

The use of medicines in a comparative study across European interview-based surveys*

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Abstract

This paper examines the approach to consumption of medicines in interview-based surveys across seven countries of the European Union. The goals of the study are to provide information on the accurateness of different surveys for microeconomic analysis of pharmaceutical demand offered by Household Budget Surveys and National Health Surveys, and to illustrate the limitations of these data sources in cross-population comparability of information.

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1. INTRODUCTION

In 1995 the Maastricht Treaty established a legal basis for public health for the first time. New objectives were introduced at Community level such as the achievement of a health status of European citizens and the convenience of cooperation among the Member States in the prevention of disease. Nonetheless, harmonization of laws and regulations were not included at this stage. The Amsterdam Treaty, in 1997, dealt with these aspects by establishing the legal framework for the coordination of health policies among the Member States. Since then, the role of the Community is to complement national policies and to assist national governments in their efforts to improve public health.

The growth of international cooperation on public health has increased demand from policy-makers for coherent and harmonized health-related information. This has been a major driving force behind the efforts to standardize concepts and definitions by establishing agreements on classifications and statistical systems. A remarkable example of this tendency is the EUROHIS project, whose objective is to develop common instruments for use in European Health Interview Surveys (WHO, 1996). Despite the international efforts to stimulate the cooperation in health-related statistics, nowadays it is very difficult to carry out a precise and valid comparison of much health data across countries. Recent works have focused on analyzing disparities in the gathering of health information. For instance, Sadana et al. (2001) show the important differences in health status and disability measures across health interview surveys corresponding to OECD countries.

Similarly, comparability problems become evident when measuring the use of health care and, in particular, medicines (Klaukka and Martikainen, 1997). Pharmaceutical expenditure is one of the largest health budget items in most industrialized countries. During the last decade, the growth rates of pharmaceutical expenditure have increased to a greater extent than the gross domestic product and health expenditure in most Member States of the European Union. In response to this development, countries have undertaken a wide range of structural reforms and cost-containment measures in order to improve the efficiency and

effectiveness of their health systems. The design of these strategies relies heavily on the accessibility of harmonized information across Member States that facilitate policy-makers to solve issues like, why pharmaceutical expenditure varies across European countries; are whether cost-containment health policies are equally effective in all countries; or to what extent those policies introduce inequities in the delivery of medicines within countries.

Methodologies to obtain data that allows researchers to evaluate the responsiveness of any health care use to different policies may be grouped into two categories: experimental and observational. Experiments are specifically designed to evaluate the effects of a particular treatment, e.g. changes in consumers' co-payment rates. One of the most important experiments in health economics is the RAND Health Insurance Experiment ran from 1974 to 1982 that randomized U.S. families in six sites into different insurance plans. The plans varied by level of cost-sharing, out-of-pocket maximum expenditure, and size of deductibles. Data from this experiment has been widely used to estimate the price elasticity and income elasticity of different categories of medical expenditures, including pharmaceutical expenditure (e.g. Newhouse, 1993). The main disadvantages of this methodology arise from the difficulties and the high costs of its implementation. The results from experiments are not easily generalizable given that they happen in a closely controlled setting. Furthermore, some random assignments of individuals into different treatments or health plans may not be ethical.

The second methodology consists in observational data collected through population-based surveys and administrative records. Interview-based surveys are a relatively cheap and quick tool when compared with the costs of routine data collection by health care agencies. This type of data are easily accessible to researchers; do not pose ethical problems about their generation; are easily accessible to researchers; and provide results which are more generalizable than those obtained from experiments. Despite the relevance of interview-based surveys for health information systems and the existence of these surveys in most countries, interest for the international comparison of survey data is rather recent.

This paper focuses on the analysis of information on out-patient pharmaceutical consumption that is offered through European interview-based surveys. In particular, the study addresses two questions: i) What type of information on pharmaceutical utilization can be found through interview-based surveys? ii) May this information be compared in a valid and reliable manner across countries? Obviously, it is impossible to be exhaustive in the inventory of existing European surveys because of the diverse local and private professional attempts to gather pharmaceutical information. Therefore, this study is restricted to public databases, mainly National Health Interview Surveys and Household Budget Surveys corresponding to seven European countries: Belgium, Denmark, Italy, The Netherlands, Portugal, Spain and the United Kingdom.

The goal of the study is twofold. Firstly, the analysis tries to provide information on the accurateness of different surveys for microeconomic analysis of pharmaceutical demand. When revising empirical literature on demand for pharmaceuticals, one finds that the majority of studies have been implemented with U.S. data and British data. Possibly, one of the reasons for the scarcity of studies in other European countries is the limitation of available data sets. Furthermore, these data sets may not be used because most potential users do not know about their contents on specific issues. Hence, this paper endeavors to compensate this lack of information to some extent. A second goal is to promote informed discussion on the use of common items to measure pharmaceutical consumption in forthcoming micro-surveys, with the aim of improving international comparison.

In the following section, we address some questions on the measurement of medicines consumption and a short revision of their determinants. Section 3 describes the main public data sources from which micro-data on these variables can be obtained. Special emphasis is placed on the advantages and disadvantages of Household Budget Surveys and National Health Interview Surveys as providers of data on pharmaceutical consumption. This section offers a detailed description of the information on pharmaceutical consumption offered by the surveys included in this study. Some comments and suggestions for future harmonization of information on pharmaceutical consumption in national interview-based surveys are presented in section 4.

2. THE PHARMACEUTICAL DEMAND AND ITS DETERMINANTS: WHAT DO WE WANT TO MEASURE?

Empirical studies on pharmaceutical demand are commonly undertaken with one or more policy objectives in mind. These objectives determine the kind of data required to carry out the analysis. A revision of data requirements to accomplish specific objectives in the analysis of the use of medicines would be a burdensome task that is beyond the scope of this paper. Therefore, a more modest objective is pursued in this section. In particular, we briefly revise the different dimensions or the different ways of measuring pharmaceutical consumption, at an individual level, and the factors that economic theory points to as potential determinants.

2.1 Measuring the use of medicines

Measuring health care consumption is undoubtedly easier than measuring other health aspects such as health status or disability. Nonetheless, the dimension of consumption we consider in the analysis may have important implications for the results. This means that the researcher should be careful in the selection of i) the type of medicine and ii) the units to use when measuring consumption, so that they satisfy the requirements of the study.

2.1.1 Classification of medicines

Medicines may be classified according to different criteria. First of all, medicines may be divided into therapeutic classes. The most common classification is the Anatomical Therapeutic Chemical (ATC) classification developed by the Nordic Council on Medicines. The ATC system is recommended by the World Health Organization for international drug utilization studies¹. This classification enables medicines to be grouped

¹ Drug utilization studies focus on the use of a drug in society and the effects this use has on the population. Results from these studies are helpful in analyzing side effects and costs of a treatment, including the ultimate economic repercussions of inappropriate prescribing and cost-effectiveness of the different therapeutic interventions studied. Drug utilization studies can be qualitative and quantitative. Qualitative studies try to ascertain the appropriateness of the usage of drugs. Quantitative studies have a variety of focuses: progression

into different categories according to the organ or system on which they act and their chemical, pharmacological and therapeutic properties².

Medicines may be also subdivided into different segments on the basis of different criteria established essentially from a demand-side perspective. A distinction may be made between prescribed and non-prescribed or over-the-counter medicines. While prescribed medicines can be purchased for out-patient use only from licensed pharmacists after presentation of a prescription from a physician, non-prescribed or over-the-counter (OTC) medicines can be obtained without prescription from pharmacies or, in some countries, other retail outlets.

