

### Trends and correlates of the public's perception of healthcare systems in the European Union: a multilevel analysis of Eurobarometer survey data from 2009 to 2013

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# BMJ Open Trends and correlates of the public's perception of healthcare systems in the European Union: a multilevel analysis of Eurobarometer survey data from 2009 to 2013

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## ABSTRACT

**Objective** The aim of the study is to assess trends in public perceptions of health systems in 27 European Union (EU) member states following the financial crisis (2009–2013), in order to discuss observed changes in the context of the financial crisis.

**Design** Repeated cross-sectional studies.

**Setting** 27 EU countries.

**Participants** EU citizens aged 15 years and older.

**Methods** The study mainly uses the Eurobarometer Social Climate Survey, conducted annually between 2009 and 2013, thereby analysing 116 706 observations. A multilevel logistic regression was carried out to analyse trends over time and the factors associated with citizens' perceptions of their healthcare systems.

**Results** Europeans generally exhibit positive perceptions of their national healthcare systems, 64.0% (95% CI 63.6% to 64.4%). However, we observed a significant drop in positive perceptions in the years following the crisis, especially within countries most affected by the crisis. Concerning fiscal characteristics, wealthier countries and those dedicating higher proportion of their national income to health were more likely to maintain positive perceptions. At the individual level, perceptions of healthcare systems were significantly associated with respondents' self-perceptions of their social status, financial capacity and overall satisfaction in life.

**Conclusions** Our finding confirms previous observations that citizens' perceptions of their healthcare systems may reflect their overall prospects within the broader socioeconomic systems they live in; which have in turn been affected by the financial crisis and the policy measures instituted in response.

## Strengths and limitations of this study

- This study uses a large sample size and includes data from 27 European Union countries.
- The cross-sectional nature of the study limits the potential to make causal associations between the crisis and changes in the perceptions.
- The Eurobarometer survey used a single question to assess citizens' perceptions, rather than using composite indices to be able to capture the multidimensional nature of 'public perception', more comprehensively.

citizens' out-of-pocket expenditure, which in turn affected people's access to care.<sup>1 3</sup> The broader socioeconomic effects of the crisis such as rising unemployment, income reduction, increased out-of-pocket spending (through coinsurance and shared payments) and retrenchment of welfare support were more pronounced in the most affected countries, which had also instituted stringent austerity measures (eg, Greece, Spain, Ireland and Portugal).<sup>1 4</sup> While a full account of the effects of the crisis in terms of mortality and morbidity rates may take several years, early health effects have already been documented in these countries in the form of rising mental disorders, high suicide rates and deteriorating access to services.<sup>1 4 5</sup> In contrast, some countries followed a different path in their responses to the crisis by implementing a fiscal stimulus package and investing in social protection (Germany) or protecting their health budgets (Belgium, Denmark, the UK).<sup>1</sup>

In light of the above, there is growing interest in studying the consequences of the crisis on health systems, as well as the different trajectories of healthcare systems across countries which may correlate to the differences

## INTRODUCTION

The global financial crisis that started in 2008 has precipitated major economic and financial impacts, and prompted austerity policy responses across Europe; majorly austerity and public sector retrenchment policies.<sup>1 2</sup> Most of the healthcare reforms following the financial crisis involved cuts to public services and a related increase in



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in the type of policy responses adopted to mitigate the effects of the crisis. In this regard, mortality and morbidity data as well as healthcare access and quality data constitute the primary measures of interest for gauging effects on health systems. Beyond these measures, public perception metrics have also become integral to cross-country and across-time comparisons of health systems; which are in turn a reflection of the shift towards people-centred health systems and the corresponding emphasis on responsiveness of health systems.<sup>6,7</sup> Technically, public perception surveys are known to represent a mixture of citizens' personal experiences with the healthcare system on the one hand, and their broader views of the system on the other.<sup>8</sup> Unlike satisfaction surveys, where patients are typically surveyed after an episode of service use to evaluate their experiences in receiving care, the results of public perception surveys are known to be influenced by wide ranging factors: respondents' views on the general state of affairs in the country<sup>8</sup>; the national political debate around the nature, effectiveness and constitution of the health system; culture of support for the welfare state in the country and portrayals of the health system in the media.<sup>6,9</sup> Still, findings of public perception surveys are used to compare and explain distinct changes over time in healthcare systems in different countries<sup>6,7</sup>; to validate and argue for the impacts of particular health policy reforms<sup>10</sup>; to counter expert opinions on the ranking of national health systems<sup>8</sup> and to ascertain people's perspectives on aspects of health policy such as levels of government financing of healthcare.<sup>11</sup>

