

# Cost of Epilepsy in Europe

**Epilepsy Advocacy Europe Workshop on the Cost  
and Prevalence of Epilepsy in Europe**  
**European Parliament, Brussels**  
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Susanne Lund, Eoin Sheanon and Torbjörn Tomson

# Outline

- Estimates of cost of epilepsy in Europe
- Sources of variability of cost estimates
- Cost vs. Outcome/Cost Utility in epilepsy

# Accurate Data on Prevalence and Cost are Important

- For planning of provision of epilepsy care
- For allocation of adequate resources for epilepsy care
- For prioritising among measures to prevent epilepsy
  - To calculate possible returns of investments in prevention

# Estimates of Cost of Epilepsy in Europe

>20 billion EUR/year

15.5 billion EUR/year

13.8 billion EUR/year

## EPILEPSY IN THE WHO EUROPEAN REGION:

### Fostering Epilepsy Care in Europe

*European Journal of Neurology* 2005, **12** (Suppl. 1): 1–27

#### Cost of disorders of the brain in Europe

Patrik Andlin-Sobocki<sup>a</sup>, Bengt Jönsson<sup>b</sup>, Hans-Ulrich Wittchen<sup>c</sup> and Jes Olesen<sup>d</sup>

<sup>a</sup>Stockholm Health Economics, Stockholm, Sweden and Department of Learning, Informatics, Management and Ethics, Karolinska Institutet, Stockholm, Sweden; <sup>b</sup>Center for Health Economics, Stockholm School of Economics, Stockholm, Sweden; <sup>c</sup>Institute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Dresden, Germany; <sup>d</sup>Department of Neurology, Glostrup Hospital, University of Copenhagen, Copenhagen, Denmark

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#### Cost of disorders of the brain in Europe 2010

Anders Gustavsson<sup>a</sup>, Mikael Svensson<sup>b</sup>, Frank Jacobi<sup>c</sup>,  
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# Cost of Epilepsy

Cost/patient **X** Number of patients



# Cost of Brain Disorders

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### Cost per person

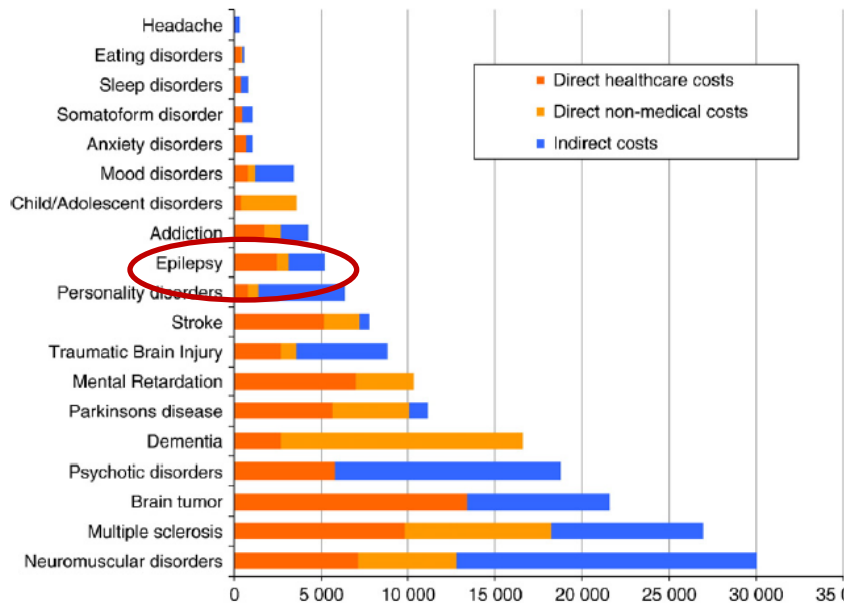


Figure 2 Cost per person by type of cost (€PPP 2010), all disorders.

