## Letters to the Editor

### Cardiovascular Disease and Gross Domestic Product in Spain. Health and Policy

### *Enfermedad cardiovascular y producto interior bruto en España. Salud y política*

**To the Editor,**

The scientific letter by Escaño-Marín et al.[1] contains a number of assumptions that need to be qualified in view of the limitations in the study's ecological design and the important health policy implications.

Regional per capita income shows an association with cardiovascular disease mortality ($r$ = –0.738; $P < .01$) and, to a greater extent, with all-cause mortality ($r$ = –0.781; $P < .01$) (Figure 1). Social determinants are major contributors to cardiovascular risk (CVR)[2] and to health inequalities between countries, regions, and socioeconomic groups.[3] However, we question the authors' conclusion "that the wealth of a region should be taken into account when estimating CV risk" and their proposal to use this measure "to help ensure appropriate resource assignment and to evaluate the success or failure of health policies." Given that CVR is determined in individuals,[4] it would seem more appropriate for CVR estimates to consider social indicators such as unemployment, social exclusion, and educational level.

The association between per capita income and mortality led the authors to conclude that "regions with a lower socioeconomic status may be at greater CV risk." In our view, this assertion mixes up or confuses individual risk with the regional ecological association between income and mortality and implies that poorer regions are likely to have worse prevention and risk-factor control and "a lower degree of control and prevention of these factors and greater barriers to accessing the health system." We find this argument questionable in light of international experience showing widely differing public health indicators between regions with similar per capita incomes. These differences are closely related to policies addressing social inequality, especially those related to revenue and spending, employment, housing, and family support. In Spain, for example, there is little or no significant correlation between per capita gross domestic product and per capita public health spending ($r$ = 0.150; $P$ = .566) (Figure 2); moreover, the available evidence indicates that the Spanish National Health Service is effective at preventing inequalities both in access to diagnosis and treatment and in control of CVR risk factors.[5] Interregional inequalities in CVR are explained not by uneven health care provision, but by social determinants.[5]

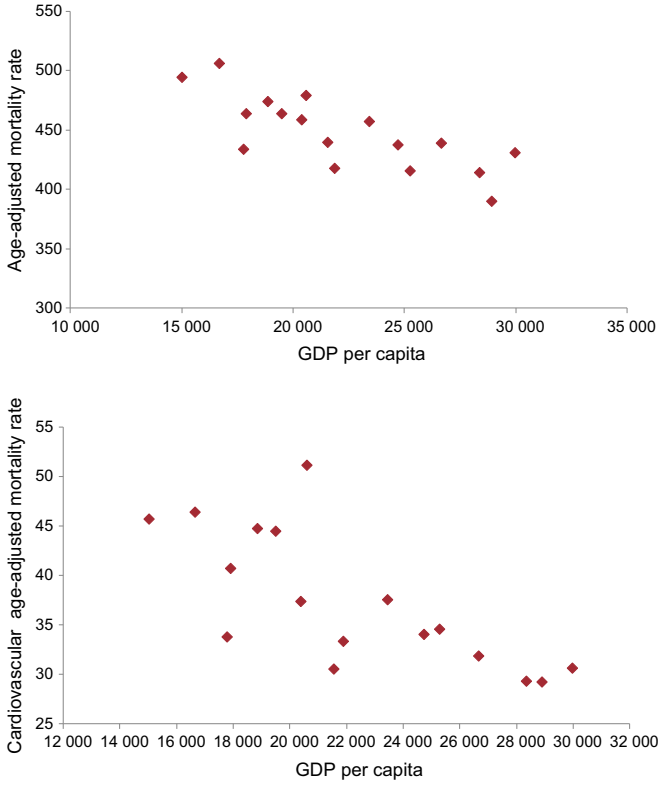


**Figure 1.** Correlation of all-cause and cardiovascular mortality with regional GDP per capita in Spanish autonomous regions. Population data are from the INE (2013), corrected for National Health System cover in 2012. GDP data were obtained from the INE Regional Accounts. Age-adjusted mortality rates were from the MSSSI. GDP, gross domestic product; INE, Spanish National Institute of Statistics (*Instituto Nacional de Estadística*); MSSSI, Ministry of Health, Social Services, and Equality (*Ministerio de Sanidad, Servicios Sociales e Igualdad*).

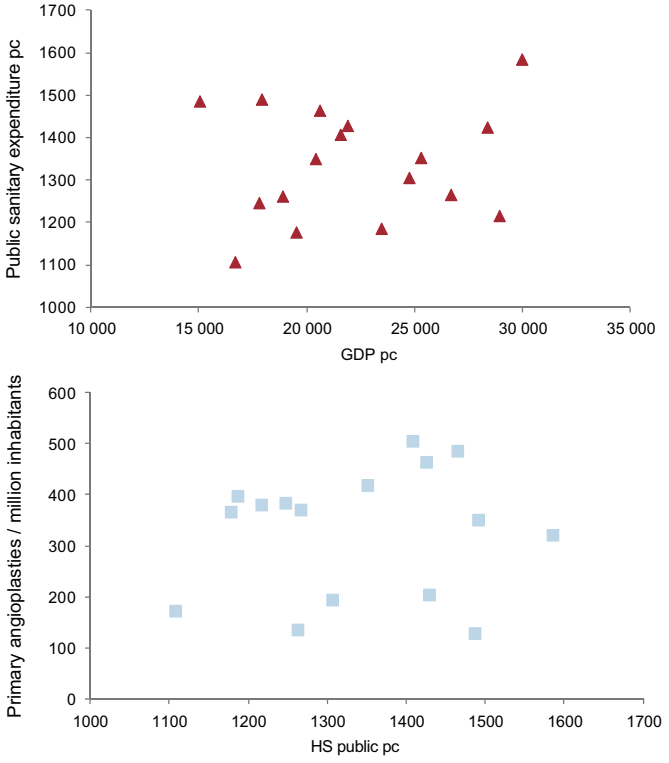


**Figure 2.** Correlation between per capita public health spending and GDP per capita and between regional primary angioplasty rate and per capita public health spending in Spanish autonomous regions (MSSSI public health spending figures, 2012-2014). Primary angioplasty data are from the *Registro de Hemodinámica y Cardiología Intervencionista* (Interventional Cardiology Hemodynamics Registry); GDP, gross domestic product; HS, health spending; MSSSI, Ministry of Health, Social Services, and Equality (*Ministerio de Sanidad, Servicios Sociales e Igualdad*); pc, per capita.

