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A comparative analysis of health policy performance in 43 European countries

Johan P. Mackenbach¹, Martin McKee²

¹ Department of Public Health, Erasmus MC, Rotterdam, The Netherlands

² European Centre on Health of Societies in Transition, London School of Hygiene and Tropical Medicine, London, UK

Correspondence: Johan P. Mackenbach, Department of Public Health, Erasmus MC, University Medical Center Rotterdam, P.O. Box 3000 CA, Rotterdam, Netherlands, tel: +31 10 703 8460, fax: +31 10 703 8475, e-mail: j.mackenbach@erasmusmc.nl

Background: It is unknown whether European countries differ systematically in their pursuit of health policies, and what the determinants of these differences are. In this article, we assess the extent to which European countries vary in the implementation of health policies in 10 different areas, and we exploit these variations to investigate the role of political, economic and social determinants of health policy. **Data and Methods:** We reviewed policies in the field of tobacco; alcohol; food and nutrition; fertility, pregnancy and childbirth; child health; infectious diseases; hypertension detection and treatment; cancer screening; road safety and air pollution. We developed a set of 27 'process' and 'outcome' indicators, as well as a summary score indicating a country's overall success in implementing effective health policies. In exploratory regression analyses, we related these indicators to six background factors: national income, survival/self-expression values, democracy, government effectiveness, left-party participation in government and ethnic fractionalization. **Results:** We found striking variations between European countries in process and outcome indicators of health policies. On the whole, Sweden, Norway and Iceland perform best, and Ukraine, Russian Federation and Armenia perform worst. Within Western Europe, some countries, such as Denmark and Belgium, perform significantly worse than their neighbours. Survival/self-expression values and ethnic fractionalization were the main predictors of the health policy performance summary score. National income, survival/self-expression values and government effectiveness were the main predictors of countries' performance in specific areas of health policy. **Conclusions:** Although many new preventive interventions have been developed, their implementation appears to have varied enormously among European countries. Substantial health gains can be achieved if all countries would follow best practice, but this probably requires the removal of barriers related to both the 'will' and the 'means' to implement health policies.

Introduction

Europe is a continent of great diversity. Despite the powerful forces of globalization and of European integration, the people of Europe still vary greatly in their attitudes, beliefs and lifestyles. Their governments are equally diverse, most obviously in terms of how they see the responsibilities of the state and the individual. Some governments have acted resolutely to tackle tobacco, whereas others have seen this largely as a matter of individual responsibility.¹ Some have put in place organized systems of cancer screening, whereas others have left this to opportunistic encounters between individuals and their physicians.² Some governments have invested massively in measures to make their roads safe, whereas others have not.³

What is less clear is whether there are systematic differences between European countries in their pursuit of health policies and, if so, what the determinants of these differences are. Can countries be identified that have systematically been more successful in adopting health policies than others, and if so, what distinguished these countries from others? Existing comparative analyses of health policy have been based on reports by key informants, usually policymakers themselves,^{4–6} and are therefore unlikely to be objective or accurate. In this article, we assess the extent to which different European countries vary in the implementation of evidence-based health policies, and explore what the political, economic and social determinants of these successes and failures of health policy could be.

We use the World Health Organization definition of health policies as 'decisions, plans, and actions that are undertaken to achieve specific health goals within a society'.⁷ We conceptualize

health policy as including policies on health care but having a much broader scope. We have limited ourselves to health policies that are based on primary prevention (aiming to avoid the occurrence of disease by reducing exposure to health risks) or secondary prevention (aiming to avoid the development of disease to a symptomatic stage by diagnosing and treating disease before it causes significant morbidity). We considered that there is already an abundance of international comparisons of health care^{8–12} and its outcomes,^{13–15} and that a focus on preventive health policies would be a more valuable addition to the literature.

Our analysis covers 10 areas of health policy that we have identified as contributing to major population health gains in many countries of Europe¹⁶: tobacco; alcohol; food and nutrition; fertility, pregnancy and childbirth; child health; infectious diseases; hypertension detection and treatment; cancer screening; road safety and air pollution. We hypothesized that differences between countries in the implementation of effective health policies are determined by differences in either 'will' or 'means', and in an exploratory analysis, we therefore also related between-country variation in health policy performance to indicators of attitudes and available resources.