The previous distinction is important to select the theoretical framework explaining the individual demand for medicines. A traditional demand model based on the concept of consumer sovereignty and full information may be applied in the case of non-prescribed medicines. However, a principal-agent relationship between doctors and patients is likely to explain prescribed drugs demand. Whereas patient characteristics are the main explanatory variables in the first case, demand for prescriptions is explained by the interaction of patient and doctor characteristics. This implies that demand-side strategies aimed at controlling demand for prescribed medicines should operate not only on patients but also on health care providers (Stoddart and Barer, 1981).

A distinction may also be made between medicines which are wholly or partially reimbursed under the health insurance system and non-reimbursed medicines. This classification may overlap with the previous. Typically, medicines sold under prescription are reimbursed, however most of OTC medicines are not reimbursed and have to be paid by the patient. It is important to remark that the conditions for prescriptions and reimbursement of medicines depend on the different legislative and regulatory measures of each Member State. This fact poses some problems from the point of view of harmonisation of statistical information on the use of medicines.

of drug utilization with time, comparison of the use of a drug between geographical areas; determining the numbers of people with a health problem by identifying the use of drugs utilized for its treatment, etc.

² More information is provided by the WHO Collaborating Centre for Drug Statistics Methodology in <http://www.whooc.nmd.no>

An important structural change that has taken place in the pharmaceutical market in recent years is the introduction of generic medicines. These are medicines with the same chemical compound as existing brand-name medicines, including the same International Common Denomination. Specific policies have been designed to encourage the use of generics. These policies have influenced both the frequency with which generic and brand-name medicines are prescribed and the prices paid for them.

2.1.2 Units of measurement

Basically, pharmaceutical consumption can be measured in physical units of consumption or in terms of expenditure.

The use of physical quantities or items of consumption is appealing and informative for disaggregated goods. In the case of medicines, this measurement makes sense if we can distinguish medicines according to their therapeutic group. A technical unit of measurement developed by the Norwegian Medical Depot and recommended by the World Health Organization in drug utilization studies is the Defined Daily Dose (DDD). The DDD is “the assumed average maintenance dose per day for a drug used for its main indication in adults”. Generally, medicine consumption figures are presented as numbers of DDD’s/1000 inhabitants/day. Sales or prescription data presented in this unit of measure provide a rough estimate of the proportion of the population within a defined area treated daily with a certain drug. This measure is generally restricted to analyses of consumption carried out from a medical or epidemiological perspective.

For social researchers, a common way of measuring pharmaceutical consumption is as the number of different medicines or prescriptions consumed by the patient during a reference period. However, the interpretation of this indicator is not straightforward. As we will see later, most interview-based surveys ask individuals whether they have used medicaments belonging to different therapeutic classes. For instance, a person who used only one type of antidepressant is computed to consume the same number of medicines as another person who used, for instance, four different types of antidepressants. In this case, this indicator

may be considered an estimation of the population *poly-pharmacotherapy*. Things are different when surveys recall the name of all medicines taken by individuals. Then the number of medicines is a more accurate proxy for the *intensity of consumption*.

When goods are diverse, i.e. if it is impossible to differentiate drugs according to some therapeutic classification, we can alternatively measure consumption in money expenditure at constant or contemporary prices. But if we are interested in cross-country comparisons, we face the problem that prices are measured in different currencies and conversions are subject to the volatility of the exchange rate. This is a crucial issue for comparability. The literature provides several options to convert pharmaceutical expenditure in a common currency. For instance, Babazono and Hillman (1994) use gross domestic product PPP exchange rates to convert expenditure data to U.S. dollars. But, as Frech and Miller (1997) observe, this is an unsatisfactory approach since regulation of pharmaceutical prices is widely used across European Countries, which implies these prices do not vary according to other prices. Alternatively, they propose the use PPP (Purchasing Power Parity) exchange rates designed specifically for converting pharmaceutical expenditures to U.S. dollars and which are available for OECD countries. Danzon and Percy (1999) provide more accurate Fisher price indexes to a group of countries (France, Italy, Germany and the United Kingdom) to perform the same conversion.

Another problem that arises when comparing health related expenditures is the difference of the social protection systems across the Member States as regards both the level and the method of implementing the social welfare effort. Individual expenditure is closely related to the organization of health systems and to the way medicines are covered by the different health insurance schemes. For instance, focusing on the countries analyzed in this paper, the proportion of the cost paid by the patient varies by type of drug in Denmark, France and Italy and for certain classes of drugs in Belgium. It is a flat rate in the United Kingdom, and for some drugs in Belgium. In Spain, patients pay a standard proportion of the cost. There are extensive exemptions in Belgium, Denmark, Spain, Italy and the United Kingdom (Mossialos, 1998).

One could analyze the household budget shares for pharmaceutical goods. This variable is informative of the differential impact of pharmaceutical expenditure on total household budgets across households with different levels of consumption defined by socio-economic and demographic characteristics.

2.2 Determinants of the use of medicines

The essential question that most of the analyses on medicine consumption tries to answer is why the population of some countries -or some groups of people within the same country- appear to consume more medicines than others. The design of pharmaceutical policies devoted to increase the rational use of medicines, or the design of public demand-side strategies for cost-containment, rely heavily on the knowledge of factors influencing the demand for pharmaceuticals. This section presents a brief revision of the main variables that the literature points to as its determinants.

2.2.1 Health

According to Grossman's (1972) approach, the demand for any health care service may be considered a demand derived from the demand for health. Empirically, though there is no perfect correspondence between drug therapeutic groups and specific diseases (i.e. some medicines can be used in different illnesses), there exists an appreciable correlation between them (Lobato et al., 1997). In fact, at aggregate level, the prevalence of a disease may be estimated on the basis of data on the consumption of specific drugs.

The disease state (acute or chronic) influence medicine consumption and the prescribing behavior of physicians. For instance, the way patients react when faced with an illness or disease, opting between self-care or physician services, determine the type of drugs, prescribed or non-prescribed, they use. On these lines, Steinke et al., (1999) find that repeat prescribing for chronic illnesses is more likely to be patient-led, while prescribing for acute conditions is more likely to be physician initiated.

2.2.2 Price and health insurance coverage

One of the major applications of pharmaceutical demand analysis is to estimate the price-elasticity (e.g. O'Brien, 1989, Hurley and Johnson, 1991, Newhouse, 1993). Difficulties to perform these estimations, however, arise from the existence of third party reimbursement. The existence of insurance coverage implies that the only estimate of price-elasticity that can be obtained in most studies is that which remains after insurance reimbursement. That is, the effective price that a consumer pays for prescribed medicines depends on many factors including coinsurance, deductibles, upper limits on out-of-pocket expenditures, premiums, and the price of the good or service itself. Consequently, empirical analyses usually focus on the effects of co-payments on pharmaceutical demand. The price-elasticity is identified from the variation in price across different health plans and/or over time.

A problem associated with the measurement of response to co-payments is that different individuals and groups of individuals in the population have different tastes for medicines, different individual characteristics and different responses to price changes (Hitiris, 2000). This underlines the convenience of distinguishing between those groups (identified by age, income, sickness categories, etc.) in order to evaluate differences in the price elasticity of demand for medicines. For instance, Newhouse (1993) shows that while higher co-payments are a tool to reduce excess consumption by persons with moderate or high incomes, they may deter deprived persons from access to necessary drugs. Grootendorst (1995) finds that the sicker patients were the most likely to benefit from the public drug insurance program (the Ontario Drug Benefit program for those aged more than 65 years). Also Coulson and Stuart (1992) offer evidence on the disproportional effect that co-payment policies may have on individuals with chronic diseases given the low price-elasticity of their medicine consumption.

