

Decreasing Socioeconomic Inequalities and Increasing Health Inequalities in Spain: A Case Study

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Most proposals aimed at reducing socioeconomic inequalities in health are based on 2 complementary interventions: those focusing on the proximal determinants of inequalities and those whose objective is to change the distribution of basic socioeconomic conditions.^{1–7} Proposals for the first type of intervention are based on the idea that socioeconomic conditions affect health largely by means of diverse material, psychosocial, and behavioral risk factors, which are more prevalent in lower socioeconomic groups. Proposals for the second type of intervention involve the implicit assumption that health inequalities will be reduced if the health of individuals in lower socioeconomic groups is improved. It is assumed that fiscal and socioeconomic policies aimed at distribution of income, employment, and family welfare and provision of public services such as health care and education are justified because they cushion the effects of inequalities in the labor market and improve the material conditions of individuals who are socioeconomically disadvantaged, thereby improving their health status.

However, a more egalitarian distribution of the socioeconomic determinants of health is not necessarily accompanied by smaller socioeconomic inequalities in health. A study comparing socioeconomic inequalities in health in the 1980s in various European countries⁸ revealed smaller relative health inequalities in countries such as Spain and Switzerland, which had greater income inequalities during that period⁹; the Nordic countries, which are traditionally more egalitarian, exhibited the largest inequalities in health. A cross-sectional study comparing different regions in Spain during the 1980s did not show any relationship between income inequality and inequality in disability.¹⁰ Increased inequalities in mortality in the Nordic countries were observed in the final 2 decades of the 20th century, a period during which levels of income inequality remained constant.¹¹ Nevertheless,

some authors have criticized the isolated use of relative measures to compare health inequalities and are in favor instead of incorporating absolute measures to evaluate the effects of public policies.¹²

In any case, little research has been conducted comparing the evolution of socioeconomic inequalities and inequalities in health, even though “natural experiments” have offered many opportunities for such studies during periods that have produced changes in the distribution of socioeconomic determinants of health for reasons other than the association of those determinants with health. This was the strategy followed in the present study, in which we estimated health inequalities in Spain in the mid-1980s and the interval surrounding the year 2000, a 15-year period characterized by major social and economic investments resulting from Spain’s entry into the European Union. In 2000, the richest 5% of the population was wealthier than in the mid-1980s, but the 50% of the population at lower income levels had increased in terms of its share of total incomes as well, and consequently there was no increase in income inequality.¹³ Also, regional per capita income in Spain moved closer to the European Union

average during this period, and inequalities in regional per capita income were reduced.¹⁴

METHODS

Data Sources

We used 2 data sets to evaluate socioeconomic inequalities in health in the periods surrounding 1985 and 2000: Spain’s mortality register and the country’s national disability register. Population estimates derived from the National Statistics Institute were used in calculating mortality rates. We obtained data on deaths for 1985–1986 and 2000–2001, and we gathered information on disability from the only 2 national disability surveys that have been carried out, one in 1986 and the other in 1999. Participants in these disability surveys were selected via a multistage procedure. Initially, towns were chosen through random selection proportional to the size of their population, and then census areas were stratified according to household socioeconomic characteristics before individual residents were randomly selected. Nonresponse rates were 5.1% in 1986 and 7.1% in 1999.

The present study was restricted to the population aged 25 to 74 years. Individuals

Objectives. We examined the evolution of income inequalities and health inequalities in Spain from the time of the country’s entry into the European Union.

Methods. We estimated distributions of provincial income and household income, relations of provincial income with mortality and disability, and relations of household income with disability in 1984–1986 and 1999–2001.

Results. Inequalities in average provincial income and household income were lower in 2000 than in 1985. Differences in mortality and disability according to income were greater in 2000 than in 1985, in both absolute and relative terms, except for differences in mortality among individuals aged 25 to 44 years. In most cases, differences in mortality from leading causes of death and differences in major types of disabilities were also greater in 2000.

Conclusions. Our results show that redistribution of income might achieve greater social justice but probably does not lead to reduced health inequalities, despite observed improvements in material circumstances as well as in most health indicators among disadvantaged population groups. (*Am J Public Health*. 2006;96:102–108. doi:10.2105/AJPH.2004.053983)

75 years or older were not included because institutionalized individuals were not represented in the 1986 disability survey, and the probability of institutionalization is relatively high in this age group.

