Development of a Software Module for Forecasting Malaria Outbreak based on an Equation Derived from Real-Time Parameters

Abstract

Malaria in India is one of the major public health problems. It is governed by many socio-ecological factors that exist in the system around. Hence forecasting the disease situation in a particular area necessitates observance of these micro factors. These factors upon identification and translation into a mathematical model can help understand and predict
malaria situations at primary level. Attempts had been made in the past ever since its vector
discovery by Sir Ronald Ross in 1897. As yet many of the models have faced difficulties in
standardization of the variables inputed. We have made an attempt here to develop a model
based on the results of our own earlier research from a real time situation of malaria in the
desert area of Rajasthan, India. An equation of inter-relationship among five existing malaria
components has been derived as an outbreak forecasting mathematical model. The equation
has been converted into software. The software developed was tested for its predictive strength
for simulated conditions of parameters as well as for real situation of five parameters. The
software found to work efficiently and predicted the correct malaria situation.

References

- http://apps.who.int/tdr/svc/diseases/malaria (as accessed on 28.10.2011)
- Joshi, V., Sharma, R.C., Sharma, Y., Adha, S. and Singhi, M. 2006. Introduction,
transmission and aggravation of Malaria in desert districts of Rajasthan, India, J.Vect. Borne.
Dis., 2006, 43; 179-185.
- Kondrashin, A.V. and Kalra, N.L., Malaria as anthropo-ecosystem. Part III: Diversity of
- Garrett-Jones, C., The human blood index of malaria vectors in relation to
- Gill, C.A., The prediction of malaria epidemics with special reference to an actual forecast
156-164.
- Joshi, V., Sharma, R.C., Singh, M., Singh, H. and Sharma, K., Entomological studies on
malaria in irrigated and non irrigated Areas of Thar Desert, Rajasthan, Ind. J. Vec. Bor. Dis.,
information system. In: GIS for health and the environment, Proc. Int. wor. Sri Lanka, IRDC,
Ottawa, Canada, 1994; 35-42.
- Filipe, J.A.N., Riley, E.M., Drakeley, C.J., Sutherland, C.J., and Ghani A.C.,
Determination of the processes driving the acquisition of immunity to malaria using a
- Gaudart, J., Toure, O., Dessay, N., Dicko, A.L., Ranque, S., Forest, L., Demongeot, J.
and Doumbo, O.K., Modelling Malaria incidence with environmental dependency in a locality of
- Smith, T., Killeen, G.F., Maire, N., Ross, A., Molineaux, L., Tediosi, F., Hutton, G.,
Ulzinger, F., Dietz, K. and Tanner, M., Mathematical modeling of the impact of malaria vaccines
on the clinical epidemiology and natural history of Plasmodium falciparum malaria: overview,
- Sharma, G.K., Review of malaria and its control in India, Proc. Indo-UK work. Mal., ICMR,
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