March 2006

Report on New Patented Drugs - Keppra

Under its transparency initiative, the PMPRB publishes the results of the reviews of new patented drugs by Board Staff, for purposes of applying the PMPRB's Excessive Price Guidelines (Guidelines), for all new active substances introduced after January 1, 2002.

Brand Name:	Keppra					
Generic Name:	(levetiracetam)	(levetiracetam)				
DIN:	2247027 2247028 2247029	Tablet Tablet Tablet	250 mg 500 mg 750 mg			
Patentee:	Lundbeck Canada Inc.					

Indication - as per product monograph:

As adjunctive therapy in the management of patients with epilepsy who are not satisfactorily controlled by conventional therapy.

Date of Issuance of First Paten to the Medicine:	n t(s) Pertaining April 12, 1988
Notice of Compliance:	March 6, 2003
Date of First Sale:	July 18, 2003
ATC Class:	N03AX14 Nervous Systems, Antiepileptics, Antiepileptics, Other antiepileptics

APPLICATION OF THE GUIDELINES

Summary

The introductory price of Keppra was found to be within the Guidelines because the cost of therapy did not exceed the cost of therapy of existing drugs in the therapeutic class comparison and did not exceed the range of prices in other comparator countries where Keppra was sold.

Scientific Review

Keppra is a new active substance and the Human Drug Advisory Panel (HDAP) reviewed it as a category 3 new medicine (provides moderate, little or no therapeutic advantage over comparable medicines).

The Therapeutic Class Comparison (TCC) test of the Guidelines provides that the price of a category 3 new drug product cannot exceed the prices of other drugs that treat the same disease or condition. Comparators are generally selected from among existing drug products in the same 4th level of the Anatomical Therapeutic Chemical (ATC) System that are clinically equivalent in addressing the approved indication. See the PMPRB's *Compendium of Guidelines, Policies and Procedures* for a more complete description of the Guidelines and the policies on TCCs.

The HDAP recommended Lamictal (*lamotrigine*), Topamax (*topiramate*) and Neurontin (*gabapentin*) as the appropriate comparators for purposes of a TCC test. These 4th level ATC comparators share the same indication as Keppra.

The Guidelines provide that the dosage recommended for comparison purposes will normally not be higher than the maximum of the usual recommended dosage. The recommended comparable dosage regimens for Keppra and the comparators are based on respective product monographs and supported by clinical literature.

Due to difficulties in establishing comparative doses for the 250 mg and 500 mg strength tablets, the HDAP recommended that these two strengths be compared on a milligram per milligram basis to Keppra 750 mg tablet.

Price Review

Under the Guidelines, the introductory price for a new category 3 drug product will be presumed to be excessive if it exceeds the prices of all of the comparable drug products based on the TCC test, and if it exceeds the prices of the same medicine in the seven countries listed in the *Patented Medicines Regulations*.

Name	Strength	Dosage Regimen	Unit Price	Cost per Day
Keppra	750 mg tablet	2 tablets	2.5900 ¹	5.1800
Lamictal	150 mg tablet + 100 mg tablet	2 tablets + 2 tablets	1.9890 ² + <u>1.3260²</u> 3.3150	3.9780 + <u>2.6520</u> 6.6300
Neurontin	400 mg capsule + 800 mg tablet	3 capsules + 3 tablets	1.1595 ² + <u>2.3190²</u> 3.4785	3.4785 + <u>6.9570</u> 10.4355
Topamax	200 mg tablet	2 tablets	3.1500 ²	6.3000

Source: PPS Pharma Publication, January 2004

²Liste de m édicaments du Québec, October 2003

A Reasonable Relationship test was conducted for Keppra 250 mg tablet and 500 mg tablet. The prices of Keppra 250 mg tablet (\$1.4900) and 500 mg tablet (\$1.8200) were within the Guidelines. These prices appear in the PPS Pharma Publication, January 2004.

In 2003, Keppra 250 mg tablet was sold in France, Germany, Sweden, Switzerland, the United Kingdom and the United States (Canadian price was second highest, above the median); Keppra 500 mg tablet was sold in France, Germany, Italy, Sweden, Switzerland, the United Kingdom and the United States (Canadian price was sixth lowest, below the median); and Keppra 750 mg tablet was only sold in the United States. In compliance with the Guidelines, the prices in Canada did not exceed the range of prices in those countries.

Where comparators and dosage regimens are referred to in the Summary Reports, they have been selected by the PMPRB Staff and the HDAP for the purpose of carrying out the PMPRB's regulatory mandate, which is to review the prices of patented medicines sold in Canada to ensure that such prices are not excessive. The publication of these reports is also part of the PMPRB's commitment to make its price review process more transparent.

The information contained in the PMPRB's Summary Reports should not be relied upon for any purpose other than its stated purpose and is not to be interpreted as an endorsement, recommendation or approval of any drug nor is it intended to be relied upon as a substitute for seeking appropriate advice from a qualified health care practitioner.