Measures of Health Outcomes

Mortality from all causes and prevalence of disability were assessed. The measure of disability used was the percentage of individuals whose survey responses indicated one or more disabilities. The types of disabilities listed in the 1986 and 1999 questionnaires were nearly the same. Only permanent disabilities were recorded. A disability was considered to be permanent when permanency was implicit in its nature—as in the case of disabilities caused by mental retardation—or when the length of time the person had experienced the disability in combination with the length of time he or she was expected to experience it was 1 year or more. In the analysis of the 1986 survey, people whose only disability was the inability to run were excluded from the analysis because this type of disability was not included in 1999.

Various specific health measures were also studied because, as pointed out by many authors (e.g., Lynch and Davey Smith¹⁵), summary measures can mask possible heterogeneous associations between socioeconomic circumstances and health. The specific health measures assessed were mortality from cancer (codes C00–C97 in the *International Classification of Diseases, Tenth Revision [ICD-10]*), mortality from cardiovascular disease (*ICD-10* codes I00–I99), mortality from respiratory disease (*ICD-10* codes J00–J99), mortality from gastrointestinal disease (*ICD-10* codes K00–K93), and disabilities in the following 6 areas: seeing, hearing, personal care, activities of daily living, ability to move about inside the house, and ability to move about outside the house.

Socioeconomic Variables

The socioeconomic variables assessed were average provincial income and household equivalent income. Gross domestic product (GDP) per capita in each province, as estimated by Eurostat, was used as the indicator of average provincial income. The provinces were rank ordered in accordance with per capita GDP in 1985 and in 2000, and the

quartiles of the distribution were calculated for each year. Populations, deaths, and individuals interviewed in each survey were then assigned to a per capita GDP quartile in accordance with province of residence.

Both disability surveys included items focusing on total household income, and respondents were asked to select one of 10 income intervals. To assign an income to each person interviewed, we transformed this variable to a quantitative variable using the midpoint of each interval and dividing by the square root of the number of people in the household. We then estimated the quartiles of the distribution of household equivalent income and included each respondent in one of these quartiles. Nonresponse rates associated with the question on household income were 7.5% in 1986 and 12.5% in 1999.

Statistical Analyses

We first calculated the indicators of the distribution of average provincial income and of household equivalent income for the periods surrounding 1985 and 2000. We then calculated age-adjusted mortality rates and age-adjusted prevalences of disability according to different socioeconomic variables. The age distribution of the Spanish population in 2000 was used as the standard population distribution. Because we found that age modified the effect of average provincial income on mortality, we conducted all analyses separately for 2 age groups: 25 to 44 years and 45 to 74 years.

We estimated magnitudes of health inequalities by determining the association between each socioeconomic variable and the measures of health. We calculated age-adjusted measures of association based on both relative differences (i.e., ratios) and absolute differences. Poisson regression was used to estimate associations between average provincial incomes and the mortality measures. In estimating associations between average provincial incomes and measures of disability, we were able to take into account potential within-province correlations in outcomes by estimating random effect logit models with a random intercept for each province. Finally, we used logistic regression analyses to estimate associations between household equivalent incomes and measures of disability.

To estimate the trends of the associations, we coded average provincial income quartiles and household equivalent income quartiles as continuous variables. In cases in which a trend was clearly evident (i.e., $P < .05$), we also calculated the age-adjusted relative index of inequality (RII), a measure that takes into account the proportion of the population in each socioeconomic group as well as the estimated effect on the measure of health for that group. For various causes of death among individuals aged 25 to 44 years and for various types of disabilities in 1985, the trend of the association with provincial income was not linear. As a result, we did not estimate the RII for the specific measures of health in the belief that, in these cases, the frequency ratio between the poorest and richest quartiles of income was a more appropriate measure to evaluate the evolution of health inequalities.

RESULTS

Inequality in the distribution of average provincial income and of household equivalent income was smaller in 2000 than in 1985 (Table 1). Table 2 presents estimates for mortality and disability according to average provincial income. In general, mortality rates and disability prevalences were highest in the lowest income quartile and lowest in the highest income quartile, with the exception of mortality among those aged 25 to 44 years and prevalence of disability in 1985. Relative and absolute differences between the mortality rates for the poorest and richest quartiles were not significant in either year among individuals aged 25 to 44 years, whereas these differences were larger in 2000 than in 1985 among individuals aged 45 to 74 years.