Literature provides empirical evidence on the effects that managed care systems have introduced in the way medicines are prescribed. Thus, Onishi (1997) finds that managed-care patients are more likely to be prescribed a less expensive alternative among drugs which are believed to have similar efficacy. She also finds that price-elasticity of uninsured

demand is determined by two main forces. First, uninsured individuals have to pay out-of-their pockets for the entire cost of drugs, which is likely to increase the substitutability among alternative drugs with respect to the insured sector. Second, their insufficient knowledge of available alternative drugs and their physician's possible lack of concern for their expenses means that the self-paid sector exhibits less elastic demand and lower substitutability. The author finds that this second force dominates the first one.

2.2.3 Physician behavior

Supply-side variables are critical components of a demand for health care analysis. Pharmaceuticals, as other health care services, are unusual commodities because the consumer of the product is typically not the one deciding which product to consume and often not the one paying for it. If supplier inducement exists, many assumptions of rational consumer choice would no longer hold, i.e. both patients and doctors (or pharmacists) preferences influence the use of prescribed (or non-prescribed) medicines. Targeting the responsibility of providers in potential over-consumption and misplaced prescription requires the measurement of their responsibility in generating demand.

There is empirical evidence that prescribing varies enormously between doctors and geographical areas. In general, the doctor paid by fee-for-service prescribes more than the doctor paid in other ways (Abel-Smith, 1994). Some studies have shown that physician's risk aversion influence his/her prescribing behavior (Jacobzon, 2000). Hellerstein (1994) finds that there is persistence in the prescription behavior of physicians so that some physicians are more likely to prescribe trade-name medicines, while others more often prescribe generics. Patients who are treated by physicians with large numbers of HMO or pre-paid patients are more likely to be prescribed generics, and there is a wide regional variation in the propensity of physicians to prescribe generic drugs.

2.2.4 Socio-economic and demographic characteristics

Reducing health differences between groups of different socio-economic status by improving the health status of disadvantaged groups is considered to be one of the most important targets of health policy. The idea that patient access to health care services should not be impeded by financial circumstances underlies all analyses on equity in the delivery of health care.

The estimation of individual income-elasticities helps classify any good or service as inferior, necessary or luxury. At a macro level, the income-elasticities of health expenditure estimated for European countries are not very different from unity and the lower the level of income, the higher the income elasticity (Sáez and Murillo, 1994). However, when disaggregating among different types of health services, the relationship between income and demand is more ambiguous. Complexity is specially marked in the case of medicines. According to Huttin (1997), several factors contribute to the complexity of the relation between pharmaceutical demand and income. For instance, income seems to have different effects over the likelihood of receiving a prescription and the likelihood of using the prescribed drug effectively. The effect of income on the demand of medicines also depends on socioeconomic characteristics of the user and, especially, on his/her health insurance coverage.

Education is often found to be relevant when explaining demand for health care. On the one hand, more-educated people use health care more efficiently, therefore a lower health care demand is expected from them. On the other hand, education may be correlated with high health consciousness, which in turn stimulates preventive use of medical care.

The correlation of the use of medicines with age is clear. Older people tend to consume larger amounts of pharmaceuticals. This result is linked to the poorer health status levels of older people or, in terms of the Grossman's model, to the positive correlation of health status depreciation rates and age.

3. THE USE OF MEDICINES ACROSS INTERVIEW-BASED SURVEYS: WHAT CAN WE MEASURE?

Let us suppose that we are interested in comparing pharmaceutical consumption patterns across different Member States in the European Union. We may be able to identify specific instruments that measure this aspect. The existing surveys differ in their sampling methods, the wording of questions or the ways of collecting data. In this section, we try to address the comparability of information to carry out a meaningful comparison among countries.

3.1 Micro-data versus macro-data

In order to accurately assess the impact of important individual characteristics such as income, demographic structure, price, etc. on medicine consumption, individual data offer several advantages over traditional macroeconomic analysis. Sometimes, it is the natural and only feasible approach to take. This occurs, for instance, if we are interested in comparing the need for medicines with their actual utilization in order to detect inequities associated to certain socio-economic or demographic variables. Similarly, when our interest focuses on measuring the impact of particular policies on the pharmaceutical consumption of certain collectives (e.g. the elderly), data should be taken on an individual basis.

A microeconomic approach also avoids the problems of aggregation faced by macroeconomists and, furthermore, a research based on micro-data offers much more insight into the data generating process than a macroeconomic approach because the design of the survey that yields those observations is usually well known and its defects easy to detect (Pudney, 1989).

Broadly speaking, methods of collecting observational data on individual pharmaceutical consumption may be grouped under two general headings: population-based surveys and administrative registers. Despite the reliability of administrative registers, the difficulties of access to this information in most countries discourage us to consider them this analysis. An additional disadvantage of this data is that it recalls event-based episodes. It is generally

accepted that episode-based data is not representative of the population nor of conditions that are less well defined or do not have effective treatments. This is primarily due to heterogeneity in the access to health services and in the health seeking behavior of the population. Nonetheless, there are some interesting experiences that constitute valuable advances in the collection of administrative information, e.g. the Danish register system³ or the proposal of Statistics Netherlands to link administrative records and sample surveys through personal identification numbers (van der Laan, 2000).

Here, we focus on household interview-based surveys that are representative of the country's population, in particular Household Budget Surveys and National Health Surveys corresponding to seven countries: Belgium, Denmark, Italy, the Netherlands, Portugal, Spain and the United Kingdom. The aim is not thoroughly review each of these surveys, but to describe their contents with respect to pharmaceutical consumption and to illustrate the possibilities of making comparisons across European countries. The surveys revised in this study are presented in Table 1.

Data collected through survey interviews presents deficiencies. For instance, the sampling design may imply important limitations. Household surveys are usually restricted to a civilian, non-institutionalized population. Given that this excludes people living within institutions, prisons, etc., household surveys are likely to miss information on a sector of the population with high incidence rates of illness and, therefore, high needs for health care. In most cases the population excluded in this way amounts to no more than 2% of the total population, though the effect is more significant for particular groups such as old people and, certainly, the homeless.

³ In Denmark, every citizen has an exclusive registration number that allows to a follow-up of his/her contact with the health care system (physician, hospital, purchasing of prescribed medicines). In the case of medicines, for each medicine which the pharmacy sells on prescription, it registers the patient's number, his/her age, sex, the code number of the medicine, the county, the identification number of the general practitioner who prescribed the medicine, the number of packages bought and their cost. This information is then forwarded to The Danish Medicines Agency on diskettes each month. The register dates back to 1994. To avoid misuse of data, access to data is given at various levels, depending on a user's professional relationship with the health services. The public can only access to summarized data offered through Internet, but there is no restriction on its use.

Furthermore, all surveys based on individual or household information measure consumption information (as expenditure or as physical units) over a limited period of time. It is well known that the more accurate the measurement in terms of precise diary records, the shorter the period over which the survey can be carried out, and the more likely the occurrence of reported zero consumption. There are three potential causes for zero consumption i) no participation; ii) corner solution; iii) infrequent purchase. As López-Nicolás (1998) observes, the existence of different health care co-payment policies leads to a higher percentage of zeros than in other consumption commodities. This fact complicates the econometric treatment of this information. The handling of the zero problem depends on whether one's objective is to model health care expenditures or frequency of contact with the provider. In modeling expenditures, the zeros pose a problem because they introduce a discontinuity in the distribution of expenditure. However, in modeling a discrete random variable such as frequency of use (e.g. the number of medicines consumed) this is not an issue given that a high frequency of zeros is compatible with standard distributions such as Poisson and its generalizations (Cameron and Trivedi, 1998).