Data and Methods

For each of the 10 areas of health policy, literature searches were carried out for scientific evidence on the effectiveness of potentially relevant policies. A summary of the evidence is given in the Supplementary Appendix and presented in detail elsewhere.¹⁶

Data were then collected on the actual implementation of these policies in different European countries, and on their population

health impacts, all measured in (a year close to) 2008. We gathered information on a wide range of 'process' and 'outcome' indicators, and for the latter, made a further distinction between 'intermediate' and 'final' outcomes. Process indicators measure the degree of implementation of policies of proven effectiveness (e.g. by measuring a country's score on previously validated measures such as the Tobacco Control Scale).¹ Intermediate outcome indicators measure the impact of these policies on the exposure of the population to health risks (e.g. by taking a country's prevalence of smoking). Final outcome indicators measure the impact on population health (e.g. by taking a country's lung cancer mortality rate). We aimed for two or three indicators for each area of health policy.

The 27 indicators that were finally selected allowed us to calculate, for each country, a summary score indicating its relative success across all these areas. This summary score was constructed by determining, for each indicator, whether the country was in the upper, middle or lower tertile of the distribution, and by taking the difference between the percentage of scores in the upper tertile and the percentage of scores in the lower tertile. This approach is based on the premise that all 10 policy areas are equally important, that within each policy area all indicators are equally important and that doing better than average is equally important as doing worse than average. Although alternative weightings could be used, there is no obvious basis for doing so. This approach does not assume correlations between the variables, but correlations are usually substantial. Of 27 indicators, only five had a correlation with the summary score <0.40.

In a final step, we generated a series of hypotheses relating to factors that might influence the adoption of health policy and identified data that would allow us to test them (see later in the text). We then conducted an exploratory regression analysis with a forward selection procedure in which we related our summary score, as well as indicators of countries' performance in specific areas of policy, to the six variables associated with our hypotheses. These were political, economic and social background factors that were expected to determine either the will (the first four) or the means (the last two) of a country to implement health policies:

- (1) Survival/self-expression values. We hypothesized that a population that adheres more closely to values of self-expression might be expected to look more to the future and to invest in measures that will enhance future health.¹⁷ The World Values Survey has identified important differences between European countries in attitudes on a survival/self-expression scale. People in more advanced industrialized countries have been shown to shift their priorities from basic economic and physical security towards subjective well-being, self-expression and quality of life.¹⁸
- (2) Democracy. We hypothesized that a more democratic government is more easily held accountable for its actions, and there may be stronger mechanisms for selecting competent and honest people.^{19,20} We expect countries with higher degrees of democratic government to have implemented more health policies.
- (3) Political composition of governments. Recognizing that health policies are ultimately a matter of political choice, and that social-democratic governments have tended to pursue more egalitarian policies than governments dominated by other political parties,^{21–24} we hypothesized that countries with more extensive government participation of left-wing parties would have implemented more health policies.
- (4) Ethnic fractionalization. Collective action to promote health requires a certain degree of cohesion between citizens. This may be less in countries that are more heterogeneous, on linguistic, religious or ethnic grounds,²⁵ where a dominant group may be less willing to invest in public goods that will benefit others. We hypothesized that European countries with

more ethnic fractionalization would provide less fertile ground for collective health policies.^{26,27}

- (5) National income. Research that has sought to explain between-country differences in health indicators often finds that aggregate health outcomes are closely correlated with national income, typically measured by gross domestic product (GDP).²⁸ We hypothesized that richer countries would, on average, have implemented more health policies than poorer countries. Given the non-linear relationship of GDP with life expectancy, its log value was used.
- (6) Government effectiveness. Whether governments are able to implement health policies is likely to also depend on their overall effectiveness, as determined by, for example, the professionalism of the civil service, the functioning of government departments and agencies and the absence of corruption.²⁹ We hypothesized that countries with better scores on government effectiveness would have implemented more health policies.

Country values for the independent variables, all measured a few years before the health policy performance indicators, are given in table 1; data sources for these variables are given in the notes to this table. Data sources for dependent variables (the health policy performance indicators) are given in the notes to Supplementary Appendix table A1. Europe was defined as the World Health Organization European region, minus Central Asia, Turkey and Israel. Further details can be found in the book underlying this article.¹⁶

Results

For each of the 10 areas of health policy, there are substantial differences between European countries in implementation and intermediate and final health outcomes. Full results for all areas of health policy are presented in Supplementary Appendix A1. For example, in the area of tobacco control, countries like the UK, Ireland, Norway and Iceland have high scores on the Tobacco Control Scale, whereas Hungary, the Czech Republic, Luxembourg and Austria have low scores. Male smoking prevalence rates are particularly high in the former Soviet Union, and among countries for which both a Tobacco Control Scale score and male smoking prevalence are available, the correlation between the two is -0.39 ($P < 0.10$), indicating that lower smoking prevalence may indeed be the result of more stringent tobacco control efforts. Male lung cancer mortality rates are also high in some countries in Central and Eastern Europe and the former Soviet Union, and relatively low in most Nordic countries and in the UK and Ireland, which may reflect the accumulated effects of policies over many years.