In 1985 and 2000, the RIIs for mortality among men aged 45 to 74 years were 1.10 and 1.24, respectively, and the corresponding RIIs among women in this age group were 1.17 and 1.32. The relative and absolute differences between the disability prevalences in the poorest and richest quartiles were significant only for 2000. In 2000, disability RIIs were 1.74 among men and 1.46 among women in the 25- to 44-year age group and 1.78 among both men and women in the 45- to 74-year age group.

TABLE 1—Indicators of Income Distribution in Spain in 1985 and 2000

	1985	2000
Average provincial income ^a		
Ratio of maximum income to minimum income	2.88	2.27
Index score: (maximum income - minimum income) / national income	1.08	0.76
Household equivalent income ^b		
90/10 percentile ratio ^c	3.54	3.49
Percentage of population with less than 40% of mean income ^c	7.14	6.90

^aBased on gross domestic product per capita.

^bBased on household income data estimated from disability surveys.

^cEstimates based on Lorenz curve. The 90/10 percentile ratio refers to the ratio of the total income received by the 10% of the population with the highest incomes to the total income received by the 10% of the population with the lowest incomes.

Among individuals aged 25 to 44 years, mortality from all of the causes of death assessed in this study decreased between 1985 and 2000 (Table 3), whereas the mortality rate ratio between the poorest and richest provincial income quartiles increased for cardiovascular diseases and decreased for cancer and gastrointestinal diseases. Among those aged 45 to 74 years, mortality from all causes of death decreased in 2000 with the exception of mortality from cancer, which increased. The mortality rate ratio between the poorest and richest provincial income quartiles increased for cardiovascular diseases and gastrointestinal diseases and remained stable for cancer and respiratory diseases.

It can also be seen from Table 3 that the prevalences of all of the types of disability assessed here decreased between 1985 and 2000 except for the prevalence of disability related to personal care, which increased. In general terms, prevalence odds ratios between the poorest and richest provincial income quartiles for the different types of disability analyzed increased among individuals aged 45 to 74 years, whereas the evolution of the magnitude of prevalence odds ratios varied according to type of disability among individuals aged 25 to 44 years.

Table 4 shows disability estimates according to household equivalent incomes. In both periods, the highest prevalence of disability was seen among those in the lowest income quartile, and the lowest prevalence was observed among those in the highest quartile. Prevalence odds ratios, prevalence differences, and RIIs were higher in 2000 than in 1985. In the case of most types of disability

analyzed, the prevalence odds ratios between the poorest and richest income quartiles were higher in 2000 than in 1985.

DISCUSSION

Principal Findings

Differences in income between Spain's richest and poorest provinces and the country's richest and poorest residents decreased between 1985 and 2000. In contrast, differences in mortality and disability between the richest and poorest provinces and differences in disability between the richest and poorest citizens were greater, in both relative and absolute terms, in the period surrounding 2000 than in the period surrounding 1985. Differences in mortality among individuals aged 25 to 44 years, which were not significant in either period, were an exception. In general terms, RIIs for both summary health measures were also higher in 2000.

The increased inequality in total mortality observed in the 45- to 74-year age group was because of a larger proportional decrease in mortality in the richest areas, and this decrease in turn was partly attributable to larger declines in mortality from cardiovascular diseases. The contribution of gastrointestinal diseases was also important, because the proportional decrease in mortality from this cause was also greater in the richest areas. The proportional increase in mortality from cancer was similar in all areas, and thus its contribution to the trend of inequality in total mortality was insignificant. In the 25- to 44-year age group, there was also a larger proportional decrease in mortality from cardiovascu-

lar diseases in the richest areas, but its impact on inequality in total mortality was cushioned by a proportionally larger decrease in the other causes of death in the poorest areas.

The increased disability inequality observed was also because of proportionally larger reductions in disability in the richest areas and among the richest individuals. Since our definition of disability was not overly specific (i.e., a person was considered disabled if he or she had one or more of several disabilities), we were not able to determine whether this trend was because of the presence of certain single disabilities or to the simultaneous presence of several disabilities. Nevertheless, in the richest areas and among the wealthiest individuals, we observed proportionally larger reductions in prevalences of disabilities related to hearing, activities of daily living, moving about inside the home, and moving about outside the home.