3.2 Household Budget Surveys

These are population-based surveys carried out in countries all over the world. The main purpose of this kind of survey is to provide updated expenditure weights which are used for the construction of consumer price and cost of living indices. In order to obtain these weights, it is necessary to get survey information on the composition of a household's consumption expenditure for the relative importance to be given to different commodity groups in the indices. In a broader sense, the purpose of conducting Household Budget Surveys is to give a picture of living conditions of private households in a country and time. Thus, these surveys also collect data on household income, savings and indebtedness as well as socioeconomic characteristics such as health insurance coverage, educational level of the head of the household, housing conditions, household composition, degree of urbanization, region, etc. Finally, the Household Budget Surveys are used as an input to building the national accounts for the purpose of measuring household final consumption at an aggregate level.

Besides these official uses, Household Budget Surveys information constitute the basis for analyzing the evolution and cross-country comparisons of income distribution and poverty. They are also used for researching on the patterns of consumption expenditures on specific groups of goods and services, across different subgroups of the population.

3.2.1 Methods of data collection

All Household Budget Surveys are confined to the population residing in private households. Collective or institutional households (old persons' homes, hospitals, hostels, boarding houses, prisons, military barracks, etc.) are excluded, as are generally persons with no fixed abode. Data collection involves a combination of (i) one or more interviews, and (ii) diaries maintained by households and/or individuals, generally on a daily basis. The main diary or diaries are used to record the household's consumption expenditure and the main interview aims to get substantive information on household characteristics and income.

3.2.2 Timing, frequency and reference period

The goal of comparative analysis across all the Member States is a strong reason for synchronization of the timing and frequency of national surveys. Differences in these aspects cause serious problems for comparability.

Focusing on the frequency of the Household Budget Surveys in the European Union, there are two patterns: annual surveys and surveys carried out at three-yearly or longer intervals. Annual surveys are carried out in 8 of the 15 EU Member States (Belgium, Denmark, Germany, Spain, Italy, The Netherlands, Sweden and the United Kingdom). Annual surveys are also continuous given that the fieldwork takes place on a continuous basis throughout the year. For instance, the Spanish Continuous Household Budget Survey is a quarterly expenditure survey where a stratified random sample of households is rotated in 1/8 every quarter. This allows the construction of panels with information on households

covering up to 8 quarters. This makes the Household Budget Surveys an appreciable data source for analyzing private health care demand at a national level (see for instance López-Nicolás, 1998).

The reference period of expenditures (the length of time over which the household is asked to report expenditures), varies depending on the category of health related expenditure. The length of recording period varies from one week to one quarter. For instance, the reference period for prescribed medicines is one week.

3.2.3 Questions on pharmaceutical consumption and problems of comparability

Generally, Household Budget Surveys include a series of questions about current health expenditures on specific items in a given period of time. Analyzing pharmaceutical out-of-pocket expenditure is of great interest to those who are working on equity in health. This data allows the identification of groups of households defined by different socio-economic or demographic characteristics that require more health care not only because of pharmaceutical spending as a share of total expenditure, but also by the individual characteristics of their members.

Since 1988, Member States transfer their micro-data to Eurostat (the statistical bureau of the European Union) according to an agreed timetable, and the data is re-codified using a common tabulation plan. For 1994 and 1999 micro data are available for all the Member States. Expenditure data is presented according to the classification COICOP-HBS (Classification of Individual Consumption by Purpose-Household Budget Survey), which is used to elaborate the harmonized index of consumer prices across Member States. Given that Household Budget Surveys are output harmonized, Eurostat does not emphasize the use of the same questions, the same survey structure or the sample designs in the surveys, but importance is given to harmonizing concepts and definitions.

In Table 2, we present the components of the expenditure in the field of health care, according to the COICOP-HBS classification. The pharmaceutical expenditure item covers

expenditure in medicinal preparations, medicinal drugs, patent medicines, serums and vaccines, vitamins and minerals, cod liver oil and halibut liver oil and oral contraceptives, both with and without prescription.

One disadvantage of these data sources is that, since the observations are at household level, it is impossible to know whether they correspond to one particular household member or to more members. Therefore, it is also impossible to evaluate the effect of individual characteristics (age, gender, socioeconomic status, etc.) on pharmaceutical expenditure. Furthermore, a problem associated with the measurement of response to co-payments is that different individuals or groups of individuals have different responses to price change. Thus, it is important to identify the persons whose medical expenditure varies so that the overall effect on utilization can be evaluated.

The differences in the social protection systems of the Member States⁴ makes comparability of health expenditures (including pharmaceutical expenditure) across national Household Budget Surveys difficult. Eurostat recommends the measurement of health expenditures via net expenditure, i.e. the record covers the households' effective expenditure minus later reimbursements. Although this approach ensures more reliable degree of comparability between the various surveys, it can cause data-collection problems for some countries or collectives with exemptions to the payment of medicines. Thus, whatever methods are used, it seems difficult to reach a good level of international comparability in these domains.

3.2 Health interview surveys

The Health Interview Surveys include information over a national representative sample of individuals on their health characteristics (e.g. perceived health, disease, disability, health-

⁴ This fact also explains differences in weights attached to pharmaceutical products in every country. For instance, in 2000 the weights of this budget item in the harmonized consumer price indexes were (per thousand): 15.5 (Belgium), 8.8 (Denmark), 21.7 (Netherlands), 17.1 (Italy), 5.3 (Spain), 21.5 (Portugal) and 7.0 (United Kingdom). This item weights 4.0 in the European Index of Consumer Prices. Source: Eurostat

related behavior) their use of health services and a wide range of demographic and socio-economic variables. The objectives of these surveys are to provide a description of the health of the total population, the determinants of health and the use of health services. In this sense, health interview surveys have proved a useful complement to the information from administrative registers.

The relevance of these data sources in assessing health-related issues has motivated the interest to harmonize their methods and instruments across countries, in order to facilitate the comparative analyses. This interest has led to a specific project lead by the World Health Organization, Regional Office for Europe, the so-called EUROHIS project (Nossikov and Gudex, 2000), the aim of which is to develop a common methodology for use in European health interview surveys. Special emphasis is addressed on standardizing modules on 1) chronic physical conditions; 2) mental disability; 3) alcohol consumption; 4) physical activity; 5) use of curative medical services; 6) use of medicines; 7) use of preventive health care; 8) and health-related quality of life.

One of the main components of Health Interview Surveys is that devoted to the use of health care services. Within this module, information on pharmaceutical consumption is developed in more or less detail, depending on the survey. In Table 3, we present the main aspects related to pharmaceutical consumption information in Health Interview Surveys revised in this paper. Though it cannot be considered a health interview survey, also included is the British General Household Survey because it is representative of the whole population and it includes health-related information, including a question on pharmaceutical consumption. The exact wording of questions is shown in Table 4. Overall, we have found cross-country differences not only in the specific weight given to items on pharmaceutical consumption, but also in the method of data collection, the recall period and the wording of questions. These differences are revised in more detail below.

3.3.1 Methods of data collection.

The usual approach of gathering information on health care use in Health Interview Surveys is by means of face-to-face interviews. Respondents give information on the type of medicines (prescribed/non-prescribed and distinguishing their therapeutic use) they are currently taking. There are, however, some problems related to the reliability of information provided by individuals. Frequently, they have neither precise information on the type of medicines they take nor on the health problem these medicines are indicated for. Nonetheless, this method of collecting data on medicine consumption is common for most of the surveys revised in this paper, but there are exceptions.

For instance, the Italian Health Survey collects data on the use of medicines through a self-administered questionnaire completed by the interviewee. Self-completion methods are generally used when questions are on sensitive subject matters (e.g. alcohol consumption, contraception, sexual behavior) for which it is important to ensure privacy. However, this method presents the same problems of reliability as the previous one.