Other areas for which measures of the implementation of health policies are available are alcohol control, child safety and organized population-based breast cancer screening programmes. Implementation is, in general, more extensive and/or systematic in the Nordic countries, the UK and Ireland and in Continental European countries, although there are some notable exceptions: Luxembourg, Germany and Austria perform below the European average on alcohol control, Ireland and Belgium on child safety, and several countries in the Northwest of Europe have not yet implemented a population-based breast cancer screening programme. Implementation of these policies is usually less extensive in the Western Balkans, Central and Eastern Europe and the former Soviet Union, but Slovenia and the Czech Republic have higher than average scores on child safety, and the Czech Republic and Estonia do have population-based breast cancer screening programmes. Often, health outcomes are also better in countries with more extensive implementation of health policies in these areas.

For the other areas, the only internationally comparable data are on intermediate and final health outcomes. These show striking variations providing indirect evidence for differences between

Table 1 Economic, cultural and political background factors, ca. 2000

Region and country	Self-expression values 2000/06	Democracy 2000	Left-party government 1990–2009	Ethnic fractionalization 2001	National income 2000	Government effectiveness 2002
Nordic						
Finland	0.94	10	34.40	0.13	26 402	2.21
Sweden	2.09	10	68.77	0.06	27 174	2.07
Norway	2.17	10	59.34	0.06	41 777	2.02
Iceland	1.63	10	21.35	0.08	31 489	2.07
Denmark	1.87	10	32.96	0.08	30 468	2.17
UK and Ireland						
UK	1.31	10	63.33	0.47	27 032	1.93
Ireland	1.18	10	11.45	0.12	31 389	1.68
Continental						
Netherlands	1.94	10	31.86	0.11	31 927	2.09
Belgium	1.13	10	49.86	0.56	29 692	1.99
Luxembourg	1.13	10	32.57	0.53	63 392	2.17
Germany	0.44	10	45.19	0.17	29 051	1.81
Switzerland	1.90	10	28.57	0.53	34 414	2.25
Austria	1.43	10	31.78	0.11	31 574	1.98
Mediterranean						
France	0.94	9	37.42	0.10	27 311	1.61
Spain	0.51	10	60.23	0.42	24 945	1.82
Portugal	0.49	10	37.48	0.05	19 606	1.20
Italy	0.85	10	28.84	0.11	27 142	0.93
Malta			9.32	0.04	19 442	1.10
Greece	0.55	10	53.06	0.16	20 707	0.84
Cyprus	0.13	10	17.68	0.09	20 274	1.17
Western Balkans						
Slovenia	0.38	10	49.36	0.22	19 043	0.88
Croatia	0.31	8		0.37	9775	0.34
Bosnia-Herzegovina				0.63	5798	-0.97
Serbia	-1.03	7		0.57	7244	-0.21
Montenegro	-1.24	7		0.57	4877	-0.29
TFYR Macedonia	-0.72	6		0.50	6358	-0.46
Albania	-1.14	5		0.22	3177	-0.59
Centre and East						
Poland	-0.60	9	32.54	0.12	10 834	0.56
Czech Republic	0.38	10	37.98	0.32	16 044	0.93
Slovakia	-0.43	9	28.10	0.25	11 844	0.47
Hungary	-1.22	10	51.47	0.15	13 025	1.01
Romania	-1.60	8	59.05	0.31	6151	-0.14
Bulgaria	-1.52	8	24.67	0.40	6374	0.09
(f) Soviet Union						
Estonia	-1.19	9	26.11	0.51	10 405	0.81
Latvia	-1.27	8	18.10	0.59	8119	0.59
Lithuania	-1.00	10	46.91	0.32	8566	0.61
Belarus	-1.23	-7		0.32	12 188	-1.06
Ukraine	-1.72	6		0.47	5644	-0.71
Republic of Moldova	-1.69	7		0.55	2420	-0.63
Russian Federation	-1.88	-5		0.25	8305	-0.32
Georgia		5		0.49	4310	-0.76
Armenia		5		0.13	4333	-0.22
Azerbaijan		-7		0.20	3722	-0.87

Self-expression: countries' mean standardized score on survival/self-expression values (source: World Value Survey³⁰).