Data Evaluation

In this study, we examined the parallel evolution of health inequalities and income inequality, but several authors have noted that income inequality is unlikely to have a short term effect on health problems.¹⁵⁻¹⁷ A life course approach has been proposed as the best alternative to determine the influence on specific health outcomes of income inequality across successive birth cohorts.^{15,17} In any event, Spain exhibited a declining trend in income inequality over the final 2 decades of the 20th century, lending importance to our study as a "natural experiment" assessing possible determinants of health inequalities.

As a result of a lack of information on personal income and other individual socioeconomic characteristics, we were able to estimate mortality inequalities only via mean provincial incomes. We probably would also have found an increase in mortality differences if data on personal income had been used, given the results of other studies showing increases in the 1980s in relative mortality differences according to social class and increases in the 1990s in absolute differences in life expectancy according to educational level in some Spanish provinces.^{18,19}

The relation observed between income and disability could have been a consequence of the effects of health on income, given that

TABLE 2—Mortality and Disability Prevalences According to Provincial Income Quartiles, Relative and Absolute Differences and Relative Indexes of Inequality: Spain, 1985 and 2000

	25-44 Years		45-74 Years	
	1985	2000	1985	2000
Mortality^a				
Men				
Age-standardized rate per 100 000 person-years				
Quartile 1	165.5	156.1	1675.1	1388.5
Quartile 2	180.6	159.2	1645.0	1348.2
Quartile 3	154.7	158.9	1587.4	1282.4
Quartile 4	168.6	154.7	1566.1	1202.9
Rate ratio (95% CI)	0.98 (0.94, 1.02)	1.01 (0.97, 1.05)	1.07 (1.05, 1.08)	1.15 (1.14, 1.17)
Rate difference (95% CI)	-3.8 (-10.8, 3.6)	1.4 (-4.1, 7.1)	93.5 (72.3, 115.0)	178.0 (160.1, 195.3)
RII (95% CI)	... ^b	... ^b	1.10 (1.08, 1.12)	1.24 (1.22, 1.26)
Women				
Age-standardized rate per 100 000 person-years				
Quartile 1	72.0	59.8	812.2	587.3
Quartile 2	80.3	62.9	813.0	566.8
Quartile 3	66.8	64.4	752.9	542.2
Quartile 4	68.9	62.6	727.8	489.0
Rate ratio (95% CI)	1.04 (0.98, 1.12)	0.95 (0.90, 1.01)	1.11 (1.09, 1.13)	1.20 (1.18, 1.22)
Rate difference (95% CI)	3.0 (1.6, 8.0)	-2.9 (-6.3, 0.7)	77.1 (62.7, 91.8)	99.1 (88.3, 110.2)
RII (95% CI)	... ^b	... ^b	1.17 (1.14, 1.20)	1.32 (1.28, 1.35)
Disability^c				
Men				
Age-standardized prevalence per 1000 population				
Quartile 1	56.4	45.1	190.2	150.0
Quartile 2	55.6	46.6	177.6	135.9
Quartile 3	44.0	30.3	173.3	101.2
Quartile 4	46.8	31.6	189.5	102.8
Prevalence odds ratio (95% CI)	1.60 (0.98, 2.63)	1.37 (1.12, 1.68)	1.11 (0.79, 1.54)	1.45 (1.21, 1.74)
Prevalence odds difference (95% CI)	3.3 (-0.1, 8.8)	12.5 (4.1, 22.9)	8.2 (-16.2, 42.3)	54.4 (25.0, 89.6)
RII (95% CI)	1.89 (0.95, 3.76)	1.74 (1.28, 2.36)	... ^b	1.78 (1.38, 2.30)
Women				
Age-standardized prevalence per 1000 population				
Quartile 1	49.2	33.5	203.5	175.6
Quartile 2	42.3	32.8	181.3	157.8
Quartile 3	42.4	22.8	179.9	119.1
Quartile 4	51.2	28.9	203.9	127.2
Prevalence odds ratio (95% CI)	1.61 (0.96, 2.69)	1.22 (0.99, 1.50)	1.12 (0.72, 1.74)	1.42 (1.12, 1.81)
Prevalence odds difference (95% CI)	3.5 (-0.2, 9.7)	6.3 (-0.2, 14.4)	12.5 (-28.7, 76.4)	59.2 (16.9, 112.8)
RII (95% CI)	... ^b	1.46 (1.06, 1.99)	... ^b	1.78 (1.26, 2.52)

Note. Quartile 1 = poorest; Quartile 4 = richest; CI = confidence interval; RII = relative index of inequality. Rate ratios (or differences) and prevalence odds ratios (or differences) refer to comparisons of the poorest versus the richest. RIIs reflect the relative rates of mortality (or prevalences of disability) for the hypothetically poorest versus the hypothetically richest areas.

