



# Costs of illness and care in Parkinson's Disease: An evaluation in six countries

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## Abstract

We investigated the costs of Parkinson's Disease (PD) in 486 patients based on a survey conducted in six countries. Economic data were collected over a 6-month period and presented from the societal perspective. The total mean costs per patient ranged from EUR 2620 to EUR 9820. Direct costs totalled about 60% to 70% and indirect costs about 30% to 40% of total costs. The proportions of costs components of PD vary notably; variations were due to differences in country-specific health system characteristics, macro economic conditions, as well as frequencies of resource use

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and price differences. However, inpatient care, long-term care and medication were identified as the major expenditures in the investigated countries.

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## 1. Introduction

Parkinson's Disease (PD) is among the most common neurodegenerative diseases. PD is characterized by bradykinesia, tremor, rigidity and postural instability. Comorbidities such as mental disorders, autonomic dysfunction, difficulties in swallowing and speech as well as sleep impairment may occur during the course of the disease. PD primarily affects the elderly and thus due to population aging has become a rapidly growing area of concern. In Europe, the prevalence of PD is approximately 160 per 100,000 among those aged 65 and older and this number will considerably increase in the coming years (Dorsey et al., 2007; von Campenhausen et al., 2005).

Care for PD patients consumes a considerable amount of health care resources, as current data on costs of PD indicate (Findley et al., 2003; Hagell et al., 2002; Schrag et al., 2000; Spottke et al., 2005). Only limited data on PD costs are available. In Eastern Europe, Austria and Portugal, data on the economic burden of PD are lacking (Lindgren et al., 2005).

The aim of this study was to evaluate the direct and indirect costs of PD using the same methodological approach in order to increase the comparability of the results from different countries. No such comparative studies exist for PD in Europe.

## 2. Experimental procedures

### 2.1. Study design and patient recruitment

This health-economic study was one project undertaken by the "EuroPa network on Parkinson's Disease" and was funded by the Fifth European Framework program ([www.EuroParkinson.net](http://www.EuroParkinson.net)). As such, participants were recruited from the EuroPa registry, founded by the EuroPa study group as a patient pool for clinical trials and research on PD. The EuroPa registry consisted of 1821 patients with PD, randomized between June 1, 2003 and December 31, 2005 from study sites in ten European countries. Five member countries took part in the health-economic substudy: Austria, Czech Republic, Germany, Portugal and Italy (von Campenhausen et al., 2009; Winter et al., 2010a; Reese et al., 2010). Russia, although not a member of the EuroPa study group, participated as well (Winter et al., 2009). A total of 600 consecutive PD patients were recruited. The study was approved by the local ethics committees. All patients gave written informed consent.

### 2.2. Data collection and management

The questionnaire assessed socioeconomic background information on age, gender, marital status, living situation, educational level, employment status and quality of life (QoL) (e.g. Appendix, Supplemental Fig. 1).

Clinical data were collected at baseline: all study participants underwent a complete medical and neurological examination that was performed by a movement disorder specialist. PD diagnosis was based on the UK PD Society Brain Bank clinical diagnostic criteria for

PD (Gibb and Lees, 1989). The clinical examination was performed in the clinical 'on' state. Clinical data were documented by the investigator and included time of symptom onset, date of first diagnosis, disease stage according to Hoehn and Yahr (H&Y) (Hoehn, 1967) and the Unified Parkinson's Disease Rating Scale (UPDRS II-IV) (Fahn and Elton, 1987) as well as complications of the disease (e.g. motor complications, dementia, depression).

Health-economic data were collected using a standardized questionnaire that was filled out by the patients at baseline with a 3 months recall period for resource use. Patients were asked to indicate their expenses, a sample of the questionnaire is presented as Supplemental Fig. 1. A follow-up questionnaire was completed 3 months after baseline by the patients. Thus, data for a 6-month period were obtained.

The questionnaire developed for the study was translated into the appropriate languages by native speakers. The questionnaire was adapted by local health economists after taking into account the country-specific regulations and organisation of the respective health care system.

### 2.3. Resource use and costs

The questionnaires provided information on resource consumption, costs and care related to PD. Costs were calculated per patient as the mean costs over the 6-month observation period.

The resource unit costs were obtained from several publicly available sources by health economists in each country. The data were recorded in local currency and converted into Euros (EUR) using purchasing power parity (PPP) (OECD, 2008), and adapted to 2008 Euros using the Medical Care Component of the Consumer Price Index (Czech Statistical Office, 2008; Istituto nazionale di statistica, 2009; Ministério do Trabalho e da Solidariedade Social (INE), 2005; Russian State Committee for Statistics, 2007; Statistik Austria, 2009; Statistisches Bundesamt Deutschland, 2008). The societal perspective, which is the most comprehensive perspective, was chosen providing direct health care costs, non-medical costs, informal care and indirect costs. Country-specific regulations were considered and are mentioned separately below. References for unit costs are presented in Table 1 ordered by country and cost category.

#### 2.3.1. Direct costs

**2.3.1.1. Inpatient care (hospital and rehabilitation).** Patients documented their inpatient stays. Cost calculations were generally based on admissions using diagnosis-related groups (DRG). When this was not possible like in the Czech Republic, per diem costs were obtained from official tariff lists or from the hospital or rehabilitation center to which the patient was admitted. Costs of rehabilitation centres were based on costs per day (Appendix, Supplemental Table 1).

**2.3.1.2. Outpatient care.** Outpatient cost was based on cost per visit. Unit costs for visits to the physician were taken from the local official tariff lists for outpatient care and based on costs per visit by speciality, multiplied by the number of visits. For ancillary treatment such as physiotherapy, the costs per session were calculated according to the official tariff lists. Costs not covered by third party payers were included in the patient costs (Appendix, Supplemental Table 1).

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