The aim of our study is to assess trends in public perceptions of health systems in 27 European Union (EU) member states between 2009 and 2013, in order to discuss observed changes in the context of the financial crisis and the European governments' responses to it.

## METHODS

### Data sources

To evaluate EU citizens' perceptions of their healthcare systems, this study used data from the Eurobarometer Social Climate Survey between 2009 and 2013 as well as other public data sources. The Eurobarometer is a series of public opinion surveys that consists of approximately 1000 face-to-face interviews per country with individuals aged 15 years and older.<sup>12</sup>

A multistage random (probability) sampling design was applied in all member states.<sup>13</sup> To ensure the samples are representative of the population, each sample was weighted according to a national weighting procedure for sex, age and region. Since country samples are approximately the same size ( $n=1000$ ), population size weighting factors were used to ensure that each country is represented in proportion to its population size.<sup>14</sup> The specific Eurobarometer waves that were analysed were 71.2 (2009), 73.5 (2010), 75.4 (2011), 77.4 (2012) and 79.4 (2013). Their sample size for each wave was 26 756, 26 691, 26 840, 26 622 and 26 680, respectively.

### Measures

The variable representing citizens' perception of the healthcare system is based on the question, "How would you judge the current situation in each of the following: healthcare provision in (OUR COUNTRY)?" Responses were dichotomised into 'positive perceptions' ('Very good' and 'Rather good') and 'negative perceptions' ('Very bad' and 'Rather bad'). 'Don't know' responses were treated as missing responses and were excluded from the analysis.

The individual-level factors were treated as categorical variables in the model. Age was divided into seven groups (15–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75 years and older), with the oldest age group (75 years and older) set as the reference group. Gender was reported as male and female. Area of residence was divided into three groups ('Rural area or village', 'Small or middle sized town' and 'Large town') based on self-report. Respondents' marital status was divided into three categories ('Single', 'Married or Living with a partner' and 'Separated, Divorced or Widowed').

The Eurobarometer survey lacked a specific question regarding income, whereby the following question was used as proxy for measuring financial status: "During the last twelve months, would you say you had difficulties to pay your bills at the end of the month?". Possible answers were categorised into two ('Almost never' vs 'From time to time' and 'Most of the time'). Self-perception of respondents' position in society was assessed with a question asking what level they would place themselves in. The survey offered 10 levels (1 being the lowest level). For simplicity three categories were created for the purposes of analysis (Low=levels 1–4, Middle=levels 5–6, High=levels 7–10). Individuals were also asked about their age of completion of full-time education ( $\leq 15$ , 16–19, 20–22,  $\geq 23$  years old).

The Eurobarometer Social Climate Survey also asked respondents about their overall satisfaction with the life they lead. Recent studies have not analysed this factor in depth, however, Cleary and McNeil<sup>15</sup> suggest a correlation between an individual's satisfaction with healthcare and their overall life satisfaction. Therefore, the variable was included in the model. The possible answers respondents could choose from were 'Very satisfied', 'Fairly satisfied', 'Not very satisfied' and 'Not at all satisfied'. The four categories were included in the model, with 'Not at all satisfied' set as the reference group.

