The economic burden of epilepsy in Europe

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Burden and Stigma of Epilepsy
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OUTLINE OF PRESENTATION

• Background
• Cost of Epilepsy – Methods
• Estimates of Costs in Europe
  – WHO/ILAE/IBE (2011)
  – European Brain Council (2004)
  – European Brain Council (2010)
• What influences cost estimates?
• Conclusions
BACKGROUND

Relatively recent area of study—1993
- 20th International Epilepsy Congress in Oslo

Four phases of research areas have evolved:
- Cost of epilepsy (direct, indirect, intangible costs)
- Cost benefit (cost effectiveness of alternative treatments)
- Cost effectiveness of structural programmes (e.g. decentralise outpatient clinics?)
- Comparing health care systems (ILAE Commission on Health Care Policy)
COST OF EPILEPSY: METHODS

• ‘Societal perspective’ approach most typical in epilepsy which examines all costs, irrespective of who incurs cost.

• Examine costs in the following areas:
  – Direct healthcare costs (e.g. Diagnosis, treatment)
  – Direct non medical (e.g. Other related goods, accommodations, may include informal care)
  – Indirect costs (value of lost output – employment)
  – Intangible (pain, etc. Valued as DALYS or lost QALYs)
COST OF EPILEPSY: METHODS

• Top down
  – national level costs for disorders are divided up by disorder

• Bottom up
  – Cost data gathered per patient extrapolated to national level using prevalence data
  – Prevalence data typically over 12 month period

Total cost of epilepsy

= cost per patient × number of patients
ESTIMATES OF COSTS IN EUROPE

(1) >20 billion euro/year

(2) 15.5 billion euro/year

(3) 13.8 billion euro/year
(1) WHO/ILAE/IBE (2011)

- Cost over €20 billion per annum
- 6,000,000 people with active epilepsy
- European Region of WHO:
  - 53 countries
  - 850 million people
- Based on prevalence estimate:
  - 8.2 per 1,000
  - From Atlas in Epilepsy (2005)
  - Expert consultation
(2) EUROPEAN BRAIN COUNCIL (2004)

- Cost €15.5 billion per annum
- 2,690,608 people with epilepsy
- Europe defined as:
  - 25 EU Member States + Iceland, Norway, Switzerland
  - 466 million people
- Based on existing epidemiological & economic studies with median prevalence estimate of 5.2/1000
(2) **European Brain Council (2004)**

- Breakdown of €15.5 billion per annum:
  - €8,554 = Indirect costs
  - €4,240 = Direct non-medical costs
  - €2,752 = Direct healthcare costs

- Average cost per person per annum:
  - €5,352 (€1,329 Estonia - €9,260 Switzerland)
(3) **EUROPEAN BRAIN COUNCIL (2010)**

- Cost €13.8 billion per annum \(\downarrow\) (€15.5)
- 2,643,001 people with epilepsy \(\downarrow\) (2.7m)
- Europe defined as:
  - 27 EU Member States + Iceland, Norway, Switzerland \(\uparrow\) (2 MS)
  - 514 million people \(\uparrow\) (from 466m)
- Median prevalence estimate of 5.3/1000 \(\uparrow\) (from 5.2)
Breakdown of €13.8 billion per annum:

- €5,644 = Indirect costs (55%-41%)
- €1,653 = Direct non-medical costs (27%-12%)
- €6,503 = Direct healthcare costs (18%-47%)

Average cost per person per annum:

- €5,221 (€1,291 Bulgaria-€10,246 Germany) (€5,352)
COST PER PERSON ACROSS 30 COUNTRIES IN EUROPE

The economic burden of epilepsy in Europe

- Bulgaria
- Romania
- Latvia
- Lithuania
- Estonia
- Italy
- Slovakia
- Poland
- Hungary
- Czech R
- Slovenia
- Malta
- Portugal
- France
- Cyprus
- Greece
- Finland
- Belgium
- Sweden
- Netherlands
- Denmark
- Ireland
- Austria
- UK
- Switzerland
- Iceland
- Norway
- Spain
- Luxembourg
- Germany

