Abstract

Background In Europe important differences exist concerning policies for the prevention of common diseases. In most cases these cannot be explained by the underlying epidemiology. However, successful policies should have a measurable effect on disease epidemiology. There has been little research comparing the effect of national preventive policies on disease-specific mortality.

Objectives To describe the mortality trends for three health problems representing the three levels of prevention in Germany and in selected European countries, which are of interest for the disease under question. To relate epidemiological trends to preventive policies at the national level and at the level of the European Union (EU).

Methods Comparison of age-standardized mortality rates for road traffic accidents, cervical cancer and diabetes mellitus in the period 1970–2002, using routine data. Analysis of disease-specific prevention policies in countries that deviate from the general trend in the EU, with a special focus on developments in Germany.

Results The development of mortality rates during the last 30 years for road traffic accidents, cervical cancer and diabetes mellitus varied substantially across Europe. Although the evidence linking specific public policies to epidemiological trends is sparse and often limited to ecological studies, a number of epidemiological changes can be plausibly linked to specific policies in the countries concerned.

Conclusions Successful preventive policies exist for all health problems reviewed. The current status of implementation of these policies can only be interpreted in the historical and political context of the countries concerned. The role of epidemiology to guide health policy decisions is under-utilized, as is the regulatory framework for disease and injury prevention at the level of the EU. Less formal policy measures such as European clinical guidelines are equally scarce. More rigorous comparative health services research is needed to formulate evidence-based policies for disease prevention.

Keywords: prevention, policy, Europe, road traffic accidents, cervical cancer, diabetes mellitus

Introduction

Public policies for disease and injury prevention vary substantially between countries within and outside of Europe, even when controlling for differences in national income and living standards. An important reason for the observed variation is the difference in the prevalence of diseases and risk factors between regions or countries, which require different priorities in policy responses to counter them. However, most health policy decisions cannot be reduced to mere responses to relevant scientific findings like changes in epidemiology or in the effectiveness of health interventions. Like all public policy decisions they are made within a specific historical, socio-political and cultural context, which ultimately determines the form and content of specific policies. For disease prevention and health promotion, variation in the organizational structure of institutions and the role of professionals in different health and social care systems, and the resulting division of responsibilities between them, is of particular importance.

Europe has been defined in many ways. In this article we focus on the member states of the European Union (EU) including the accession countries in Central and Eastern Europe (CEE).

After an overview of the current legal basis of prevention policies within the EU, a comparison of selected policies for disease prevention for important diseases and injuries is made between Germany and selected European countries. At the level of primary prevention, policies to prevent road traffic accidents are compared. Screening programmes for cervical carcinoma are compared at the level of secondary prevention. At the level of tertiary prevention, policies to reduce the incidence of complications from diabetes mellitus are analysed. The paper concludes with an outlook on possible improvements of national health policy for disease prevention through standard-setting and increased regulation at the EU level and other less formal policy instruments.
The legal basis of public policies for disease prevention in the European Union

In 1992, the legal basis for a common policy for disease prevention in the EU was created in Maastricht. Article 152 of the current version of the Treaty of the European Union and the Treaty establishing the European Community (TEC) forms the basis for a common policy for disease prevention and health promotion. It specifies that ‘Community action shall complement the member states’ policies in improving public health, preventing human illness and diseases, and obviating sources of dangers to human health’. The support of measures to combat major health scourges is mentioned as a priority. Otherwise, only drug-abuse related health damages are specifically mentioned.

The role and contributions of the European Union are specified as follows: setting of high standards for the quality and safety of organs and substances of human origin, including blood products; measures in the veterinary and phytosanitary fields to protect public health; incentive measures to protect and improve human health excluding any harmonization of the laws and regulations of the member states.

On proposal from the European Commission, the Council can also issue recommendations for these purposes. However, the responsibility of member states for the organization and delivery of health care services is fully respected.

In the draft treaty establishing a Constitution for Europe submitted to the European Council on 18 July 2003, two articles are of special interest for the field of disease prevention. These are article II-35 on health protection and article III-179 on health care. Part II of the Constitution corresponds to the EU Charter of basic rights, as proclaimed by the European Parliament, the European Council and the European Commission in December 2000. Article II-35 establishes a right of access to preventive health care and a right to benefit from medical care according to national laws and practices. The claim for a high level of health protection in all policy actions taken by the EU as specified in article 152 TEC is repeated. With minor changes, article III-179 corresponds to article 152 TEC.

Comparison of national policies for disease prevention

For the comparative analysis of policies for disease prevention in Europe, examples were selected for all level of prevention. Epidemiological trends for the period 1970–2002 are presented for Germany, the EU-average and for selected countries, which are of particular interest for the disease or risk factor under question. Epidemiological analysis was based on data from the World Health Organization (WHO) Regional Office for Europe’s European Health for All Database (HFA-DB) (Version June 2003).