Given that various studies have demonstrated an association between citizens' perceptions of the healthcare system and national-level macroeconomic and social indicators, we collected these data from the World Bank and WHO to include in the analysis.<sup>16,17</sup> Gross domestic product (GDP) per capita, total expenditure on health as per cent of GDP and government expenditure on health as per cent of total expenditure on health were included in the model and were treated as continuous variables (online supplementary tables 1 and 2). The GDP variable was recoded so that results are presented for Purchasing

Power Parity (PPP)\$1000 changes in GDP per capita. Government expenditure on health as per cent of total expenditure on health was also recoded so that results are presented for a 10% increase.

### Statistical analysis

A multilevel logistic regression (member state being the higher level of analysis) was carried out in STATA V.13.0 in order to analyse trends over time and the factors associated with citizens' perceptions of their healthcare system. The dependent variable in the analysis was citizens' perceptions of the healthcare system. The independent variables included in the model were year of the survey, gender, age, marital status, area of residence (rural, small town or large town), employment status, place/level in society, difficulty paying bills, education, life satisfaction, GDP per capita, total expenditure on health as per cent of GDP and government expenditure on health as per cent of total expenditure on health. The year variable included in the model was treated as a categorical variable. The dataset initially included 133589 observations, however, due to a lack of sufficient data regarding national-level variables, Lithuania was excluded from the analysis (accounting for 5135 missing observations). The remainder of the missing observations related to 'Don't know' responses in the survey, which were also excluded from the analysis. Survey weights provided in the original Eurobarometer datasets were used in descriptive analyses, as needed, in order to account for the complexity of the study design.

A sensitivity analysis was performed excluding life satisfaction from the model, since the direction of causality could be debatable. Finally, in order to examine trends in individual countries and explore differences in citizens' perceptions across the various countries, logistic regressions were conducted including the 'year' variable and individual-level variables for each EU member state separately.

## RESULTS

A complete description of survey respondents' sociodemographic characteristics for the corresponding years can be found in online supplementary table 3. European citizens tend to have a positive perception of their healthcare system, which can be seen in the descriptive statistics presented in table 1. In 2009, 64.9% of respondents, across the EU, stated that healthcare provision in their country was either 'Very good' or 'Rather good'. This proportion was about the same in 2013, and there appears to be little variation from year to year. The unadjusted relationships between positive perceptions of healthcare provision and sociodemographic characteristics are shown in table 1, in which the proportion of positive perceptions exceeded 50% in almost all the groups, except for those who stated they were not satisfied with their lives overall. Regarding the national-level variables, there appears to be an increasing trend in the

proportion of positive perceptions when moving from the lowest quartile to the highest quartile for GDP per capita, total expenditure on health as per cent of GDP, and government expenditure on health as per cent of total expenditure on health.

The number of observations included in the multilevel logistic regression analysis after accounting for missing data was 116706. Looking at the regression results presented in table 2, there appears to be significant decrease in positive perceptions. Respondents in 2013 had 15% lower odds (95% CI 10% to 20%) of having a positive perception of healthcare provision in comparison to respondents in 2009 ( $P < 0.001$ ).

With regard to individual-level variables, the unadjusted and adjusted results appear to be compatible. Respondents who had difficulty paying their bills 'sometimes or most of the time' had approximately 20% lower odds (95% CI 16% to 21%) of reporting that healthcare provision in their country was good when compared with those who 'Almost never' had difficulty paying their bills (table 2). Moreover, self-perceptions of position in society (society level) appear to be positively and significantly related to good perceptions of the healthcare system. Those who considered themselves to belong to higher ranks in society had 27% higher odds (95% CI 21% to 32%) of having good perception than those who placed themselves in a low societal level. Regarding life satisfaction, individuals who were 'Very satisfied' with the life they lead had five times the odds of having a good perception of healthcare provision, relative to individuals who were 'Not at all satisfied'.

GDP per capita and total expenditure on health as a per cent of GDP were positively and significantly associated to good perceptions of healthcare systems. The odds of reporting good perceptions of the healthcare system increased by 8% (95% CI 7% to 9%) for every PPP\$1000 increase in GDP per capita. A positive association was also evident between total expenditure on health and healthcare perceptions, in which a 1% increase in total expenditure on health as a per cent of GDP increased the odds that citizens would have a good perception of their healthcare system by 17% (95% CI 11% to 24%).

