two previous studies of general self-reported health by level of education using the European Community Household Panel (ECHP) support these findings. In a study of older men and women, Huisman *et al.* (2003) found lowest health inequalities in Bismarckian countries (Belgium, France and the Netherlands) and largest in the South (Italy, Greece and Spain). Denmark, which was the only Nordic country in this study, had large inequalities for men, but smaller ones among women. They also found rather large inequalities in the two Anglo-Saxon countries. Using the same survey, Van Doorslaer and Koolman (2004) found particularly large income-related health inequalities in self-assessed health in Portugal and relatively low inequalities in Netherlands and Germany.

With regard to chronic conditions, Dalstra *et al.* (2005) compared results from eight national health surveys and did not find higher or smaller health inequalities concerning nine chronic disease groups in the South (Italy and Spain) compared to Bismarckian countries (Belgium, France and the Netherlands). However, they observed smaller inequalities in heart disease prevalence. Cavelaars *et al.* (1998) did not reveal a pattern between Bismarckian and South European countries, but they found a tendency for inequalities to be relatively large in the North (Sweden, Norway and Denmark).

The studies on morbidity are largely confirmed by previous comparative studies on mortality differences by educational level. Mackenbach *et al.* (1997) reported average-size

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inequalities in the Nordic countries, while Huisman *et al.* (2005) found smaller inequalities in total mortality in men and women aged 40 or more in Turin and Barcelona and Madrid compared to Belgium, Austria and Switzerland.

We should be aware that those reports were based on different data sources, covering different periods and partly different age groups. Only a few of these studies found that South European countries had large inequalities, compared to Bismarckian countries. A generalised finding though is that inequalities in the Nordic countries are not among the smallest.

The Scandinavian welfare regime

Notably, in terms of educational health inequality, countries in the Scandinavian welfare regime were placed less favourably than those in the Anglo-Saxon and Eastern European regimes. Only Sweden shows relatively small inequalities from an international perspective, perhaps reflecting the longevity of the Swedish welfare state. These results are surprising, as we would have expected the Scandinavian welfare states, given that they provide the most extensive welfare provision (for example, they are the most decommodifying (Esping-Andersen 1990)), to be some of the best-performing countries in terms of the degree of health equity. Not only did we find that relative inequalities in the Scandinavian regimes were not among the smallest, but, worryingly, this was also the case with absolute inequalities.

This finding requires attention. Drawing upon the work of Dahl *et al.* (2006), we speculate that relative deprivation, and class-related health behaviours may be factors behind our findings. In addition, we suggest that social exclusion may be a contributory mechanism.

Relative deprivation is a result of expectations and comparisons with other individuals and groups (Dahl *et al.* 2006). Relative deprivation will occur in all societies, in which there is inequality, including the Scandinavian welfare states. Following Dahl and colleagues, it is possible to speculate that the effects of relative deprivation may be more extensive in the Scandinavian welfare states because of the high levels of expectation of upward social mobility and prosperity that they generate amongst the less privileged, expectations that are seldom met (Yngwe *et al.* 2003). This may increase health inequalities, especially in stress-related conditions, such as heart disease or indeed self-assessed health.

Dahl and colleagues also suggest that the relatively large socioeconomic differences in smoking prevalence in the Scandinavian countries (Cavelaars *et al.* 2000) may well contribute to health inequalities.

Furthermore, the previously homogenous Scandinavian countries have experienced considerable immigration over the last decade. Immigrants are often marginalised within the Scandinavian welfare states, are without entitlement to the full benefits of the universalistic system and are more likely to experience unemployment and social exclusion. Such groups are also most likely to be amongst the least educated in society. A study comparing immigrants from Poland, Turkey, and Iran with Swedish-born persons revealed a strong association between ethnicity and poor self-reported health, which was mediated by socioeconomic status, poor acculturation, and discrimination (Wiking *et al.* 2004). Another study found a large diversity of self-rated health, prevalence of diabetes and distress between ethnic Pakistanis and native Norwegians (Syed *et al.* 2006). However, further research into the ethnic make up of people with the lowest education would be useful to explore this explanation.

Although these different explanations are somewhat speculative, they point to causal mechanisms in which education may play a role. Finding empirical evidence for these causal mechanisms should be explored in future studies.

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Conclusion

The prevalence of ill-health, and absolute and relative educational inequalities in health in European countries appears to cluster according to the welfare regimes to which these countries belong. This was especially the case for the reporting of limiting longstanding illness. Welfare is provided in dissimilar fashion both qualitatively and quantitatively across welfare regimes. In addition to comparing countries individually, forthcoming research might thus derive advantage from adapting a welfare regimes point of view.

Our results suggest that the South European (excluding Italy) family-oriented welfare system does not sufficiently buffer ill-health among disadvantaged groups. Italy pioneered the welfare state expansion in the South by the end of the 1940s, while democracy consolidated in the late 1970s (and welfare state expansion even later) in Portugal, Spain and Greece in a highly compressed time (Ferrera 2005). Although the South European countries have fully caught up with the traditional Western democracies in terms of economic growth and rapid expansion of the welfare system, they entered the epoch of modernity in a state of socioeconomic and political decline (Sapelli 1995).

Moreover, although the Eastern European countries had the highest prevalence rates, they held an average position in Europe, in both absolute and relative educational inequalities in health. Future research would benefit from considering Eastern European countries as a separate welfare state regime and to look at the health effects of specific distributive policies and mechanisms within these countries.

The Scandinavian countries, except in Sweden, had rather large relative and absolute inequalities in health and only intermediate prevalence rates. The distribution of welfare benefits within the Scandinavian countries certainly has a protective effect for disadvantaged groups compared to those in other welfare regimes. We should, however, question to what extent this is counteracted by some unintended mechanisms, such as expectations of upward social mobility and prosperity that might tend inadvertently to widen educational inequalities in health.

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