The usual limitations of comparative analysis between countries apply to this study. Although data included in the HFA-DB is compiled, validated and processed in a uniform way in order to improve the international comparability, WHO relies on national data sources with varying data handling systems and practices. In particular disease definitions, coding practices, time-periods, and the completeness of registration differ between countries. The comparisons between countries presented in this paper should thus be interpreted with these limitations in mind. Age-standardized mortality rates were chosen for comparison as they are the least critical epidemiological measure that can be compared between countries. Only diabetes mellitus mortality rates are complemented by incidence rates where available.

For the specific health problems under investigation, issues relating to the comparability of health data presented concern the coding of mortality from cervical cancer and diabetes mellitus. Under the current version of the International Classification of Diseases (ICD-10), death from cervical cancer can be either coded as ‘malignant neoplasm of cervix uteri (ICD-10–C53)’ or as ‘malignant neoplasm of the uterus, part unspecified (ICD–10–C55)’. The HFA-DB data presented, only encompass cases coded under ICD–10–C53 and its equivalents under former ICD versions, such as ICD–9–180. Mortality assigned to diabetes mellitus presents a particular challenge for coding, because diabetes is often not considered as the underlying cause of death. Instead, secondary causes more directly linked to death, such as renal failure and coronary heart disease are often noted on death certificates. As a result, part of the variation in mortality rates attributed to diabetes mellitus between countries will reflect differences in national medical traditions and in national guidelines for completing death certificates. However, this will not explain longitudinal changes within countries unless major changes occurred, which influence physician’s death certification practices, e.g. publication of a new national guideline. The HFA-DB mortality data for diabetes mellitus include all cases coded under ICD–10–E10–E14.

Primary prevention: road traffic accidents

Road traffic accidents are already the leading cause for death by injury worldwide. WHO expects a dramatic increase of road traffic accidents and the related global burden of disease. Ranking ninth among the leading causes of disease burden worldwide in 1999, motor vehicle accidents are projected to become the third leading cause of disability-adjusted life years lost in the year 2020. This contrasts with the development in Western European and other industrialized countries in the past 30 years, where both the absolute and the relative numbers of traffic accident-related deaths have decreased despite concomitant increases in motorization and traffic density (Fig. 1).

This positive development can be attributed to the implementation of traffic regulation to prevent road crashes, as all key factors responsible for road traffic injuries are preventable: driving under the influence of alcohol; speeding; under-utilization of seat belts and child restraints; poor road design and roadway environment; unsafe vehicle design; under-implementation of road safety standards.
The European countries, in which road traffic accidents leading to injury or death have not decreased contrary to the general trend, are all located in Southern or Eastern Europe. Whereas age-standardized mortality rates attributable to road traffic injuries in Germany, Austria, Switzerland, France, the Benelux and Scandinavian countries decreased from about 30 to 40/100,000 inhabitants in 1970 to rates below 10/100,000 in 2000, the rates stagnated in many Southern and CEE countries in the same time period with between 15 and 20 deaths/100,000/year. In some CEE countries and in Portugal rates peaked in the 1980s and temporarily exceeded 40/100,000/year. In Greece, the rate of traffic-related deaths increased steadily from 10/100,000/year in 1970 to about 20/100,000/year in 2002 [data from the Organisation for Economic Co-operation and Development (OECD)–International Road Traffic and Accident Database (IRTAD)].

The increase in death rates caused by traffic injuries in the countries concerned is a result of an increase in motorization and traffic density that has not been accompanied by countering public policies to prevent injuries. In Hungary and the Czech Republic, only 35 and 43 per cent of drivers regularly use a safety belt, respectively, compared to 90–95 per cent in most countries in Western Europe. Although mortality rates in Germany follow the general EU trend, a number of countries like the United Kingdom, Norway and the Netherlands were much more successful in controlling traffic injuries. As the evidence from large, randomized trials or controlled observation studies evaluating the effectiveness of traffic control measures is largely lacking, it is impossible to attribute these differences to single policy measures. However, the implementation and reinforcement of measures that control the undisputed key risk factors, like adequate speed limits backed up by speed cameras and heavy fines in these countries is a possible explanation. Driving under the influence of alcohol was shown to be the single most important factor for traffic accidents leading to a lethal injury in a large ecological study in France. Whereas for non-lethal traffic accidents 9.8 per cent of drivers were drunk, the percentage rose to 31.5 for lethal traffic crashes.