### Country-specific results

The proportion of individuals who reported positive perceptions of their country's healthcare system varied between countries. The unadjusted proportions for each of the countries between 2009 and 2013 can be found in online supplementary table 4. Overall, data from Belgium, the Netherlands, Luxembourg and Austria revealed the highest proportions of positive perceptions. At the other end of the spectrum were Greece, Bulgaria and Romania which had the lowest proportion of respondents reporting positive perceptions (below 30%). Figure 1 illustrates the change in perceptions across countries over the years, specifically comparing the per cent of respondents with good perceptions of the healthcare system in 2009 and 2013. In examining the results, it is

**Table 1** Descriptive statistics of positive perceptions of healthcare provision among European Union citizens between 2009 and 2013

Variable	Per cent of respondents with positive perceptions of healthcare provision	95% CI
<b>Year</b>		
2009	64.9	64.0 to 65.8
2010	64.9	64.0 to 65.8
2011	62.9	62.0 to 63.8
2012	63.3	62.4 to 64.2
2013	64.0	63.1 to 64.9
<b>Gender</b>		
Male	65.3	64.7 to 65.8
Female	62.8	62.3 to 63.3
<b>Age</b>		
75 years and older	70.1	68.8 to 71.4
65–74 years	64.5	63.4 to 65.6
55–64 years	61.9	60.9 to 62.8
45–54 years	62.2	61.2 to 63.4
35–44 years	61.6	60.7 to 62.6
25–34 years	62.6	61.6 to 63.6
15–24 years	68.9	67.8 to 70.0
<b>Marital status</b>		
Single	68.1	67.2 to 68.9
Married or living with a partner	62.9	62.3 to 63.4
Separated/divorced/widowed	62.3	61.4 to 63.3
<b>Area of residence</b>		
Rural area or village	63.8	63.1 to 64.4
Small/middle town	65.3	64.6 to 65.9
Large town	62.1	61.4 to 62.9
<b>Employment status</b>		
Unemployed	57.3	55.9 to 58.7
Not working	64.8	64.2 to 65.4
Employed	64.5	63.9 to 65.0
<b>Society level</b>		
Low	53.6	52.7 to 54.4
Middle	65.1	64.5 to 65.7
High	71.2	70.4 to 71.9
<b>Difficulty paying bills</b>		
Almost never	70.8	70.3 to 71.3
Sometimes or most of the time	53.4	52.7 to 54.0
<b>Education</b>		
15 years and below or no full-time education	61.6	60.7 to 62.5
16–19 years	62.6	62.0 to 63.2
20–22 years	68.4	67.3 to 69.4
23 years and older	68.4	67.4 to 69.3

Continued

**Table 1** Continued

Variable	Per cent of respondents with positive perceptions of healthcare provision	95% CI
<b>Life satisfaction</b>		
Not at all satisfied	26.5	24.9 to 28.1
Not very satisfied	39.1	38.1 to 40.1
Fairly satisfied	67.4	66.9 to 67.9
Very satisfied	82.5	81.8 to 83.2
<b>GDP per capita (PPP current international dollar)</b>		
Lower quartile	30.0	29.3 to 30.7
Second quartile	60.3	59.5 to 61.1
Third quartile	71.6	71.0 to 72.3
Upper quartile	80.4	79.6 to 81.2
<b>Total expenditure on health as per cent of GDP</b>		
Lower quartile	32.8	32.0 to 33.6
Second quartile	58.8	57.8 to 59.7
Third quartile	69.1	68.3 to 69.8
Upper quartile	77.5	76.9 to 78.1
<b>Government expenditure on health as per cent of total expenditure on health</b>		
Lower quartile	34.4	33.8 to 35.1
Second quartile	57.2	56.4 to 58.0
Third quartile	67.3	66.6 to 68.0
Upper quartile	76.0	75.2 to 76.7
Overall	64.0	63.6 to 64.4

Weighted percentages were included in the table; all values were rounded to the first decimal place.