^aEstimates based on 285 857 deaths and 55 320 000 person-years for 1985 and on 265 860 deaths and 62 342 000 person-years for 2000.

^bP for trend >.05.

^cSample sizes were 184 343 for 1985 and 167 186 for 2000.

disability can cause impoverishment. Furthermore, levels of impoverishment among individuals with disabilities could have been responsible for the increased differences in disability prevalences according to level of income. How-

ever, when we analyzed prevalence of disability according to educational level of the head of household, we also observed an inverse gradient; likewise, the magnitude of this gradient was larger in 2000 (data not shown). It might

be suggested as well that bias explained the increased differences in disability prevalences by average provincial incomes, since no differences were seen in 1985. However, we found no evidence that people without disabilities

TABLE 3—Age-Standardized Mortality Rates From Leading Causes and Prevalences of Major Disabilities, According to Provincial per Capita Income Quartiles: Spain, 1985 and 2000

	25-44 Years		45-74 Years	
	1985	2000	1985	2000
Mortality				
Cancer				
Quartile 1	28.4	24.8	385.4	395.0
Quartile 4	25.9	25.6	366.7	382.2
Rate ratio (95% CI)	1.10 (1.02, 1.18)	0.97 (0.91, 1.03)	1.05 (1.03, 1.07)	1.03 (1.01, 1.05)
Cardiovascular disease				
Quartile 1	22.9	13.7	458.1	286.4
Quartile 4	25.6	11.8	424.3	207.5
Rate ratio (95% CI)	0.90 (0.83, 0.97)	1.17 (1.07, 1.28)	1.08 (1.06, 1.10)	1.39 (1.35, 1.42)
Respiratory disease				
Quartile 1	4.2	3.8	102.7	76.4
Quartile 4	4.5	4.2	80.0	61.3
Rate ratio (95% CI)	0.94 (0.78, 1.14)	0.92 (0.78, 1.08)	1.27 (1.22, 1.33)	1.24 (1.20, 1.29)
Gastrointestinal disease				
Quartile 1	10.9	6.2	97.3	63.7
Quartile 4	10.0	6.1	92.2	52.0
Rate ratio (95% CI)	1.23 (1.08, 1.39)	1.01 (0.89, 1.15)	1.05 (1.01, 1.09)	1.22 (1.17, 1.27)
Disability				
Seeing				
Quartile 1	7.5	7.8	46.8	45.0
Quartile 4	5.6	7.0	32.2	31.3
Prevalence OR (95% CI)	1.24(0.83, 1.85)	1.19 (0.85, 1.66)	1.58 (1.23, 2.02)	1.43 (1.08, 1.90)
Hearing				
Quartile 1	7.9	6.3	35.2	34.8
Quartile 4	8.7	5.7	47.3	31.3
Prevalence OR (95% CI)	0.90 (0.70, 1.17)	1.10 (0.80, 1.50)	0.83 (0.66, 1.04)	1.13 (0.89, 1.44)
Personal care				
Quartile 1	5.0	7.6	19.1	28.8
Quartile 4	2.4	3.9	9.9	14.2
Prevalence OR (95% CI)	2.13 (1.65, 2.76)	1.88 (1.36, 2.61)	1.90 (1.45, 2.50)	1.94 (1.59, 2.37)
Activities of daily living				
Quartile 1	5.3	5.2	40.9	25.6
Quartile 4	5.7	5.2	41.8	14.2
Prevalence OR (95% CI)	1.26 (0.84, 1.91)	1.13 (0.84, 1.51)	1.20 (0.77, 1.85)	1.40 (1.09, 1.79)
Moving inside the house				
Quartile 1	5.5	5.6	33.8	35.0
Quartile 4	4.6	4.1	35.2	17.0
Prevalence OR (95% CI)	1.42 (0.93, 2.17)	1.54 (1.12, 2.11)	1.10 (0.91, 1.34)	1.92 (1.53, 2.39)
Moving outside the house				
Quartile 1	17.7	16.2	140.6	83.0
Quartile 4	14.2	11.6	127.8	49.5
Prevalence OR (95% CI)	1.54 (1.14, 2.07)	1.51 (1.22, 1.87)	1.21 (0.93, 1.57)	1.69 (1.37, 2.08)