A relatively few number of countries have conducted at least one nationally representative survey in the past decade combining household interviews with clinical examinations or laboratory assessments. These include Germany⁵, the United Kingdom and the United States. The Health Survey for England includes a health examination component that delegates the gathering of information to a medical team (a nurse in this case). Apart from taking blood, saliva samples and some physical measurements, the nurse writes the name and the British National Formulary Code corresponding to the prescribed medicines the respondent is taking at the moment of interview. This method of collecting medicine consumption information is not exclusive to health examination surveys. For instance, the Belgium Health Interview Survey records the name and the code of those medicines that are taken by the individual in an ordinary face-to-face interview. Information, in this case, is expected to be more reliable than that obtained by means of self-completion questionnaires. However, there exists the unavoidable problem that the interviewee does

not show all the medicines he/she takes to the interviewer, being this either a doctor/nurse or a non-sanitary person.

Another way of collecting information on medicine consumption is through physicians. An example of this type of survey is the National Ambulatory Medical Care Survey (NAMCS) in the United States⁶. Although it cannot be considered a household interview survey, it is one of the more frequently used data sources in empirical analyses on demand for prescription medicines (e.g. Hellerstein, 1998; Ellison et al. 1997; Onishi, 1997). The data consists of national samples of patient visits to the offices of non-federally employed physicians, but exclude visits to hospital-based physicians and physicians primarily engaged in training, research or administration. Therefore, outpatient markets are the focus of the survey. The NAMCS contains patient characteristics (e.g. age, sex, race, ethnicity, geography, insurance type), physician characteristics (e.g. specialty, geography, practice) the patient's reason for the visit, the physician's diagnoses and treatment, and the choice of prescription. For the medication item, the NAMCS was designed to allow physicians to code up to five drugs prescribed to a patient per office visit, including both prescription and over-the-counter medications. The NAMCS also records whether the physician prescribes generic or trade-name drugs. This survey constitutes a valuable source of information on prescription habits of doctors.

Among the disadvantages of this method of collecting data is that the prescription habits of physicians does not necessarily coincide with the consumption patterns of patients. Furthermore, we do not really know whether medicines ordered by the doctor are the medications ultimately dispensed to the patient by the pharmacist. That is, the pharmacist could have substituted a generic version of the drug for a trade-name prescription, unless the physician prohibited substitution on the prescription pad (Hellerstein, 1994). Another disadvantage is that information refers to illness-based episodes and therefore is not representative of the whole population.

⁵ The German National Health and Examination Survey collected by the German Robert Koch Institute does not include information on pharmaceutical consumption, therefore it was excluded from this study.

⁶ See Evans et al. (2000) for a complete inventory of U.S. data sources on health that may be interesting for economic research.

3.3.2 Reference period

The recall period for pharmaceutical consumption is two weeks for four surveys (Belgium, Danish, Dutch and Spanish). The Italian survey uses a two-day reference period and the Health Survey for England asks for current use of medicines and whether prescribed medicines were taken during the last week.

In Table 3, we observe that the reference period for pharmaceutical consumption coincides with the reference time for doctor visit in the Spanish survey and in the British General Household Survey. On the other hand, all surveys, except the Italian survey and the Health Survey for England, include questions on acute illnesses by using the same period of reference as for pharmaceutical consumption. The coincidence of these three reference periods is relevant because it allows the link between medicines consumption, prescribing habits of physicians and patients' self-perception of their needs.

3.3.3 Questions on pharmaceutical consumption and problems of comparability

The importance assigned to the subject of medicines in the questionnaires analyzed varies from one country to another. The questions addressing the utilization of medicines are also diverse. In Table 4 the exact wording of questions on pharmaceutical use in the revised surveys is presented.

A simple question on whether the interviewee either received a prescription and/or used medicines during the reference period is one of the most commonly used in Health Interview Surveys. In some surveys, like the British General Household Survey, the only question on medicines asks whether the doctor sent the interviewee a prescription during the previous two weeks. But this cannot be considered strictly a measure of effective use because it does not detail whether or not prescribed medicines were dispensed to the individual and whether s/he used them or not.

Questions addressing pharmaceutical consumption may be connected with previous statements about illness, including chronic illnesses (e.g. the Danish Health and Morbidity Survey and the Health Survey for England). This makes it possible to compare the need for service with the actual utilization in order to establish the degree to which such needs are met in relation to different socio-economic or demographic variables. However, in this case, information on pharmaceutical consumption has the disadvantage of being restricted to those persons who report a chronic illness or other complaints.

More complete information is obtained by asking questions about the pharmaceutical use to all interviewees on whether or not they report an illness during the reference period. This approach is undertaken in all the Health Interview Surveys revised here. Individuals who declared to have used medicines are usually asked about the type of medicines consumed. Following the distinction made by Klaukka and Martikainen (1997), there are two different ways of classifying medicines: the disease or symptom-based approach and the drug-based approach. In the first case, individuals are asked about whether they used medicines for specific diseases (Denmark and England). In the second case, questions focus on the use of medicines classified into different therapeutic groups (Denmark, Italy, England). Other questionnaires poses a classification of medicines that consists of a mixture of symptom-based and drug-based approaches. This is the case of Belgium, The Netherlands and Spain. In all cases, interviewees classify the drugs into the different groups. The limitations of this information derives from the imperfect knowledge that individuals may have about the type of medicines they are taking or the reasons for which these medicines were prescribed.

A much better procedure of collecting this information is to code the name of the medicines taken by the interviewee during the reference period. For instance, the Belgium survey offers the name, the code and regularity of the dosage of up to ten medicines taken during the two weeks previous to the interview. The Health Survey for England also records the name of medicine currently taken by the interviewee. One of the advantages of this information is that information may be complemented by drug characteristics such as marketing costs and prices. Variables involving drug characteristics are mainly supplied by data from IMS Health, which provides vast collections of data on marketing and sales of

the pharmaceutical industry (e.g. retail prices of prescription drugs, promotional expenditures to office-based physicians, spending on medical journal advertising of pharmaceutical products, etc.). The complementary use of population-based surveys and IMS data has been undertaken in other studies. For instance, Onishi (1997) analyzes differences in the degree of price sensitivity on the demand for tranquilizers and beta blockers across different types of health insurance by using data from the U.S. National Ambulatory Medical Care Survey and data from IMS America.

Finally, the Danish and the Italian questionnaires ask if the respondent read the instructions of medicines. The subject of expenditure on medicines is only mentioned in two surveys: the Portuguese Inquérito Nacional de Saúde which asks for individual expenditure and the Belgium Enquête de Santé par Interview, that records household expenditure.

4. CONCLUDING REMARKS

Literature distinguishes between two approaches to deal with comparability of data sources: pre-harmonization methods and post-harmonization methods. Pre-harmonization requires an agreement among all countries to start collecting comparable data. This is, undoubtedly, the best way to achieve comparability of data. However, it is also the most difficult alternative. Once a country has realized a survey, it is advantageous to repeat it at least partially unchanged so as to permit trend evaluations at a national level. Therefore, pre-harmonization will only work for the new and not for the existing data (van der Rijckeversel, 2001). Post-harmonization methods are more conservative, in the sense that they allow surveys to differ in the wording and the number of categories per item of information. Thus, these methods attempt to transform incomparable data into comparable data. The problem is that the transformation is not obvious and, sometimes, relies on strong assumptions.