GDP, gross domestic product; PPP, purchasing power parity.

evident that Greece and Spain experienced the greatest drop in positive perceptions between 2009 and 2013.

The results of the regression analyses for both Greece and Spain show that respondents in 2013 had 61% (95% CI 50% to 70%) and 65% (95% CI 56% to 72%) lower odds of reporting positive perceptions than respondents in 2009. In total, in seven member states the odds of positive perceptions were significantly lower in 2013 compared with 2009; odds of positive perceptions were higher in 2013 than in 2009 in 12 member states (figure 2).

In the sensitivity analysis, excluding 'life satisfaction' from the model appeared to have the greatest impact on the association between education and perceptions, as well as employment status and perceptions. Individuals who completed full-time education at the age of 23 years or older had 12% (95% CI 6% to 18%) higher odds of reporting good perceptions of healthcare provision in their country compared with individuals who were 15 years and below when they exited full-time education or

**Table 2** Results of multilevel logistic regression illustrating adjusted trends and associations of positive perceptions of healthcare provision among European Union citizens between 2009 and 2013

Variable	OR	P value	95% CI
<b>Year</b>			
2009*			
2010	0.98	0.510	0.94 to 1.03
2011	0.79	<0.001	0.75 to 0.84
2012	0.85	<0.001	0.80 to 0.90
2013	0.85	<0.001	0.80 to 0.90
<b>Gender</b>			
Male*			
Female	0.89	<0.001	0.87 to 0.92
<b>Age</b>			
75 years and older*			
65–74 years	0.82	<0.001	0.77 to 0.88
55–64 years	0.75	<0.001	0.70 to 0.80
45–54 years	0.75	<0.001	0.70 to 0.80
35–44 years	0.77	<0.001	0.71 to 0.82
25–34 years	0.80	<0.001	0.74 to 0.86
15–24 years	0.90	0.010	0.83 to 0.98
<b>Marital status</b>			
Single*			
Married or living with a partner	0.93	0.001	0.89 to 0.97
Separated/divorced/widowed	0.97	0.266	0.92 to 1.02
<b>Area of residence</b>			
Rural area or village*			
Small/middle town	1.03	0.069	1.00 to 1.07
Large town	1.01	0.552	0.97 to 1.05
<b>Employment status</b>			
Unemployed*			
Not working	0.98	0.551	0.93 to 1.04
Employed	0.91	0.001	0.87 to 0.96
<b>Society level</b>			
Low*			
Middle	1.12	<0.001	1.08 to 1.16
High	1.27	<0.001	1.21 to 1.32
<b>Difficulty paying bills</b>			
Almost never*			
Sometimes or most of the time	0.81	<0.001	0.79 to 0.84
<b>Education</b>			
15 years and below or no full-time education*			
16–19 years	0.97	0.098	0.93 to 1.01
20–22 years	1.02	0.494	0.97 to 1.08
23 years and older	1.03	0.219	0.98 to 1.09
<b>Life satisfaction</b>			
Not at all satisfied*			
Not very satisfied	1.63	<0.001	1.52 to 1.75

Continued

Table 2 Continued

Variable	OR	P value	95% CI
Fairly satisfied	3.56	<0.001	3.33 to 3.82
Very satisfied	5.65	<0.001	5.23 to 6.10
GDP per capita	1.08	<0.001	1.07 to 1.09
Total expenditure on health as per cent of GDP	1.17	<0.001	1.11 to 1.24
Government expenditure on health as per cent of total expenditure on health	1.02	0.684	0.91 to 1.15

ORs and 95% CI rounded to two decimal places; OR for GDP per capita refers to a \$1000 increase; OR for government expenditure on health as per cent of total expenditure on health refers to a 10% increase; OR for total expenditure on health as per cent of GDP refers to a 1% increase.