### Cost by Disorder

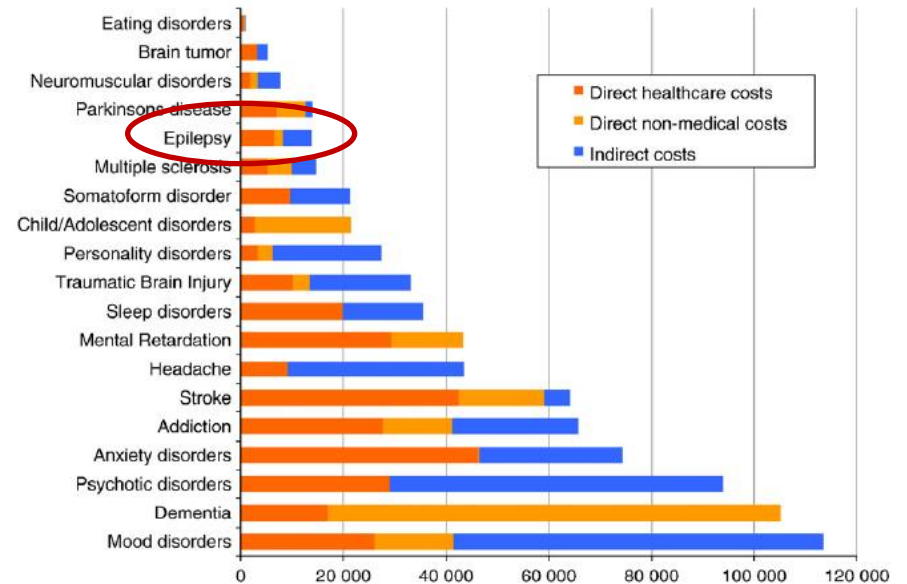


Figure 3 Total cost by disorder and type of cost (€PPP million, 2010), all disorders.

# Cost of Epilepsy

- **Direct health care costs**

All goods and services related to the prevention, diagnosis and treatment of epilepsy

- **Direct non-medical costs**

Other goods and services, e.g. social services, special living, informal care

- **Indirect costs**

Lost production due to work absence or early retirement

# Variability in Cost Estimates

## Direct health care costs

**Table 27** Annual cost per patient with epilepsy (costs are presented in 2009 Euros).

Country	Direct health care costs	Direct non-medical costs	Indirect costs	Total costs	Year	Reference
Switzerland	5186	n.a.	2831	8017	1990	Gessner et al. (1993)
UK	689	1677	5448	7813	1990	Cockerell et al. (1994)
UK	850	n.a.	2691	3541	1991	Swingler et al. (1994)
France, Germany, UK	3104	409	2555	6068	1993	van Hout et al. (1997)
UK	1044	2375	1777	5196	1993	Jacoby et al. (1998)
France	2640	n.a.	n.a.	2640	1998	(De Zélicourt et al., 2000) – 1st year
France	695	n.a.	n.a.	695	1998	(De Zélicourt et al., 2000) – 2nd year
Italy	1579	n.a.	223	1802	1996	Berto et al. (2000)
Italy	2262	n.a.	n.a.	2262	1998	Guerrini et al. (2001)
Italy	1439	n.a.	n.a.	1439	2000	Tetto et al. (2002)
The Netherlands	3448	901	n.a.	4349	1999	Kotsopoulos et al. (2003)
Italy	1562	n.a.	n.a.	1562	2001	Beghi et al. (2004)
Germany	1493	n.a.	7161	11,654	2003	Hamer et al. (2006)
Spain	5506	282	1790	7564	2005	Sancho et al. (2008)

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# Variability in Cost Estimates

## Direct non-medical costs

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# Variability in Cost Estimates

## Indirect costs

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# Variability in Cost Estimates

## Total costs

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# Sources of Variation: Methods

- Age: Prevalence and costs may be age dependent
  - some studies only include a certain age range
- Setting: Clinic-based or population-based?
  - Patients recruited in hospital setting tend to be high-cost cases
- Co-morbidities are common among people with epilepsy and have a major impact on costs.
  - Presence of comorbidity associated with 4-fold increased odds for hospitalization, 136% higher treatment costs (Lee et al., 2005)
  - Should the goal be to capture epilepsy-specific costs or a broader scope of costs including co-morbidities?