Why Germany has a much higher number of non-lethal injuries than the EU average is not clear (Fig. 2). Part of the excess morbidity could be plausibly explained by the lack of a

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**Fig. 1 Age-standardized mortality rates attributed to road traffic accidents in all age groups per 100,000 inhabitants in selected European countries and EU average, 1970–2002. Source: HFA-DB data, WHO/Europe.**
general speed limit on motorways. In 2001, traffic accidents with non-lethal injuries on German motorways happened at a rate of 31.7/100 000. In other big European countries with national speed limits on motorways, rates were nearly half those in Germany: in France 13.1, and in the United Kingdom 15.9/100 000 (own calculations based on IRTAD data). Although these rates are not controlled for possible confounding factors, like traffic density, a policy intervention is highly desirable, at least in the form of a large pilot project. Furthermore, the lack of a general speed limit on motorways is just one expression of a socio-political culture of speeding in Germany. Other expressions of this are the scarcity of fixed safety cameras to control speed in inner cities, towns and villages, an effective instrument widely used in the United Kingdom, Norway, France and the Netherlands, and the comparatively low level of penalties for speeding offences. In January 2004, the fines for exceeding the indicated speed limit by 20 km/h in the EU ranged from EUR40 in Germany to EUR390 in Norway.

Secondary prevention: cervical cancer
Carcinoma of the cervix is the second most common malignant disease of women worldwide. In most Western European countries, the mortality rates for cervical cancer have decreased substantially since the 1970s, which is also reflected in a falling EU average (Fig. 3).

This reduction in mortality is mainly attributed to the introduction of screening in the form of cervical smears and early surgical treatment of detected lesions. Known risk factors for cervical cancer are primarily factors that predispose to an infection with human papilloma virus. These are sexual activity starting at a young age, a high number of sexual partners, and a history of genital warts. Other factors are HIV infection, immunosuppressive therapy and cigarette smoking.

A number of observational studies showed a consistent reduction of cervical cancer specific mortality after the introduction of screening in different settings and countries. Some studies reported significant improvements of screening effectiveness through organized screening procedures using patient registers and invitation and recall systems as compared to opportunistic screening. But there are also examples of opportunistic screening programmes achieving high coverage among high-risk groups.

With an age-standardized mortality rate of 3.28/100 000 in the year 2000, Germany has a substantially higher rate than the
One reason for this high rate is the persisting East–West German gradient in mortality, a legacy of mortality rates above 10/100 000 in the German Democratic Republic in the 1980s. In 2001, age-standardized mortality rates were 4.8/100 000 in the Eastern part of the country compared to 3.3/100 000 in the Western part. (Western part of the country with East Berlin, Eastern part of the country without East Berlin, i.e. there is differential misclassification and the true East–West gradient is even higher. Age-standardization uses the new European standard population.) The other most likely factor is the lack of an organized screening programme with a potentially lower coverage of high-risk women who are less likely to participate in the opportunistic screening offered by office-based gynaecologists. This is particularly troublesome, as a national guideline on cervical cancer screening was issued as early as 1977 by the Federal Committee of Physicians and Sickness Funds. Since then German sickness funds offer yearly screening, resulting in 2002 in a mean coverage of 48.8 per cent of women of all ages, ranging from 8 per cent in women aged over 80 years to 63 per cent in women aged 25–29 years.

However, in Denmark and in some CEE countries, in particular in Romania, mortality rates are substantially higher than in Germany. Denmark does not have a national organized screening programme either. Instead, it is up to regional politicians and health authorities to decide on the organization of a cervical cancer screening programme. As a consequence seven out of 15 counties have only introduced population-based screening during the last 10 years and there are still regional differences in the age groups invited, follow-up procedures and treatment. In the year 2000, local quality assurance guidelines were still missing in eight counties. In CEE, the high incidence of sexually transmitted diseases and the lack of barrier contraceptives are considered the main factors for the high incidence of cervical cancer. The break-down of state prevention programmes in the early 1990s in many CEE countries, some of which offered cervical screening, is certainly another factor for the high mortality rates. In Bulgaria for instance, a significant decrease of the effectiveness of the cervical screening programme in the period 1975–1996 has been reported. The mortality rates in the large countries in Southern Europe, like Portugal, Spain and Italy on the other hand remained below the EU average since 1970. Possible explanations are a different sexual behaviour at the time of infection of those who die now in these traditional catholic countries, and a later onset of the
Tertiary prevention: diabetes mellitus

The increase in consumption of foods that are rich in free sugars and saturated fats, and a concomitant decrease in physical activity levels has led to a rise in the prevalence of obesity in some parts of Europe since 1980 by a factor of three. Overweight and obesity lead to a number of adverse metabolic effects like hypertension, increased cholesterol and triglyceride serum levels, and to insulin resistance. The latter is responsible for type 2 diabetes mellitus, which—formerly confined to older adults—now affects obese children even before puberty.