Probably the best way to obtain internationally comparable data on individual patterns of consumption of medicines is through the development and administration of a common

international health-related survey across all participant countries. One of these experiences was a study conducted by the World Health Organization in 1969, the International Comparative Study of Medical Care Utilization. This study compared health care consumption patterns in twelve different cities from seven countries. Using interview-based surveys, the purpose of the analysis was to determine the need, use and allocation of health care resources (including medicine consumption) in each location. This alternative is, however, the most ambitious and resource-intensive approach.

Being realistic, Health Interview Surveys are the best available option to perform comparisons, given the difficulties to compare household expenditure across Household Budget Surveys. Another important advantage of health-related surveys is that they contain information on an important set of variables which are potential predictors of pharmaceutical consumption: health status, lifestyles, socio-demographic variables, other health care uses, etc. Based on the revision carried out in this paper, the two items in which a higher number of surveys coincided were:

- i) Incidence of use of prescribed and non-prescribed medicines in a common reference period (2 weeks) for Belgium, Denmark, Netherlands and Spain.
- ii) Therapeutic category of medicine consumed during the same reference period for Belgium, Denmark, Netherlands and Spain. Categories: pain relievers; heart and cardiovascular; laxatives; antibiotics; tranquilizers, sedatives and sleeping pills.

But even for these few items, the comparability of data would be improved by moving towards the use of common questions in international surveys. The existence of identical individual-level surveys conducted across all Member States of the European Union offers the possibility of adding new and common items or modules to the questionnaires with, relatively, low costs. This is the case of the European Community Household Panel, sponsored by the European Commission and conducted by thirteen Member States with the aid of a questionnaire drawn up by Eurostat. The questionnaire was developed in close cooperation with the countries involved and can be adjusted to national research practices.

For each country, the fieldwork is carried out by national research institutes and databases are combined by Eurostat to form one central database. The survey focuses on income and labor markets but also includes questions on demographic characteristics, housing, education and training, and a limited number of questions addressing non-fatal health status and use of health services. There is, however, no information about the use of medicines.

The possibility of widening the health module in the European Community Household Panel by including additional questions on pharmaceutical consumption and other health-related issues would provide a unique source of comparable health information across Member States of the European Union. This strategy could be developed in collaboration with the EUROHIS project to develop common instruments for use in national health surveys. Undoubtedly, this would multiply the benefits of the two projects in terms of implementation and information obtained. At this moment in time, this seems to be the most accurate and feasible strategy to harmonize data for pharmaceutical use (and, also, other health-related issues) given the difficulties in modifying existing national surveys to achieve cross-country comparability.

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TABLE 1: European surveys: country, name, internet site, timing

COUNTRY	SURVEY 1. Household Budget Survey 2. Health Survey	DATA COLLECTION	INTERNET SITE INFORMATION	SURVEY ⁽¹⁾ PERIOD since 1990
Belgium	Enquête sur les Budgets des Ménages	Institute National d'Statistique	statbel.fgov.be	Annual since 1995
	Enquête de santé par interview	Institute Scientifique de la Santé Publique	www.iph.fgov.be/epidemio/epien/index4.htm	1997, 2001
Denmark	Forbrugerundersøgelsen	Danmark Statistics	www.si-folkesundhed.dk	Annual
	Danish health and morbidity survey	Danish Institute for Clinical Epidemiology	www2.dst.dk/vadekalartion/en/v01079.htm	1994, 2001
Italy	Indagine campionaria sui bilanci delle famiglie italiane	Banca d'Italie	www.bancaditalia.it www.lisweb.cps.lu	Annual
	Indagine Statistica Multiscopo sulle Famiglie. (Condizione di salute e ricorso ai servizi sanitari) 1999-2000	ISTAT (Istituto Nazionale di Statistica)	www.istat.it	1994, 2000
Netherlands	Budgetonderzoek	Statistics Netherlands	www.scp.nl	Annual
	Permanent Onderzoek Leefsituatie	Statistics Netherlands	www.scp.nl	Continuous since 1991
Portugal	Inquérito aos orçamentos familiares	Instituto Nacional de Estadística	www.ine.pt	Irregular intervals
	Inquérito nacional de saúde	Instituto Nacional de Saúde	www.min-saude.pt	
Spain	Encuesta de presupuestos familiares	National Institute of Statistics	http://www.ine.es	Annual
	National Health Survey	National Institute of Statistics	http://www.msc.es	Since 1993 every two years
United Kingdom	Family Expenditure Survey	Office for national Statistics	http://www.mimas.ac.uk/surveys	Annual
	General Household Survey	Office for National Statistics. Social Survey Division	http://www.mimas.ac.uk/surveys	Annual
	Health Survey for England	Department of Health / National Centre for Social Research	http://www.mimas.ac.uk/surveys	Annual since from 1991

(1) In the case of Household Budget Surveys, the survey period refers to the duration over which the data is collected. This period is 12 months but not in all surveys does it coincide with the corresponding calendar year. In this case, the annual surveys are also continuous in the sense that the fieldwork takes place on a continuous basis throughout the year.

**TABLE 2: Components of out-patient health care expenditure in Household Budget Surveys
(COICOP-HBS Classification)**

Source: Eurostat's New Cronos Database

<p>06.1. Medical products, appliances and equipment</p> <p>This group covers medicaments, prostheses, medical appliances and equipment and other health-related products purchased by individuals, either with or without a prescription, usually from dispensing chemists, pharmacists or medical equipment suppliers.</p> <p>Such products supplied to out-patients by medical, dental and paramedical practitioners or to in-patients by hospitals and the like are classified in (06.2) or (06.3) as appropriate.</p> <p>06.1.1. Medical products, appliances and equipment</p> <p>06.1.1.1 Pharmaceutical products</p> <ul style="list-style-type: none"> - Medicinal preparations, medicinal drugs, patent medicines, serums and vaccines, vitamins and minerals, cod liver oil and halibut liver oil, oral contraceptives <p>06.1.1.2 Other medical products</p> <ul style="list-style-type: none"> - Clinical thermometers, adhesive and non-adhesive bandages, hypodermic syringes, first-aid kits, hot-water bottles and ice bags, medical hosiery items such as elastic stockings and knee-pads, condoms and other mechanical contraceptive devices. <p>06.1.1.3 Therapeutic appliances and equipment</p> <ul style="list-style-type: none"> - Corrective eye-glasses and contact lenses, hearing aids, glass eyes, artificial limbs and other prosthetic devices, orthopaedic braces and supports, orthopaedic footwear, surgical belts, trusses and supports, neck braces, medical massage equipment and health lamps, powered and unpowered wheelchairs and invalid carriages; - Repair of therapeutic appliances and equipment. <p><i>Includes: dentures but not fitting costs.</i></p> <p><i>Excludes: hire of therapeutic equipment (06.2.3); protective goggles, belts and supports for sport (09.3.1); veterinary products (09.3.3); sun-glasses not fitted with corrective lenses (11.2.2); medicinal soaps (12.1.2).</i></p> <p>06.2. Out-patient services</p> <p>This group covers medical, dental and paramedical services delivered to out-patients by medical, dental and paramedical practitioners and auxiliaries. The services may be delivered at home or in individual or group consulting facilities or dispensaries or the out-patient clinics of hospitals and the like. The group includes the medicaments, prostheses, medical appliances and equipment and other health-related products supplied to out-patients by such practitioners and auxiliaries.</p> <p>06.2.1. Medical Services (S)</p> <p>06.2.1.1. Medical Services</p> <ul style="list-style-type: none"> - Consultations of physicians in general or specialist practice. <p><i>Includes: orol-dental specialists.</i></p> <p><i>Excludes: services of medical analysis laboratories and X-ray centres (06.2.3); traditional medicine (06.2.3).</i></p> <p>06.2.2. Dental services (S)</p> <p>06.2.2.1. Dental services</p> <ul style="list-style-type: none"> - Services of dentists, oral-hygienists and other dental auxiliaries. <p><i>Includes: fitting costs of dentures but not the dentures themselves.</i></p> <p><i>Excludes: dentures (06.1.3); oro-dental specialists (06.2.1); services of medical analysis laboratories and X-ray centres (06.2.3).</i></p> <p>06.2.3. Paramedical services (S)</p> <p>06.2.3.1. Services of medical analysis laboratories and X-ray centres</p> <p>06.2.3.2. Services of medical auxiliaries</p> <ul style="list-style-type: none"> - Services of nurses and midwives; - Services of acupuncturists, pedicures, chiropractors, optometrists, physiotherapists, speech therapists, etc.; - Medically-prescribed corrective-gymnastic therapy; - Out-patient thermal bath or seawater treatments. <p>06.2.3.3. Other non-hospital services</p> <ul style="list-style-type: none"> - Ambulance services other than hospital ambulance services; - Hire of therapeutic equipment. <p><i>Includes: traditional medicine.</i></p>