# Sources of Variation: Methods

- Length of follow-up
  - Extrapolation from studies with short follow-up will over-estimate the long-term cost of epilepsy.
- Severity and treatment response
  - The cost per patient is strongly associated with seizure frequency and responsiveness to drug treatment
- Cost and prevalence data should be matched, i.e. measured in same/similar populations
  - This has seldom been the case, which may contribute to the uncertainty

# Cost of Intervention vs. Outcome

- **Cost-effectiveness**

Costs are expressed in monetary units and effectiveness is expressed in many possible ways, e.g. as in clinical trials

- **Cost-utility**

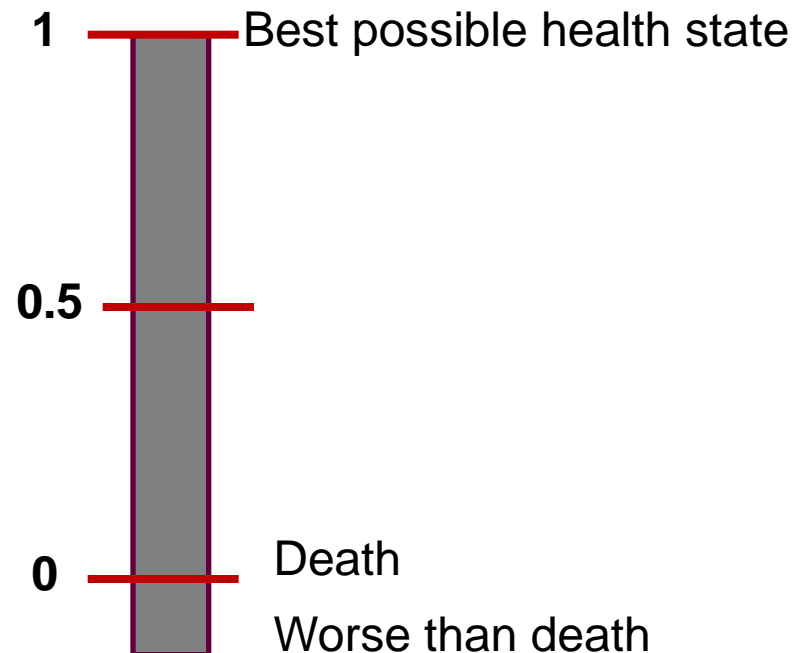
A cost-effectiveness estimate in which effectiveness includes a utility (QoL) measure

- **QALY**

# What is a QALY?

- QALY is a quality-adjusted life-year taking into account both the quantity and quality of life generated by the intervention
- The product of life expectancy and quality of remaining life-years

## Calculating QALYs



# Estimating and Using QALY

- Quality of life can be valued in different ways, often rating scales (health utility scores), e.g. EQ-5D (NICE)
- QALY considered to provide "a common currency" to assess the extent of benefit from different interventions in different conditions
- Cost-utility ratios (Cost/QALY) indicate the additional cost to generate one QALY
  - Comparisons between cost-utility ratios for different interventions used for prioritising
  - Society can set a ceiling, e.g. 25-40000 EUR/QALY