Democracy: this scores a country's democratic system from -10 (least democratic) to 10 (most democratic) based on the competitiveness of political participation, constraints on the chief executive and competitiveness of executive recruitment (source³¹).

Left-party government: average share of the total number of cabinet posts held by social-democratic parties in the period 1990-2009 [Source: Quality of Government dataset (<http://www.qog.pol.gu.se/data/>)].

Ethnic fractionalization: index reflecting probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group [Source: Quality of Government dataset (<http://www.qog.pol.gu.se/data/>)].

National income: gross domestic product (GDP) in international dollars per capita [source: WHO HFA Database (<http://data.euro.who.int/hfad/>)].

Government effectiveness: standardized score (average 0, standard deviation 1) for a country's government's overall effectiveness, as determined by, for example, the professionalism of the civil service, the functioning of government departments and agencies and the absence of corruption [source: Quality of Government Dataset (<http://www.qog.pol.gu.se/data/>)].

countries in implementation of effective health policies. The proportion of the population with inadequate iodine intake varies between <20% in several countries in Eastern Europe and >50% in countries like the UK, Ireland and Belgium, among others, in a pattern largely consistent with the penetration of iodized salt ($r = -0.59$; $P < 0.05$). Rates of teenage pregnancy are high in many

countries in the Western Balkans, Central and Eastern Europe and the former Soviet Union, with correspondingly high levels of maternal mortality. Measles immunization rates are suboptimal in many countries, with rates <95% for measles in Denmark, the UK, Ireland, Austria and Malta. The response to the AIDS epidemic was delayed in Central and Eastern Europe and the former Soviet Union.



Figure 1 Summary scores for health policy performance, by country

As a result, the incidence of HIV infections is high in Ukraine, Estonia and Moldova.

There are also large differences in prevalence of hypertension between European countries, with average systolic blood pressure being lower in Western Europe than in Central and Eastern Europe and the former Soviet Union. These variations are likely to be due to a combination of dietary salt reduction and hypertension detection and control.³² Road traffic death rates among car drivers and passengers (adjusted for the number of registered vehicles per country) are high in the former Soviet Union and the Western Balkans, and are negatively associated with the proportion of drivers and passengers wearing seatbelts ($r = -0.80$; $P < 0.05$), reflecting differences between countries in enforcement of seatbelt laws. Several countries of Southern and Central and Eastern Europe have failed to reduce their sulphur dioxide emissions substantially, and the highest concentrations of sulphur dioxide in the air are currently found in Central and Eastern Europe.

The performance indicators for each policy area presented in Supplementary Appendix table A1 allowed us to calculate, for each country, a summary score indicating its relative success across all these areas (figure 1). The countries with overall best performance are Sweden, Norway and Iceland. The countries with the worst overall performance are Ukraine, Russian Federation and Armenia. These countries do better, or worse, than other countries for a wide range of policies, both for process indicators and for intermediate and final outcome indicators. On the whole, countries in Western Europe do better than countries in Eastern Europe, but this general pattern hides some important distinctions between countries that are in the same geographical region of Europe. Among the Nordic countries, Denmark performs distinctly less well on a number of performance indicators. In Continental Europe, the Netherlands ranks first, but neighbouring Belgium does least well. Among the Mediterranean countries, France does well, but Portugal and Greece do not. In the Western Balkans, Slovenia stands out as a country that performs better than the others, as does the Czech Republic in Central and Eastern Europe. Among the countries of the former

Soviet Union, the Baltic countries and Belarus do a little bit better than the others.

In a univariate regression analysis, all six background factors, except left-wing parties, were significantly associated with the health policy performance summary score (results not shown). In a multivariate analysis, two variables were significantly associated with the summary score, that is, survival/self-expression values and ethnic fractionalization (table 2). As expected, the more a country's population is oriented towards self-expression values, the higher is its score; also, the more a country is ethnically fragmented, the lower is its score. On their own, survival/self-expression values explained almost 87% of the variation in the summary score ($r^2 = 0.87$), whereas the addition of ethnic fractionalization increased this to almost 90% ($r^2 = 0.90$).