\*Reference category.

GDP, gross domestic product.

those who had no full-time education. Furthermore, the direction of the association between employment status and perceptions was reversed in the sensitivity analysis. The key findings from the regression analysis, however, were fairly similar to those in the sensitivity analysis.

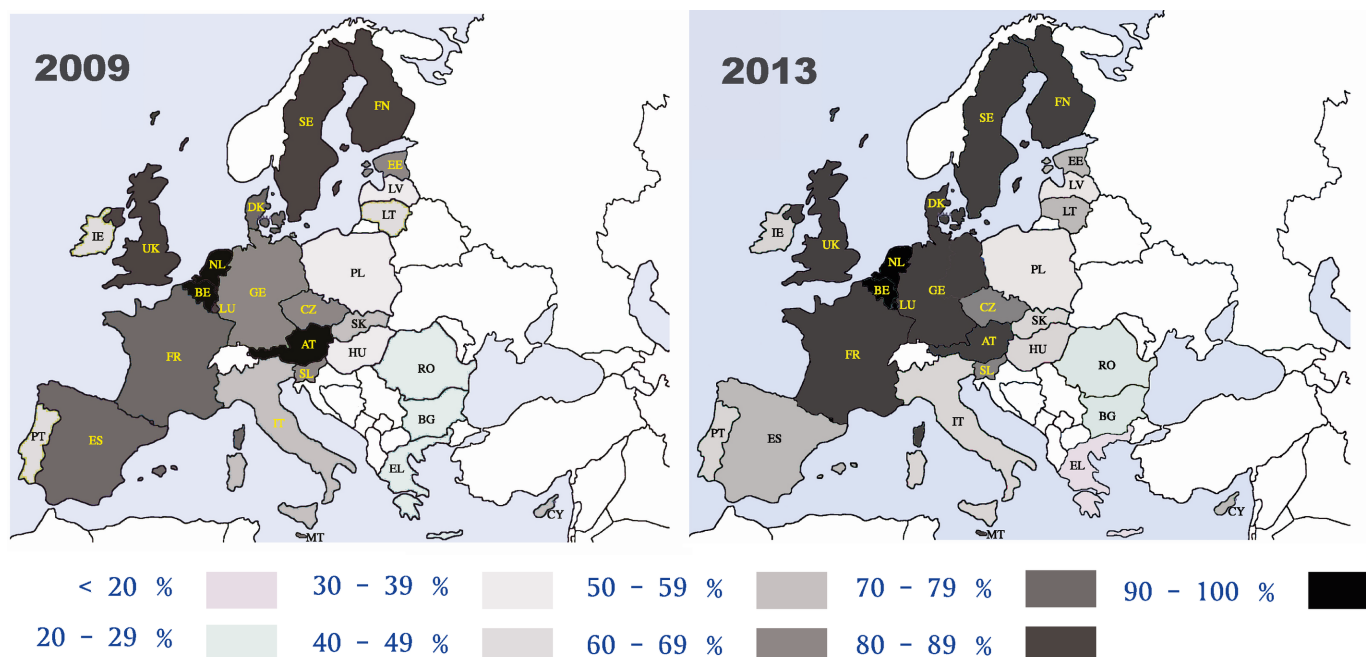
## DISCUSSION

### Main findings

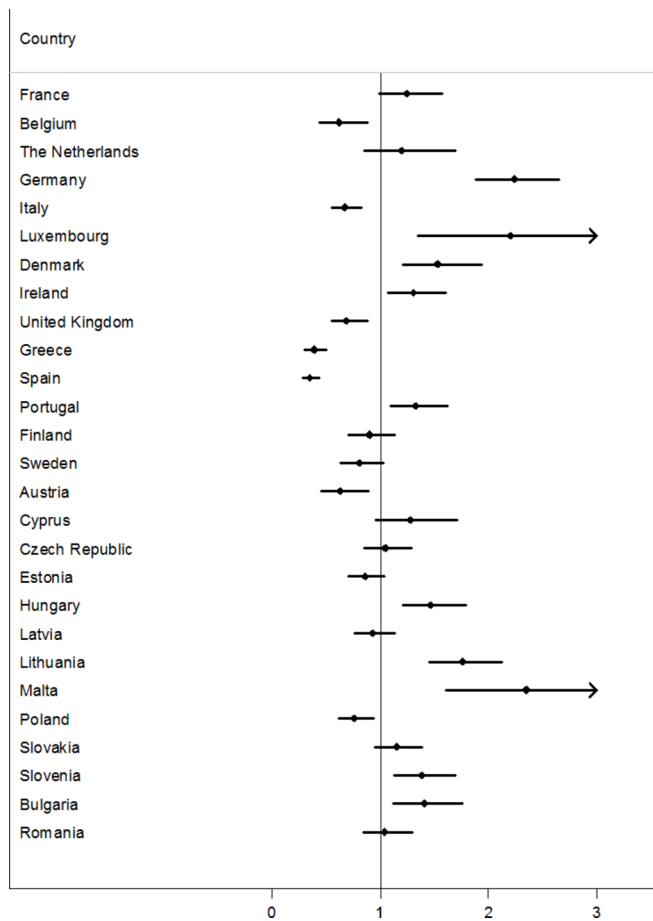
We found that there was a reduction in positive perceptions of healthcare systems over the years following the financial crisis in Europe. Our analysis also showed that higher national income per capita and higher spending on health were associated with better perceptions throughout the financial crisis. In addition, we

observed starkly different trends among member states over the years following the financial crisis, with those hit the hardest by the financial crisis reporting the greatest declines in positive perceptions.

Our finding that the biggest drop in perceptions has occurred in Spain and Greece is in line with evidence from other studies regarding negative health effects documented so far in these countries.<sup>1 4 5</sup> Conversely, countries such as Germany and Denmark, which have either opted to invest in further social protection or decided to protect public spending on health appear to have seen an improvement in the public's perception of the healthcare systems, although we did not formally test whether national policies were associated with changes