TABLE 3: Main characteristics of pharmaceutical information across European Health Interview Surveys

	BELGIUM	DENMARK	ITALY	NETHERLANDS	PORTUGAL	SPAIN	ENGLAND	UK
Recall of data	Face-to-face	Face-to-face	Self-completion	Face-to-face	Face-to-face	Face-to-face	Examination component	Face-to-face
Reference period								
---- Medicines	2 weeks	2 weeks	2 days	2 weeks	2 weeks	2 weeks	1 week	2 weeks
---- Needs (health status)	2 weeks	2 weeks	4 weeks	2 weeks	2 weeks	2 weeks	2 weeks	
---- Doctor consultation	2 months	3 months	4 weeks	2 months	3 months	2 weeks	2 weeks	2 weeks
Distinction by therapeutic classes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Distinction prescribed/non-prescribed	Yes	Yes	Yes	Yes	No	No	Yes	Only prescribed
Names, code of medications	Yes	No	No	No	No	No	Yes	No

TABLE 4 : Questions on the use of medicines in European Health Interview Surveys

Survey	Pharmaceutical utilization	Therapeutic groups	General contents
<p>BELGIUM</p> <p>Enquête de santé par interview, Belgique (2001)</p>	<p>Individual:</p> <ol style="list-style-type: none"> 1. Did you use medicines during the last 2 weeks? If not, when did you use any medicines for the last time? 2. What type of medicines did you use (25 therapeutic groups) and who prescribed these (GP, specialist, other practitioner)? 3. Did you use non-prescribed medicines during the last two weeks? If not, when did you use them for the last time? 4. What type (18 therapeutic groups) of non-prescribed medicines did you use? 5. For all medicines taken during this period (up to 10) the survey records: name, code CNK, prescribed/ non-prescribed, regularity of the dosage (regularly, temporarily, when required, etc.) <p>Household:</p> <ol style="list-style-type: none"> 1. Expenditure in prescribed and non-prescribed medicines (jointly) 	<p><u>Therapeutic groups in (2)</u></p> <p>Cough, flu / Pain relievers for rheumatism and joints / Other pain relievers / Heart and cardiovascular / Vitamins / Cerebral pressure / Diuretics / Laxatives / Stomach, digestive / Sleeping pills / Anti-depressant / Tranquilizers / Antibiotics / Skin problems / Allergy / Asthma / Contraceptive pills / Hormones for menopause / Diabetes / Epilepsy / Parkinson / Medicines for eyes / Medicines to lose weight / Homeopathic medicines / Natural medicines / Others</p> <p><u>Therapeutic groups (4)</u></p> <p>Cough, flu / Pain relievers for rheumatism and joints / Other pain relievers / Heart and cardiovascular / Vitamins / Cerebral pressure / Diuretics / Laxatives / Stomach, digestive / Sleeping pills / Tranquilizers / Skin problems / Allergy / Asthma / Medicines for eyes / Medicines to lose weight/ Homeopathic medicines / Natural medicines / Others</p>	<p>Three questionnaires:</p> <p><u>Household:</u> composition, insurance coverage of members, health expenditures, housing, environment.</p> <p><u>Self-questionnaire</u> (individual of reference): self-perceived health, lifestyles, satisfaction with health services</p> <p><u>Face-to-face questionnaire</u> (individual of reference): health status, health care use, pharmaceutical utilization, socioeconomic variables</p>
<p>DENMARK</p> <p>Danish Health and Morbidity Survey (1994)</p>	<ol style="list-style-type: none"> 1. Do you regularly or continuously take any medicine/drug (i.e. prescribed or OTC, but don't include vitamins, minerals or natural products and contraceptive pills)? Trade name. 2. Within the past 2 weeks have you taken any of the following prescribed or OTC medicine? (11 therapeutic groups) 3. About the use of prescribed medicines: Has anyone instructed you on how to take it? Have you read anything about how to use the prescribed medicine? 4. About the use of OTC medicines: Has anyone instructed you on how to take it? Have you read anything about how to use the OTC medicine? Have you seen any commercials for the OTC medicine you are taking? 5. During the past 2 weeks have you been bothered by any of the complaints listed? (14 health problems). If yes, what did you do? (among the options: "I took prescribed medicines", "I took OTC medicines"). 	<p><u>Therapeutic groups in (2)</u></p> <p>Cough / Asthma / Anti-hypertensives / Heart / Remedies for the skin / Pain relievers for aches and pains in the muscles, bones, tendons or joints / Other kind of pain relievers / Sleeping pills / Laxatives / Sedatives, tranquilizers / Penicillin or other antibiotics</p> <p><u>Complaints that may require medication in (5)</u></p> <p>Pain in shoulder or neck / Pain in back or loin / Pain or discomfort in arms, hands, legs, knees, hips or joints / Headache / Rapid palpitations / Anxiety, nervousness, restlessness and apprehension / Sleeping problems / Melancholy, depression, unhappiness / Fatigue / Stomach ache / Indigestion, diarrhoea, constipation / Eczema, rash, itching / Colds, rhinitis, cough / Breathing difficulties</p>	<p>Two questionnaires:</p> <p><u>Face-to-face interview</u> Socioeconomic variables, health and morbidity, medication, use of health services, use of complementary treatment, physical disability, dental health, external health risks and resources, amount and nature of work, lifestyles.</p> <p><u>Self-administered questionnaire:</u> self-perceived health, attitudes towards health and habits, health education, general considerations about the survey.</p>

TABLE 4: (continued)

