

Editorial

Modelization of cost assessment in childhood asthma is essential for policy makers

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Asthma is a major chronic disease throughout the world affecting all ages (1). Within the European Union (EU), prevalence of childhood asthma (wheeze) ranges from 5.7% in Greece to 25.3% in England (2). With an increasing incidence, dozens of millions of children and adults are concerned. Asthma is a serious global health problem and represents a significant burden, with a substantial economic impact on the affected persons, their families, the health care systems and society as a whole and reduced participation in family life (3).

This burden is composed of direct expenditures generated within the health care system, indirect costs associated with the loss of economic productivity and intangible costs corresponding to the quality of life of children as well as of their parents. However, it is difficult to translate such a subjective notion into an objective and economic evaluation as most quality of life scales used in children and their parents do not include an economic value (4–6). In children with uncontrolled asthma, the children and their parents are obliged to stay at home, or if this is not possible, the parents have to employ a caregiver to look after their child, thereby increasing indirect costs. Asthmatics are frequently required to make choices on how to re-allocate their personal and family resources. The economic burden of these conditions also affects school and work productivity (7).

Health economic outcomes are increasingly being relied upon as a decision-making source for health care providers. Economic analysis can help to set priorities and maximize management strategies for cost control without sacrificing safety, efficacy or effectiveness. Member states of the EU have different socio-economic levels

and health care systems. Effective antiasthma medications are available in all EU countries but they may not be affordable for all patients. Moreover, indirect costs (e.g. a working day lost) vary widely between countries. Different viewpoints should be considered. Patients always desire an optimal treatment in terms of efficacy and safety. However, they have a different perspective depending on the health system. If their medical insurance or the health care system were to reimburse all medical expenses, patients would be unrestricted and could use health care resources and funds excessively. The economic evaluation will be truncated and, for the patients, indirect and intangible costs will represent the only costs. On the contrary, if patients are obliged to pay medical costs partly or completely, they would also want to have a more cost-effective treatment which, unfortunately, may not be the optimal one (e.g. inhaled corticosteroids *vs* combination therapy). In low- and middle-income countries, childhood asthma has a significant adverse impact on finances, with the average monthly expenditure on a child's medication sometimes over one-third of the monthly per capita income (8). Ideally, the model should provide a societal perspective by taking into account all the costs including school and indirect working days lost (for parents) and quality of life.

Health care has a cost and resources are limited. The knowledge of the cost-of-illness of asthma is very important, particularly for a frequent and chronic disease that concerns children and adults. There has been considerable evidence of the cost-effectiveness of treating asthmatic patients, especially considering its high prevalence, morbidity, mortality, and concomitant health care

consumption (9). Health care systems and the EU member states should have to anticipate costs incurred by asthma, comorbidities and the complex environment exposure causing or exacerbating asthma. However, before modelizing the cost trends in EU, there is need for an estimation of current costs in the 25 EU countries.

In this issue of *Allergy*, Van-den-Akker-van-Marie et al. (10) studied the cost-of-illness for asthma in children under 15 years in all 25 EU member states. This important study was commissioned by the Joint Research Center of the European Commission in the frame of the European Science and Technology Observatory. It was a contribution to the scientific workshop on childhood asthma enviromics held on April 22–23, 2004 in the University College of Cork, Ireland. In this report, all EU countries, including those, which entered the EU on the May 1, 2004, were taken into account. The authors calculated the costs depending on the prevalence of asthma and wheeze, direct and indirect costs, but they did not include the intangible costs. This economic evaluation was very carefully analyzed. All the published papers were used and the authors sought help from many pharmacoeconomists around Europe. Thus, it appears that such a modelization of costs has been achieved with the greatest care and with the highest standards. However, for many reasons, it is very difficult to obtain an accurate economic estimation in the 25 EU countries.