The regional differences in per capita public health spending in Spain reflect the high level of discretion enjoyed by regional authorities in defining policies aimed at tackling social deprivation and related health inequalities. There is only a weak and nonsignificant correlation between per capita health expenditure and primary angioplasty rates in the Spanish autonomous communities ($r$ = 0.117; $P$ = .667) (Figure 2); however, the introduction of regional primary angioplasty systems shows an association with both procedure rates and reduced in-hospital mortality due to acute myocardial infarction.[6]

The state financing system for the Spanish autonomous communities includes provision for resource redistribution to support regions with a lower per capita income. Once resources are assigned, it is then the responsibility of the health service in each autonomous community to ensure that they are used efficiently. One indicator of efficient resource use is the introduction of effective policies to combat social inequality; another might be the rate of primary angioplasty to treat ST-segment elevation acute coronary syndrome.

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## REFERENCES

1. Escaño-Marín R, Pérez-Belmonte LM, Rodríguez de la Cruz E, Gómez-Doblas JJ, De Teresa-Galván E, Jiménez-Navarro M. Enfermedad cardiovascular y producto interior bruto en España: análisis de correlación por comunidades autónomas. *Rev Esp Cardiol.* 2017;70:210–212.
2. Mendis S, Puska P, Norrving B, eds. In: *Global atlas on cardiovascular disease prevention and control.* Geneva: World Health Organization; 2011. [accessed 15 Sep 2016]. http://www.who.int/cardiovascular_diseases/publications/atlas_cvd/en/.
3. Marmot M. Social determinants of health inequalities. *Lancet.* 2005;365:1099–1104.
4. Cordero A, Galve E, Bertomeu-Martínez V, et al. Tendencias en factores de riesgo y tratamientos de pacientes con cardiopatía isquémica estable atendidos en consultas de cardiología entre 2006 y 2014. *Rev Esp Cardiol.* 2016;69:401–407.
5. Redondo A, Benach J, Subirana I, et al. Trends in the prevalence, awareness, treatment, and control of cardiovascular risk factors across educational level in the 1995-2005 period. *Ann Epidemiol.* 2011;21:555–563.
6. Cequier Âaue, Ariza-Solé A, Elola FJ, et al. Impact on mortality of different network systems in the treatment of ST-segment elevation acute myocardial infarction. The Spanish experience. *Rev Esp Cardiol.* 2017;70:155–161.

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## Wealth, Mortality and Primary Angioplasty

### *Riqueza, mortalidad y angioplastia primaria*

**To the Editor,**

We have read the study by Escaño-Marín et al.[1] with great interest and would like to congratulate the authors on their contribution to defining the relationship between socioeconomic markers and health outcomes. This subject has received insufficient attention in the literature and is, moreover, largely overlooked by cardiologists, despite its profound health policy implications. In their study, the authors show that low regional gross domestic product correlates with elevated cardiovascular mortality and a relatively low primary angioplasty rate. Although the authors do not explicitly assign cause, the article implies that the lower regional mortality in richer autonomous communities is in some way related to a higher rate of primary angioplasty. Independently of their wealth, almost all the Spanish autonomous communities have programs in place for early reperfusion after acute myocardial infarction. Using the data reported in the study, we have analyzed the correlation between the number of primary angioplasty procedures and the geographical area of the autonomous communities (excluding the Balearic and Canary Islands); this analysis reveals that autonomous community size is inversely related to the number of primary angioplasty procedures (Figure). The appropriate quality measure in the treatment of infarction is not primary angioplasty, but appropriate and timely reperfusion (the inapt slogan *Stent for life* should instead be *Reperfusion for life*).

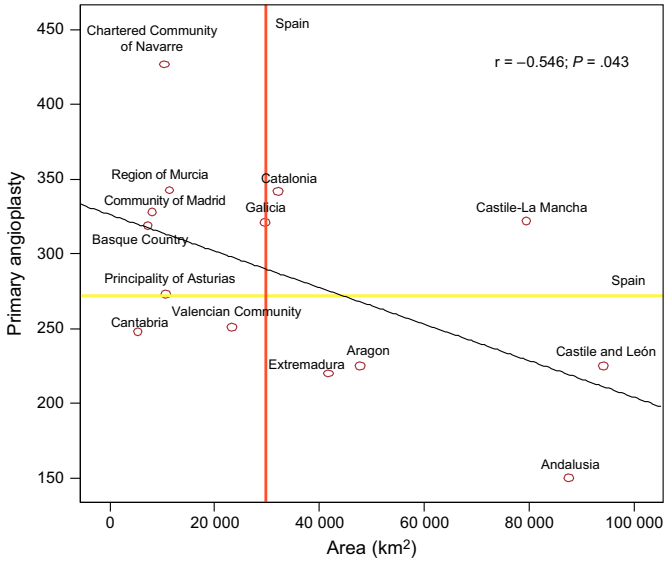


**Figure.** Correlation between the number of primary angioplasty procedures and the geographical size of Spanish autonomous communities, excluding the Balearic and Canary islands.

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