**Figure 1** Proportion of respondents with positive perceptions of healthcare provision in 27 European Union member states in 2009 and 2013. AT, Austria; BE, Belgium; BG, Bulgaria; CY, Cyprus; CZ, Czech Republic; GE, Germany; DK, Denmark; EE, Estonia; EL, Greece; ES, Spain; FN, Finland; FR, France; HU, Hungary; IE, Ireland; IT, Italy; LT, Lithuania; LU, Luxembourg; LV, Latvia; MT, Malta; NL, Netherlands; PL, Poland; PT, Portugal; RO, Romania; SE, Sweden; SL, Slovenia; SK, Slovakia; UK, United Kingdom.



**Figure 2** Adjusted trends (OR and 95% CI) of positive perceptions of healthcare provision for each of the 27 European Union member states comparing perceptions in 2013–2009.

in perceptions. These changes in perceptions may not be entirely informed by people's first-hand experiences of the changes precipitated by the policy choices on the healthcare systems, but may be reflective of the general mood precipitated nationally by these policies, essentially highlighting the role of factors 'external' to the health systems. These external factors include the nature of the political debates around the crisis and proposed policy measures, media representation of the changes, and shifts in the general outlook regarding the overall state of affairs in the countries.<sup>6,9</sup> Indeed, perceptions of public expenditure retrenchment can have a major influence on public perception. Wendt *et al*<sup>18</sup> found public expenditure on health to be a significant determinant of perceptions, irrespective of whether there was a corresponding increase in other sources of finance, such as the private sector. In addition, total health expenditure has been found to be associated with perceptions of safety in healthcare, which arguably impacts overall perceptions of the health system.<sup>19</sup>