The definition of asthma is always a matter of discussion, especially in young children. The authors have appropriately used both asthma and wheeze (10). The prevalence of 'asthma and 'wheeze was based on the International Study of Asthma and Allergies in Childhood (ISAAC I) (11) and KIDSCREEN [screening and promotion for health-related quality of life (HRQL) in children and adolescents] (12) studies. Although data were available for most countries, the authors had to estimate the prevalence in some of the 25 EU countries where there is no data. Moreover, data from the mid-1990s were used and changes in asthma prevalence have occurred within the past decade (13). Finally, the prevalence of 'wheeze is difficult to compare between countries, at least partly because this term is not similar between different languages. The total estimated prevalence of 'wheeze and 'self-reported asthma for children and adolescents in the EU25 was reported to be 12.3 and 7.2 respectively (10). To estimate the number of children and adolescents with wheeze and with self-reported asthma within each country, the prevalence figures were combined with population data from Eurostat, the EU Statistical Office.

Two types of cost-of-illness studies can be distinguished: prevalence and incidence. Van-den-Akker-van-Marie et al. (10) studied prevalent costs. They first analyzed data on the cost-of-illness using a thorough literature search. They updated the review published by Sculpher and Price (14) who attempted to capture all economic evaluations published in asthma between 1985

and June 2002. The authors distinguished direct and indirect costs (costs for the parents), took into account discount costs when analyzing the studies found in the literature, and estimated that asthma treatment is less expensive in children than in adults. Another problem well identified by the authors is the difficulty to appreciate the drug cost equivalence in the 25 EU countries. Unfortunately, many of the studies used by the authors did not include indirect costs (and sometimes nonmedical direct costs). These costs had to be estimated by the author. Annual costs are very different depending on the country. Thus, the authors (10) appropriately carried out a sensitive analysis integrating these differences and taking into account variations of proportion between medical, nonmedical direct costs, and indirect costs.

Societal perspectives taking into account the impact of the disease and quality-of-life as well as the patient viewpoints could have been considered. Although the KIDSCREEN study assessed HRQL in 14 EU countries, Van-den-Akker-van-Marie et al. (10) did not report these intangible costs. Moreover, the author did not take into account other indirect costs such as prevention and training, which appear to be so important in childhood asthma. Although, it is extremely difficult to calculate these costs, this study may have underestimated the costs for asthma in children.

Van-den-Akker-van-Marie et al. (10) estimated average annual costs at €613 per child under 15 years old, ranging from €142 in Estonia to 1529 in Hungary. These numbers appear surprising since it was not expected that the highest costs per patient in EU25 would be from this country where medical expenditures are not the highest.

Cost-of-illness studies are important for the treatment policies of the disease. To obtain an estimate for the annual prevalent costs for childhood asthma in the EU25, the costs were multiplied by the prevalence of self-reported asthma. The authors estimated total costs of childhood asthma amounts at €3000 million (10). Adding 'wheeze in the definition of asthma leads to a considerable higher estimate of the total costs (€5200 million) (10). Using the definition of wheeze may lead to the inclusion of cases of very mild asthma and of patients without asthma.

This paper is of paramount importance since the economic knowledge should lead to a better use of resources depending on the country cost, prevalence and incidence repartition in the EU. Guidelines such as the GINA guide for asthma management and prevention in children (3) already incorporate cost analyses but these will be of greater importance in the future. Moreover, the prediction of costs is needed. The modelization of asthma costs have been proposed using sophisticated methods such as the probabilistic sensitivity analysis for decision trees with multiple branches using the Dirichlet distribution in a Bayesian framework (15). The Markov model can be used to estimate the cost-effectiveness of

alternative asthma treatments (16). However, these models only attempt to assess costs associated with medications and/or asthma exacerbations. A more global modelization should be envisaged taking into account the natural history of asthma, the expected trends in

prevalence and morbidity, the role of the indoor (allergens, tobacco smoking) and outdoor environment (allergens, pollution), nutrition and occupation, comorbidities, quality of life (utility), work and school as well as the ageing of the population.

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