We also performed multivariate regression analyses for each of the specific performance indicators (with the exception of the existence of a breast cancer screening programme, as it could only take values of 0, 1 or 2) (table 2). GDP was the main predictor of performance for nine of the indicators, survival/self-expression values for six, government effectiveness for five, democracy for three, involvement of left-wing parties for two and ethnic fractionalization for none. None of the potential explanatory factors offered any significant explanation of performance in relation to iodine deficiency, AIDS incidence, ozone levels or measles immunization (in the latter case, virtually all countries reported levels in excess of 90%, except for Austria and Malta).

Discussion

We found striking variations between European countries in process and outcome indicators of health policies. On the whole, Sweden, Norway and Iceland perform best, and Ukraine, Russian Federation and Armenia perform worst. Within Western Europe, some countries, such as Denmark and Belgium, perform worse than their neighbours. Survival/self-expression values and ethnic fractionalization were the main predictors of the health policy performance summary score. National income, survival/self-expression values and government effectiveness were the main predictors of performance in specific areas.

This study had a number of limitations. First, there were many gaps in information about the actual implementation of health policies and their intermediate and final health impacts. We would probably have obtained a more reliable measure of health policy performance if indicators at all three levels had been available for all 10 areas of health policy. Also, there were a few missing data, which tended to be more frequent in countries with lower scores on the available indicators (Supplementary Appendix table A1). We therefore performed a sensitivity analysis by imputing, for each country, all its missing data on the basis of the average value for the indicator in its region. This sensitivity analysis showed that country rankings were sufficiently robust (correlation coefficient between summary scores shown in figure 1 and summary scores partly based on imputed data is 0.98). Although this lack of information hampered our analysis, it also informs the development of an agenda for data collection and research that national governments, as well as the European Commission and World Health Organization, may want to consider.

Second, given the inter-correlation between the six background variables, associations with the health policy indicators are likely to be determined by some variables acting through their impact on others, such as higher GDP per capita encouraging a move away from an emphasis on survival values and towards modern values emphasizing quality of life.³⁰ Unfortunately, the limited number of countries and the amount of missing data preclude undertaking the structural equation modelling that would be necessary to tease out these relationships. The same applies to interaction analyses: it would have been interesting to study the interdependence of 'will'

Table 2 Results of regression analyses of health policy performance on possible explanatory factors

Indicator	Variable	Beta	Significance	r ²
Tobacco control score	Survival	0.419	0.024	0.18
Male smoking	Survival	-0.715	<0.001	0.55
	Left parties	-0.432	0.001	0.75
Male lung cancer	Survival	-0.606	<0.001	0.37
Alcohol policy score	Government effectiveness	0.435	0.210	0.19
Alcohol consumption	Survival	-0.571	0.002	0.33
Male liver cirrhosis	Survival	-0.819	<0.001	0.62
	Left parties	0.276	0.027	0.69
Iodine deficiency	None			
Fat as % of energy	Log GDP	0.695	<0.001	0.48
Fruit and vegetable consumption	Log GDP	1.420	<0.001	0.16
	Government effectiveness	-1.130	0.004	0.39
	Log GDP	-1.685	<0.001	0.65
Teenage pregnancy rate	Democracy	-0.411	0.012	0.74
	Democracy	-0.803	<0.001	0.65
Neonatal mortality	Democracy	-0.662	<0.001	0.44
Maternal mortality	Democracy	-0.662	<0.001	0.44
Measles immunization rate	None			
Child safety score	Government effectiveness	0.438	0.047	0.19
Post-neonatal mortality	Log GDP	-0.496	0.001	0.71
	Democracy	-0.468	0.001	0.81
AIDS incidence	None			
MRSA rate	None			
Influenza vaccination rate	Log GDP	0.758	0.001	0.58
Male systolic blood pressure	Survival	-0.607	<0.001	0.37
Female stroke mortality	Log GDP	-1.770	<0.001	0.87
Cervical cancer mortality	Log GDP	-1.989	<0.001	0.80
Seat belt wearing	Government effectiveness	0.575	0.003	0.33
Vehicle occupant mortality	Log GDP	-1.720	<0.001	0.80
Pedestrian mortality	Log GDP	-0.837	<0.001	0.70
Sulphur dioxide	Government effectiveness	-0.569	0.002	0.32
Ozone	None			
Summary score	Survival	0.781	<0.001	0.79
	Ethnic fractionalization	-0.138	0.098	0.81

Beta: standardized beta coefficient.