The current prevalence of diabetes mellitus in Germany has been estimated at 5–6 per cent. Within the last 30 years, age-standardized mortality rates attributed to diabetes have developed quite differently in various European countries (Fig. 4).

In most countries in Central and Northern Europe, diabetes-specific mortality rates have remained rather stable since 1970—in Germany on a high level—while the EU average has fallen slightly. The apparent increase in diabetes-specific mortality in the United Kingdom between 1984 and 1993 is artefactual, and can be attributed to changes in coding in these years. The rigorous implementation of rule 3 of the 9th revision of the ICD in England led to a fall in coding of modes of dying like pneumonia and heart failure and to a rise in coding of underlying primary diseases like diabetes. In some countries however, such as in Portugal, the Czech Republic, the Baltic states, and in particular in Israel, diabetes-specific mortality has risen substantially. Portugal and Israel now has higher mortality rates than Germany, the United Kingdom or Spain. For some countries data on incidence are available. In the last decade, in France, the three Baltic states and in the Czech Republic a substantial and steady rise in the number of new cases was observed, whereas in Germany the number of new cases remained remarkably stable (Fig. 5).

For the prevention of type 2 diabetes, interventions at all levels of prevention are needed. Here, we limit the discussion to selected measures to prevent diabetic complications, i.e. tertiary prevention. Among others, these comprise of an adequate control of blood glucose levels, regular controls of HbA1c levels, blood pressure, cholesterol levels, and regular examination of the eyes and feet for the early detection of diabetic retinopathy and the diabetic foot syndrome.

The EURODIAB IDDM Complications Study compared the management of concomitant hypertension in type I diabetes...
patients in 16 European countries in 1989–1990. The main result of the study was a massive undertreatment of hypertension in these patients. Although 24% of diabetics suffered from a concomitant hypertension requiring treatment, only 42% of these patients received antihypertensive treatment. Furthermore, blood pressure was adequately controlled in only 11.3% of those diabetics who received antihypertensive medication. The differences in treatment fractions between study centres were substantial. In Italy both the highest (80% per cent) and the lowest fraction of patients treated (12 per cent) were observed. The two German (44 and 48 per cent) and the two UK centres (43 and 45 per cent) came close to the average of 42 per cent. Unfortunately, a comparison of the data on adequate hypertension control was not reported.

Another study compared the process quality and costs of preventing secondary complications in type 2 diabetes in surgeries of office-based general practitioners and physicians in seven European countries in 2000/2001. The authors reported an overall poor quality of preventive care in these patients. On a combined quality index (maximum according to European treatment guidelines = 1.0), the achieved process quality varied between 0.40 in the Netherlands and 0.62 in the United Kingdom. With an index of 0.49, Germany ranked near the median on quality, but, with EUR522 per index case and year, occupied the top rank for costs. In the United Kingdom, costs per index case were lowest with EUR122 per year. The higher process quality in the United Kingdom was attributed to the frequent participation of general practitioners in audits and to the presence of a recall system in primary care. The differences in costs were mainly attributed to differences in financial incentive systems.

Conclusions

Within the EU, and even more so within the larger European region, disease-specific mortality rates and the specific policies to prevent these diseases differ substantially. This applies to all three levels of prevention, as demonstrated in the examples presented.

The consistent implementation of regulatory measures, such as speeding limits and penalties for driving under the influence of alcohol, is an effective instrument for disease and injury prevention. Measures that interfere with the organization of health services are equally effective, e.g. the introduction of a national, organized screening programme for cervical cancer or of a population-based patient register for diabetes. The effects of
such measures are even evident in national mortality statistics, which is not the case for the majority of curative health interventions.

It is noteworthy that all examples of preventive measures presented here include elements of prevention through changes in behaviour and do not merely represent structural changes. This is contrary to the widely held belief that health policy is inadequate to influence the behaviour of citizens or patients. The question is much more of whether and how much a state is willing and able to force preventive policies through, even though they contradict the interests of powerful lobbying groups. A good example is the strong automotive industry in Germany and the lack of a national speed limit on motorways, little effort to reinforce existing speed limits, and low levels of penalties for speeding offences in Germany.

The current EU legislation, and the existing plans for its changes in the near future, limits the role of the EU to support national policies. Its main focus is standard-setting for health protection rather than disease prevention and health promotion. A robust public health article in the new EU constitution, which is not simply an exclusive list of potential EU legislation, is clearly needed to increase the quality of preventive services. Better data and specific research will allow evaluation with subsequent adjustments if they prove ineffective or inefficient.

The support of comparative health services research is another basic requirement for the improvement of existing preventive services. Better data and specific research will allow the formulation of evidence-based policies for prevention, which can in turn be subjected to regular monitoring and evaluation with subsequent adjustments if they prove ineffective or inefficient.

References


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