**Italian cost minimisation analysis: BUCCOLAM® (midazolam oromucosal solution) versus rectal diazepam for prolonged acute convulsive epileptic seizures**

**Background**
- In Italy, the current standard of treatment for prolonged acute convulsive seizures in paediatric patients consists mainly of rectal diazepam (RD), with some use of intravenous treatments (diazepam, midazolam and lorazepam) in a hospital setting.1,2
- In the community, there can be reluctance to administer RD due to dignity and social acceptability issues.3,4 This may result in the inadequate treatment of children experiencing a breakthrough seizure, requiring the use of an ambulance and hospitalisation.1
- **BUCCOLAM®** (midazolam oromucosal solution), which became available in Italy on 01 July 2013, addresses these issues. Use of oromucosal midazolam is generally preferable for carers, who are more likely to treat seizures early when a socially acceptable route is available.1,5
- Use of BUCCOLAM simplifies the administration procedure as it is presented in a convenient oral, until dose, colour-coded, ready-to-use delivery system. BUCCOLAM is approved for the treatment of prolonged acute convulsive seizures in a community setting in children (6 months to <18 years) with a diagnosis of epilepsy and may be administered by parents and other carers.1

**Clinical data confirm that BUCCOLAM is at least as effective as existing treatments.**3,6

**Objectives**
- A decision-tree model was developed to perform cost-minimisation analysis comparing BUCCOLAM and RD for the treatment of prolonged acute convulsive seizures initially occurring in children in the community setting.
- The aim of this model was to establish whether use of BUCCOLAM would affect the cost of treatment.

**Methods**
- The model captures the treatment pathway for children experiencing a prolonged acute convulsive seizure including:
  - Whether treatment is administered in the community,
  - Whether an ambulance is required,
  - Whether the patient is hospitalised.
- Figure 1 shows the decision-tree model constructed for this analysis, which is repeated each time a child experiences a prolonged acute convulsive seizure.

**Results**
- Over 1 year, compared to RD, BUCCOLAM showed a reduction in per patient per year (pp/yr) costs of €1,765.
- The largest saving came from an estimated reduction in inpatient costs of €1,677 pp/yr.
  - Sensitivity analysis showed the largest variation in pp/yr cost reduction for the probability a patient is admitted (€1,091 - €2,523).
  - Using BUCCOLAM reduced the number of ambulance calls by 0.98 (4.79 to 3.81) pp/yr.
- Table 2 shows the full cost breakdown, with costs rounded to the nearest euro.

**Conclusions**
- BUCCOLAM has a more acceptable method of administration,1,4,5 that avoids compromising patients’ dignity and an easier administration route than rectal diazepam.1
- Treatment with BUCCOLAM is expected to increase the number of prolonged acute convulsive seizures resolved in the community - increased carer willingness to treat seizures and fewer failed deliveries.
- Treatment with BUCCOLAM is expected to be cost saving, through a reduction in the need for ambulance calls and hospital stays.

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**Table 1: Key model inputs**

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<th>Category</th>
<th>BUCCOLAM</th>
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<th>Incremental cost</th>
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<tr>
<td>Ambulance calls</td>
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<td>NICU admission costs</td>
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<td>61,767</td>
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<td>Total</td>
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<td>67,607</td>
<td>-1,769</td>
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</table>

**Table 2: Estimated per patient costs over 1 year by treatment strategy**

- The number of patients treated with BUCCOLAM in Year 1 is estimated to be between 13,000 and 27,000 patients; based upon a prevalence of 54,000 - 108,000 children experiencing recurrent seizures (0.5 – 1.0% of the total number of paediatric subjects in Italy).
- The predicted budget impact over 5 years gave a saving of €115 million. Additional scenario analyses were undertaken with the following results for the 5-year budget impact:
  - Low-high case population scenario gave savings of €76/153, respectively.
  - Assuming 15% of carers attempt to administer a second dose of RD after treatment failure gave a saving of €119 million.
  - Assuming an alternative average of 3.78 seizures per year (estimated by Italian clinicians)6 led to a saving of €63 million.

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**References**