Note. CI = confidence interval; OR = odds ratio. Quartile 1 = poorest; Quartile 4 = richest. Mortality rates were calculated per 100 000 person-years; disability prevalences were calculated per 1000 population. Rate ratios and prevalence ORs refer to poorest versus richest income quartiles.

emigrate to richer provinces or that people with disabilities emigrate to poorer ones.

In the 25- to 44-year age group, trends in the relationship of mean provincial income to mortality stemming from different causes and to prevalence of different types of disability were highly heterogeneous: in some cases the magnitude of the relation increased, in other cases it decreased, and in still others it remained stable. These heterogeneous results were probably because of poor classification of the measure of exposure—mean income level in area of residence—in this age group, since changes in residence among provinces are more frequent among young adults than among those older than 44 years.

We estimated both relative and absolute measures. Our objective from a public health perspective was to identify the problems representing the greatest population burdens, and, in such an analysis, absolute measures are more appropriate than relative ones. The greatest reductions in health inequalities will be achieved when interventions focus on the health problems that occur most frequently, even if problems that occur less frequently show a pronounced gradient in relative terms. However, relative measures are equally appropriate in evaluations of the effects of public policies. Comparisons of health inequalities over time and between areas may well require the use of various types of estimates.^{12,20,21} In any case, there is no reason for uncertainty in interpreting the results of our study, since the magnitudes of both measures were greater in 2000 than in 1985.

The differences in disability according to provincial income and their evolution could reflect the effects on health of the individual socioeconomic characteristics of the residents of each province. When we adjusted for equivalent household incomes, however, the relation between disability and average provincial income in 2000 did not disappear, although the prevalence odds ratio for the overall population declined from 1.44 (95% confidence interval [CI]=1.20, 1.73) to 1.22 (95% CI=1.03, 1.47).

Comparison With Other Studies and Possible Explanations

Few studies have examined the simultaneous evolution of socioeconomic inequalities

TABLE 4—Disability Prevalences According to Income Level, Along With Relative and Absolute Prevalence Differences and Relative Indexes of Inequality: Spain, 1985 and 2000

	25-44 Years		45-74 Years	
	1985	2000	1985	2000
Men				
Age-standardized prevalence per 1000 population				
Quartile 1	73.5	59.7	212.4	170.2
Quartile 2	50.7	47.6	183.1	148.3
Quartile 3	44.2	38.7	187.5	114.3
Quartile 4	30.7	20.3	151.7	76.6
Prevalence odds ratio (95% CI)	2.58 (2.22, 2.99)	3.01 (2.55, 3.55)	1.45 (1.36, 1.54)	2.20 (1.99, 2.43)
Prevalence difference (95% CI)	48.3 (37.4, 61.0)	40.6 (31.3, 51.6)	65.4 (52.6, 79.1)	81.2 (67.0, 96.8)
RII (95% CI)	3.74 (3.38, 4.53)	4.06 (3.62, 5.00)	1.59 (1.53, 1.72)	2.44 (2.30, 2.72)
Women				
Age-standardized prevalence per 1000 population				
Quartile 1	58.2	44.5	209.3	201.1
Quartile 2	50.2	42.7	206.9	164.7
Quartile 3	48.8	28.5	194.0	134.0
Quartile 4	31.8	16.3	164.8	90.2
Prevalence odds ratio (95% CI)	1.92 (1.65, 2.24)	2.89 (2.39, 3.49)	1.29 (1.22, 1.37)	2.10 (1.92, 2.29)
Prevalence difference (95% CI)	29.0 (20.4, 39.1)	30.6 (22.5, 40.4)	46.9 (35.3, 59.2)	85.2 (71.1, 100.6)
RII (95% CI)	2.25 (2.03, 2.72)	4.12 (3.62, 5.22)	1.38 (1.33, 1.48)	2.20 (2.09, 2.41)