Survey	Pharmaceutical utilization	Therapeutic groups	General considerations
<p>ITALY</p> <p>Indagine statistica multiscopo sulle famiglie : Condizione di salute e ricorso ai servizi sanitari (1999-2000)</p>	<ol style="list-style-type: none"> 1. Have you used any medication during the last 2 days? If yes: Medicines were prescribed or non-prescribed? 2. With what frequency do you take the following medicines? (7 therapeutic groups) 3. Does your doctor know you take those medicines? 4. Do you usually check the sell by data of the medicines? Do you usually read instructions? 5. Is there any medicine that has been prescribed to you during the last 4 weeks and that, for any reason, you have not used? 	<p><u>Therapeutic groups in (2)</u></p> <p>Pain relievers / Sedatives or tranquilizers / Sleeping pills / Laxatives / Nasal sprays / Digestive / Vitamins / Others</p>	<p><u>Self-administered questionnaire</u></p> <p>Health status, disability, smoking habits, consumption of medicines</p> <p><u>Face-to-face interview</u></p> <p>Household composition, socio-economic variables, demographic variables, health care use, alternative medicine, prevention, housing conditions, physical handicaps of household members.</p>
<p>THE NETHERLANDS</p> <p>Permanent Onderzoek Leefsituatie / Continuous Quality of Life Survey (1998)</p>	<ol style="list-style-type: none"> 1. Did anyone prescribe medication for you during the past 14 days? 2. Did you use the prescribed medication during the past 14 days? 3. When did you use prescribed medication for the last time? 4. What medication was it (17 therapeutic groups)? 5. Who prescribed it? 6. Did you use medication that was bought without prescription during the past 14 days? 7. When did you use medication that was bought without prescription for the last time? 8. What medication was it? (10 therapeutic groups) 	<p><u>Therapeutic groups in (4)</u></p> <p>Pain relievers and medication for fever / For cough, cold, flu, sore throat / Vitamins / Heart, blood vessels, blood pressure / Diuretics / Laxatives / Stomach and intestinal complains; indigestion / Sedatives, tranquilizers; nervous disorders / Antibiotics / Skin / Rheumatism, arthritis / Allergy / Asthma / Contraceptive pills / Hormones / Diabetes / Medication for the eyes / Others</p> <p><u>Therapeutic groups in (8)</u></p> <p>Aspirin / Cough, cold, flu / Vitamins / Heart / Laxatives / Stomach and intestinal complains; indigestion / Sedatives, tranquilizers; nervous disorders / Skin / Rheumatism, arthritis / Homeopathic medication / Others</p>	<p><u>Face-to-face interview</u></p> <p>Living conditions: experience and valuation of the life situation, some welfare characteristics, demographic and socio-economic variables.</p> <p>Labor conditions: shiftwork, noise, smell, danger, physical strains, workrate, monotony, occupational level, job satisfaction and promotion opportunities</p> <p>Health: perceived health, use of medicine, smoking, alcohol consumption, use of medical facilities,</p>
<p>PORTUGAL</p> <p>Inquérito Nacional de Saúde / National Health Interview Survey (1998-1999)</p>	<ol style="list-style-type: none"> 1. Did you take sleeping pills during the last 2 week? How many days did you take pills? Why? For how long are you taking sleeping pills? 2. Individual expenditure in medicines during the previous 2 weeks 	<p>Only sleeping pills</p>	<p><u>Face-to-face interview</u></p> <p>Health indicators, nutrition habits, disability, expenditure on health services, use of health services, health insurance, demographic and socio-economic variables</p>

TABLE 4 (continued)

Survey	Pharmaceutical utilization	Therapeutic groups	General considerations
<p>SPAIN</p> <p>Encuesta Nacional de Salud / National Health Survey (1997)</p>	<ol style="list-style-type: none"> 1. Did you use any medication during the last 2 weeks? 2. What medication was this (17 therapeutic groups)? For each medicine: was it prescribed or non-prescribed? 	<p><u>Therapeutic groups in (2)</u></p> <p>Colds, cough, flu / Pain relievers / Vitamins / Laxatives / Antibiotics / Tranquilizers, sedatives, sleeping pills / Allergy / Diarrhoea / Rheumatism / Heart / Blood pressure / Digestive problems / Anti-depressant / Contraceptive pills / Medicines to lose weight / Medicines for cholesterol / For diabetes / Other</p>	<p><u>Face-to-face interview</u></p> <p>Health indicators, lifestyles, disability, expenditure on health services, use of health services, health insurance, demographic and socio-economic variables</p>
<p>ENGLAND</p> <p>Health Survey for England (1999)</p>	<ol style="list-style-type: none"> 1. For every chronic illness: Are you taken medicines for it? 2. For every doctor visit: did the doctor give a prescription? 3. Currently taking medication prescribed by doctor? 4. Names of prescribed medication (BNF code) 5. Have you taken these drugs in the last 7 days? 6. Are you taking medicines for ... (12 therapeutic uses)? 7. Number of prescribed medicines taken. 	<p><u>Chronic illnesses in (1)</u></p> <p>High blood pressure / Angina / Myocardial infarction or coronary thrombosis / Heart murmur / Abnormal heart rhythm / Other heart trouble / Stroke / Diabetes</p> <p><u>Therapeutic groups in (5)</u></p> <p>Cardio-vascular / Gastrointestinal / Respiratory / CNS medicine / Infection / Endocrine / Gynae-Urinary / Cytotoxic / Medicine for nutrition / Musculoskeletal / Eye or Ear / Skin / Other</p>	<p><u>Face to face interview</u></p> <p>Health indicators, lifestyles, socio-economic variables, parental history, use of health services, heart problems, diabetes, household information on housing, car, income, head of household</p> <p><u>Self-administered survey</u></p> <p>Smoking, drinking , GHG-12, social support, use of contraceptive pill and HRT</p> <p><u>Nurse visit</u></p> <p>Prescribed drugs, vitamin supplements and nicotine replacements. Physical measurements. Saliva and blood samples are analysed.</p>
<p>UNITED KINGDOM</p> <p>General Household Survey</p>	<p>During the last 2 weeks, did the doctor send you a prescription?</p>	<p>None</p>	<p><u>Household questionnaire</u></p> <p>Household composition, housing, consumer durables, migration</p> <p><u>Individual questionnaire</u></p> <p>Employment, education, sickness, use of health and personal social services, smoking, alcohol consumption and leisure activity</p>

TABLE 5: Information on the use of medicines across European Health Interview Surveys

INFORMATION	COUNTRIES*	OBSERVATIONS
<p>During the reference period:</p> <ul style="list-style-type: none"> • Did anyone prescribe medication for you? • Did you use medication? 	<p>Reference period: 2 weeks: NE, UK 2 days: IT For every doctor visit: England</p> <p>Reference period: 2 weeks: BE, DK, NE, SP 2 days: IT Current use: DK, England</p>	<p>The Portuguese Inquérito Nacional de Saúde asks for individual expenditure during the reference period.</p>
<p>Type of medicines used during the reference period. Distinction by:</p> <ul style="list-style-type: none"> • Prescribed or OTC • Therapeutic groups: <ul style="list-style-type: none"> -Symptom-based -Drug-based -Mixture 	<p>BE, DK, IT, NE, SP</p> <p>DK, England (for chronic illnesses)</p> <p>IT, DK, England (only for prescribed medicines)</p> <p>BE, NE, SP</p>	<p>The Health Survey for England focuses on prescribed medicines. The Portuguese Inquérito Nacional de Saúde only asks for consumption of sleeping pills. Therapeutic groups differ among surveys (see Table 4).</p>
Number of medicines	England (only prescribed)	-----
Names of medicines taken	BE (up to 10), DK (for medicines taken continuously), England (only prescribed)	-----
Expenditure	BE (household-level) P (individual-level)	-----
Consumer information (do you read the instructions of medicines?)	DK, IT	-----

* BE: Belgium; DK: Denmark; IT: Italy; NE: The Netherlands; P: Portugal; SP: Spain; UK: United Kingdom

TABLE 6: Therapeutic groups for prescribed medicines (recall period of two weeks) in Health Interview Surveys

	BELGIUM	DENMARK	NETHERLANDS	SPAIN
Cough, flu	X	X	X	X
Pain relievers	X	X	X	X
Heart and cardiovascular	X	X	X	X
Diuretics	X		X	
Laxatives	X	X	X	X
Stomach, digestive	X		X	X
Anti-depressant	X			X
Tranquilizers, sedatives, sleeping pills	X	X	X	X
Antibiotics	X	X	X	X
Skin problems	X	X	X	
Allergy	X		X	X
Asthma	X	X	X	
Medicines for diabetes	X		X	X
Medicines for eyes	X		X	
Vitamins	X		X	X
Contraceptive pills	X		X	X

* This table only reflects therapeutic groups for which at least two countries coincide.