Variables were selected in a forward procedure, and only variables retained in the regression are shown. If more than one variable was retained, the first retained variable is shown first. The r² values are cumulative, as each successive variable is added.

and 'means', but the number of units of analysis is too small for a sufficiently powered interaction analysis.

Our findings have important implications. First and foremost, they suggest that considerable health gains could be achieved if all countries would follow best practice in health policy. If all European countries would have achieved the age-specific mortality rates of Sweden, the country that stands out as having adopted the 'best practice' overall, far fewer deaths would have occurred in 2009: about 850 000 fewer in the whole of Europe from ischemic heart disease, almost 600 000 fewer from cerebrovascular disease, 150 000 fewer from lung cancer and almost 120 000 fewer from liver cirrhosis, with substantial gains in the other areas too.¹⁶ Although most of these potential health gains are concentrated in Eastern Europe, even in Western Europe, significant health gains are still possible.¹⁶

Our exploratory regression analyses also indicate that performance on health policy is strongly associated with a relatively small number of important background variables, that is, the dominant values in the population, ethnic fractionalization, national income and government effectiveness. A higher score on the survival/self-expression scale was associated with stronger tobacco control, lower male smoking, lower lung cancer mortality among men, lower levels of alcohol consumption and liver cirrhosis among men and lower systolic blood pressure. This is consistent with the idea that the adoption of self-expression values encourages individuals and their political leaders to invest in the future, specifically in policies that will promote health. However, the relationship is likely to be complex, with values presumably contributing to and being

influenced by the political climate, and thus the balance between collective and individual approaches to policy. As shown in the analysis of the health policy summary score, the will to take action seems to be reduced in more fragmented societies, where there may be less willingness to invest in policies that benefit everyone.

Performance in a number of areas was clearly associated with greater availability of resources. Thus, wealthier countries have higher levels of fruit and vegetable consumption, but they also have a higher proportion of fat in their diets. Wealthier countries also had lower teenage pregnancy rates, lower post neonatal mortality rates, higher rates of influenza immunization, lower death rates from stroke and from cervical cancer and lower death rates from traffic injuries, among both vehicle occupants and pedestrians. All of these associations are intuitive. Thus, wealthier people can afford more fruit and vegetables, but they also live in countries where there is a high degree of penetration of energy-dense high-fat products. Greater resources can be spent on health care, such as cervical screening, detection and treatment of blood pressure and immunization. They also make it possible to maintain roads and enable people to buy more modern, and therefore safer, cars.

Government effectiveness emerges as significantly associated with alcohol policy, where the ability to enforce restrictions on access and sanctions against drunk driving and related matters is important. Similarly, the ability to develop, implement and enforce measures to increase the safety of children's environments is clearly linked to the effectiveness of government. The association between government effectiveness and seatbelt wearing is also unsurprising, given the importance of law enforcement in this area. The association with

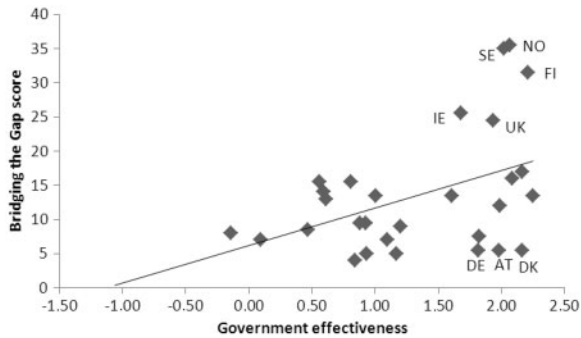


Figure 2 Association between government effectiveness and alcohol policy score. AT: Austria; DE: Germany; DK: Denmark; FI: Finland; IE: Ireland; NO: Norway; SE: Sweden; UK: United Kingdom

sulphur dioxide emissions may reflect the effectiveness of environmental protection agencies.