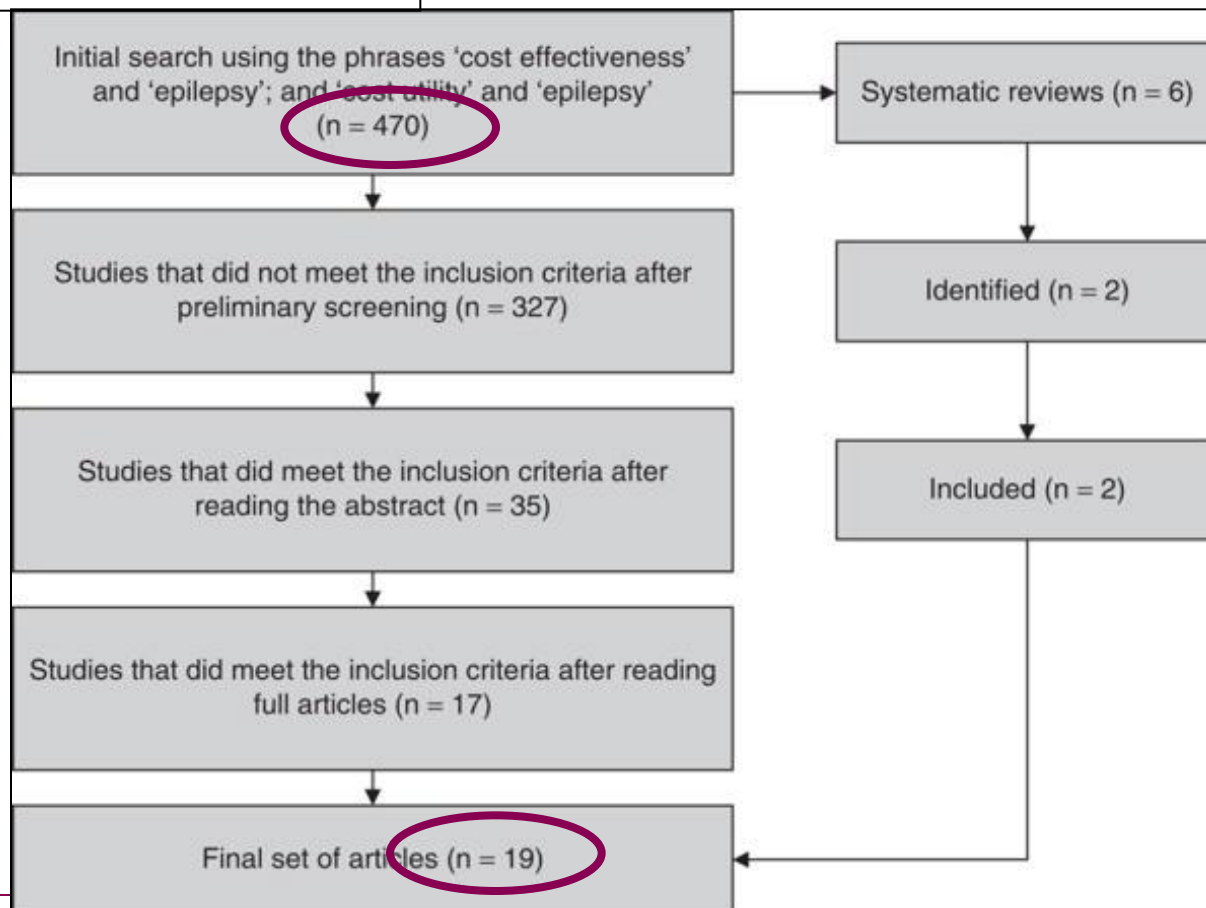
# Newer antiepileptic drugs and QALY

## The Cost Effectiveness of Newer Epilepsy Treatments: A Review of the Literature on Partial-Onset Seizures.

Bolin, Kristian; Forsgren, Lars

Pharmacoeconomics. 30(10):903-923, October 1, 2012.

DOI: 10.2165/11597110-000000000-00000



# The Cost Effectiveness of Newer Epilepsy Treatments: A Review of the Literature on Partial-Onset Seizures

**Bolin, Kristian; Forsgren, Lars**

**Pharmacoeconomics. 30(10):903-923, October 1, 2012.**

- No cost-effectiveness evidence identified for four newer treatments: felbamate, eslicarbazepine-acetate, oxcarbazepine or tiagabine
- Cost/QALY ranged from EUR 14,800 (levetiracetam) to 44,200 (pregabalin)
- Mortality considered in only 2/19 (and indirectly)
- Adverse effects considered in only 10/19

# COST OF EPILEPSY IN EUROPE

- Data on costs of epilepsy limited to a minority of EU countries
- Estimates of cost per patient highly variable
  - Different definitions and methods
  - Different populations
- Data on cost-effectiveness and cost-utility of interventions insufficient
- Data on prevalence rates uncertain
- Need for coordinated pan-European population-based prevalence/cost-studies

# European prevalence and cost-study should...

- Be prospective, population-based, including all ages, and representative distribution of severity and duration of epilepsy
- Be carried out in major countries with missing data as well as in selected countries where data exist
- Include countries representing all regions
- Cover information over a defined period (e.g. 6 months)
  - Number and type of seizures
  - Medical visits, investigations, days in hospital
  - Treatment for epilepsy, and for other conditions
  - Non-medical costs
  - Days of absence, early retirement
- Include a comparison group without epilepsy