A STATISTICAL METHOD FOR ESTIMATING UNDER-REPORTED INCIDENCE RATES WITH APPLICATION TO CHILD DIARRHEA IN THAI PROVINCES BORDERING CAMBODIA

Sulawan Yotthanoo[1] and Chamnein Choonpradub[2]

[1]Department of Statistics, School of Science and Technology, Naresuan University, Phayao; [2]Department of Mathematics and Computer Science, Faculty of Science and Technology, Prince of Songkla University, Pattani Campus, Pattani, Thailand

Abstract. Diarrhea is a major health problem in Thailand, but reported data of disease incidence are known or suspected to be under-reported. This study aimed to develop a statistical model for estimating the annual incidence of hospital diarrhea cases among children under five years. Data regarding diarrhea patients 0-4 years old were collected for the National Notifiable Disease Surveillance (Report 506) about Thai provinces bordering Cambodia during 1999-2004 by the Ministry of Public Health. A log-linear regression model based on the prevailing seasonal-trend pattern was used for diarrhea incidence as a function of quarter, year and district, after imputing rates where under-reporting was evident, using populations obtained from the 2000 population census. The model also takes any spatial correlation between districts into account, using the generalized estimating equation (GEE) method. Diarrhea incidence had seasonal peaks in the first quarter (January to March) and the trend steadily increased from 1999 to 2004. Results from such studies can help health authorities develop prevention policies.

Key words: child diarrhea, statistical model, BEE method, linear regression

Correspondence: Chamnein Choonpradub, Department of Mathematics and Computer Science, Faculty of Science and Technology, Prince of Songkla University, Pattani Campus, Pattani 94000, Thailand.
Tel: 66 (0) 89 4660 803; Fax: 66 (0) 7331 2729
E-mail: cchamnein@bunga.pn.psu.ac.th