Cost of disorders of the brain in Europe 2010
Anders Gustavsson, Mikael Svensson, Frank Jacobi, Christen Allgulander, Jordi Alonso, Ettore Beghi, Richard Dodel, Mattias Eklman, Carlo Faravelli, Laura Fratiglioni, Brenda Gannon,
Countries included in EBC2010 epilepsy costings studies
## Variation in 2010 Cost Estimates

<table>
<thead>
<tr>
<th>Country</th>
<th>Direct health care costs</th>
<th>Direct non-medical costs</th>
<th>Indirect costs</th>
<th>Total costs</th>
<th>Year</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>5186</td>
<td>n.a.</td>
<td>2831</td>
<td>8017</td>
<td>1990</td>
<td>Gessner et al. (1993)</td>
</tr>
<tr>
<td>UK</td>
<td>689</td>
<td>1677</td>
<td>5448</td>
<td>7813</td>
<td>1990</td>
<td>Cockerell et al. (1994)</td>
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<tr>
<td>UK</td>
<td>850</td>
<td>n.a.</td>
<td>2691</td>
<td>3541</td>
<td>1991</td>
<td>Swingler et al. (1994)</td>
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<tr>
<td>France, Germany, UK</td>
<td>3104</td>
<td>409</td>
<td>2555</td>
<td>6068</td>
<td>1993</td>
<td>van Hout et al. (1997)</td>
</tr>
<tr>
<td>UK</td>
<td>1044</td>
<td>2375</td>
<td>1777</td>
<td>5196</td>
<td>1993</td>
<td>Jacoby et al. (1998)</td>
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<tr>
<td>France</td>
<td>2640</td>
<td>n.a.</td>
<td>n.a.</td>
<td>2640</td>
<td>1998</td>
<td>(De Zélicourt et al., 2000) — 1st year</td>
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<tr>
<td>France</td>
<td>695</td>
<td>n.a.</td>
<td>n.a.</td>
<td>695</td>
<td>1998</td>
<td>(De Zélicourt et al., 2000) — 2nd year</td>
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<tr>
<td>Italy</td>
<td>1579</td>
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<td>223</td>
<td>1802</td>
<td>1996</td>
<td>Berto et al. (2000)</td>
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<td>n.a.</td>
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<td>1998</td>
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<tr>
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<td>1439</td>
<td>n.a.</td>
<td>n.a.</td>
<td>1439</td>
<td>2000</td>
<td>Tetto et al. (2002)</td>
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<tr>
<td>The Netherlands</td>
<td>3448</td>
<td>901</td>
<td>n.a.</td>
<td>4349</td>
<td>1999</td>
<td>Kotsopoulos et al. (2003)</td>
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<tr>
<td>Italy</td>
<td>1562</td>
<td>n.a.</td>
<td>n.a.</td>
<td>1562</td>
<td>2001</td>
<td>Beghi et al. (2004)</td>
</tr>
<tr>
<td>Germany</td>
<td>4493</td>
<td>n.a.</td>
<td>7161</td>
<td>11,654</td>
<td>2003</td>
<td>Hamer et al. (2006)</td>
</tr>
<tr>
<td>Spain</td>
<td>5506</td>
<td>282</td>
<td>1790</td>
<td>7364</td>
<td>2005</td>
<td>Sancho et al. (2008)</td>
</tr>
</tbody>
</table>
**Sources of Variation**

- **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)
**Sources of Variation**

- **Length of follow-up**
  - Extrapolation from studies with short follow-up will over-estimate 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.
CONCLUSIONS

• Variation in extrapolated prevalence (2.6 – 6 million)
• Variation in extrapolated costs (13.8 – >20 billion)
• Large areas of Europe unrepresented in epidemiological and economic estimates
• Greater accuracy in estimates may be obtained if:
  – More country specific data
  – Epidemiological and economic data collected simultaneously
  – Greater understanding of the role of direct, direct non-medical and indirect costs