Note. CI = confidence interval; RII = relative index of inequality. Quartile 1 = poorest; Quartile 4 = richest. Incomes were estimated from 170 546 individuals in 1985 and 146 216 individuals in 2000 with information on household income. Prevalence odds ratios (and differences) refer to poorest versus richest income quartiles. RIIs reflect the relative prevalence of disability among the hypothetically poorest versus hypothetically richest person in the population.

and health inequalities. One exception is a study conducted in Holland that showed stabilization in income inequality during the final 2 decades of the 20th century, together with a more or less stable magnitude of inequalities in various health problems and a substantial increase in inequality in terms of less than optimal self-assessed health.²²

Another way to compare our results with those of other investigations is to assess the evolution of socioeconomic inequalities in health, on the one hand, and the evolution of the distribution of income inequality, on the other, in various countries. During the 1980s and 1990s, increased inequality in terms of less than optimal self-assessed health according to income level was observed in both the Nordic countries and Germany, where income inequality remained stable, as well as in the United Kingdom, where income inequality increased during this period.^{9,23,24} Likewise, in the final third of the 20th century, there were continuous relative increases in inequality in

mortality according to occupation and other indicators reflecting material conditions in countries with available data: the United Kingdom,^{4,25} the United States,^{26,27} and the Nordic countries.^{11,28-30} However, income inequality decreased or remained stable up to the beginning of the 1980s in the United Kingdom and the United States and up to the early 1990s in the Nordic countries.⁹

It is normally assumed that reductions in income inequality will lead to differences in terms of improvements in the health of lower socioeconomic groups. However, the studies just cited show that such improvements have been proportionally larger in higher socioeconomic groups. Likewise, the increased health inequalities observed in the present study reflect the fact that their frequency in the poorer provinces of Spain and among individuals with low incomes has decreased to a lesser degree than in the wealthier provinces and among individuals with higher incomes. A possible explanation is increased inequalities in proximal

determinants of health such as smoking, poor nutrition, excessive alcohol consumption, and lack of physical activity. However, there are several reasons to believe that these factors were probably of little importance.

For example, Rodriguez-Artalejo et al. noted that material deprivation explains most of the provincial variability in cardiovascular mortality—the cause of death for which the increase in inequality was greatest—whereas the proximal determinants of health contribute very little to this variability.³¹ In addition, although the present results were similar among men and women, smoking trends have been shown to vary according to gender; smoking has decreased among men and increased among women, especially in the upper socioeconomic groups.³² Neither have socioeconomic differences been observed in adherence to the Mediterranean diet (given that adherence to this diet has shown an inverse association with mortality).³³ Finally, these proximal determinants of health cannot be considered fundamental risk factors in the occurrence of certain health problems such as disabilities.

Some researchers have pointed out that, although health inequalities in England and Wales have increased no more than in other developed countries, the international literature on trends in health inequalities is dominated by reports from these areas.^{23,34} Likewise, the idea that reducing income inequality will decrease health inequalities has been disseminated by British authors, despite the fact that there is no evidence that reducing income inequality leads to reduced health inequalities.^{35,36} As pointed out by Deaton,³⁷ income redistribution policies will not easily reduce health inequalities because they are usually accompanied by other social policies that provide more benefits to individuals at higher education levels, who in turn have higher incomes and are in better health.

It may well be that the “inverse equity hypothesis” suggested by others to explain how health inequalities evolve in response to public health interventions in developing countries³⁸ can be applied to developed countries as well. In fact, wealthier areas and richer individuals probably benefit to a greater extent from improved health-related conditions in the physical, economic, and social environments that normally accompany income distribution

policies. Only when the rich have reached a certain level of improved health status—beyond which socioeconomic interventions are unlikely to produce substantial further improvements—will the poor begin to catch up and health inequalities begin to be reduced.

In summary, in this study we found that inequality in the distributions of average provincial income and of household equivalent income in Spain were smaller in 2000 than in 1985; in contrast, there was an immense increase in health inequalities between 1985 and 2000. Our results show that income redistribution might achieve greater social justice but probably does not reduce health inequalities, despite the improved material circumstances and health indicators of the more disadvantaged segments of the population. ■

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This article was accepted February 18, 2005.

Contributors

E. Regidor and E. Ronda originated the study. E. Regidor, C. Pascual, and D. Martínez performed the data analysis. M.E. Calle and V. Domínguez contributed to the drafting of the article. E. Regidor coordinated the writing of the article. All of the authors contributed to the final version.

Human Participant Protection

No protocol approval was needed for this study.

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