The sociodemographic variables also revealed the importance of factors external to the health system in influencing people's perception. Positive perceptions were more frequent among people with no financial

difficulties and those who regarded themselves as having high status in society. Bleich *et al*<sup>8</sup> report similar findings and we share their explanation that this is possibly the result of people drawing on their general outlooks and their prospects in life as they participate in these surveys. To add further credence to this argument, the strongest association in our study was found between perceptions of health systems and people's self-reported levels of satisfaction with life in general. This association between overall outlook on life in general and perceptions of the state of the healthcare system has long been recognised.<sup>15</sup> Across the EU, individuals who were older and had lower social status were also found to be more satisfied with the health system, findings which have been reported previously with regard to both patient satisfaction and overall perception of the health system.<sup>20–22</sup> These associations may be explained by different notions of what qualifies as a good healthcare system among different population groups.<sup>20</sup> For example, younger and highly educated individuals may expect more out of their healthcare system leading to lower satisfaction if those expectations are not met.

The decline in positive perceptions of healthcare services identified in our regression analysis is not reflected in the unadjusted estimates, which seem to be fairly stable over time across the EU. Consistent with previous research,<sup>9</sup> we found that perceptions of healthcare systems were positively associated with GDP per capita. Almost all member states experienced an increase in GDP between 2009 and 2013, which may explain the discrepancy between unadjusted and adjusted results.

### Strengths and limitations

We analysed a multiyear dataset covering 27 EU member states to assess trends in public perceptions of national health systems in the aftermath of the financial crisis of 2008. The study used a large sample size coming from a far larger number of countries than similar studies in the past, which had enrolled utmost 21 countries. This has enabled us to study a wide range of countries, which had contrasting experiences and policy responses to the crisis. The cross-sectional nature of the study limits the potential to make causal associations between the crisis and changes in the perceptions; still, the samples were nationally representative, thereby making comparisons meaningful.

Furthermore, the study is guided by critical understanding of the nature of public perception studies, which stipulate that public perception is at least partly explained by factors external to the health system. Studies have determined that people's direct experiences with the healthcare system merely inform up to 13% of their perceptions of national health systems.<sup>6,9</sup> This has specifically guided the selection of factors chosen to test for associations with people's perceptions of their national health systems as well as in the interpretation of the findings. The Eurobarometer survey used a single question to assess citizens' perceptions, rather than using composite indices to be



able to capture the multidimensional nature of 'public perception', more comprehensively.<sup>23</sup> Interpreting single item measures may be quite difficult, given that the dimensions of healthcare provision cannot be fully captured in one question.<sup>23</sup> In this study, for instance, respondents may have a different understanding of what qualifies as 'very good' healthcare provision. It is also important to note that we could not compare our findings with trends in views about other services that may have also changed during the study period; hence, we were unable to distinguish trends in views about the healthcare system from overall trends about society.

Another limitation of the study was the exclusion of Lithuania from the analysis, due to a lack of sufficient data regarding its national-level indicators. Additionally, 10.1% of all observations had missing values for some of the variables and could not be included in the regression analysis.  $\chi^2$  tests were conducted, which revealed significant differences with respect to sociodemographic characteristics between those who were included and those who were excluded from the analysis, which introduces into the study a potential bias due to missing data. This may have affected the associations observed between healthcare perceptions and the individual-level variables analysed in the study.

### Policy implications and conclusions

Public perceptions of health systems are considered critical for assessment and comparison of national health systems. Our findings suggest that people's perceptions of their countries' health systems are intertwined with their assessment of their overall well-being and prospects more generally. This strongly indicates that perception of health systems cannot be viewed in separation to the overall social and economic outlooks of countries. Countries aiming to improve the public's confidence in their health systems need to frame and propagate policy measures as part of a holistic effort aimed at improving social protection and welfare. Finally, we join previous papers<sup>6,9</sup> in calling for studies exploring the ways in which the factors 'external' to health systems shape the public's perception of health systems.

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**Contributors** FTF conceived the study and AMA conducted the data analysis. AMA, FTF and HBT contributed to data interpretation and manuscript preparation.

**Competing interests** None declared.

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**Data sharing statement** The datasets are publicly available at the GESIS Data Archive at [www.gesis.org](http://www.gesis.org).

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