In additional analyses, we studied outliers in the association between these three background variables and health policy, to see whether some countries did better or worse than predicted on the basis of their 'will' or 'means'. We found some interesting cases, of which one example is presented in figure 2. Norway, Sweden and Finland stand out as having even more stringent alcohol control policies than would be expected, given the high level of effectiveness of their governments. All three have experienced major problems with alcohol in the past, with the development of strong temperance movements in the 20th century.³³ Measures have included retail monopolies with limits on times when alcohol can be purchased, coupled with high taxes. However, Finland and Sweden have been compelled to weaken their policies as a consequence of European Union accession.³⁴ In contrast, policies on alcohol in Germany, Austria and Denmark lag behind what might be expected. This is a strong indication that these countries lack the political will to tackle this issue, even though all three have high levels of alcohol-related problems. Other examples were the low immunization coverage in the UK, which has been linked to media coverage of a Lancet article suggesting a link between autism and the Measles, Mumps, Rubella vaccine,³⁵ and the high teenage pregnancy rate in Malta, which has been attributed to religious objections to sex education.³⁶

In contrast to some previous analyses, which did not have the specific focus on health policies of our article,^{22–24} the involvement of left-wing parties in government seemed to contribute relatively little explanatory power. The exceptions were with liver cirrhosis, where greater left-wing participation in government was associated with higher levels of mortality, after adjustment for survival/self-realization values, and male smoking, where it was associated with lower rates. Neither association was particularly strong, and it is possible that they were due to confounding by some unmeasured variable.

This is the first ever attempt to compare quantitatively the performance of European countries in terms of their health policies. However, there have been a number of other studies using qualitative methods.^{4–6} These have typically focused on inputs to policy and on policy processes, and have often been based on self-reports by policymakers. This is quite different from our focus on the outputs of policy, in the form of actual policy implementation and intermediate and final health outcomes. Although we could sometimes see a correspondence between the results of these previous studies and ours, the results were often uncorrelated. This highlights the need for caution in relying on official documents and self-reports; there may be a large gap between intentions and the ability to implement policies on a scale that will create population-wide health impacts.

We conclude that although many new preventive interventions have been developed, their implementation has varied enormously between European countries. Substantial health gains can be achieved if all countries would follow best practice, but this probably requires the removal of barriers related to both the 'will' and the 'means' to implement health policies.

Supplementary Data

Supplementary data are available at EURPUB online.

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Tobacco control policy in the UK: blueprint for the rest of Europe?

David T. Levy¹, Laura Currie^{2,3}, Luke Clancy²

1 Cancer Control, Lombardi Comprehensive Cancer Centre, Georgetown University

2 Tobacco Free Research Institute Ireland

3 Royal College of Surgeons in Ireland

Correspondence: David T. Levy, PhD, Population Sciences, Department of Oncology, Georgetown University, 3300 Whitehaven Street NW, suite 4100, WA 20007, USA, tel: +202 687 0863, e-mail: dl777@georgetown.edu

Introduction: With male smoking prevalence at ~30% in 1998, the UK implemented stricter tobacco control policies, including a comprehensive cessation treatment programme. We evaluate their effect. **Methods:** Data for the UK (excluding Northern Ireland) are applied to 'SimSmoke', a simulation model used to examine the effect of tobacco control policies over time on smoking initiation and cessation. Upon validating the model against smoking prevalence, the model is used to distinguish the effect of policies implemented between 1998 and 2009 on smoking prevalence. Using standard attribution methods, the model estimates lives saved as a result of policies. **Results:** The model predicts smoking prevalence accurately between 1998 and 2009. A relative reduction of 23% in smoking rates over that period is attributed to tobacco control policies, mainly tax increases, smoke-free air laws, advertising restrictions and cessation treatment programmes. The model estimates that 210 000 deaths will be averted by the year 2040, as a consequence of policies implemented between 1998 and 2010. **Conclusions:** The results document the UK's success in reducing smoking prevalence and prolonging lives, thereby providing an example for other European nations. When Framework Convention for Tobacco Control (FCTC) consistent policies are also implemented, the model projects that smoking prevalence will fall by another 28% with an additional 168 000 deaths averted by 2040.

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Introduction

Globally, 5 million deaths are attributed to smoking each year, with trends driving an increase to 10 million deaths per year by the 2030s.¹ Substantial evidence indicates that higher cigarette taxes, smoke-free air laws and advertising bans can appreciably reduce adult smoking rates, especially when combined as a comprehensive

strategy.^{2,3} The World Health Organization has set out the Framework Convention for Tobacco Control (FCTC) recommending these and other policies.

In the past decade, some European nations have adopted the 'public health' model,⁴ increasing cigarette taxes and implementing smoke-free air laws, advertising restrictions, health warnings and media campaigns, with the aim of reducing population exposure