References - Keppra

- 1. Bazil CW, Rose A, Resor S, Yaspicular B, Hirsch LJ. Levetiracetam may be ore effective for late-onset partial epilepsy. Arch Neurol 2002;59:1905-8.
- Ben-Menachem E, Edrich P, Van Vleymen B, Sander JWAS, Schmidt B. Evidence for sustained efficacy of levetiracetam as add-on epilepsy therapy. Epil Res 2003;53:57-64.
- 3. Ben-Menachem E, Falter U, et al. Efficacy and tolerability of levetiracetam 3000 mg/d in patients with refractory partial seizures: A multicenter, double-blind, responder-selected study evaluating monotherapy. Epilepsia 2000;41(1):1276-83.
- 4. Ben-Menachem E, Gilland E. Efficacy and tolerability of levetiracetam during a 1year follow-up in patients with refractory epilepsy. Seizure 2003;12(3):131-5.
- 5. Betts T, Waegmans T, Crawford P. A multicentre, double-blind, randomized, parallel group study to evaluate the tolerability and efficacy of two oral doses of levetiracetam, 2000 mg daily and 4000 mg daily, without titration in patients with refractory epilepsy. Seizure 2000;9:80-7.
- 6. Betts T, Yarrow H, Greenhill L, Barrett M. Clinical experience of marketed levetiracetam in an epilepsy clinic a one year follow-up study. Seizure 2003;12(3):136-40.
- 7. Blume WT. Diagnosis and management of epilepsy. Can Med Assoc J 2003;168(4):441-8.
- 8. Boon P, Chauvel P, Pohlmann-Eden B, et al. Dose-response effect of levetiracetam 1000 and 2000 mg/day in partial epilepsy. Epil Res 2002;48:77-89.

- 9. Browne TR, Holmes GL. Epilepsy. N Engl J Med 2001;344(15):1145-51.
- Centre for Reviews & Dissemination/Centre for Health Economics. A rapid and systematic review of the clinical effectiveness, tolerability and cost effectiveness of newer drugs for epilepsy in adults (Commercial-in-confidence [CIC]data removed).
 Feb 2003. Available from: <u>http://www.nice.org.uk/pdf/HTA_Epilepsy_in_adults.pdf</u> (accessed 2 October 2003).
- 11. Cereghino JJ, Biton V, Abou-Khalil B, et al. Levetiracetam for partial seizures: Results of a double-blind, randomized clinical trial. Neurology 2000;55:236-42.
- 12. Chaisewikul R, Privitera MD, Hutton JL, Marson AG. Levetiracetam add-on for drugresistant localization related (partial) epilepsy (Cochrane Review). In: The Cochrane Library, Issue 3e, 2003. Oxford: Update Software.
- 13. Chang BS, Lowenstein DH. Epilepsy. N Engl J Med 2003;349:1257-66.
- 14. Cramer JA, Arrigo C, Van Hamm Je G, Bromfeld EB. Comparison between the QOLIE-31 and derived QOLIE-10 in a clinical trial of levetiracetam. Epil Res 2000;41:29-38.
- 15. Cramer JA, Arrigo C, Van HammJe G, et al. Effect of levetiracetam on epilepsyrelated quality of life. Epilepsia 2000;41(7):868-74.
- 16. Cramer JA, Van HammJe G, et al. Maintenance of improvement in health-related quality of life during long-term treatment with levetiracetam. Epil Behav 2003;4:118-23.
- 17. Deckers CLP, Knoester PD, de Haan GJ, et al. Selection criterial for the Clinical Use of the Newer Antiepileptic drugs. CNS Drugs 2003;17(6);405-21.
- 18. Epilepsy Canada Website Epilepsy Facts. Address: http://www.epilepsy.ca/eng/mainSet.html (Accessed 19 Sept 2003).
- 19. French J, Edrich P, Cramer JA. A systematic review of the safety profile of levetiracetam: a new antiepileptic drug. Epil Res 2001;47:77-90.
- 20. Grant R, Shorvon SD. Efficacy and tolerability of 1000-4000 mg per day of levetiracetam as add-on therapy in patients with refractory epilepsy. Epil Res 2000;42(2-3):89-95.
- 21. Hovinga CA. Levetiracetam: A novel antiepileptic drug. Pharmacotherapy 2001;21(11):1375-88.

- 22. Krogh CME, ed. Compendium of Pharmaceuticals and Specialties. 20th ed. Canadian Pharmaceutical Association. Ottawa, On. 1985.
- 23. Morrell MJ, Leppik I, French J, et al. The KEEPER trial: levetiracetam adjunctive treatment of partial-onset seizures in an open-label community-based study. Epil Res 2003;54:153-61.
- 24. Motamedi M, Nguyen DK, Zaatreh M, et al. Levetiracetam efficacy in refractory partial-onset seizures, especially after failed epilepsy surgery. Epilepsia 2003;44(2):211-4.
- 25. National Institute for Clinical Excellence. Clinical Guidelines. Clinical Guidelines. Epilepsy in adults – Newer Drugs. Available from: <u>www.nice.org.uk/cat.asp?c=26698</u> (accessed 18 September 2003).
- 26. National Institute for Clinical Excellence. Clinical Guidelines. Epilepsy: The diagnosis and management of epilepsy in children and adults. Available from: www.nice.org.uk/cat.asp?c=20119 (accessed 18 Sept 2003).
- 27. Perucca E. Current treands in antiepileptic drug therapy. Epilepsia 2003; 44 (Suppl. 4):41-7.
- 28. Product Monograph, Keppra, dated January 16, 2003
- 29. Repchinsky C. Compendium of Pharmaceuticals and Specialties. Canadian Pharmacists Association. Ottawa, On. 2003.
- 30. Sadler RM. Seizures and Epilepsy. In: Gray J, ed. Therapeutic Choices. 4th ed. Canadian Pharmacists Association. Ottawa, On. P. 170-81.
- 31. Shorvon SD, L` wenthal A, Janz D, et al. Multicentre double-blind, randomized, placebo-controlled trail of levetiracetam as add-on therapy in patients with refractory seizures. Epilepsia 2000;41(9):1179-86.
- 32. Wallace SJ. Newer antiepileptic drugs: advantages and disadvantages. Brain Develop 2001;23:277-83.
- 33. Welty TE, Gidal BE, Ficker DM, Privitera MD. Levetiracetam: A different approach to the pharmacotherapy of epilepsy. Ann Pharmacother 2002;36:296-304.